PLANAR

Installation Guide

Clarity Matrix G3 LCD Video Wall System

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ADA Compliance Statement

Some Clarity Matrix G3 models are compliant with the Americans with Disabilities Act Section 4

Manual Part Number: 020-1339-00H

Contents

Introduction

The Clarity® Matrix® G3 LCD Video Wall System uses cutting edge technology to provide a video wall solution using commercial-grade 46" and 55" full high definition (FHD) and 65" ultra high definition (UHD) LCDs in a tiled application. The Clarity Matrix G3 utilizes cutting edge extreme-narrow bezel LCD with a combined bezel width as small as 0.9mm. The product can support multiple 4K (3840 x 2160) 60Hz sources and scale them to beyond 298MP. The sources can be displayed across discrete panel boundaries, resulting in a highly configurable compact system. All products come in a standard aspect ratio of 1.77 (16:9). The Clarity Matrix G3 can be installed with the minimum install depth of 3.6 inches (91mm).

The Clarity Matrix G3 utilizes the Planar® EasyAxis™ mounting system to support landscape and portrait orientation, free-standing wall deployment and flying wall applications. Because the panels are self-supporting, Clarity Matrix G3 can support unlimited stacking height.

The Planar® WallDirector™ software provides an easy and intuitive method for setup and management of sources and content display on the Clarity Matrix G3 LCD Video Wall System. Through the use of a web browser-enabled device, a user can in real-time assign, position and resize multiple sources to the display area. WallDirector also provides a central status monitoring hub where video wall health can be monitored. Additionally, a mobile device interface allows for simple control of the most common features.

Caution: This manual is intended for use by qualified service persons and end users with experience installing LCD displays.

Safety Information

The Clarity Matrix G3 LCD Video Wall System was designed with safety in mind. By not heeding the safety warnings and cautions, injury may occur. There are safety warnings on stickers in various places in and on the display.

Important Safety Instructions

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use any of the Clarity Matrix G3 LCD Video Wall System products near water.
6. Clean the LCD screens with an LCD screen cleaner or LCD wipes.
7. Do not install near any heat sources such as radiators, heat registers, stoves or other apparatus (including amplifiers) that produce heat.
8. Do not defeat the safety purpose of the polarized or grounding type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. For safety purposes, the wide blade or the third prong is provided. When the provided plug does not fit into an outlet, consult an electrician for the replacement of the obsolete outlet.
9. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles and the point where they exit from any of the Clarity Matrix G3 LCD Video Wall System products.
10. Only use the attachments/accessories specified by the manufacturer.
11. Unplug all Clarity Matrix G3 LCD Video Wall System products during lightning storms or when unused for long periods of time.
12. In instances where a power surge has occurred and a display no longer has an image, the display power will need to be reset.
13. All National Electrical Code regulations must be followed. In addition, be aware of local codes and ordinances when installing the system.

14 Refer all servicing to qualified service personnel. Servicing is required when any of the Clarity Matrix G3 LCD Video Wall System products have been damaged in any way, such as the AC power cord or plug is damaged, liquid has been spilled or objects have fallen into a product, the products have been exposed to rain or moisture, do not operate normally or have been dropped.

15 Keep the packing material in case the equipment should ever need to be shipped.

16 Wall mounts must be secure. The wall must be strong enough to hold all Clarity Matrix G3 LCD modules, brackets and cables. (See "Clarity Matrix LCD Display Specifications for LX46X, MX46X, LX46U, MX46U, LX46U-3D" on page 149 and "Clarity Matrix LCD Display Specifications for LX55U, MX55U, LX55X, MX55X, MX55X2, LX55X2, LX55M, MX55M" on page 150.) Seismic engineers should be consulted in areas prone to earthquakes.

17 Slight pressure on the LCD will cause distortion of the image. Heavier pressure will cause permanent damage. Clarity Matrix G3 LCD Video Walls should be mounted where viewers cannot touch the screen or insert small objects in the openings that will create hazards by contacting bare conductive parts.

18 The polarizer is a thin sheet of film laminated to the outside layer of glass on the LCD screen. Take care when handling items near the screen.

Caution: The front polarizer is soft and subject to scratches from sharp objects.

19 The panels are meant to be installed electrically isolated from ground. Grounding to the building may cause issues with performance.

20 The power supply has multiple AC inputs. Disconnection of one does not de-energize the system. Remove all connected AC sources prior to servicing.

Caution: This product contains a type CR 1220 lithium battery. There is a risk of explosion if the battery is replaced by an incorrect type. Do not ingest—there is a chemical burn hazard. Dispose of the battery according to the instructions on the next page.

Important Waste Disposal Information

Please recycle or dispose of all electronic waste in accordance with local, state, and federal laws. Additional resources can be found online at http://www.planar.com/about/green/.

The crossed-out wheelie bin symbol is to notify consumers in areas subject to Waste Electrical and Electronic Equipment (WEEE) Directive 2012/19/EU that the product was placed on the market after August 13, 2005 and must not be disposed of with other waste. Separate collection and recycling of electronic waste at the time of disposal ensures that it is recycled in a manner that minimizes impacts to human health and the environment. For more information about the proper disposal of electronic waste, please contact the local authority, the household waste disposal service, or the seller from which the product was purchased.

Recommended Usage

In order to get the most out of the LCD modules, use the following recommended guidelines to optimize the display.

Burn-In Versus Temporary Image Retention

Burn-in causes the screen to retain an image essentially forever, with little or no way to correct the problem. Under normal use, an LCD module will not experience burn-in, nor will it retain images in any way.

Normal use of an LCD module is defined as displaying continuously changing video patterns or images. However, LCD modules can experience *temporary* image retention when recommended usage guidelines are not followed.

What is Temporary Image Retention?

Temporary Image Retention (TIR) can occur when a static image is displayed continuously for extended periods of time. An electrical charge differential may build up between the electrodes of the liquid crystal, which causes a negative-color video image (color-inverted and brightness-inverted version of the previous image) to be retained when a new image is displayed. This behavior is true for any LCD device from any manufacturer.

TIR is not covered under warranty. See standard warranty terms and conditions for details. Here are some guidelines to help avoid TIR:

- Use the LCD module to show a screen saver, moving images or still pictures that change regularly. When using high-contrast images, reposition the images frequently.
- Turn off the LCD module when it is not in use. There are a few ways to do this automatically:
  - To use the source computer's Power Options Properties, set up the computer to turn off the display when not in use.
  - To use RS232 commands, see the *RPS and Video Controller RS232 User Guide*.
  - To use the power on/off scheduling feature within the system software.

Note: For optimal performance, we suggest turning off the power to the Clarity Matrix G3 LCD panels for four hours per day.

Normal Use Thermal Guidelines

Normal use of the LCD display, video controller and power supply module are defined as **operating in the open air** to prevent heat buildup, and without direct or indirect heat sources such as lighting fixtures, heating ducts, or direct sunlight that can cause the modules to experience high operating temperatures. For all modules, do not block fans or ventilation openings. If the LCD display will be installed in a recessed area with an LCD surround or enclosed system, ensure adequate openings are applied for proper air flow and ventilation.

At 2000 meters or below, the maximum ambient operating temperature for the LCD display may not exceed 35° C/95° F (95° F) nor be below the minimum ambient operating temperature of 5° C/41° F (41° F) (as measured at the surface of the screen). For the video controller and power supply module, the maximum ambient operating temperature may not exceed 40° C (104° F) nor be below the minimum ambient operating temperature of -10° C/14° F (14° F). If one of these conditions is exceeded, it is up to the installer to ensure that module placement is changed, thermal shielding is provided, and/or additional ventilation is provided to keep the system within its nominal operating parameters. (See "Environmental Specifications" on page 155.)

Cooling Requirements

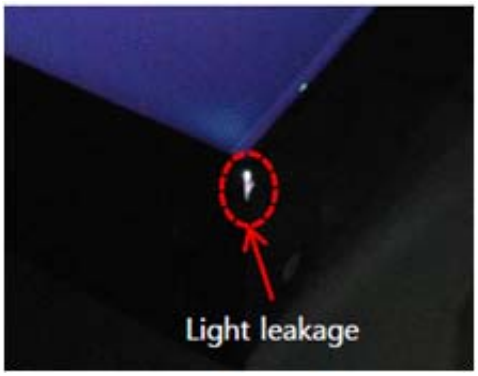
For optimal performance, active cooling by the installer should be planned for when the ambient temperature of the wall is predicted to be above the specified ambient temperature for the panel. Cooling may be done behind the displays and depending on the wall configuration, it may be helpful to place air ducts (AC) at every third display tall.

Safe Handling

WARNING! There are special ways to handle the Matrix displays. *Safe handling*, in this instance, means **not damaging the displays**. See below.

Improper handling of the displays can cause problems like these:

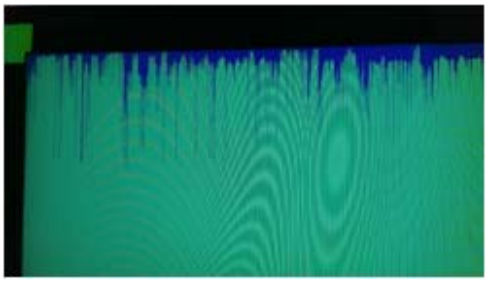
Line/Column defect



Light leakage caused by damaged corner tape

Light leakage caused by bent chassis

Mullion peeling away from bezel (ERO units only)



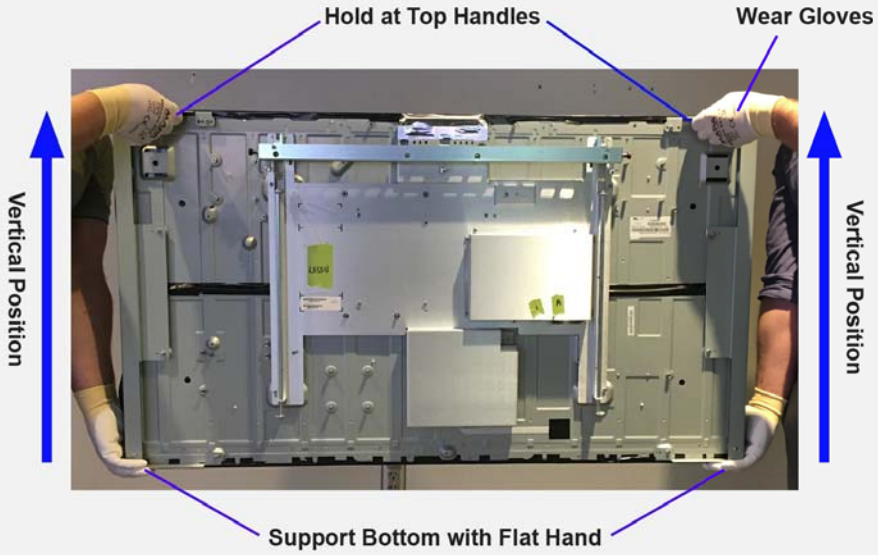
Screen bleeding caused by chipped LCD

Silicone pulling out of seams (ERO units only)

LCD PANEL HANDLING GUIDELINES

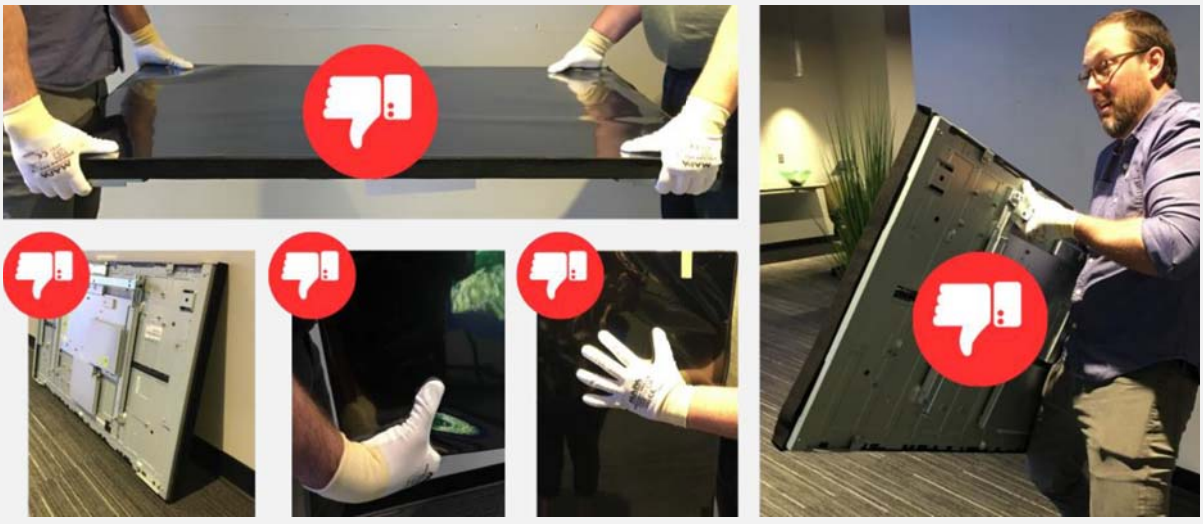
ACCEPTABLE

- ☑ **ALWAYS** use two people to lift LCD panels and wear gloves.
- ☑ **ALWAYS** keep the LCD panel in vertical position.
- ☑ **ALWAYS** use the rear handles to carry.



NOT ACCEPTABLE

- ☒ **DO NOT** grip bottom of LCD panel.
- ☒ **DO NOT** carry LCD panel in horizontal position.
- ☒ **DO NOT** touch the front of the LCD panels AT ANY POINT.
- ☒ **DO NOT** place LCD panel on ground or lean against surfaces.
- ☒ **DO NOT** place LCD panel in horizontal position on any surface (including tables).
- ☒ **DO NOT** place or lean any object against the LCD panel.

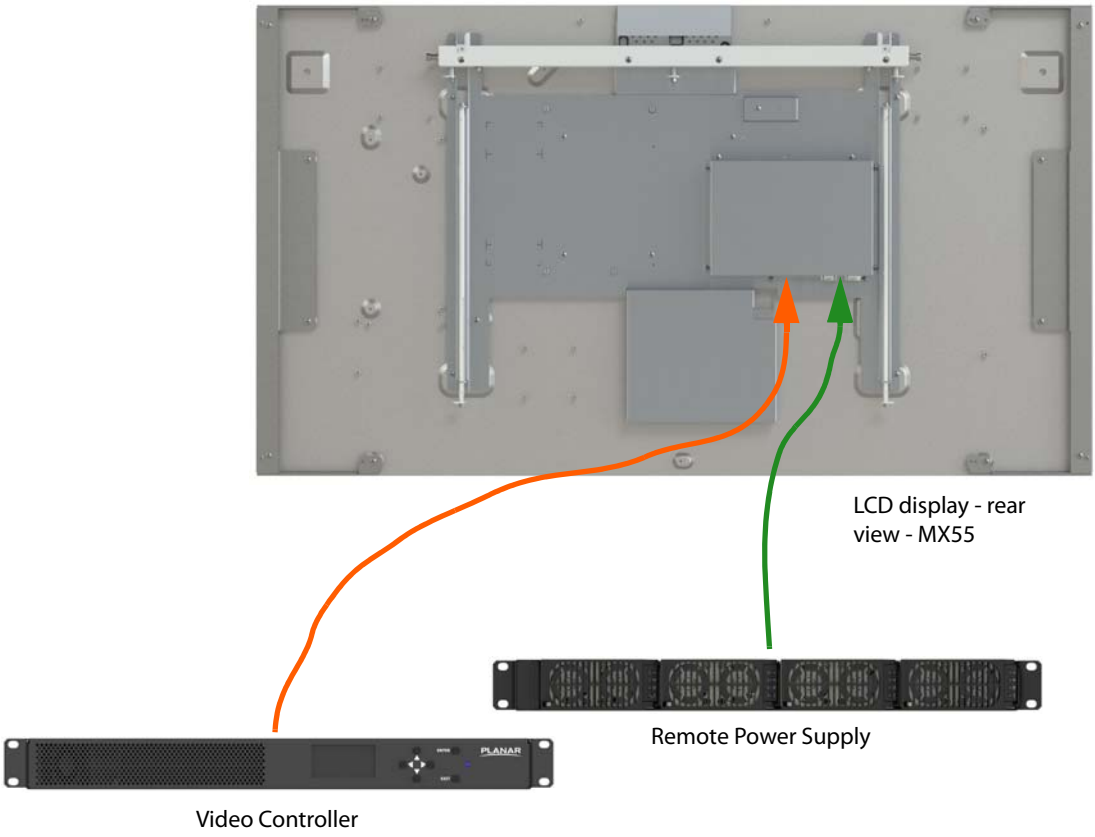


System Architecture

Clarity Matrix G3 LCD Video Wall System has four main electronic components:

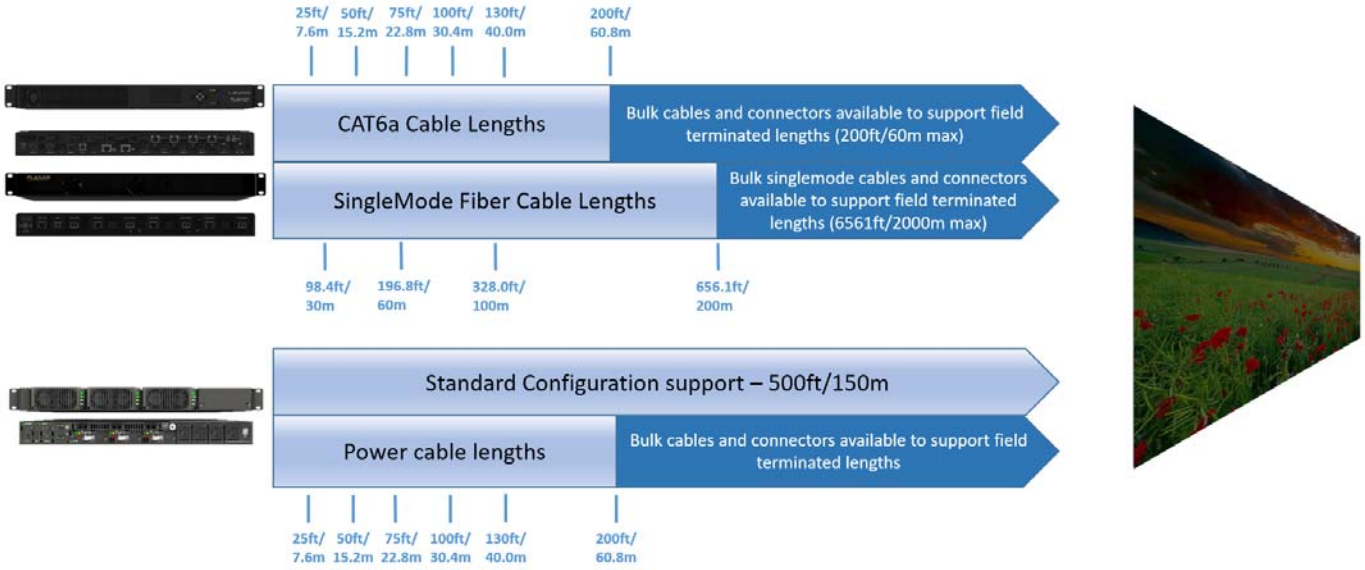
- Planar EasyAxis Mount System (EMS)
- LCD Display (LCD)
- Planar Remote Power Supply (RPS)
- Planar Video Controller (VC)

The LCD display has an interface board, which connects to a remote power supply and a video controller. Additionally, the video control can connect to the power supply module to ensure a complete feedback system with one control point of operation. Using remote power and controller modules produces less heat at the display and allows for reduced and easier service of the LCD display.



Some basic points to keep in mind:

- Video controllers can support up to nine panels depending on the configuration.
- Each remote power supply is capable of powering up to 48 LCDs depending on the configuration.
- Remote power supplies and video controllers are linked together by a LAN connection providing a system network.
- The first module in the LAN chain is the system master.
- The master component is the control point for all electronic commands and status for the system, and may be the RPS (preferred) or VC.
- The master may be controlled via a Web browser over a wide area network configuration, or via UDP, RS232 or USB connections.
- The total number of remote power supplies is dependent on the different models and cable length between the remote power supplies and the LCD displays.
- The total number of panels supported for any independent system is 72 FHD panels. Video walls consisting of more than these limits should be divided into multiple systems with each having its own master component.



Planar recommends these cable types:

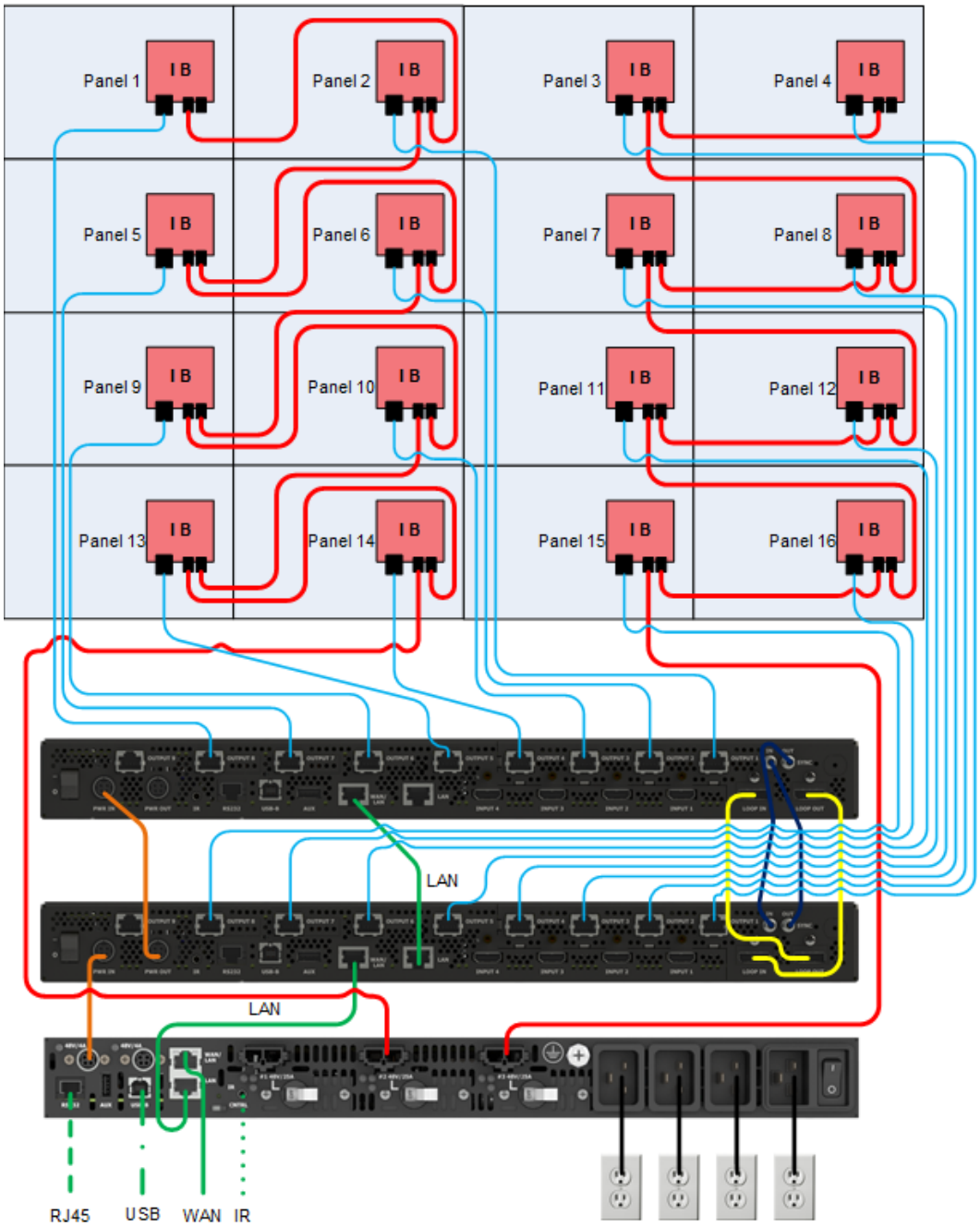
- 22-24AWG STP Cat 6A certified cables for remote data connection to the LCD displays up to 60m (200ft) for 1920x1080 resolution products and 40m (130ft) for 3840x2160 resolution products.
- Duplex single mode 9/125um (OS1/OS2) fiber certified cables for remote data connection to the LCD displays up to 2000m (6561ft).
- 2-conductor 10AWG wire with a measured maximum resistance of 1.07ohms/1000feet for power connections to the LCD displays up to 60m (200ft). Contact Planar for suggestions regarding applications beyond 60m (200ft).

Note: When not using Planar supplied CAT cable and terminations, be sure to use shielded connectors and properly terminate on both ends.

Note: Use of jumpers between cables is highly discouraged as this will degrade the signal between equipment, resulting in poor performance or failure over otherwise acceptable distances between equipment.

Note: For longer fiber lengths up to 10km, the installer must supply SFP+ 10G single-mode transceivers (in place of the Planar supplied 2km single mode transceivers) with compatible OS1/OS2 duplex single-mode cables.

The following example shows the connections for a basic Clarity Matrix G3 LCD video wall.

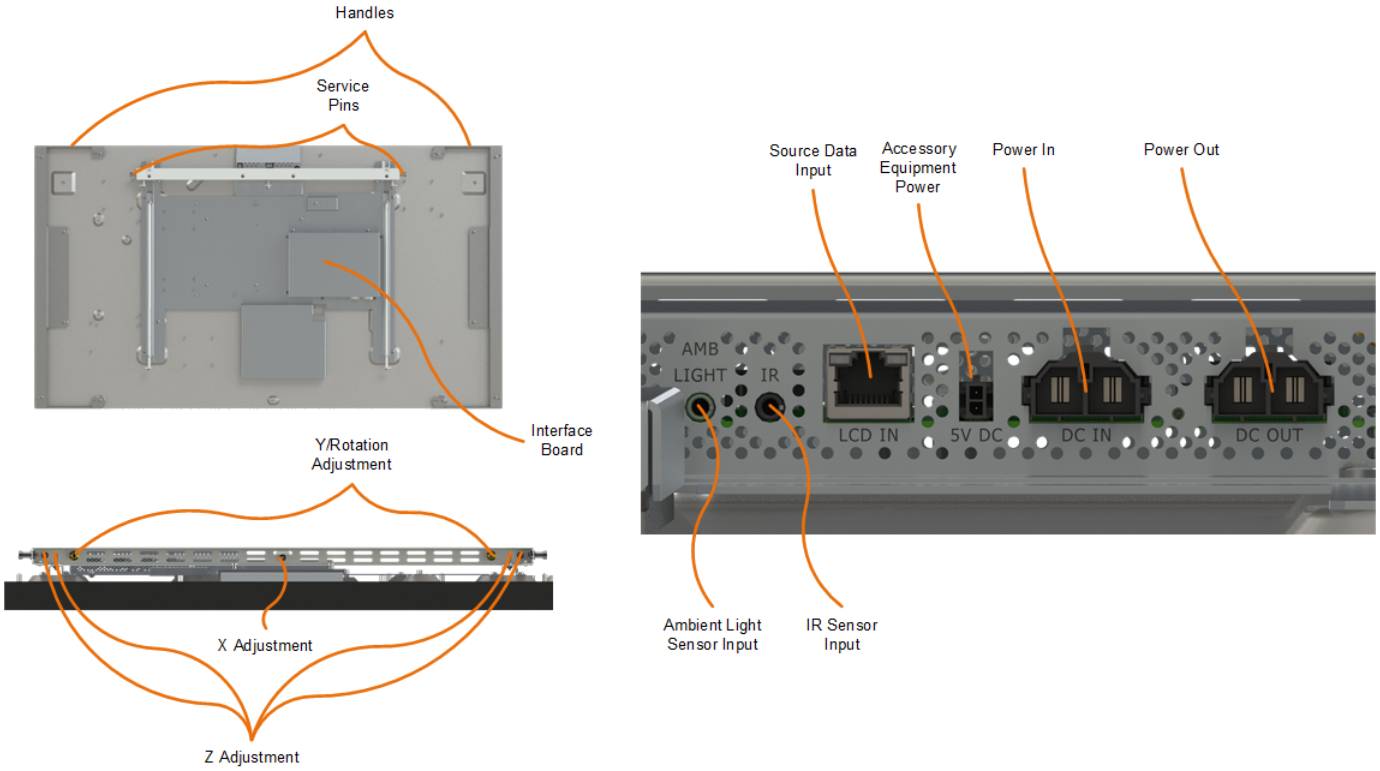


The Clarity Matrix G3 can be ordered as either landscape or portrait. For customers wanting to use a third-party VESA mount, Clarity Matrix G3 models can be configured without the Planar EasyAxis mount and includes a VESA standard hole pattern.

The Clarity Matrix G3 LCD Video Wall System consists of several different components. These are described in more detail on the following pages.

LCD Displays

The Clarity Matrix G3 LCD display is composed of an LCD without a cosmetic enclosure but with a mechanical subframe for mounting. It incorporates a simple electronic interface board designed to distribute power, video and control signals to the LCD, keeping depth, weight, heat and points of potential failure to a minimum. Most LCD modules are available with Planar® ERO™ protective glass for added protection in public spaces or for use as an interactive touch surface. The LCD blade-style display incorporates a bracket that is perfectly paired with the Planar EasyAxis mount. The LCD includes Planar EasyAxis adjustment cams that facilitate precise six-axis alignment ensuring uniform, minimized image-to-image gap.



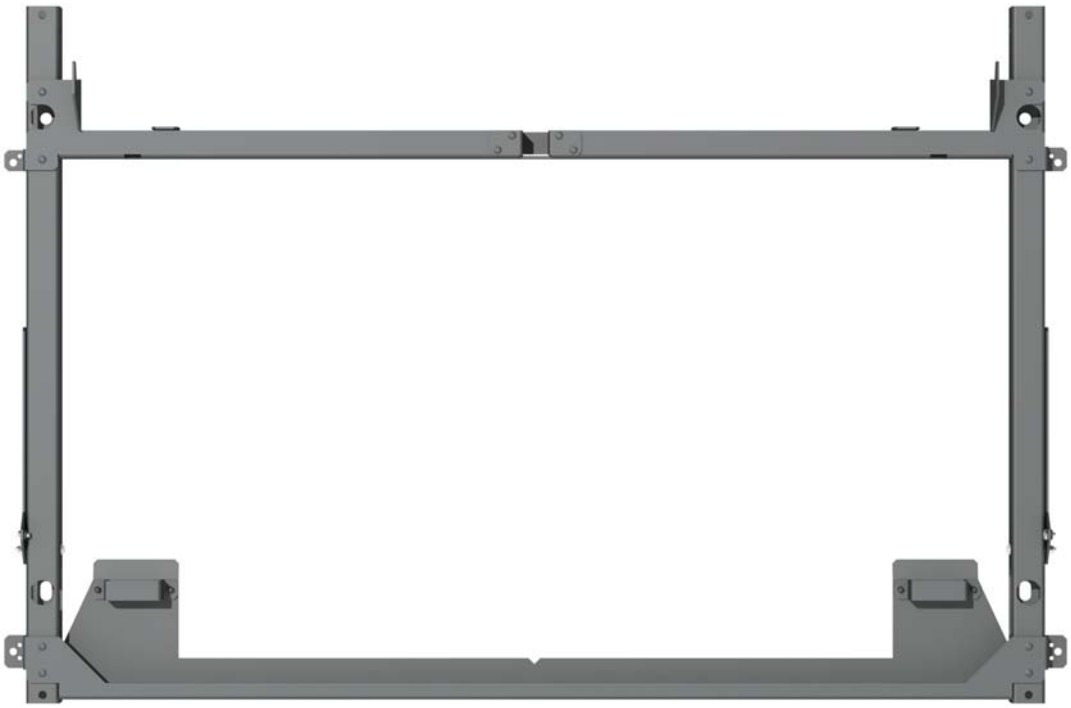
Note: This shows a rear picture of the 55X-L.

Planar EasyAxis Mounting System

The Planar EasyAxis mounting system is included with most models and are used to secure the Clarity Matrix G3 LCD displays to a structure. Follow these instructions carefully.

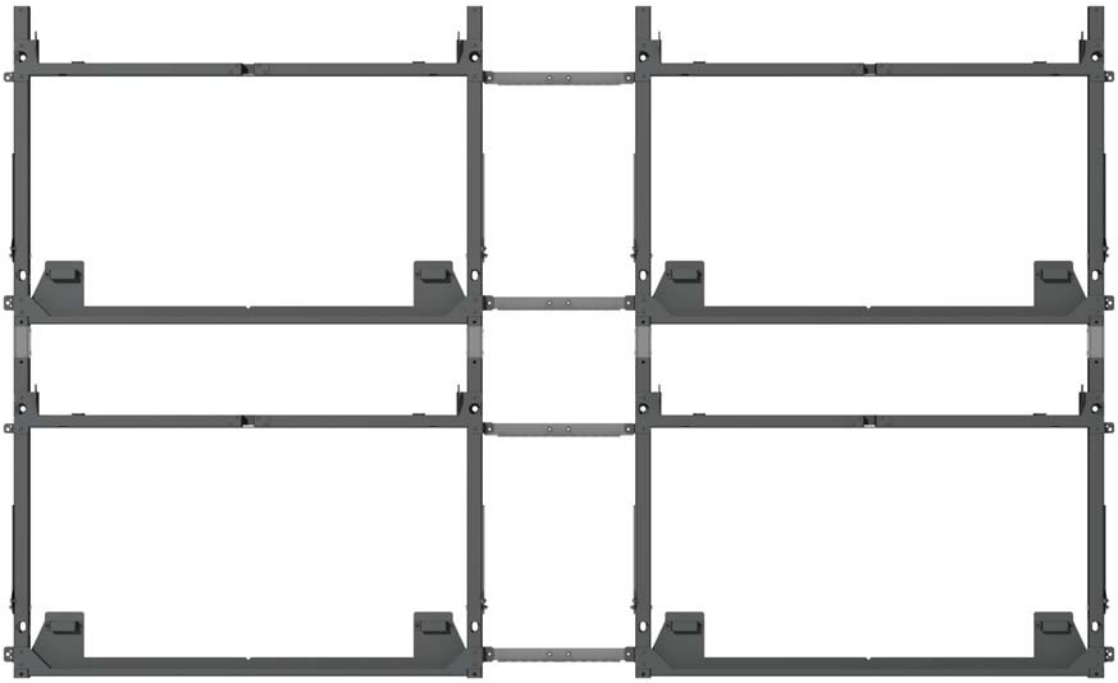
Keep in mind the following general installation guidelines:

- Verify the structure the video wall will be mounted to is engineered to hold the entire load of the displays and proper material is used where fastening the mounts.
- Prior to installation, make sure to know where all of the mounting points are located.
- Follow all safety precautions outlined in this manual.
- Verify the parts received with the list shown in this manual.

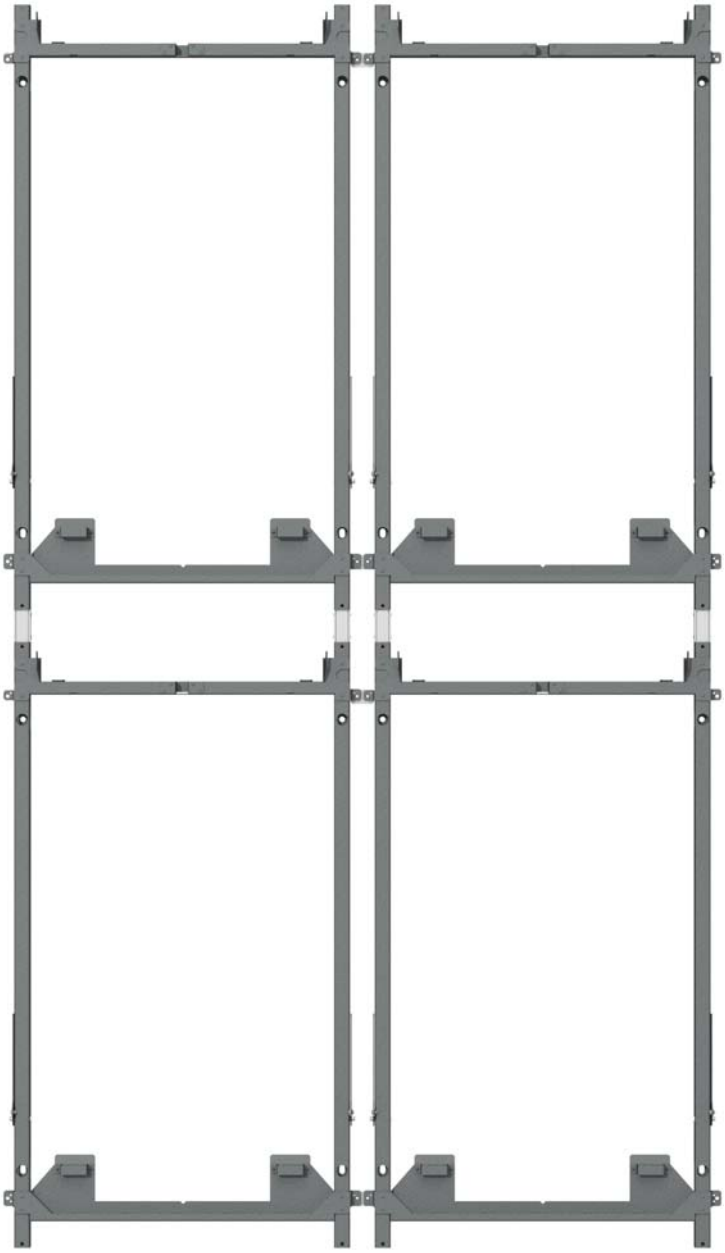


LCD Mounting Structure

The Planar EasyAxis mounting system simplifies the task of installing and aligning the LCD displays while allowing for efficient in-wall service. Planar EasyAxis is designed to be attached to a wall, used with optional free-standing bases, or secured overhead. When assembled, horizontal and vertical connection brackets ensure that each mount is perfectly spaced from its neighbor in the video wall. The mount system also incorporates a service mode to accommodate front and rear in-wall repair of any LCD in the video wall.



Note: This image is an example of a 2x2 landscape mount configuration.



Note: This image is an example of a 2x2 portrait mount configuration.

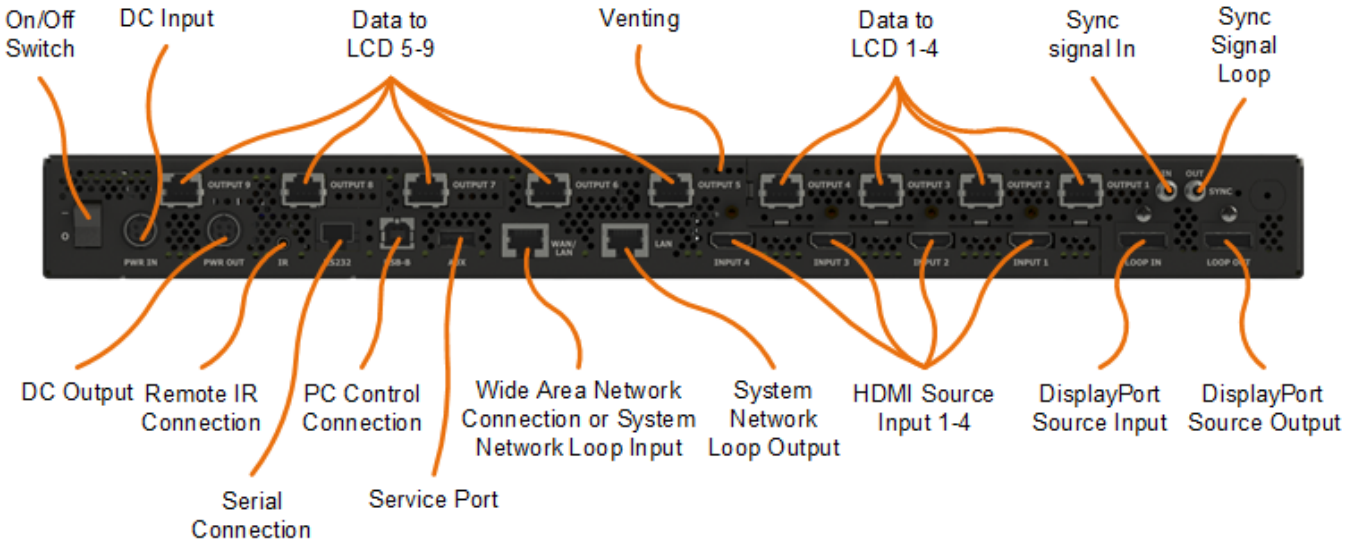
Planar EasyAxis mounts are designed to facilitate the thinnest profile LCD video wall while maintaining precise alignment. The combination of the mount plus the Clarity Matrix G3 LCD display's blade-style design results in video walls that can measure 3.6 inches (91mm) in depth, screen to wall.

Rack Equipment and Components

To reduce heat issues and to make servicing of the video wall easier, there are two main Clarity Matrix G3 components that are separate from the LCD display itself. The video controller and remote power supplies can be mounted in an equipment rack that is typically located away from the video wall itself.

Planar Video Controller

The Planar Video Controller has an architecture that is able to manage the video information flowing to multiple LCD displays. The video controller routes up to five digital source inputs to the LCDs and a digital output. For more information about the capabilities of the video controller, see "Planar Video Controller Specifications" on page 151.



VC9H-BP+

VC4-HSL

Each source input is capable of a 4K/60Hz signal at 4:4:4 color subsampling while the source loop out is capable of the same. Any source input may be routed to the loop out connector using the multiple user interfaces. This provides a common signal that may be displayed across an entire wall without the use of a matrix switcher.

The video controller is able to be powered by the RPS or compatible power supply and loop power to up to 2 additional video controllers depending on the model.

Each video controller output is able to connect to a single FHD LCD at up to 200ft (60m) away using standard STP CAT6 cable.

The video controller can be part of a larger system receiving commands over the system network connections. It may also be controlled via the serial connections, IR sensor or front panel keypad.

Model	Description
VC-HSL	4 HDMI 2.0 inputs with two (2) QSFP+ video loop connections between video controllers, 4 CAT6 FHD outputs up to 60m (200ft) capable of displaying single or multiple images over all connections.
VC9H-BP+	4 HDMI 2.0 inputs with DiplayPort 1.2 loop signal loop between video controllers, 9 CAT6 FHD outputs up to 60m (200ft) capable of displaying single or multiple images over all connections.

Planar Remote Power Supply

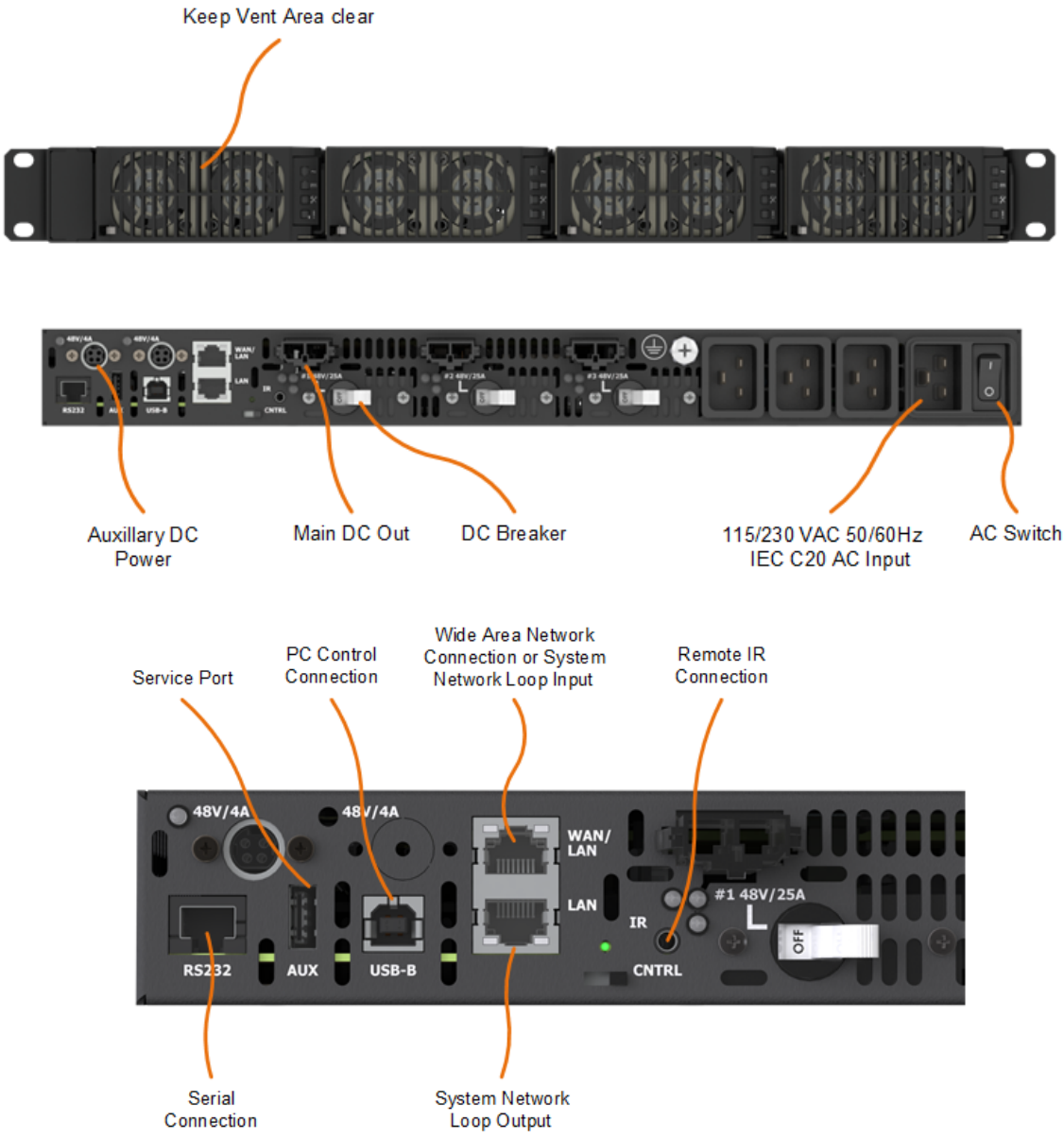
The Planar Remote Power Supply (RPS) is a rack unit that can hold up to 4 remote power supply modules (RPSM). The remote power supply modules may be configured n+1 redundant and are hot swappable.

There are six configurations of the Planar Remote Power Supply that can be remotely located from the connected equipment.

Model	Description
RPS110-1	100-120VAC or 200-240VAC auto ranging power supply capable of 48VDC output with one 1200W main output and one 200W auxiliary output.
RPS110-2	100-120VAC or 200-240VAC auto ranging power supply capable of 48VDC output with two 1200W main output and two 200W auxiliary outputs.
RPS110-3	100-120VAC or 200-240VAC auto ranging power supply capable of 48VDC output with three 1200W main output and two 200W auxiliary outputs.
RPS220-1	200-240VAC auto ranging power supply capable of 48VDC output with two 1200W main output and two 200W auxiliary outputs.
RPS220-2	200-240VAC auto ranging power supply capable of 48VDC output with four 1200W main output and two 200W auxiliary outputs.
RPS220-3	200-240VAC auto ranging power supply capable of 48VDC output with six 1200W main output and two 200W auxiliary outputs.

The specific configuration is identified on the product label. This can also be determined by examining the number of main DC outputs present on the rear panel of the RPS and the AC voltage selected for the installation. All are capable of installation of an optional redundant power module for fail-over compliance.

The RPS units are capable of remotely distributing up to 1200W of 48V DC power per main output up to 150m (500ft) away. Depending on the model, there are up to two auxiliary outputs capable of 200W each for other equipment located near the RPS. The power supply consists of up to four AC inputs that are auto-ranging between 100-120VAC and 200-250VAC. Each input corresponds to a hot-swappable power module that is accessed through the front panel. The model number(s) required are calculated from the specific wall configuration parameters as input when the product was ordered.



Each main DC power output can power up to eight panels depending on equipment and distance to the equipment. Once the first panel is connected, the remaining are daisy chained to the calculated number of panels.

The RPS can also be the video wall system command center. All system configuration, commands and monitoring functions are performed from a single system master. For more information, see "Component Connections" on page 70.

The remote power supply can be part of a larger system receiving commands over the system network connections. It may also be controlled via the serial connections, IR sensor or video controller front panel keypad.

Installing a Clarity Matrix G3 LCD Video Wall System

This section explains how to install a Clarity Matrix G3 LCD Video Wall. We suggest that this entire section be read before attempting to install the wall.

Before Beginning

Make sure all the items in the following lists are present before unpacking and installing the Clarity Matrix G3 LCD Video Wall(s).

Opening Matrix Packaging Carton

All Clarity Matrix G3 boxes and cartons must be inspected before and during the unpacking process.

Note: If any damage is visible before opening cartons, contact Planar Technical Support immediately.

1 Inspect the Clarity Matrix shipping carton for any physical damage.

Need to report damage?

Contact Planar
Technical Support:

Inside North America –
ts@planar.com
+1 866 752 6271

Outside North America –
emeats@planar.com

2 Remove packing straps.

3 Remove carton lid.

4 Remove side cardboard sleeves.

In-Box Testing & Inspection

Before removing the LCD display from the carriage, in-box testing and inspection are required.

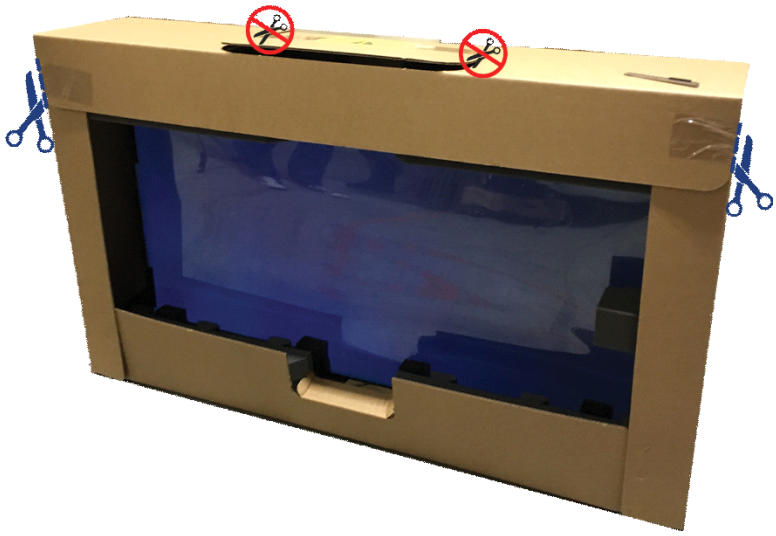
Note: The design of the carriage allows in-box testing and inspection of the LCD display and safe transport and storage prior to mounting. Carefully follow the testing and inspection steps below. Do not break the tamper seal until testing and inspection is successfully completed. If damage or failure is observed, contact Planar Technical Support immediately.

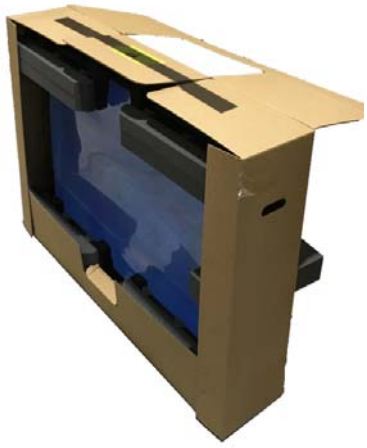
1 Carefully lift at the handles to move the carriage from the shipping carton to the location of equipment required to test the display.

ALWAYS keep the carriage in the upright position.

2 Open Display Test Kit box and verify all parts are included. If a Display Test Kit is unavailable, skip to step 5.

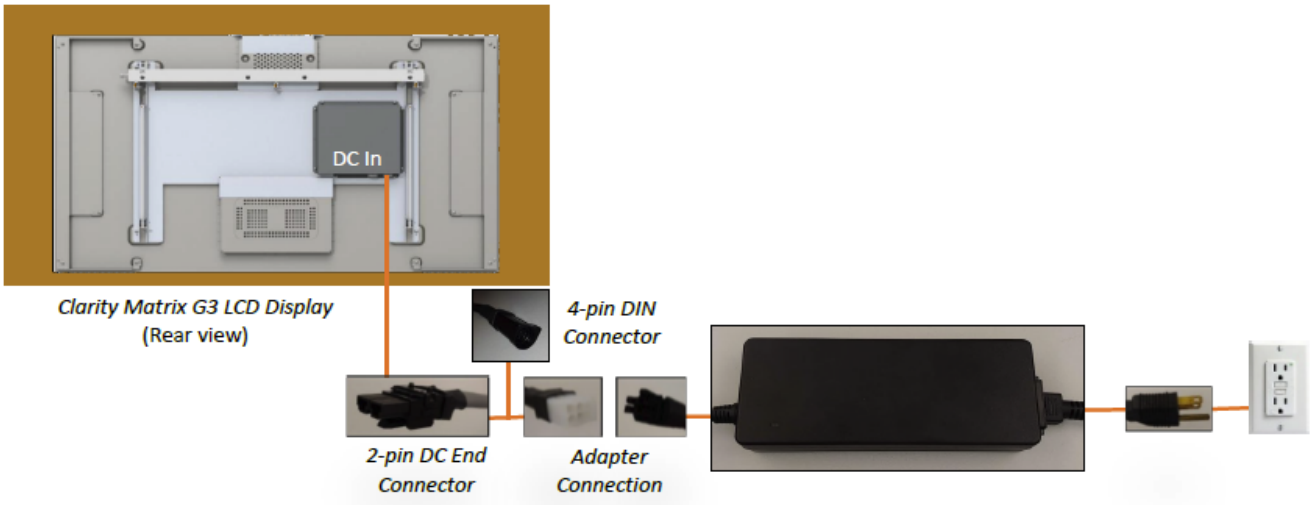
3 Ensuring to not damage the tamper seal and flap on the top of the carriage, cut tape at top front edge of carriage box and flip back carriage lid for best panel viewing.





4 Connect DC Power to display as shown. Skip to step 12.

Note: Use only the 2-pin DC connector. Keep the 4-pin DIN connector disconnected.



5 Open and verify all parts are included in the Electronics Accessory Kit.

6 Retrieve main AC Power Cables and LCD Loop Power Cable.

7 Unpack the Remote Power Supply (RPS) rack unit, the Remote Power Supply Modules (RPSM) (up to 4 per box).

8 From the front of the RPS unit, remove the temporary RPS slot spacer and install RPSM into ALL open slots from left to right.

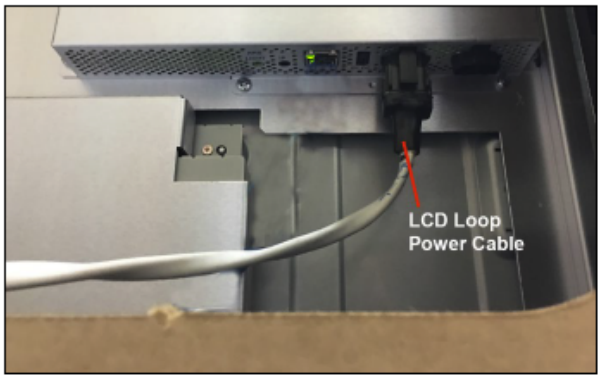
Note: All open slots must be populated with modules for the RPS to function.

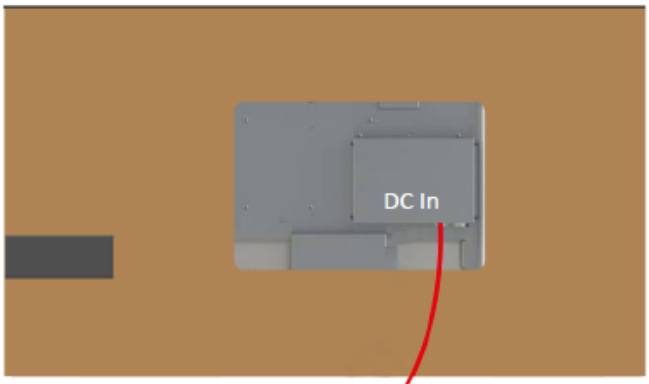
Example of RPS with three RPSM slots. Open slots vary with order

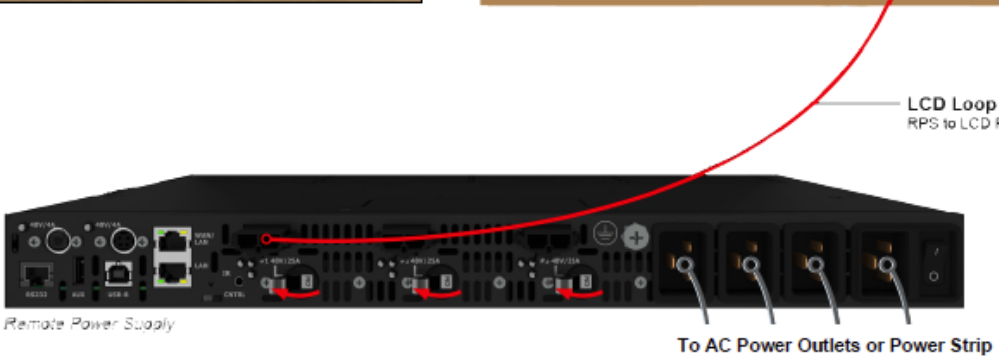
9 Connect main AC Power Cables from the RPS to AC power outlets or an AC power strip, as shown below.

10 On the RPS, turn circuit breaker switches and main power switch to the ON position. Wait for the RPS indication lights to appear.

11 Connect the LCD loop power cable from Output 1 on the RPS to the DC In jack on the LCD display.





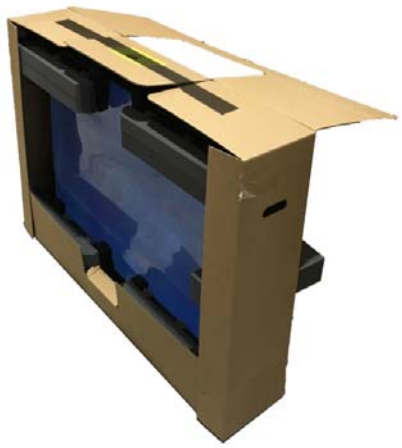


12 The display will show a white test pattern when DC power is connected for the first time.

13 The display will continue to show a white test pattern when power is connected, until a VC is connected and recognized by the system.

Note: The display will show a blue test image when it is disconnected from the VC and DC power is applied.

14 After the LCD panel is on, visually inspect the LCD panel. You may need to manipulate the foam slightly to see all areas of the LCD display.



Things to look for:

- Lines / column defects
- Mullion peeling away
- Screen bleeding
- Screen / bezel separation
- Etc.

15 If there is visible damage to the LCD display, keep it in the carriage with the tamper seal intact and call Planar Tech Support immediately.

16 If there is no visible damage and the display appears to function appropriately, disconnect all cables from the LCD display.

17 Repeat this process for all LCD displays.

Checking Shipment Equipment

The Clarity Matrix G3 LCD Video Wall System is configured with several components. The number and type of individual components vary with each configured order.

Components may include one or more of the following:

- Video Controller Box
- Remote Power Supply Box
- Matrix G3 LCD Packaging Carton
- System Accessories Box
- Accessories Kit

Video Controller Box

The following items are included in the video controller box.

Part	Description	Per Video Controller	Picture
Video controller	Routes up to five (5) digital source images to the displays.	1	
RJ45 to RJ45 patch cable (1m)	Connects one video controller to another for control communication.	1	
Power cable (4ft)	Connects the power supply to the video controller.	1	
DisplayPort cable (3ft)	Loops input signal between video controllers.	1 per video controller, configuration dependent	

Part	Description	Per Video Controller	Picture
QSFP+ cable (0.5ft)	Loops input signals between controllers.	2 per video cable video controller, configuration dependent	
Mini HDBNC cable (0.3m)	Loops Genlock between video controllers.	1 per video controller	

Note: It is highly recommended that the cable label maker be used to identify each cable before it is installed.

Remote Power Supply Box

The following items are included in the remote power supply box.

Part	Description	Per Power Supply	Picture
Remote power supply module	Inserts into power supply providing power to the system.	1-4	
Remote power supply	Supplies power. Pieces of equipment depend on model type and cable lengths.	1	
RJ45 to RJ45 patch cable (1m)	Connects one power supply to another for control communication.	1	
AC power cable (3m)	Depending on the order, the cable will be for use in North America or Europe. If the installed outlet does not match the cable plug, consult a qualified electrician.	1-4	

LCD Display Box

The following items are included in the Clarity Matrix LCD Packaging Carton.

Part	Description	Picture
LCD display	1 or 2 per box depending on the order. **Caution:** Do not remove the LCD from the box until ready to install. See section "In-Box Testing & Inspection" on page 32.	
LCD mount	1 or 2 per box depending on the order.	

When it is time to remove the LCD display, see "Safe Handling" on page 14.

Accessory Box(es)

The following items are provided in the larger accessory box, which also contains the accessory kit box. The contents of this box are described below.

Part	Description	Number	Picture
Vertical bracket	Vertically spaces and secures mounts. Notches indicate U vs. X vs. M products; the finish indicates standard vs. ERO.	Depends on configuration requirements.	
Horizontal bracket (landscape)	Horizontally spaces and secures landscape mounts. Notches indicate U vs. X vs. M products; the finish indicates standard vs. ERO.	Depends on configuration requirements.	
Horizontal bracket (portrait)	Horizontally spaces and secures portrait mounts. Notches indicate U vs. X vs. M products; the finish indicates standard vs. ERO.	Depends on configuration requirements.	
Power cable (various lengths depending on order); standard cable may be replaced by optional self-terminated cable	Connects the power supply to a display for long reach power transmission. (These are plenum rated.)	1 per power supply output	

Part	Description	Number	Picture
Power cable (8ft/11ft); standard cable may be replaced by optional self-terminated cable	Loop-through for power from one display to another.	1 per LCD	
CAT6A cable	Connects the video controller to the display for long reach video transmission.	Wall configuration dependent	
Mount attach screws	Attaches mounts and brackets to one another.	Wall configuration dependent	

Accessory Kit

The following items are included in the accessory kit, which is inside the larger accessory box.

Part	Description	Number Included	Picture
Gloves	Used to handle LCDs.	2 pairs	
Remote Control	**Note:** To use the remote, it must be aimed at the IR Sensor, not the display.	1	

Part	Description	Number Included	Picture
Battery	AAA for remote.	1	
Installation manual (on a USB drive)	Provides detailed setup and configuration information. (This document is included.)	1	
IR sensor	Connects the power supply module, video control module or LCD display. Length is 3m; can be extended up to 30m **Note:** Keep in mind that the remote must be pointed *at the IR sensor*, not the display.	1	
150mm assembly and alignment tool	Used to align modules.	2	
270mm assembly and alignment tool	Used to align modules.	2	
Mini HDBNC to BNC cable (0.3m)	Used to adapt a standard size BNC to HDBNC for customer-supplied sync devices.	1 per 16 video controllers	
Mini HDBNC cable (1m)	Used to loop last video controller in stack to first.	1 per 16 video controllers	

Configured Accessory Box

Part	Description	Number Included	Picture
QSFP+ cable (0.5ft)	Loops input signals between controllers.	2 per video cable video controller, configuration dependent	

Optional Planar-Supplied Accessories

Make sure the following optional Planar-supplied items are available as needed to complete the installation:

- Curved brackets
- Wall adapter bracket (see "Wall Adapter Bracket" on page 189)
- Floor stand
- Outer edge cosmetic trim (see "Cosmetic Trim" on page 191)
- Fiber optic cables for extension beyond 200ft (60m).
- Bulk cables for on-site termination. See the Outline Drawings from http://www.planar.com for detailed terminal information.
- Separate AC power supply to power the video controllers and fiber boxes directly.
- Ambient light sensor
- Clarity® Matrix® MultiTouch LCD Video Wall System (information can be found in the Clarity Matrix *MultiTouch LCD Video Wall System User Guide*)
- Clarity® Matrix® Fiber Video Extension (information can be found at the end of this manual)

Note: For Clarity Matrix MultiTouch systems, it is highly recommended that the wall installation guidelines for flatness be followed for best performance.

Tools/Equipment List

Depending on the installation, one or more of the following items may be needed:

- Drill and bits
- Nut drivers
- Pencil
- 3mm hex key
- Measure
- String/string level
- Digital/laser level
- Ladders/lift
- Back brace
- Stud finder

Other Things Possibly Needed

- LCD screen cleaner or LCD wipes - available at most electronics stores
- At least two capable people to lift LCD displays into place

Safe Handling of the LCD Modules

Very important notes below:

All Clarity Matrix LCD displays are susceptible to damage through improper handling. It is important to take great care in how the units are unpacked, staged and installed. The packaging has been specifically designed to protect the LCD during the installation of the mounting system, so they should be left in the package until it is time for their installation.

Note: See "Safe Handling" on page 14.

Use the handles provided to lift the units from the package. Using areas other than these features may lead to panel damage. The bottom of the unit may be supported with a free hand, but most lifting should be done by the handles.

If the LCD is not an ERO model, *do not* apply pressure to the front of the LCD. This pinching could break the glass or cause the glass to dislodge from the bezel.

If the panel must be put down outside of its packaging, place it vertical to slightly tilting toward the back of the unit on what is the bottom edge of the panel when installed. Be sure the surface the panel will rest upon is flat and clear of any debris. *Concentrated points of contact will damage the LCD.* Resting on the thicker edge of the bezel (for units with one) will cause damage to the LCD.

When rotating the unit, *do not allow any weight to rest on the corner* of the LCD as this can cause damage. The corner where the two narrow front bezels meet is the most susceptible to damage. Tilting a unit toward the front may cause damage to the structure holding the glass in place.

Most LCD bezels are smooth, however some have features that can get caught on various objects and be damaged. Avoid clothing or other items which can snag on corners or edges.

Caution: *Do not* lay the panel on its face or back. This may cause the glass to become dislodged from the bezel and make it susceptible to falling out.

Design Guide

Plan the Installation

The plan should include consideration and calculations for the following:

- **Floor/wall load:** Make sure the structure that the product will be attached to is able to safely support the weight of the whole video wall. See "Specifications" on page 149 for component weight(s).
- **Ventilation and cooling requirements:** For passive cooling, we recommend a minimum of 200mm (8") of top and bottom clearance. Please consult Planar Sales for video walls that are more than eight LCD Displays high. It is very important that there is proper cooling and ventilation for the entire video wall and its remotely-located equipment. Ventilation requirements can be reduced if the video wall is actively cooled.
- **Power consumption:** Plan the building power appropriately for the video wall power consumption. Refer to "Calculating DC Power Requirements and Component Heat Load" on page 47 for more information.
- **Cable routing to the video wall:** To help the installation run more smoothly, it is highly recommended that a cabling diagram of primary and interconnecting cables be created, including power, source and control, prior to installation. This should account for how long cable runs need to be and where they will be routed as well as compliance with all local building codes and local, state and federal laws.

Calculating DC Power Requirements and Component Heat Load

Clarity Matrix G3 LCD Video Walls use power loop-through management. The remote power supply modules convert AC power to 48VDC that is distributed to the components of the video wall. Each remote power supply main DC output is electrically capable of powering up a maximum of eight LCD displays, depending on the display model and distance between the remote power supply and the video wall. This is determined for each configuration based on a maximum 1200W of available power from a RPS output.

Heat load represents the amount of heat per hour that the video wall will generate and add to the ambient temperature of the room. All or some of that heat, in turn, must be compensated for with the HVAC system in the room. Heat load is typically expressed in BTUs / hour and is a straight calculation based off power usage (Watts).

When determining heat load, the best practice is to calculate that figure based on maximum power usage. Typical power usage factors in content and level of brightness at which the video wall is expected to run. Planar estimates typical power assuming 80% display brightness. The actual typical power may vary depending on the application.

One of the most important points to consider is to determine the total power consumption for the LCDs and the necessary number of remote power supplies to run the configuration. We recommend consulting Planar Application Engineers for best results. To determine the video wall requirements, use the table below and the calculation considerations to help determine total power consumption.

Component	Model	Typical Power Consumption (W)	Maximum Power Consumption (W)	Max Heat Load at Component (BTU/hr)
Remote Power Supply	RPS110-1		140	477.7
	RPS110-2		280	955.4
	RPS110-3		400	1364.9
	RPS220-1		280	955.4
	RPS220-2		520	1774.3
	RPS220-3		760	2593.2
Video Controller	VC-HSL		70	239.1
	VC9H-BP+		75	255.9
Fiber Controller	MG2-F		50	170.6

Component	Model	Typical Power Consumption (W)	Maximum Power Consumption (W)	Max Heat Load at Component (BTU/hr)
LCD displays	MX46U	134	140	477.7
	MX55U	202	210	716.5
	LX55U	145	155	528.9
	LX46U	106	115	392.4
	MX55X	220	225	767.7
	MX55X2	152	215	733.6
	LX55X2	116	160	545.9
	LX55X	146	155	528.9
	MX46X	159	165	563.0
	LX46X	114	125	426.5
	LX46U-3D	106	115	392.4
	MX55M	191	235	801.8
	LX55M	153	235	801.8
Remote DC cables			See EQ 1.	

Because of the remote DC power system, it is not sufficient to add the power consumption of the LCD displays and efficiency of the power supply. The power loss over the cable(s) must also be taken into account. To do this, the equation below should be calculated and added to overall power consumption of a power chain. The number of LCD displays may need to be adjusted depending on the total power with the addition of the cable power in order to remain below the 1200W maximum per output of the Remote Power Supply.

$$P_{(\text{cable})} = (\Sigma P_{(\text{cabinets})}/48)^2 \times 0.001076_{(\text{cable resistance in } \Omega/\text{foot})} \times 2 \times D_{(\text{cable length in feet})} \quad \textbf{EQ. 1}$$

Note: The cable resistance here is valid only using the 10AWG wire sourced through Planar. Anything beyond 200ft may require a reduction in the displays attached to maintain an acceptable V_{drop} from the RPS to the video wall.

Summing the LCD display(s), video controllers, remote power supply(s) and cable(s) power will result in a total power that can be used to calculate total heat load of the system. If the components are located in different areas, it may be beneficial to know the individual heat load of the items so the cooling can be planned accordingly. Follow EQ. 2 for calculating heat load based on power.

$$P_{(\text{BTU/hr})} = 3.412 \times P_{(\text{W})} \quad \textbf{EQ. 2}$$

The video wall will typically consume less than maximum power, depending on the brightness appropriate for the environment. However, it is a best practice to design the system requirements for maximum power and supply one appropriately rated circuit for every RPS AC input, whether in standard or redundant configuration.

During the installation, use the power indicators located on the back of the remote power supply to verify that the cables have been correctly routed on the video wall. The intensity setting will affect the overall power load so make sure that there is adequate head room if adjusting the intensity to maximum brightness. Conversely, the power level can be reduced by reducing the intensity. If an indicator LED is red, that means that the output load is close to or higher than the specification and the breaker may trip. It is possible re-cabling of the displays is required.

Power level is good and can add more panels.

Power level is good, but approaching limit

Power level at limit; lifetime may be affected.

Configuring Sources for Display

The Clarity Matrix G3 is a highly configurable system through the use of the WallDirector software to add, place and display sources on the video wall. However, it is important to understand how cabling of both displays and VCs can affect the physical limitations of the system. This section is here to help describe cabling options to achieve the designers' desired results. This is not a complete guide as there are infinite combinations that can be desired, but merely a starting point to show the possibilities.

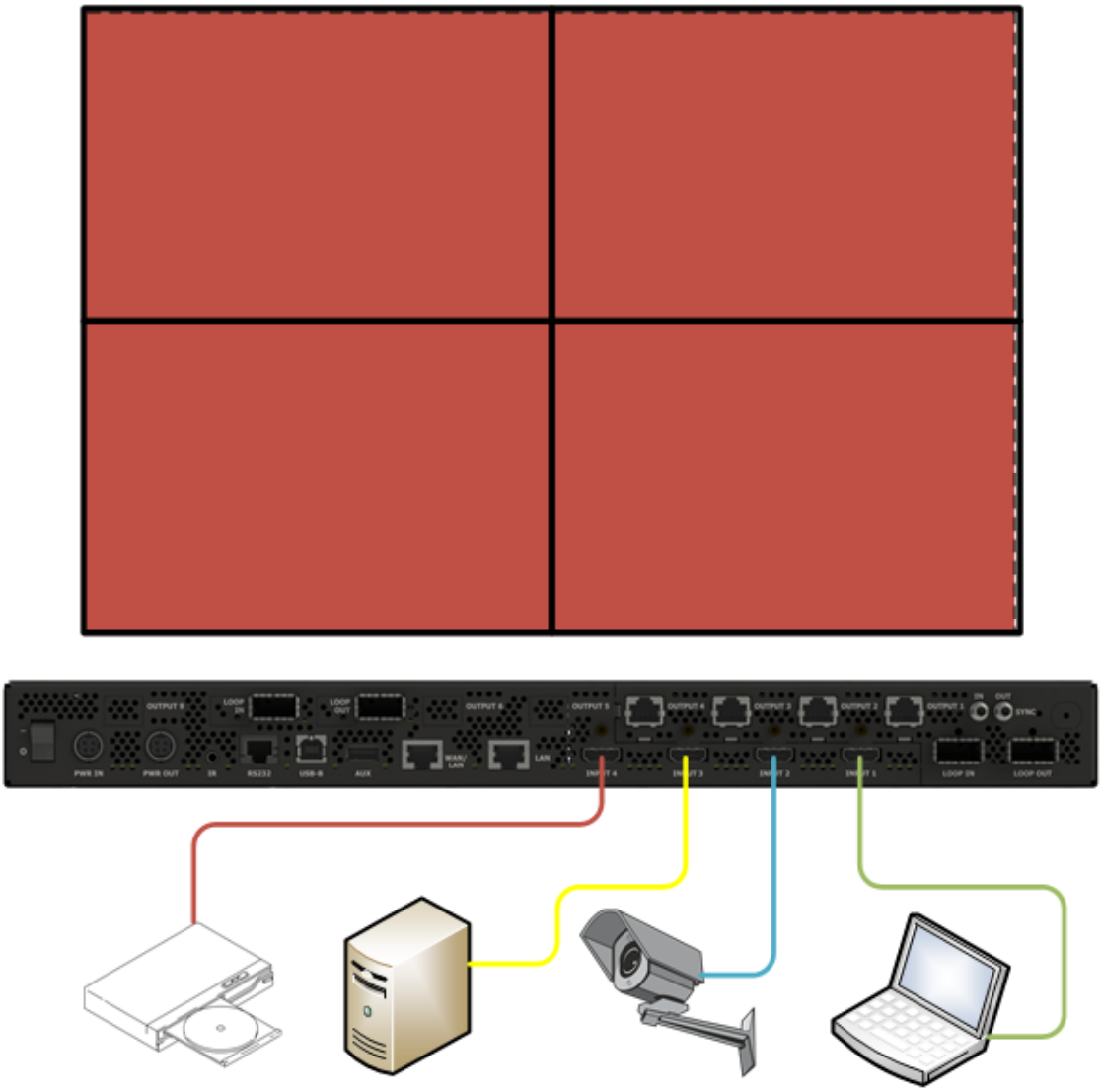
Planar Big Picture Plus

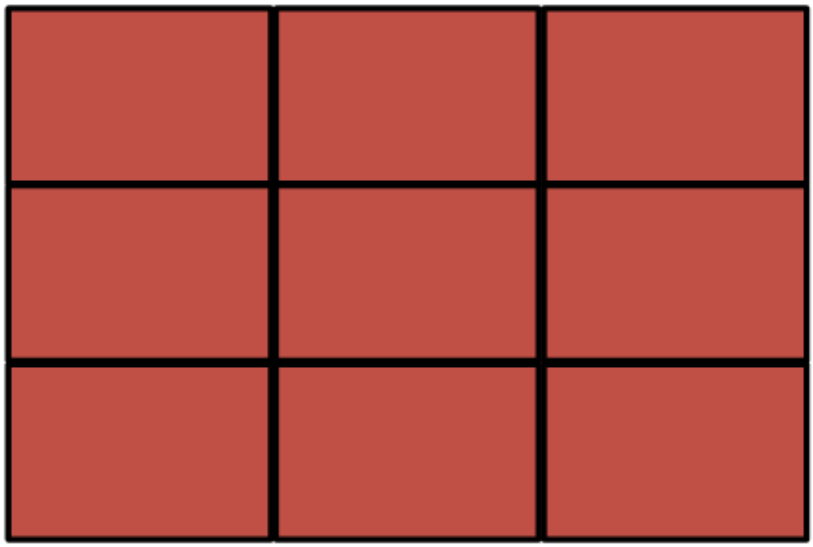
The Clarity Matrix G3 LCD Video Wall System is capable of displaying single sources across multiple displays through the use of available source inputs and the source looping on each VC. Most simply, a single source can be displayed across a small wall connected to a single VC as below. The two examples below show the DVD source on Input 4 has been configured to be the sole image to be displayed. This is referred to as Planar Big Picture Plus (BP).

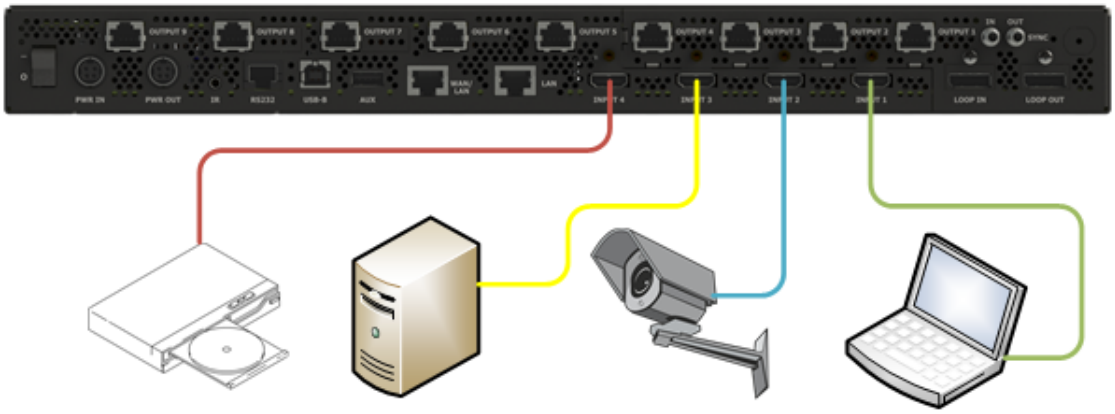
Additionally, a single source can be scaled to be displayed across a much larger wall, given the signal looping is complete. See "Multiple Video Controllers" on page 58.

Note: When choosing a cable for connecting sources to a VC, it is important to use the best quality to be sure the signal transmission is not degraded, especially at lengths beyond 10ft. Planar has a selection of cables that have been tested to perform at these demanding conditions. Please consult our sales team for assistance.

Note: Multiple layouts of sources and outputs can be saved as presets within the software interface. This information is directly saved to the master control component of the system.







Configuring High Resolution Inputs

Hardware Limitation

The Image Processing chip used in the Clarity Matrix design has an input limitation of 600MHz pixel clock with up to 9170 horizontal pixels or 4320 vertical pixels. However, be aware that the Clarity Matrix is a system of multiple chips each supporting a separate LCD display, we can still display such resolutions by spreading that image over more than one display in the system. The system provides the correct portion of the image for each display. This is accomplished through front-end FPGA logic in the video controller and communication amongst the processors via the system network.

High Resolution Setup

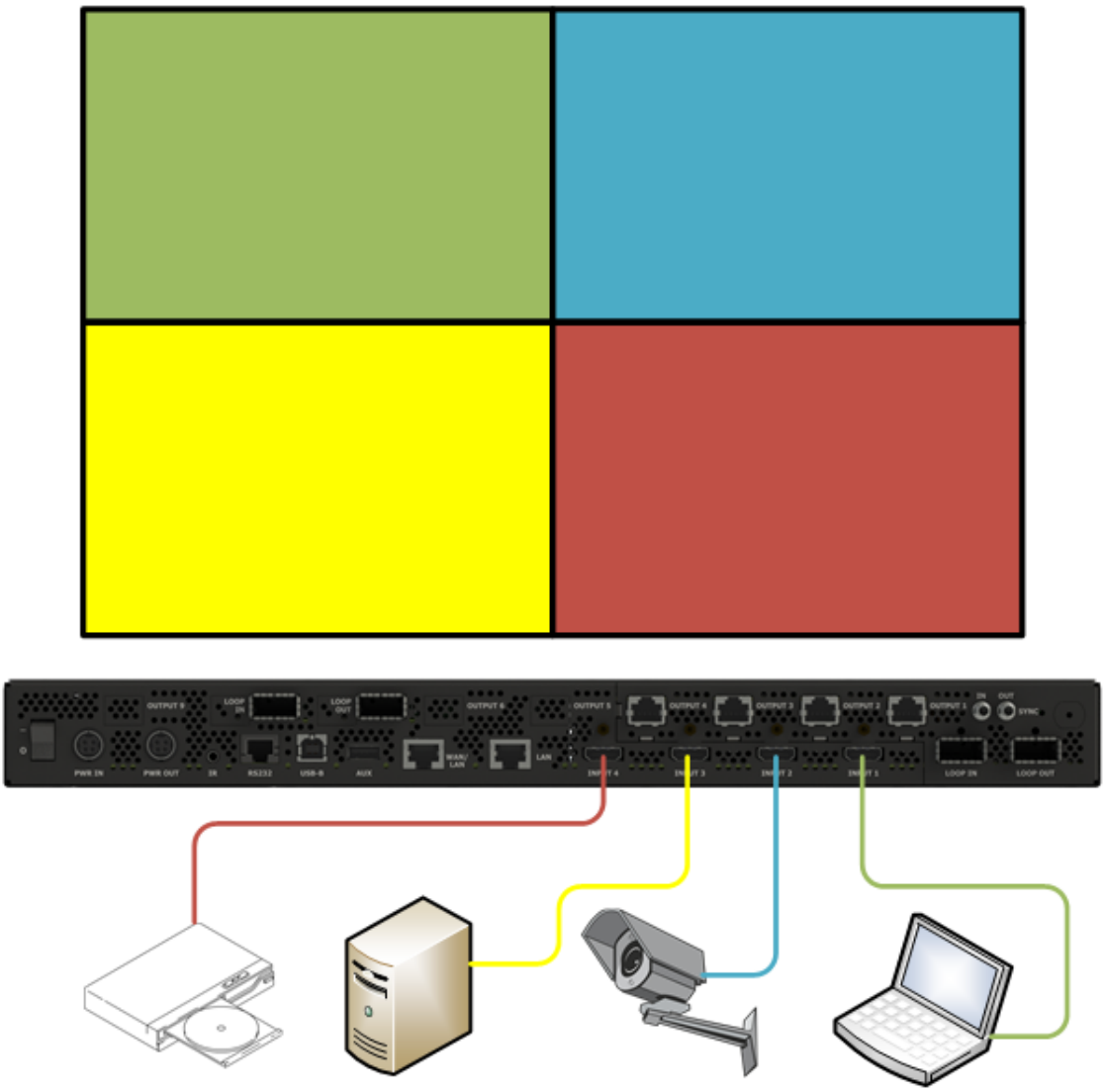
The table below lists some of the commonly used Planar Big Picture Plus resolutions and shows the maximum refresh rate allowed to stay within the limits for HDMI and DisplayPort connections.

Commonly Used Planar Big Picture Plus resolutions

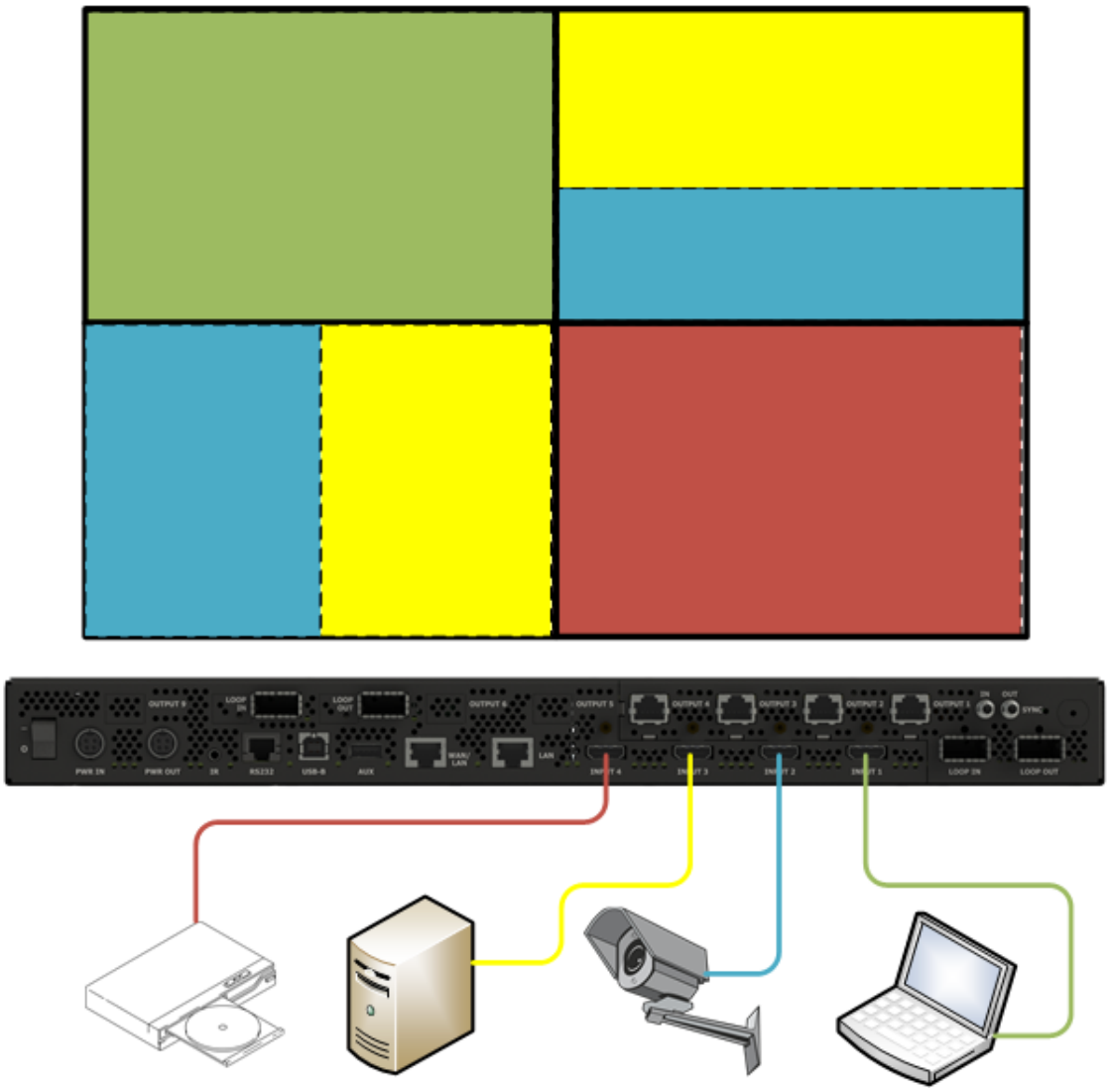
Big Picture Size 3840x2160 displays	Big Picture Size 1920x1080 displays	Input Resolution	Maximum Refresh Rate
	1 x 2	1920 x 2160	60Hz
	1 x 3	1920 x 3240	60Hz
	1 x 4	1920 x 4320	60Hz
	2 x 1	3840 x 1080	60Hz
1 x 1	2 x 2	3840 x 2160	60Hz
	2 x 3	3840 x 3240	30Hz
1 x 2	2 x 4	3840 x 4320	30Hz
	3 x 1	5760 x 1080	60Hz
	3 x 2	5760 x 2160	30Hz
	3 x 3	5760 x 3240	30Hz
	4 x 1	7680 x 1080	60Hz
2 x 1	4 x 2	7680 x 2160	30Hz
	4 x 3	7680 x 3240	23Hz

Zones

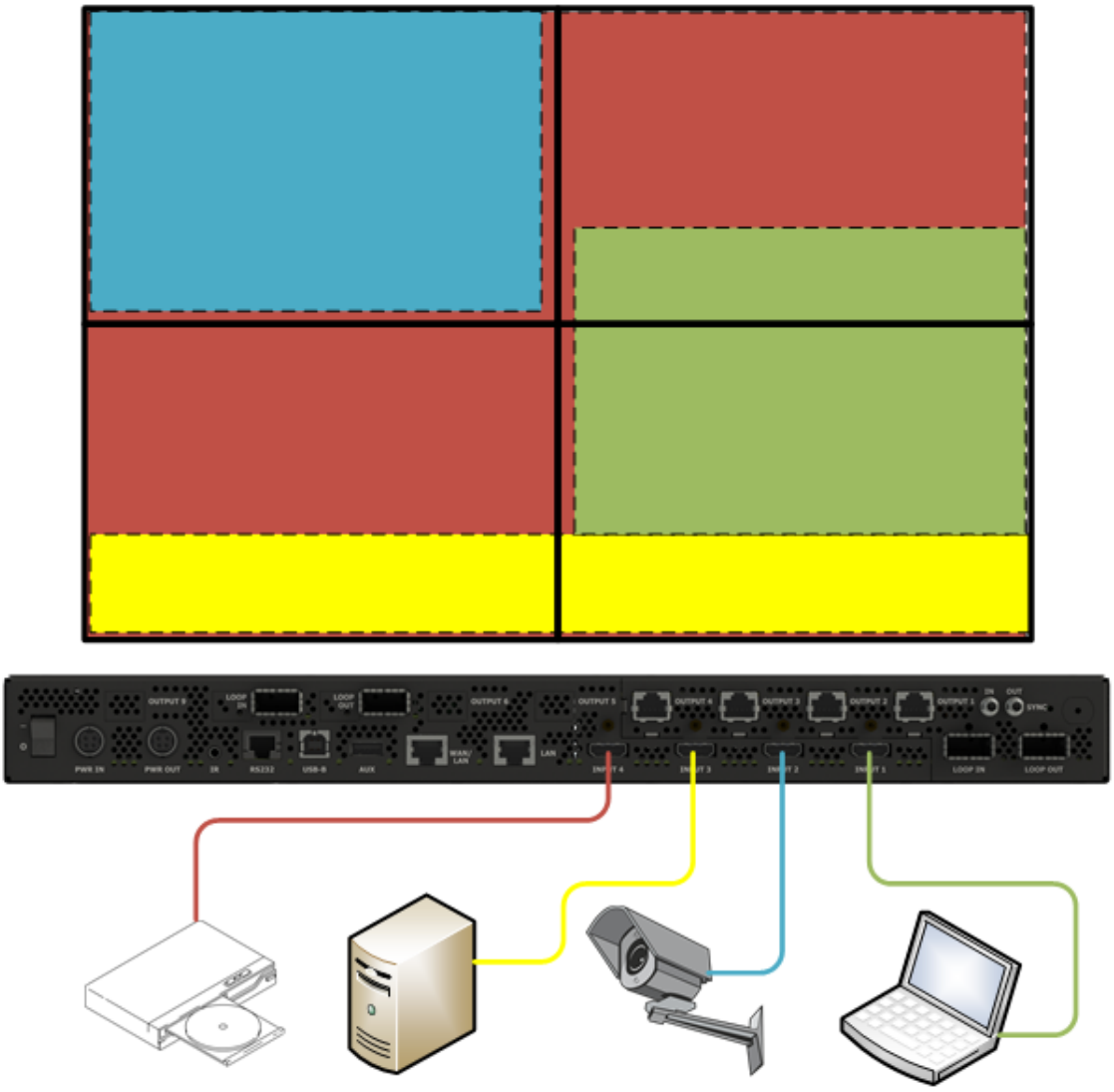
Additionally, multiple sources can be displayed on a wall connected to a VC as below. The first example is a traditional one-to-one display, where each input is routed to a corresponding panel. Each one of these images to be displayed is referred to as a zone.



The second example shows how multiple sources can be assigned to multiple zones for display and that zones can be scaled to fit the end use requirement.

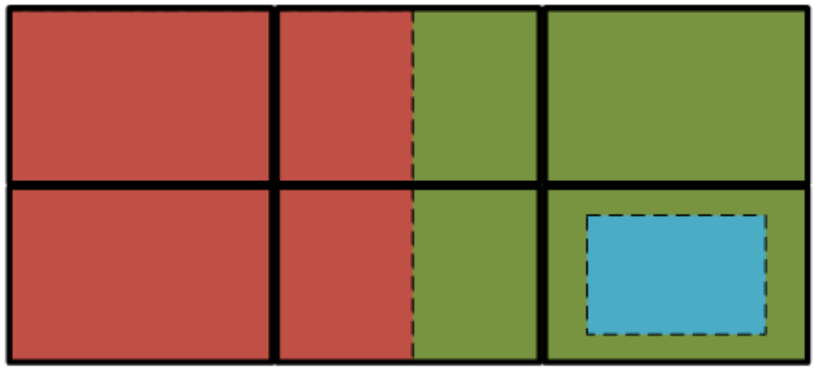


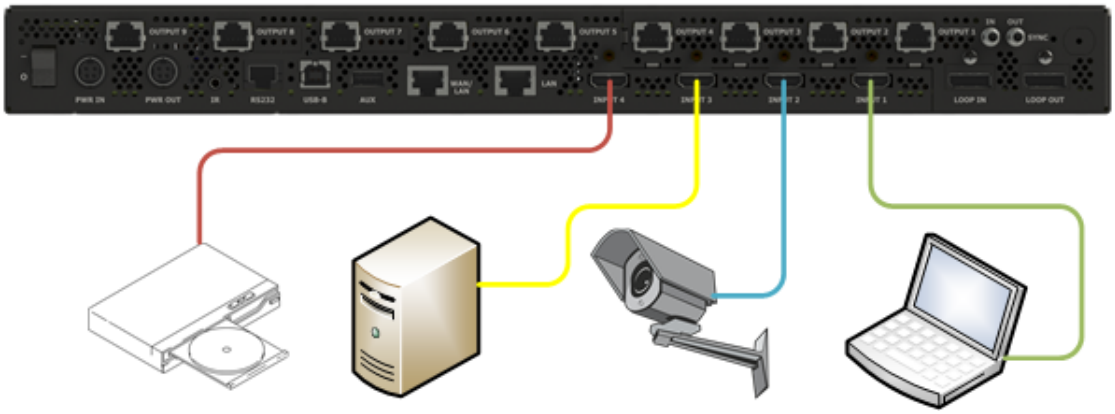
The next example shows how these same zones can be placed to span panels. When a zone crosses a panel border, this breaks the zone up into partial zones. For a single VC, there is a limit of 13 zone/partial zones that can be displayed at any one time. Exceeding 13 zone/partial zones will result in a blank zone/partial zone within the display area.

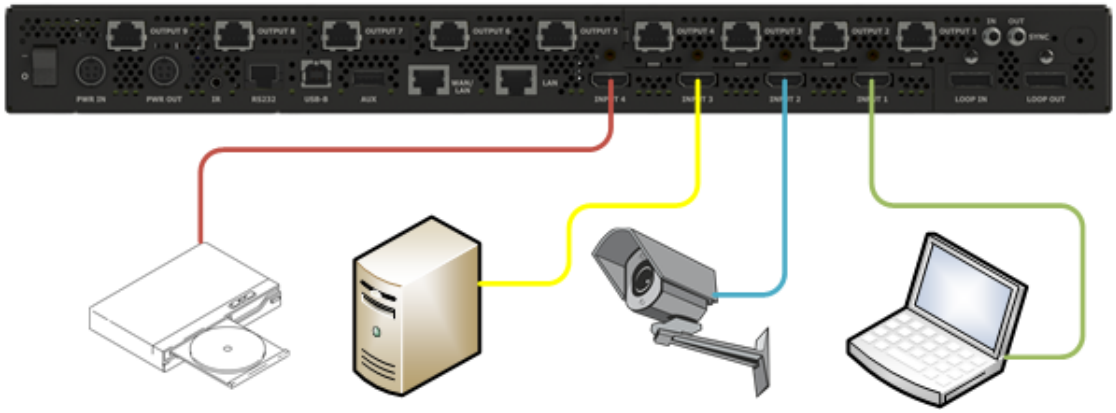


Note: This example has 9 zone/partial zones (4 for the red source, 2 for the green, 1 for the blue and 2 for the yellow).

If the number of panels supported by the video controller is less than the outputs it is still possible to use all 13 zones/partial zones such as in the two examples shown below.





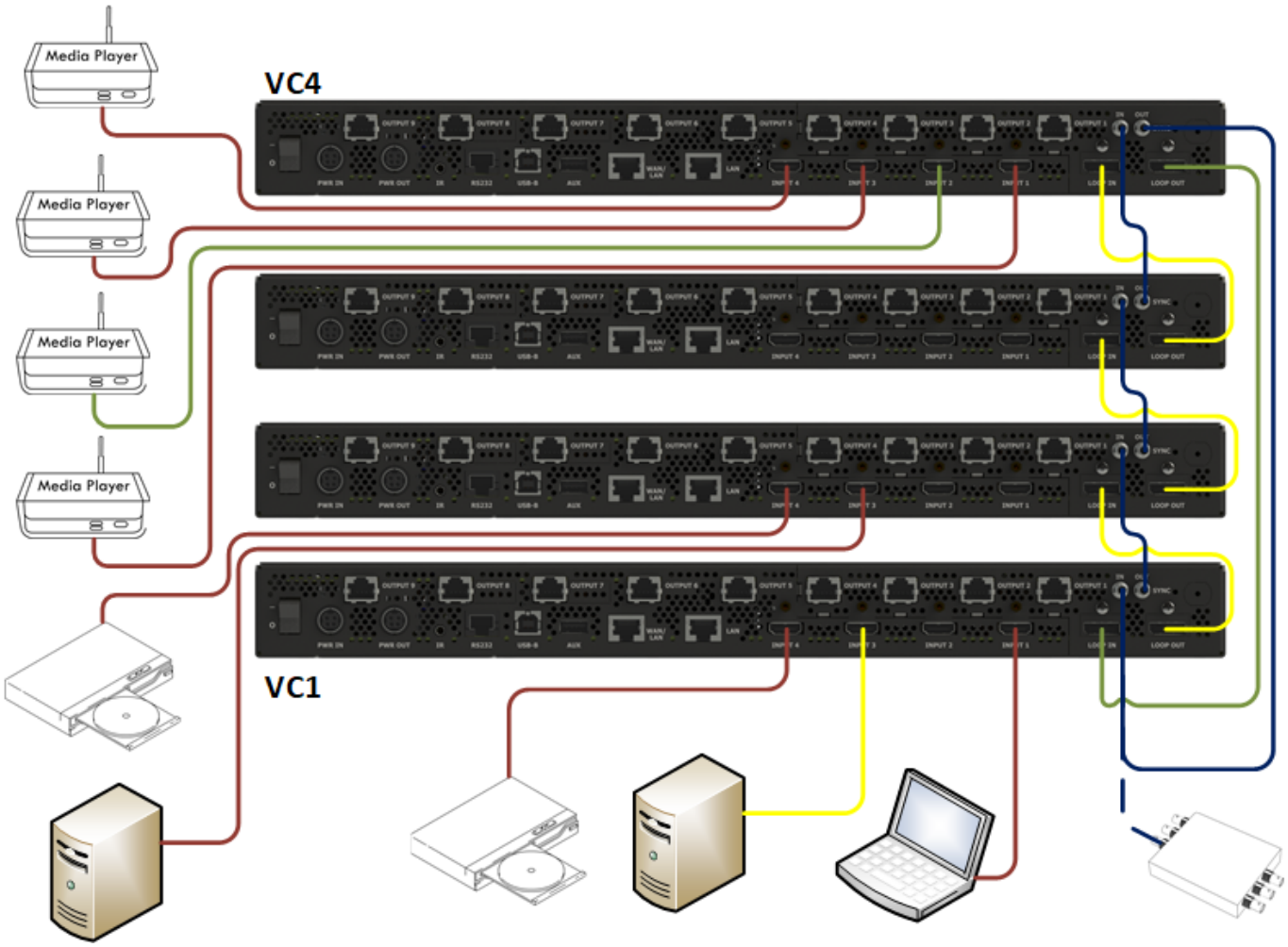


Note: If the application requires a greater ratio of inputs or zones to inputs than the standard VC9H-BP+, be sure to specify either the VC-HSL or use a video processor if necessary.

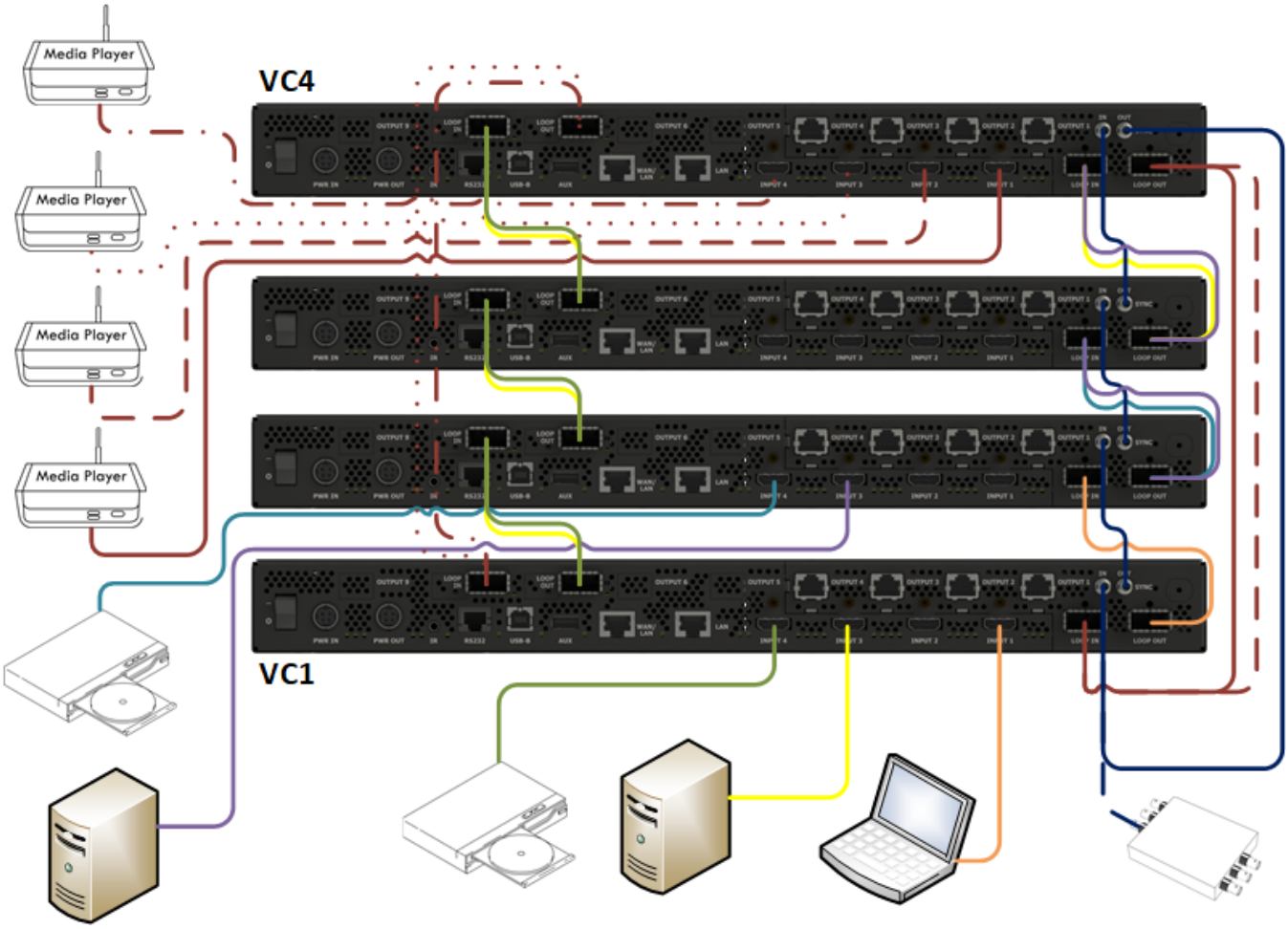
Multiple Video Controllers

With the DisplayPort loop connection port, any input within a VC can be routed to provide a source to another VC within a larger wall. The example below shows how the PC by the yellow connection to VC1 can be distributed to all the VCs in the wall, allowing this source to be displayed on any or all of the outputs like any other output described above. Another item this demonstrates is that the media player in VC4 denoted by the green connection can also be looped to VC1, making this source available across both VC1 and VC4.

Note: The DisplayPort loop out is capable of supporting up to a single 4K/60Hz signal and can be assigned to loop any input to the VC.

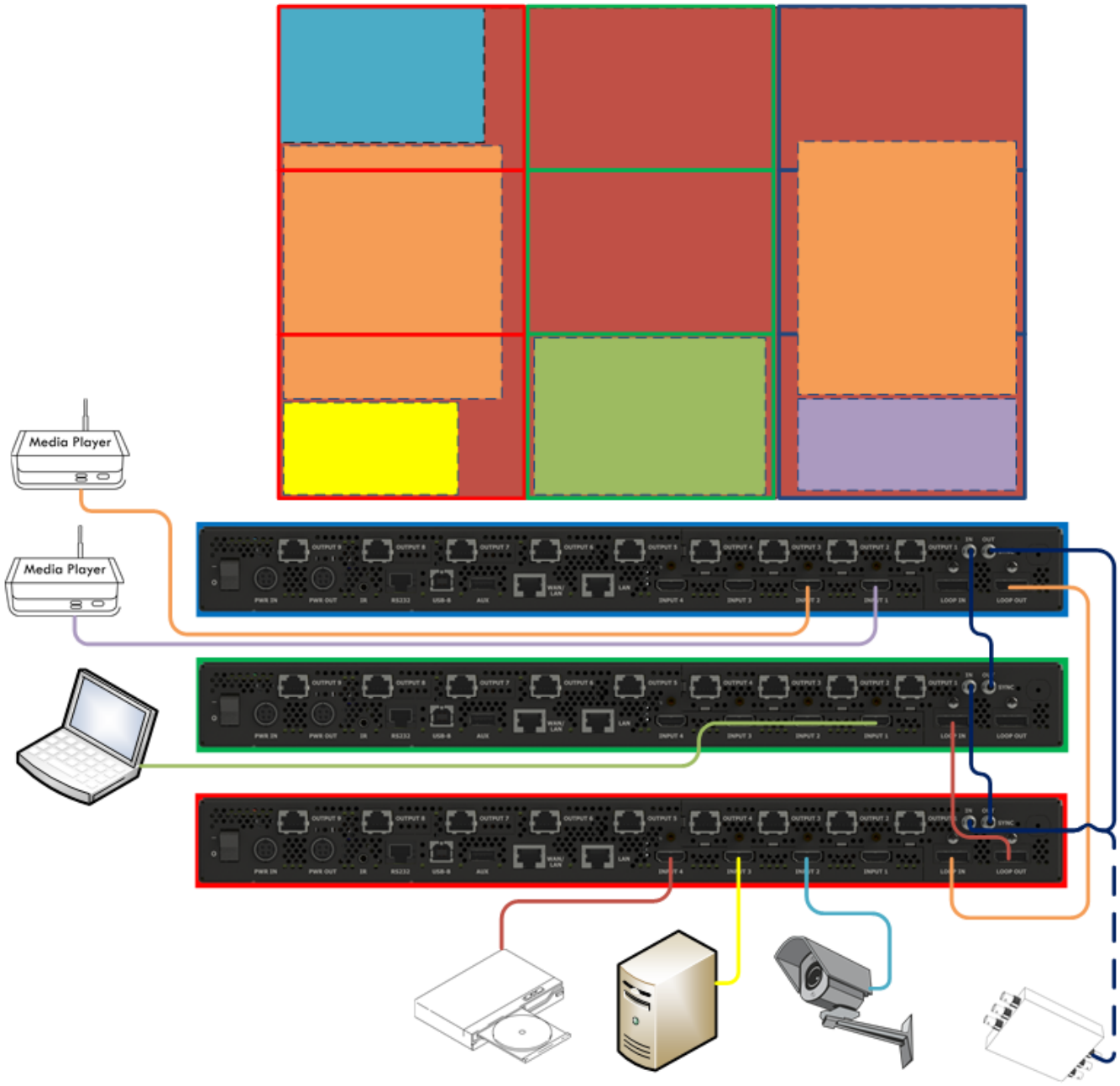


With High Speed Link loop connections, any input within a VC can still be routed to provide additional sources to another VC within a large wall, but it is not limited to a single source between VCs. The bandwidth between each VC is capable of routing four 4k sources or 16 1080 sources (or a combination of resolutions) between each VC. In the example below, consider each source as 4k. VC1 loops three 4k sources to VC2 where two more sources are input. These additional sources are routed to VC3, but require that the orange source drop due to maximum bandwidth. If any two of the sources at VC2 were 1080, then the orange source could continue to route to VC3. Again, sources introduced at VC4 can then be routed back to VC1. In this case, all four sources are able to be routed.

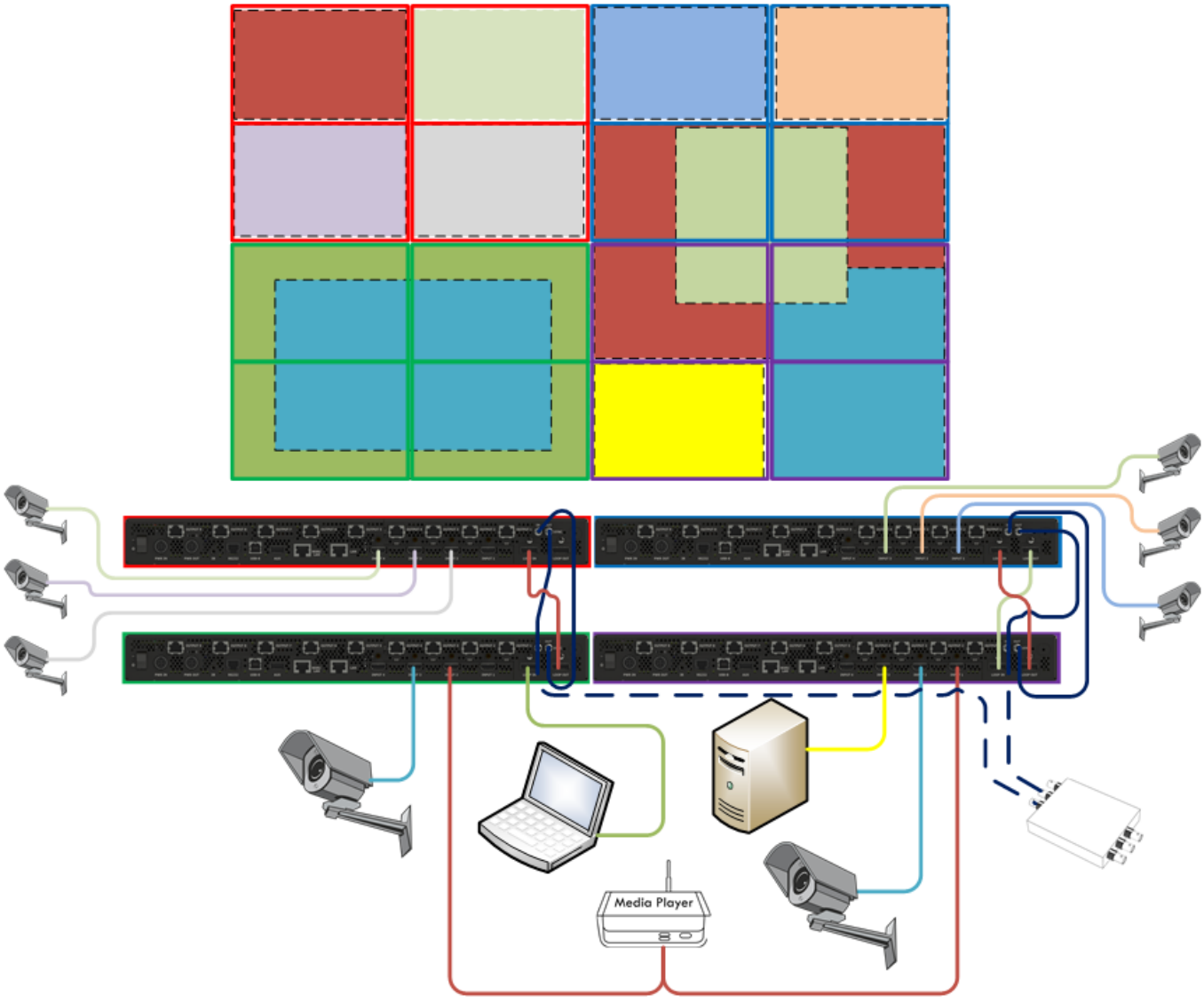


Note: An additional capability of the video controller is to genlock to an input or a sync provided by the user. This allows for optimum performance for the displays to reduce timing playback issues between controllers. All outputs internal to a VC are already synchronized; the provided connection is to allow synchronization between video controllers. This should always be used with a system using the High Speed Link. See "Genlock" on page 68.

In an installation, this may be used as below. Note the panel outline colors match the VC outline color as to which panels are supported by which VC. The BP of the DVD player into VC_{red} and looped to each VC is displayed as a background. Each VC then displays additional content from sources directly connected to it, overlapping the BP without exceeding the 13 zone/partial zone limit. Additionally, VC_{blue} loops a media player signal back to VC_{red} so that source is available on both without the need for a distribution amplifier.



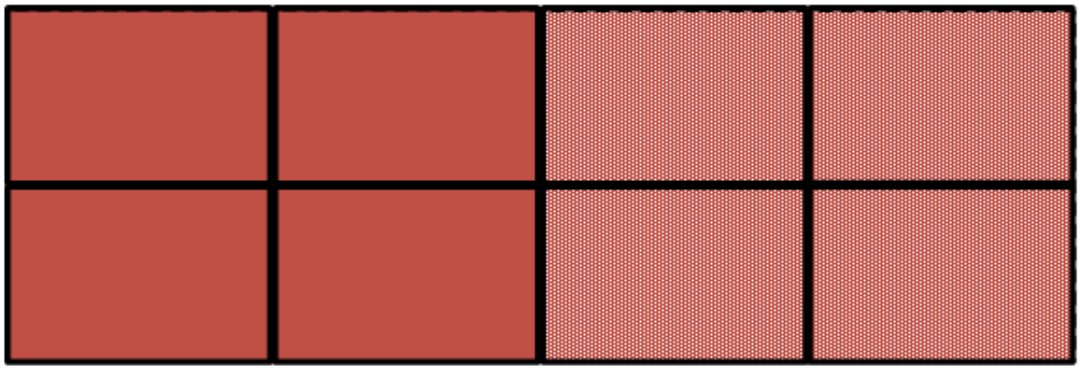
Another scenario of this is below where a distribution amplifier may be used. This example also shows how a source may be split between VCs and then split between multiple panels on each VC while being scaled with the green camera input.

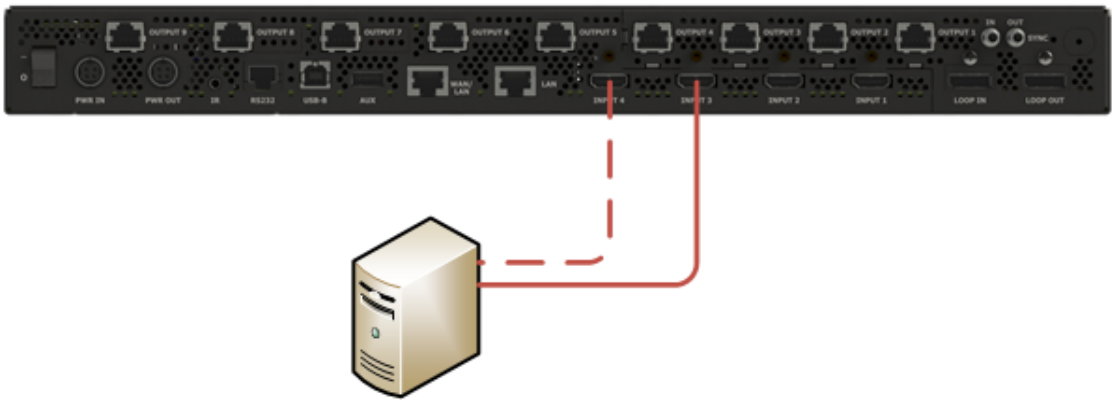


Note: Using a distribution amplifier may not have support for genlock standard performance.

Native Resolutions

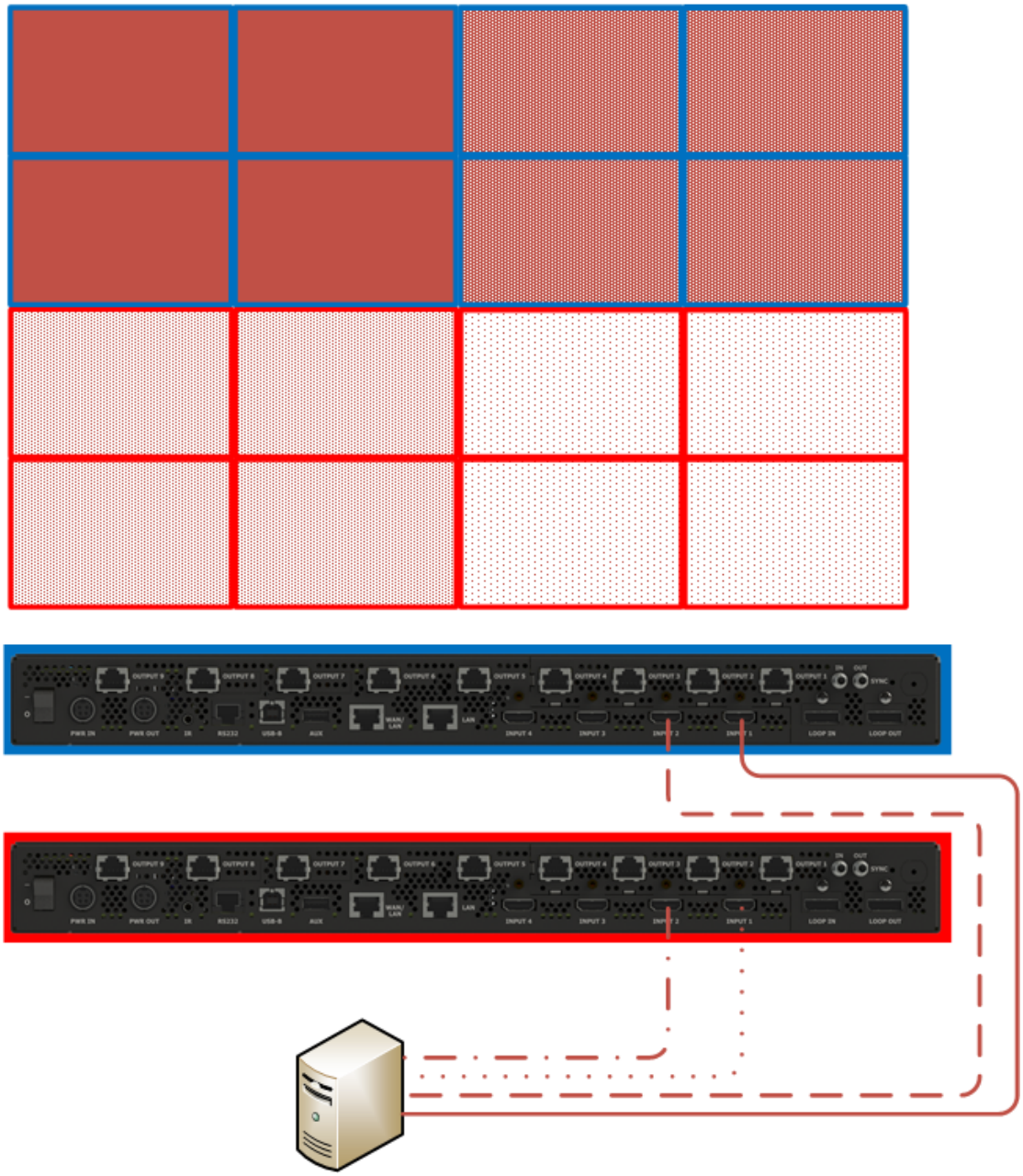
In instances where native resolution is desired on panels that are 1920x1080 resolution, single 9 out VC is capable of outputting two 4K sources or single source with a multi-output PC.





The same is true for 3840x2160 panels except only a single 4 out VC is required.

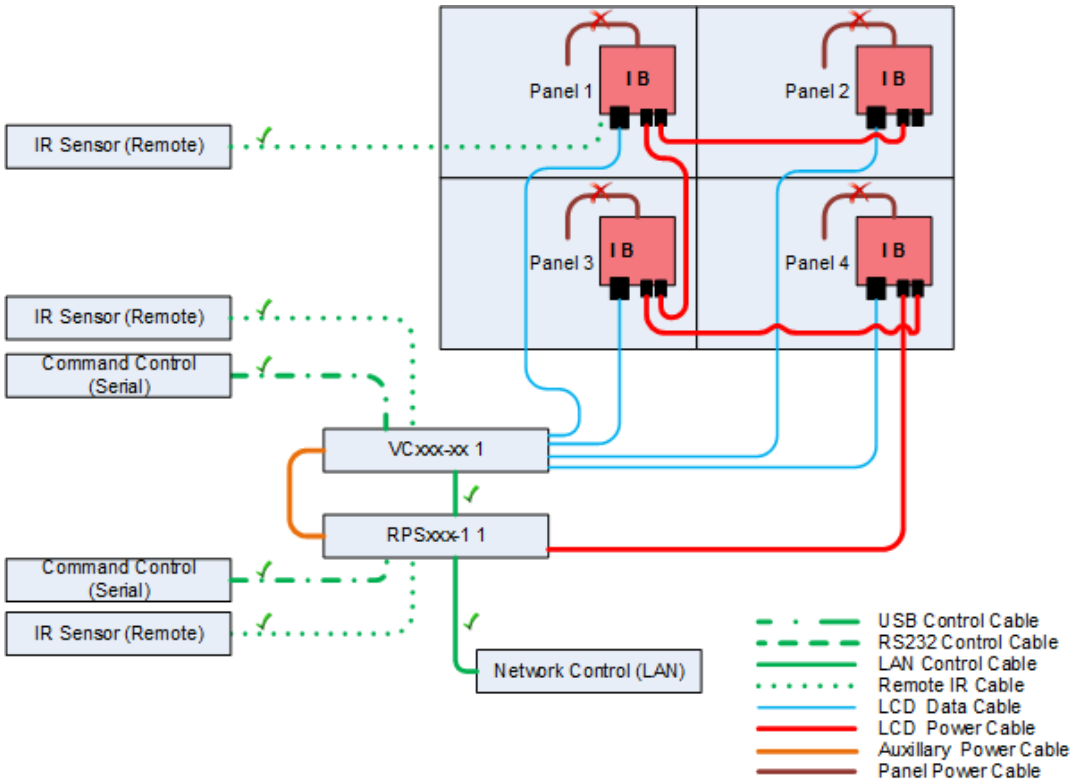
Using two VCs allows for 8K 60Hz to be spread across a video wall as shown below. Note that in cases of multi-output sources, it is important that the outputs be synced to provide optimal display of the source. Genlock between VCs will be required to prevent frame tearing between horizontal sections controlled by the VCs. When synchronized inputs are available, there are several methods to ensure the VC outputs are properly synchronized.



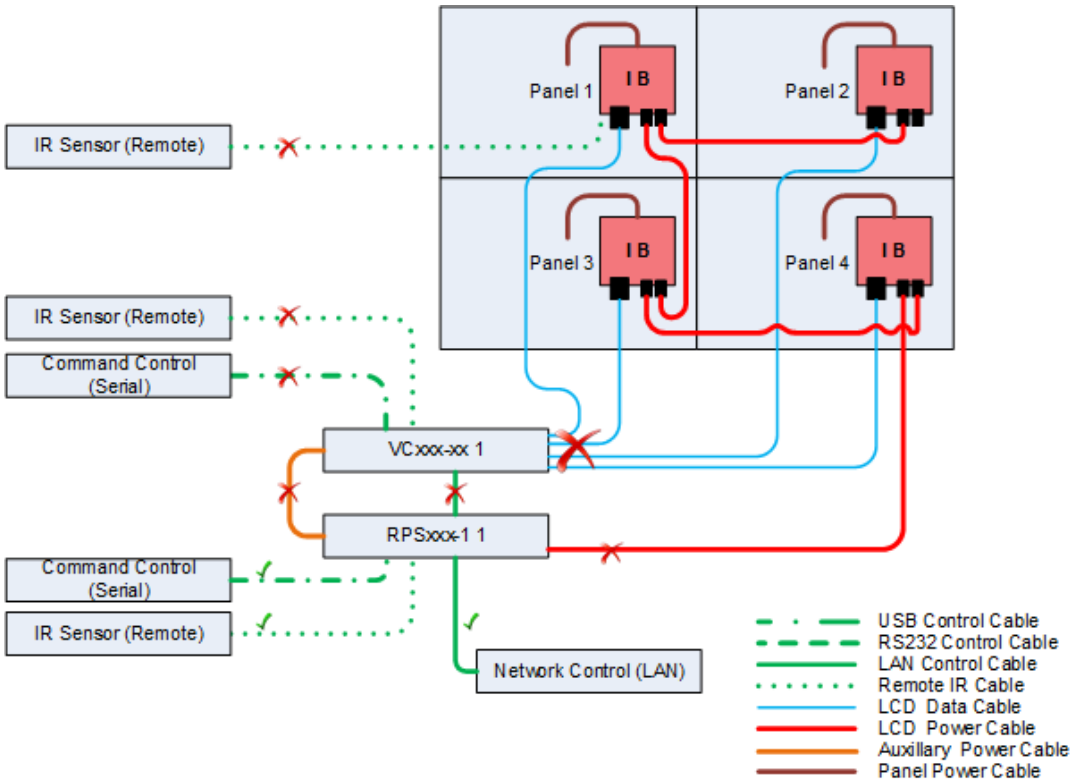
Note: 1920x1080 product is shown. 3840x2160 product uses two 4 out VCs.

Standby Power Wiring

The Clarity Matrix G3 LCD Video Wall System is capable of two methods of enabling a standby power mode when not in use, ranging from 3W per RPS to 30W per panel. These are referred to as "Low Power" and "Fast Start," respectively. To achieve the lowest standby power, the system requires a complete shutdown of all peripheral equipment powered by the RPS. This would mean that if control of the system were normally to be done through the peripheral equipment, this would no longer function and control would need to revert back to the RPS. Below are examples the active communication of components with either "Fast Start" or "Low Power" modes.



Fast Start Power Wiring



Low Power Power Wiring

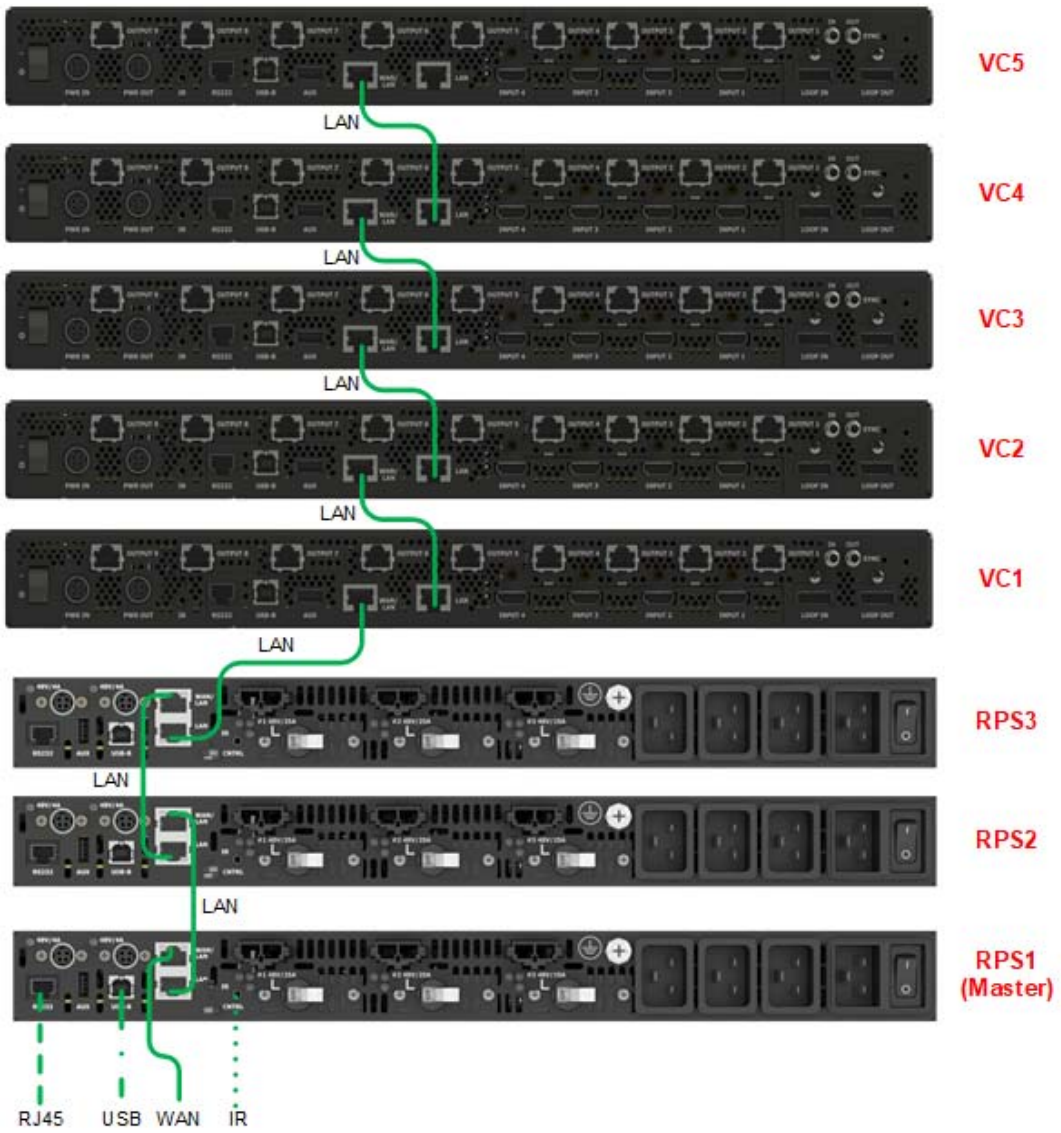
Note: It is important that RPS be daisy chained via the LAN connection prior to the VCs in order to maintain communication for Low Power mode. Not doing this will result in a system that may not be able to resume from low power mode. Also, see "Use of a Network Switch" on page 66 as an alternate wiring method.

The reason for choosing between these two modes are performance vs. power. If it is important that the video wall be ready to display at a moment's notice, then Fast Start is the method to employ. If downtime is frequent and/or overall power consumption outweighs the need for immediacy, the Low Power is the method to choose.

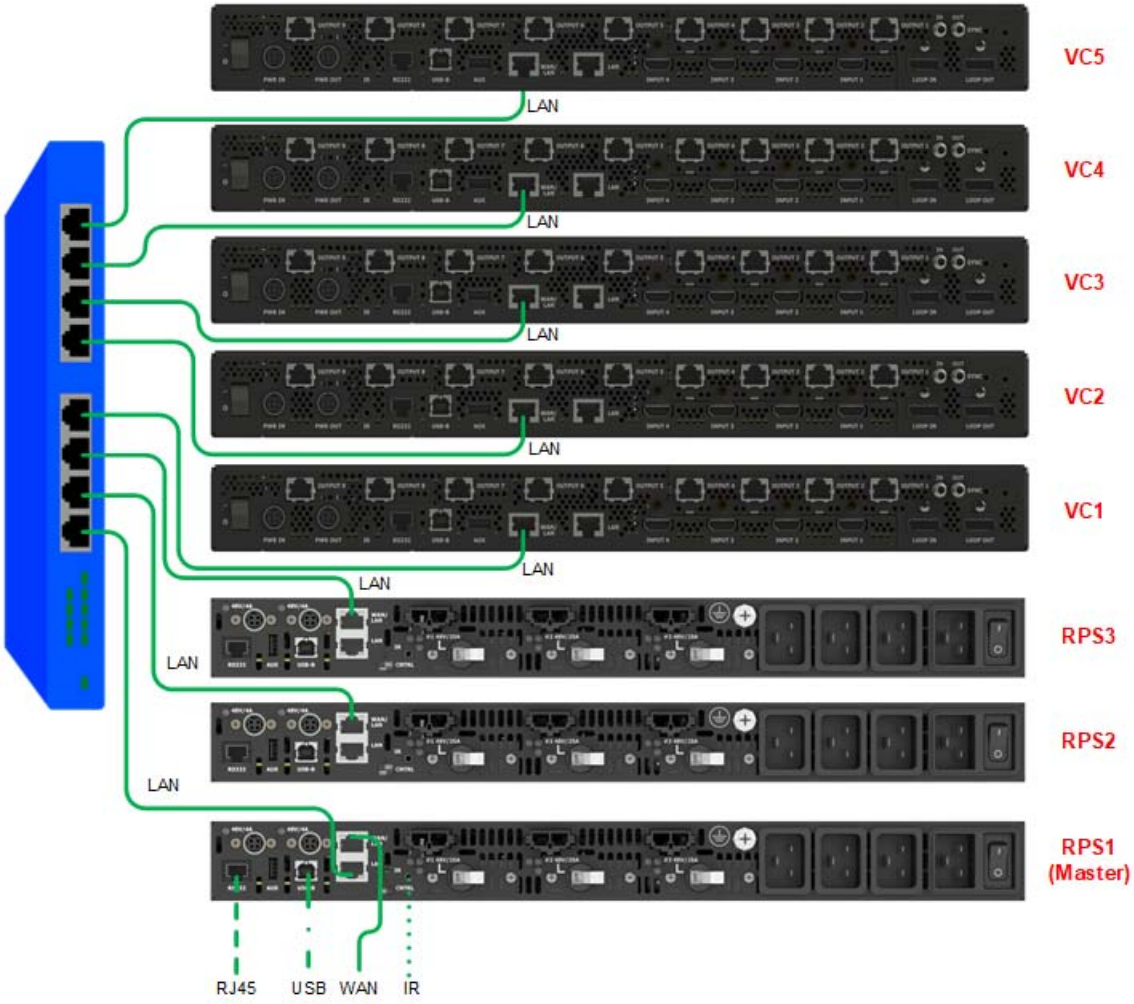
Note: The remote IR can be extended up to 30m from the connected equipment without any additional enhancement hardware. Depending on the installation, it may be possible to locate the IR sensor connected to the RPS near the wall so the control would always be active at that location. However, the time to live would still be delayed.

Use of a Network Switch

The rack components of the Clarity Matrix G3 system communicate with each other over an internal network connected through the LAN ports. Due to the nature of the physical connection of the ports on each piece of equipment is done in a serial manner if a piece of equipment fails, components down the chain will no longer have a communication path back to the master controller. In situations where communication redundancy is important, a network switch may be implemented to reduce the issues with this daisy chain failure scenario. Below are examples of a standard daisy chain communication implementation and a method using a switch as an intermediary connection between equipment.



Daisy Chain Network Connection



Switch Network Connection

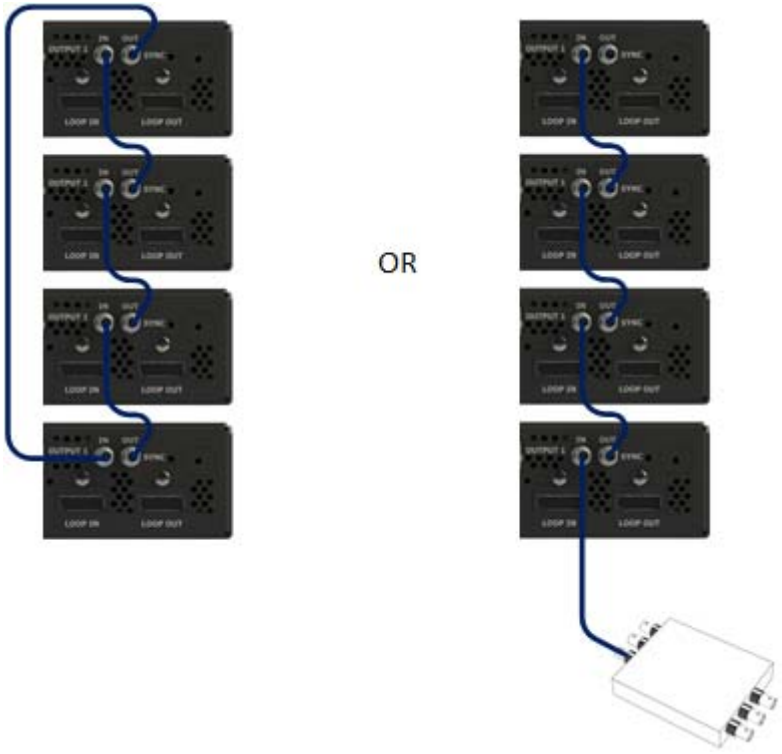
Note: Be sure the master is connected to the customer supplied Ethernet connection in both cases. If using a switch, be sure that only the WAN/LAN port is connected. Both ports being connected to the switch may result in data errors and/or poor performance.

Genlock

The video controller comes with the genlock feature automatically enabled. This feature automatically chooses the source that may be set up as the Planar Big Picture Plus if that configuration is chosen, or the system automatically selects the optimum internal clock to synchronize each video controller. To get the best from this feature, it is suggested that the HDBNC cables be routed between all video controllers creating a closed loop system.

For customers who require full control over the synchronization feature, it may be configured in the OSD or WallDirector menus. See the *WallDirector-RPS and Video Controller User Interface Guide* for Genlock setup.

Additionally, the system is able to recognize bi-level (blackburst) and tri-level reference signals from an external source. The external sync source should be connected to the "SYNC IN" in the first video controller in the genlock daisy chain.



Installation Checklist

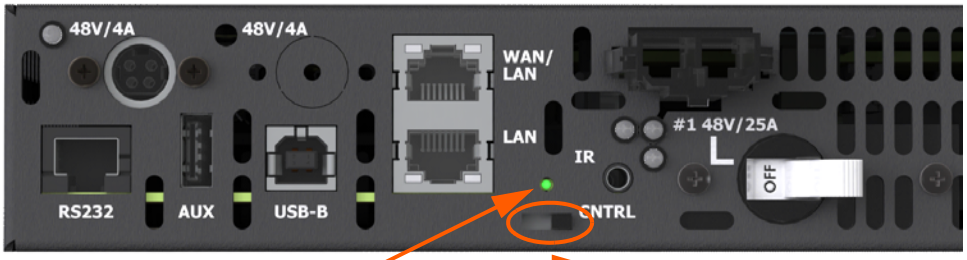
Use this quick checklist as a guide to ensure the installation is performed in the correct order.

1. Check shipment for required components.
2. Install video controllers and remote power supplies.
3. Install the LCD mount brackets.
4. Route cables from rack equipment to LCDs and route cables between LCDs.
5. Install LCD modules.
6. Use the software to configure the displays.

Component Connections

For best system communication and setup, all remote components should be co-located. The RPS has the ability to control the entire system from power to display communication. A single RPS should be selected as the main connection point to the network or control PC. This will be the master and is selected by the switch below. There can be only one master within a system, so be sure only one green control light is visible on any one RPS or there will be communication conflicts.

Note: For systems where the RPS and VC are not co-located, it is possible for the VC to be the master; however, note the reduction of controllable panels if a VC is used as a master. See page 71.



RPS110 Shown

Note: Follow these rules to prevent unstable system operation. When setting or changing the master, the power should be turned off. There should never be more than one master in the system.

The WAN/LAN connection on the master is used to connect to a network so that a device on that network can control and configure the system through the WallDirector software. (The default static IP for connecting to the master component is factory set to be 192.168.0.12 on port 24, however, the DHCP connection of the WAN will assign it an address for use over the attached network. To determine this address, see a connected VC front panel or see the *RPS and Video Controller RS232 User Guide*.) The LAN connection is used to further connect additional components that then create a system network IP connection. All external commands are handled by the master and then distributed through the system network.

Note: The system network addresses are automatically randomly generated for each component connected within the system. These addresses are default within the 169.254.xxx.xxx network.

When the VCs and RPS are connected together through the internal network, each component is auto-assigned an ID based the sequence in which the master in the system recognized they were added to the system. The ID assigning does not correspond to the cable connection order of the components. This ID can be changed after initialization or after full installation if required or desired. If there is no

need, then leaving the IDs as they have been initially applied is best. To find a particular RPS ID, the serial command set with proper communication connection will need to be used. See the *RPS and Video Controller RS232 User Guide* for more information.

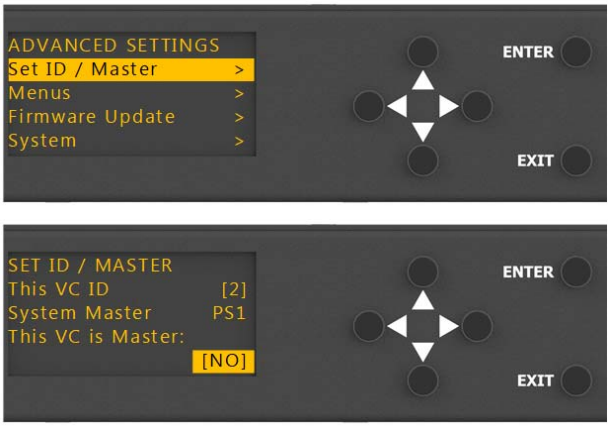
For the VC, the ID will be found on the front panel.

Also found on the front panel main menu is the master IP address for communicating with the system and all its components via the WallDirector software. See the *WallDirector, RPS and Video Controller User Interface Guide* on WallDirector usage.

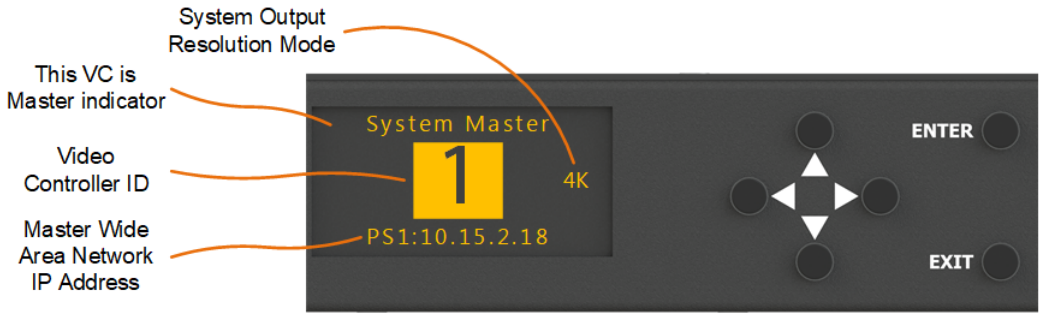
VC as Master

In cases where an RPS is unable to be master, it is possible to make a VC a master component via the front panel menu. All the same information and setup will be stored within the VC that is master. It is still important not to have two master components connected on the same internal network due to communication conflicts.

When using a VC as master, there is a total connected panel limitation of 36.



When a VC is set as master, the Front Panel Info screen will change as shown below for ease of recognition.



Connecting Sources

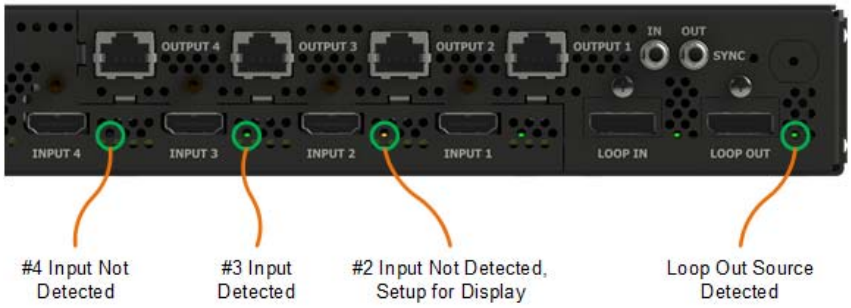
Note: If the sources are not connected at this time, the Matrix Layout (see "Matrix Layout Menu" on page 117) and color balance (see "Adjusting Color Balance" on page 119) may be done before sources are connected.

The digital inputs of the Clarity Matrix provide the flexibility to create a variety of configurations that can be displayed. There are three basic ways that these will most likely be used on the video wall.

- Spread one picture over the entire video wall.
- Display individual inputs into each LCD in the wall.
- Spread one picture over a section of the wall, or what is called a zone, and have individual inputs on the other displays.

Each video controller has four HDMI inputs, a DisplayPort input and a DisplayPort Loop out. How these sources are connected may depend on desired output to the wall. Become familiar with the configuration scenarios ("Configuring Sources for Display" on page 49) before connecting the sources. If in doubt, connect each source to the HDMI In connector that corresponds to the LCD connector where a source is to be displayed. If the plan is to use any form of the Planar Big Picture Plus, cable the Loop Out and Loop In connections as shown in "Configuring Sources for Display" on page 49. If there is an analog source to be used, there will need to be an analog to digital converter used between this source and the video controller.

The VC inputs have LED indicators next to each connector that indicates if there is a valid source detected.



VC9H-BP+ Shown

If a green light is shown, then there is a valid source available that meets the input specification shown on page 156.

If there is no light, then there is no valid source connected. If a cable is connected, it could be the source is in standby, off or not outputting a valid signal.

If there is an amber light, then a source is not detected, but has been set up within the system to be displaying on the video wall. This could be as above when there is no lit indicator or the system was set up to display the incorrect source.

The loop out connection has a similar indication scheme. A green light indicates a detected component is connected and off is no connection detected.

Placing Rack Components

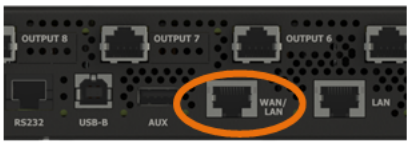
Place the video controller and power supply units in the area where they will be installed. If installed in a rack, it is recommended the power supplies be at the bottom and the video controllers above. See "Remote Power Supply Operation and Features" on page 164 for details on setting up the RPS.

Plugging In Cables to the Rack Components

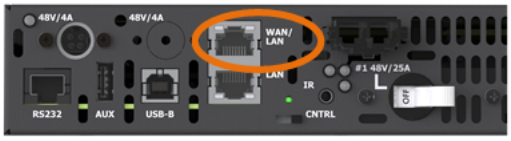
Choose the component that will be used as the master control for the system. Record the serial number for this component as it will be required as a password the first time that WallDirector is used to access the system. (See the *WallDirector, RPS and Video Controller User Interface Guide* for more information.) Once the rack components are placed, complete the following steps.

1. Insert the main control network cable to the WAN/LAN port of the master component.

Video Controller



Remote Power Supply

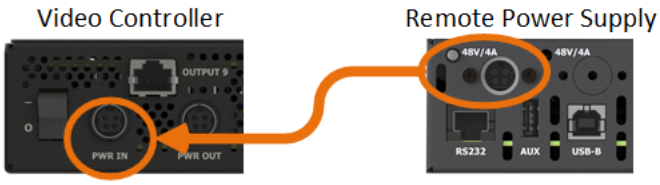


Note: If connected to an external network, this connection must have a DHCP service to assign the master an appropriate IP address for communication with the setup software, otherwise the network parameters will need to be set via the various user interface options.

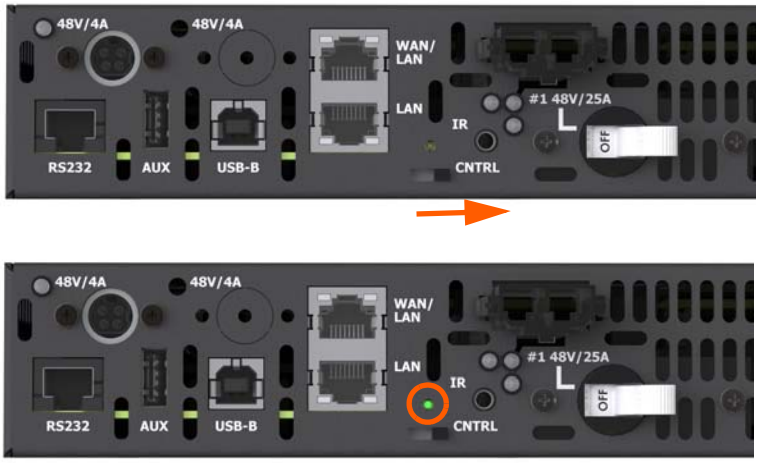
2. Serially connect further units from the LAN port to the WAN/LAN port of successive units, or see "Design Guide" on page 46 for details on how to connect via a network switch.

3. If the VC is master, skip to the next step. From the last RPS in this chain, connect the LAN port to the WAN/LAN port of a VC and follow the same looping scheme for successive VCs in the system.

4 For each video controller, plug one end of a power cable into the DC IN connector on the video controller and the other end into the 48V/4A power connector on the power supply module. The configuration may allow for a power loop through the VC. Make sure the total power in the loop does not exceed the 200W available from the RPS output. Refer to the power specifications for the video controllers on page 47.



5 If the master is a power supply, slide the CNTRL switch to the right (if AC power has been applied, the green LED will remain solid, indicating that this is the master control). If the VC is to be the master, be sure that power is applied and configure the component. (See "VC as Master" on page 71.) See the *WallDirector, RPS and Video Controller User Interface Guide* for keypad use.

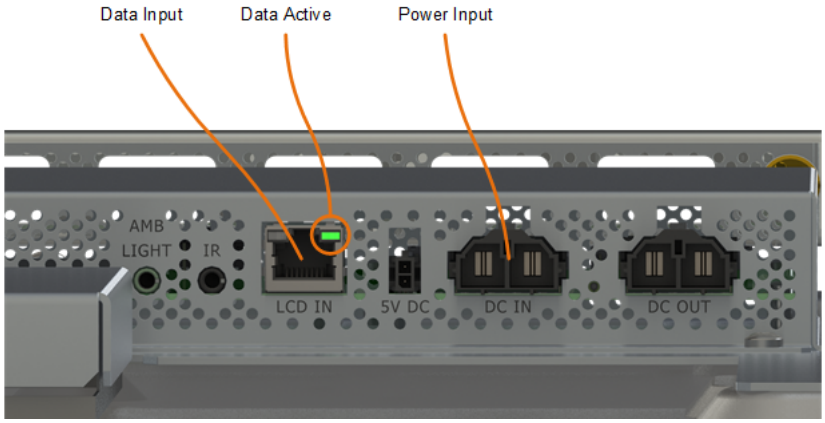


RPS Rear Panel

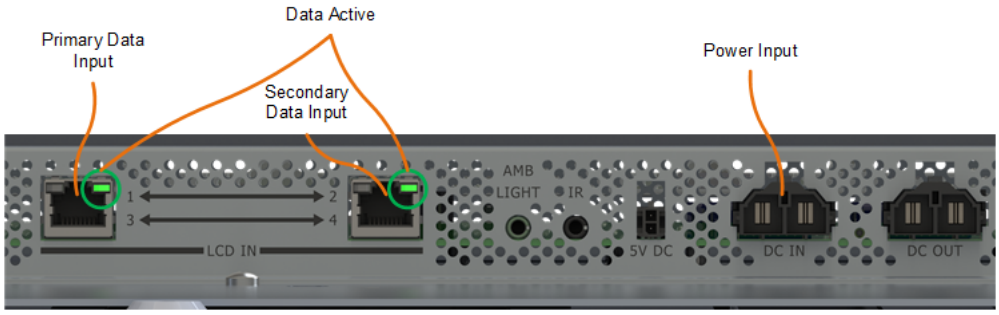
6 For each video controller, plug the CAT 6 cables from the LCDs into the Output connections. If the LCDs are connected and power is applied to the entire system, a green light will be visible, indicating that there is a good connection between the VC and the LCD. This light can also be found on the LCD interface board.

VC9H-BP+ Shown

Note: Check the cable connector to be sure it is free from debris or defects. Cables not constructed correctly may cause damage to the contacts within the equipment, resulting in intermittent connections.



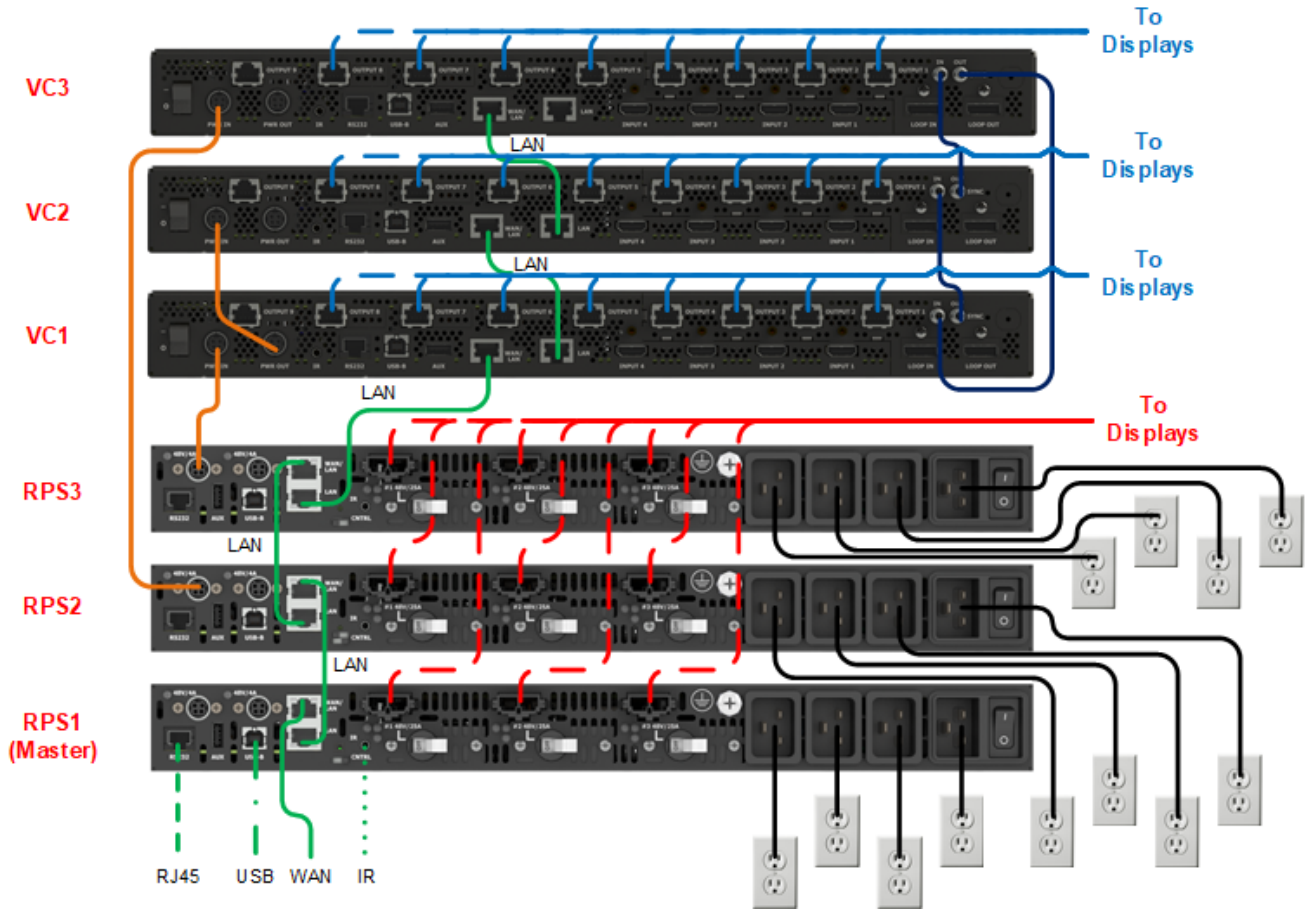
1920x1080 Panel Input



3840x2160 Panel Input

7 Insert cables connected to the sources into the inputs of the VCs and loop the signal between them accordingly. Refer to the "Design Guide" on page 46 for help in making proper connections for desired results.

Depending on the equipment, the connections will look similar to the picture below.



Wall Installation

Before starting to build the wall, keep the following points in mind:

- A structure that is plumb and flat will greatly reduce issues with mounting and alignment of the Clarity Matrix system.
- Mounts are to be installed first - do not remove LCDs from their boxes until the entire wall of brackets is installed, level and plumb.
- When hanging the mounting bracket and displays, start with the center and work out and up.
- After each row of mounts and displays is built, check it for level and plumb.
- All mounts in a row should be level with the bracket next to it within ±0.1°. Each mount should be square with the level surface by ±0.05°. Bracket wall planarity should not exceed ±0.5mm. For larger walls, we recommend assuring that the accumulation of tolerances will not prevent the proper positioning of the LCD panels.
- It is important to check communication between the LCD modules as each row is built. This will help minimize changes once the wall is fully installed.
- For optimal product performance, maintain components within temperature specifications. Occasional temperatures out of specification are acceptable for a short period of time.
- For touch walls, ensuring the wall is flat will greatly improve performance.

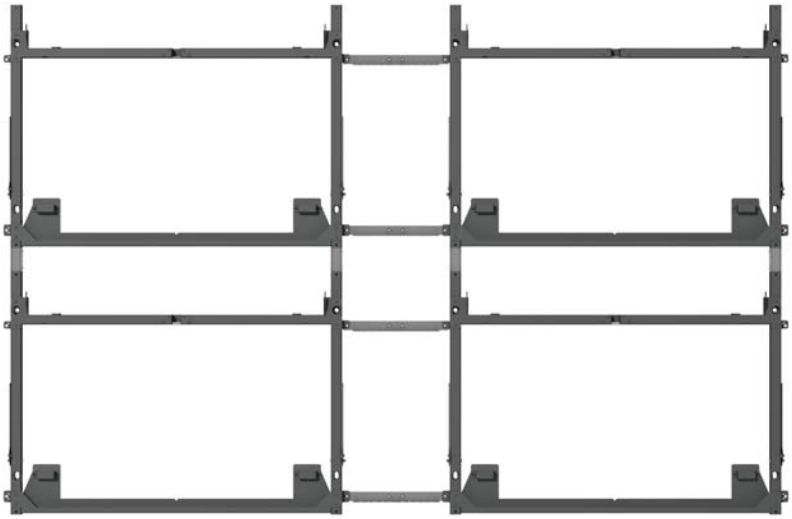
Wall Installation Options

There are three main types of Clarity Matrix installations:

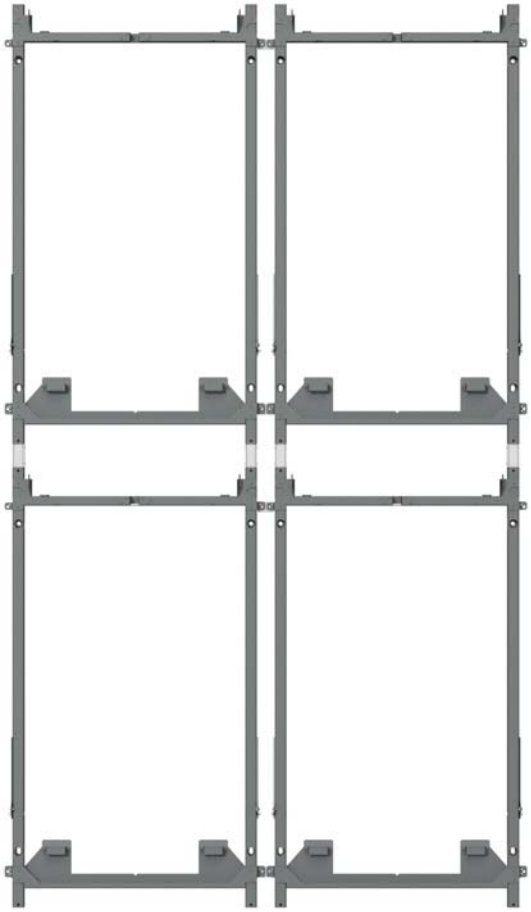
- Standard installation - mounted to a wall (see "Mounting Brackets to a Wall" on page 80)
- Column floor stand - maximum of 2.2m (7ft) without additional support
- 2 x 2 free-standing mount (46L only)

Installing the LCD Mount Structure

Planar EasyAxis mounts are designed to facilitate the thinnest profile LCD video wall. The combination of the mount plus the Clarity Matrix LCD module's "blade" design results in video walls that can measure 3.6 inches installed depth, screen to wall.



Landscape Mounting



Portrait Mounting

Mounting Brackets to a Wall

The basic concept of mounting brackets to a wall is to start from the center of the wall and build out the first row. It is recommended that the wall is a flat surface. If the wall is not flat, shims will need to be inserted in between the LCD mounts and the wall.

Caution: For whatever structure is used to mount the LCD wall, be sure that it is sufficiently engineered to handle the weight of the LCDs.

There are three standard brackets that are used for wall installation. An optional stud adapter bracket (landscape only) can also be used if mounting to plywood and want to mount to studs in a wall.

LCD mount	
Horizontal bracket (landscape)	 **Note:** A yellow finish indicates the bracket is meant for an ERO product.
Horizontal bracket (portrait)	 **Note:** A yellow finish indicates the bracket is meant for an ERO product.

Vertical bracket	 **Note:** A yellow finish indicates the bracket is meant for ERO product.
Wall stud adapter bracket (optional)	

Installing Brackets on the First Row of a Fixed Wall

1. Remove the LCD mounts from the LCD module boxes. Set aside the boxes with the LCD modules still in them for later installation. Unpack the horizontal/vertical brackets and hardware from the wall accessory box(es).

2. Use the drawings that correspond to the specific product ordered. Obtain the appropriate Product Outline drawings from http://www.planar.com.
   The LCD mounts are designed to mount with either four M6 or #1/4-20 hardware and a washer.

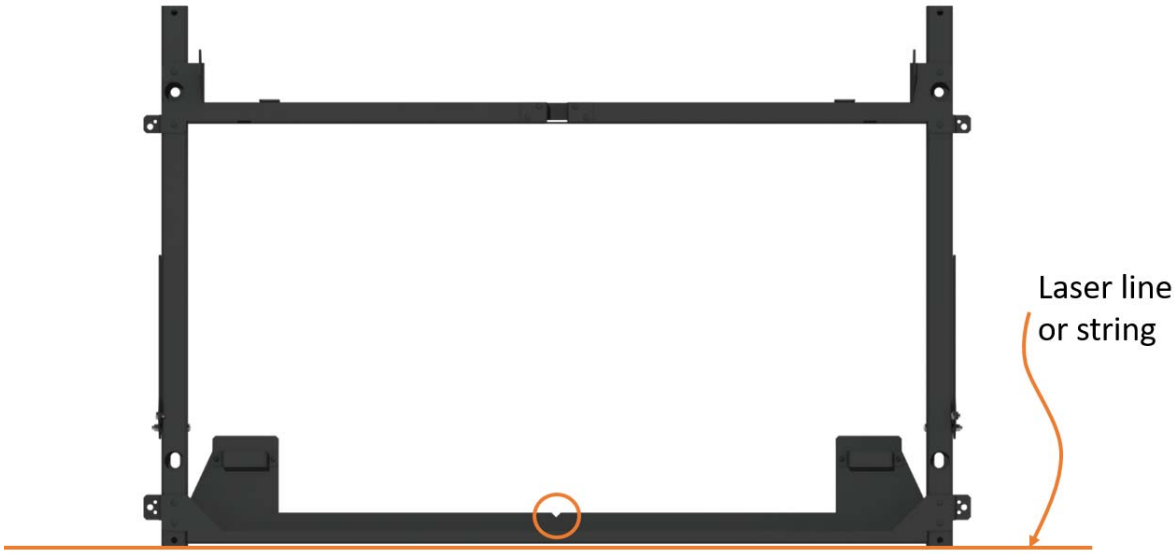
3. Determine the vertical center of the wall and then find the location of the closest display to this position.

4. Mark on the wall vertically where the center of that display will be. Using a pencil, make horizontal line where the bottom center mount will be. Use a string or laser level to continue the line for the rest of the desired wall. This will help maintain a level row while installing additional LCD mounts.

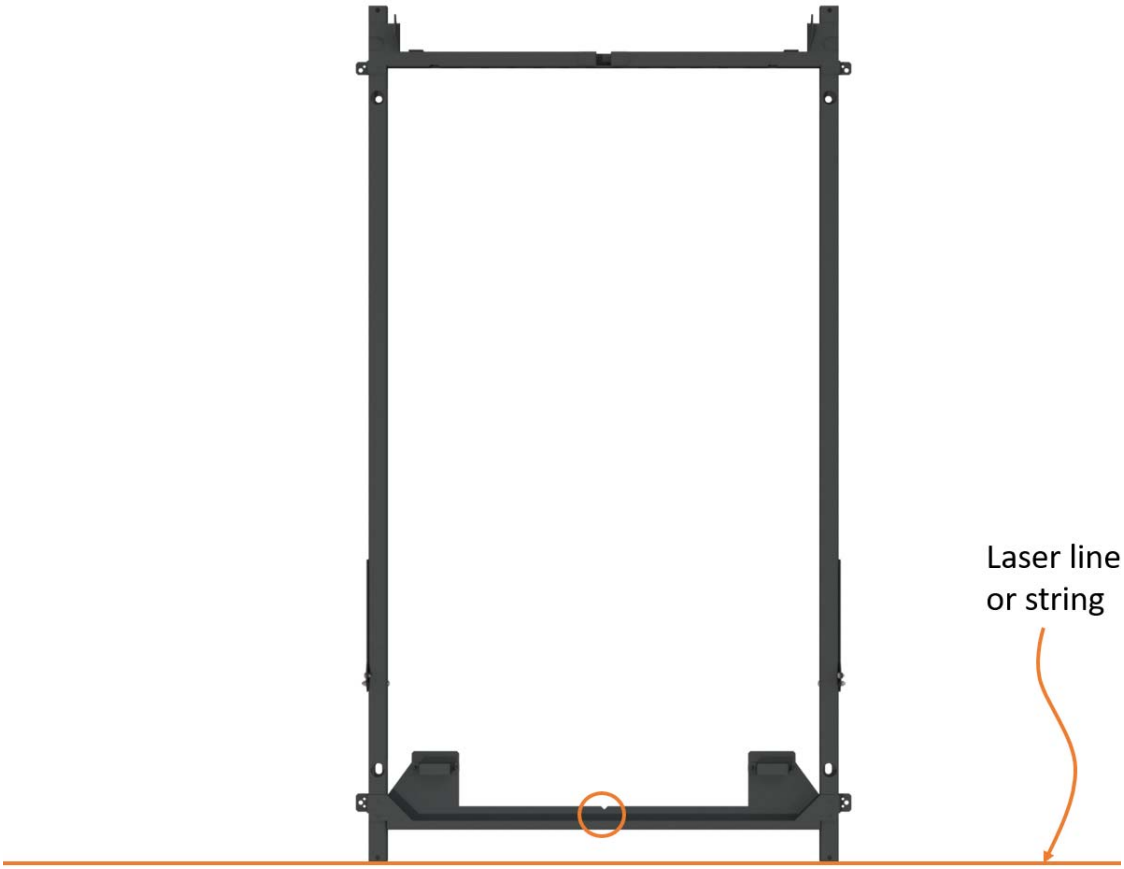
5. To pre-determine the proper mount points for the LCD mount, measure out or use a template. Then loosely attach the LCD mount.

6. Using a level (a digital one is highly recommended), level the bracket monitoring the string or laser level at the bottom.

7 Align the v-shaped notch on the LCD mount with the desired center of the LCD (this is done for the first bracket only).



Note: The mount shown is for a Landscape installation.

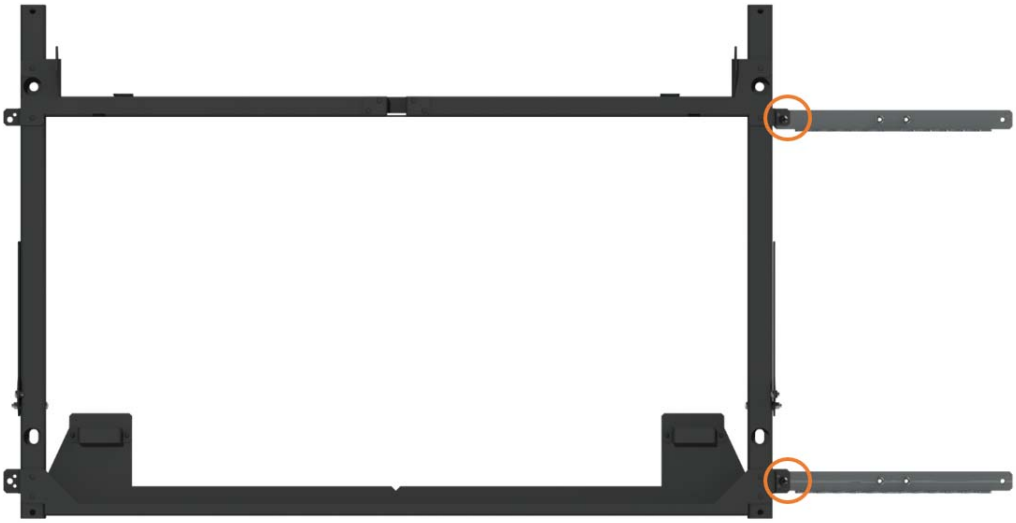


Note: The mount shown is for a Portrait installation.

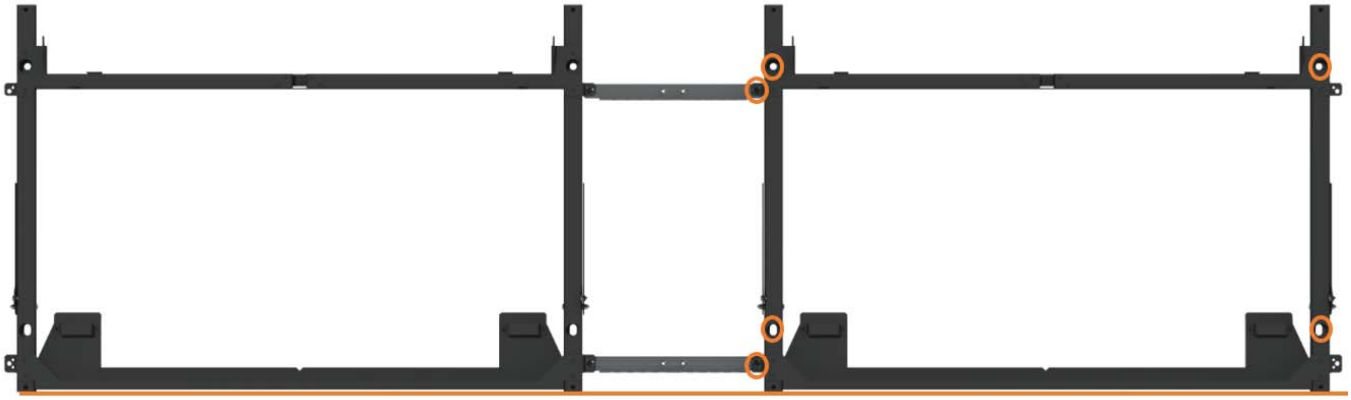
8 Tighten the screws holding the mount to the structure as necessary.

Note: Be sure the mount is flat as the screws are tightened. If it is not, use shims near the mounting points as necessary.

9 Attach horizontal brackets to the LCD mount that will attach to the next LCD mount to be installed.



10 Repeat steps **5**-**9** for the first row. Be sure to level all brackets with respect to the first mounted bracket.



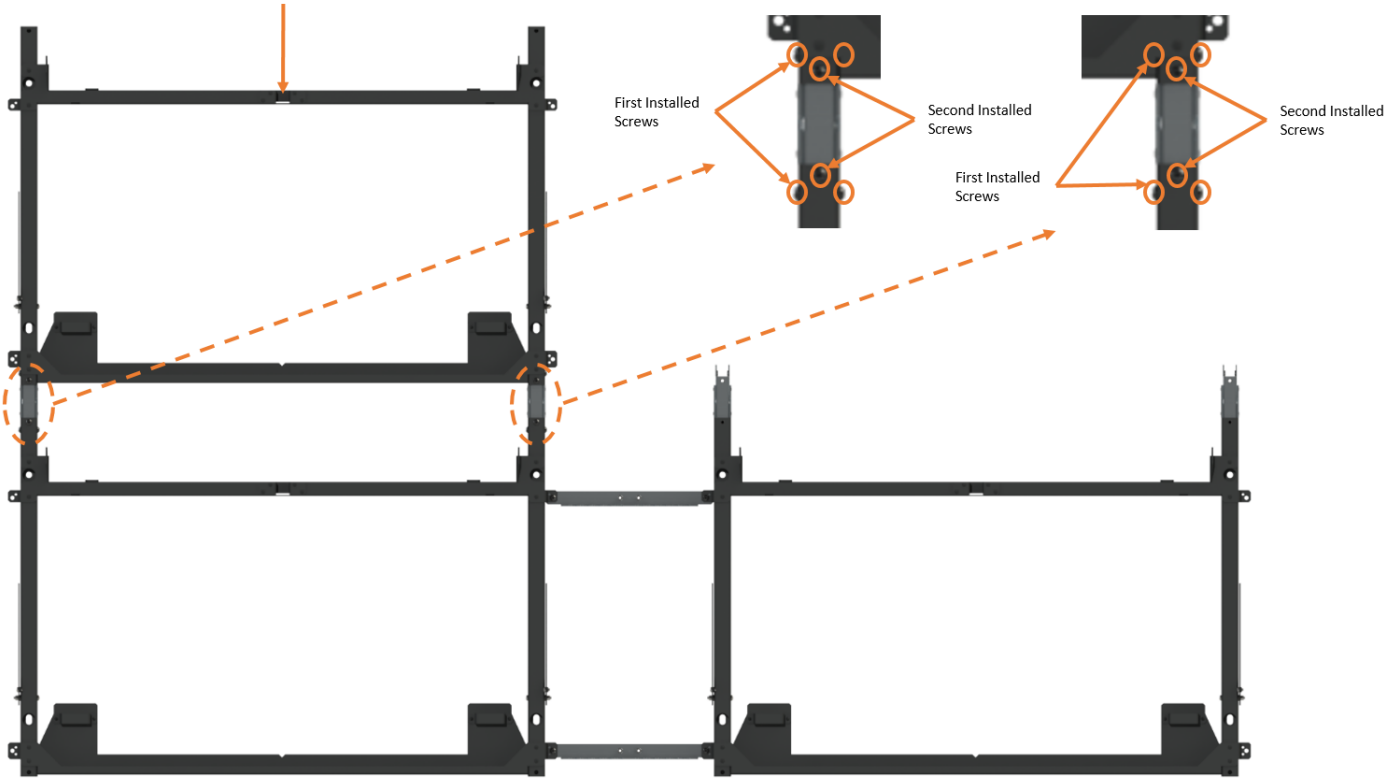
11 Using a digital level, make sure the first row is level. All brackets in a row should be level with the bracket next to it within ±0.1°.

Installing Brackets on Subsequent Rows

1 Insert the vertical brackets across the entire row as required.

2 Starting again in the middle of the wall, install the LCD mount into the vertical brackets.

3 Install the screws provided attaching the vertical spacers to the LCD mounts.



Note: To help keep the mounts plumb as the wall is assembled vertically, tighten a bracket screw from one side first and then the other side. Be consistent in the side tightened as mounts are assembled to one another. Before installing the other side screw, install the one on the front.

4 Loosely attach LCD mounts to the wall.

5 Install the horizontal brackets. As each new set of mounts is added, make sure the row continues to be level and plumb. Tighten the screws that attach the LCD mount to the wall. Repeat this process for all of the LCD mounts and horizontal brackets in this row.

Note: Be sure that the mount is flat as the screws are tightened. If it is not, use shims near the mounting points.

6 Using a digital level, make sure the row is level and the columns are plumb.

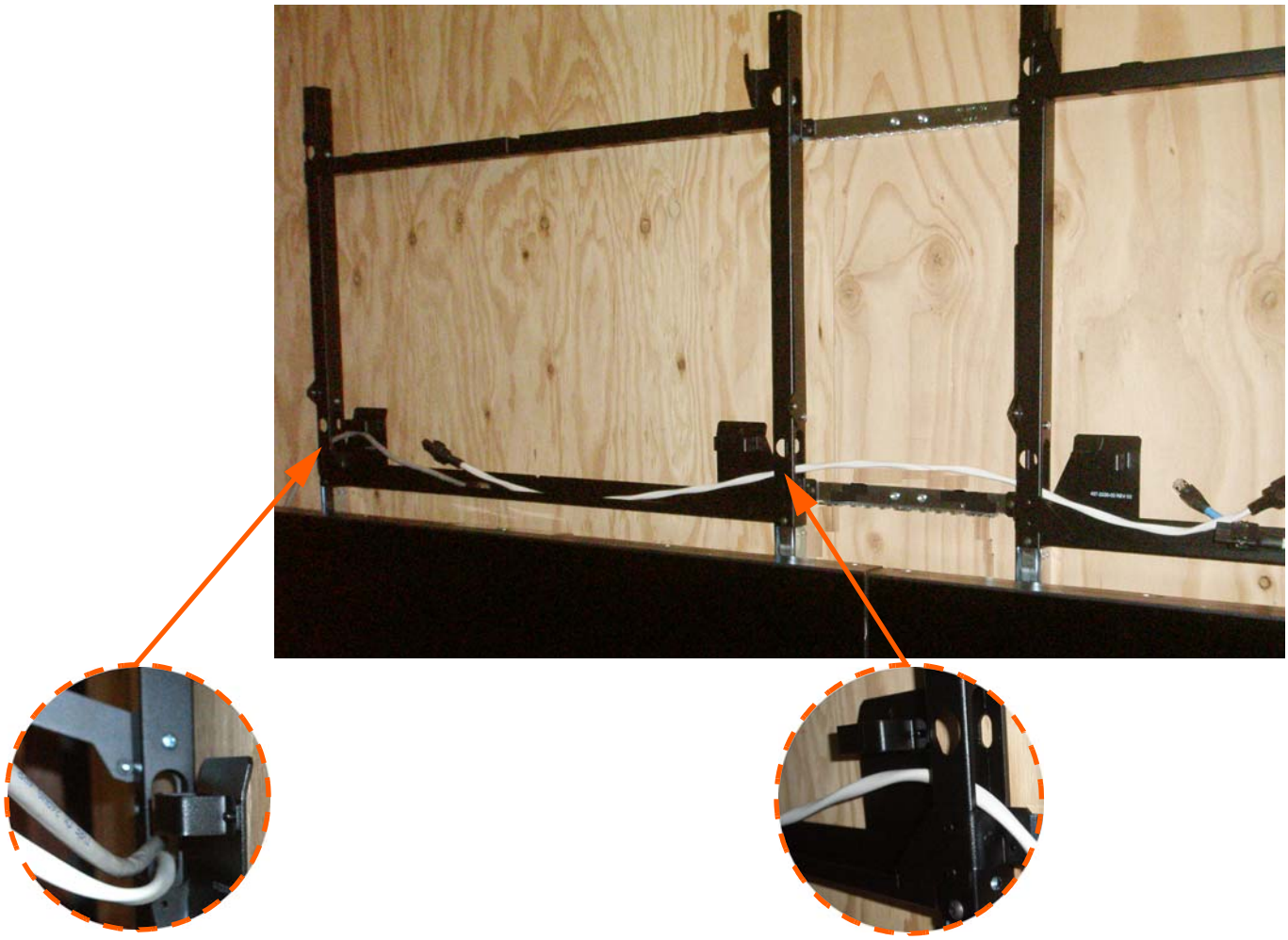
7 Repeat steps **1**-**6** for each row added.

Routing Cables

Before installing LCD displays, route cables through the LCD mounts. Notches on the horizontal brackets make routing cables easier. See "Routing Power Cables" on page 89 for information on how to connect components together.

1 Route power and video cables between the LCD mounts and then through the side hole near the bottom of the LCD mount. Place cables in the LCD mount channel so they are out of the way.

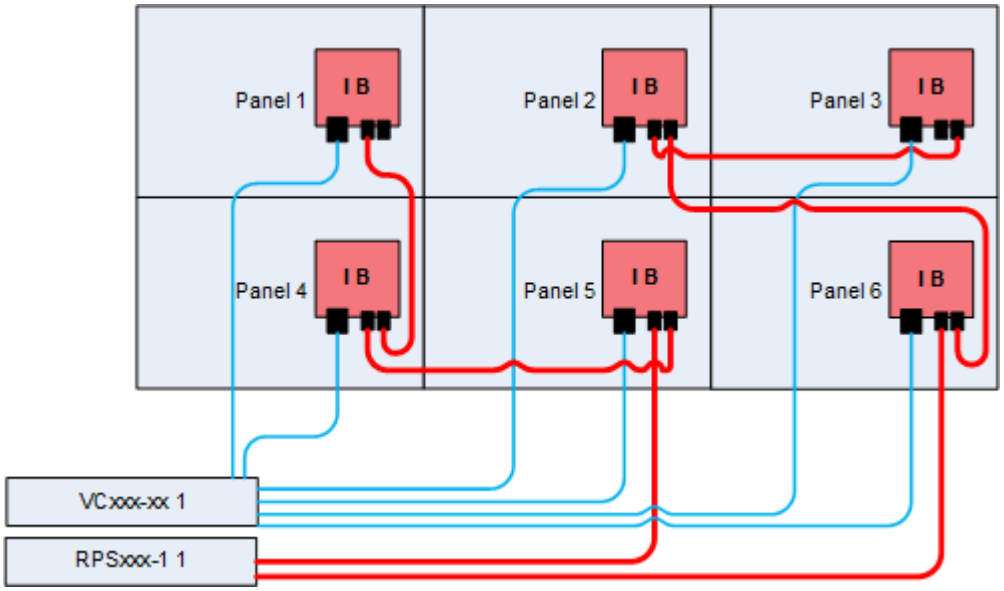
Best practice for routing heavy cables



Note: It is recommended that the cable label-maker be used to identify each cable before it is installed.

Note: It is recommended that 0.5m (2 ft) of cable be left beyond the LCD mounts to ease connection. The excess cable can be pulled back as the panels are put into place.

2 Route power and video cables from the brackets to the rack equipment for the entire wall. For ease in troubleshooting and configuration, we recommend that video cables are routed together in “clusters” when possible; however, this will greatly depend on the content to be displayed and how the source routing needs be done at the equipment. Use one video controller and (up to) nine LCD displays in each cluster. Pick a rectangle of LCD displays and connect them all to the same video controller. For ease of turning on displays as they are installed, we recommend that the power cables be routed from the bottom center out whenever possible.



Note: For most configurations of the wall, any arrangement of rectangles may be chosen. But for configurations that will have multiple sub walls, plan the configuration before choosing the clusters of LCDs. See "Design Guide" on page 46 for more information.

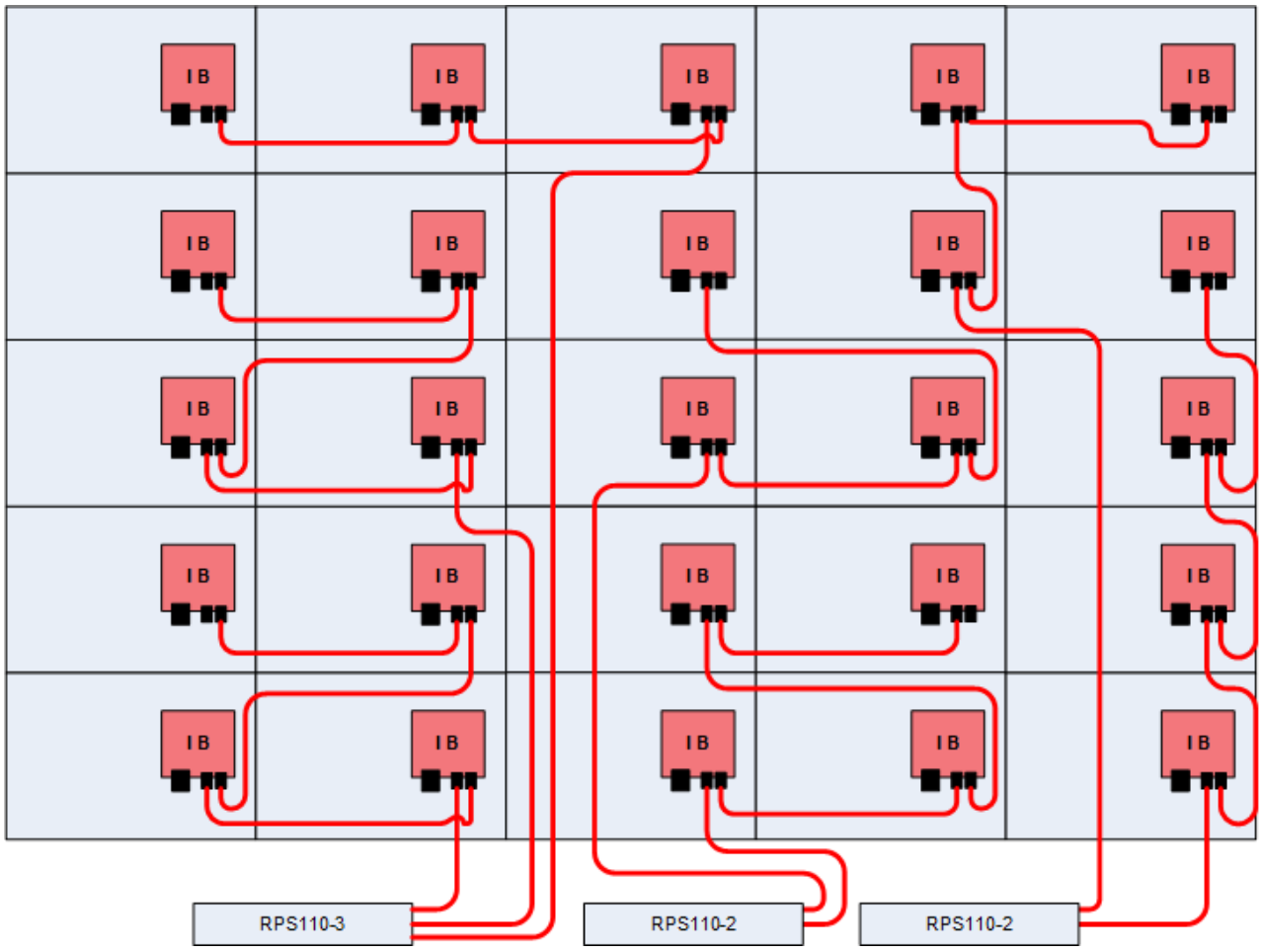
When routing the cables from the VC and RPS to the panels, it is important that any excess over 3m (10ft) is not coiled. For data this can cause video artifacts. For power this can cause a thermal concentration beyond the cable jacket rated specification. It is also recommended that the data and power cables are kept separate during routing.

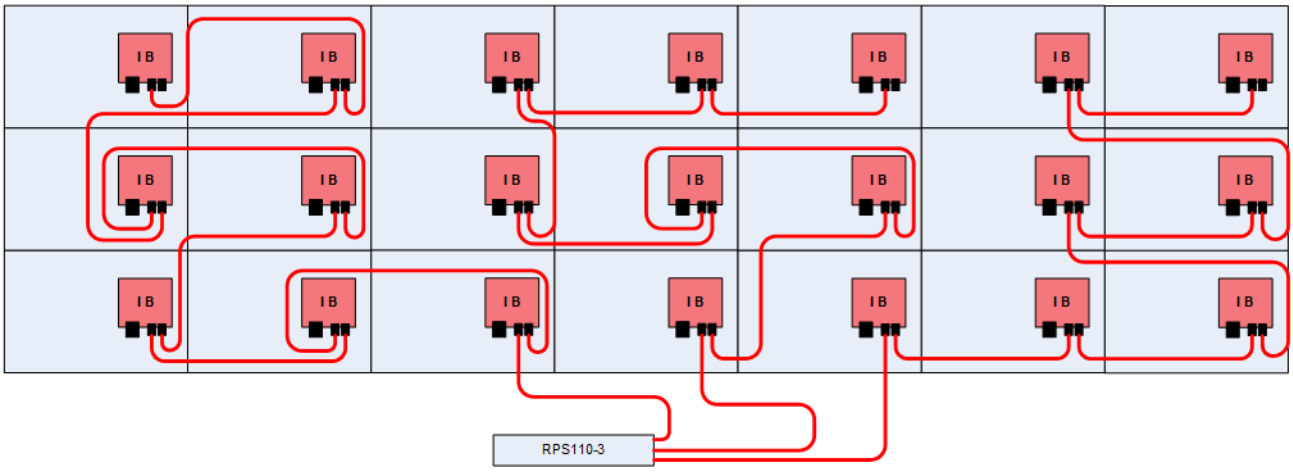
Routing Power Cables

Power Cable Routing

The number of LCDs that can be driven by a single power output was shown in the section "Calculating DC Power Requirements and Component Heat Load" on page 47.

Power cable looping should start with the center LCD and move outward and upward, to the LCD number limit defined by the power calculations. Below are two examples of a power wiring diagram illustrating an example of loop-through cable management for video walls. Note that the entry point for power from the RPS is in the center/bottom and the routing is generally outward and upward.



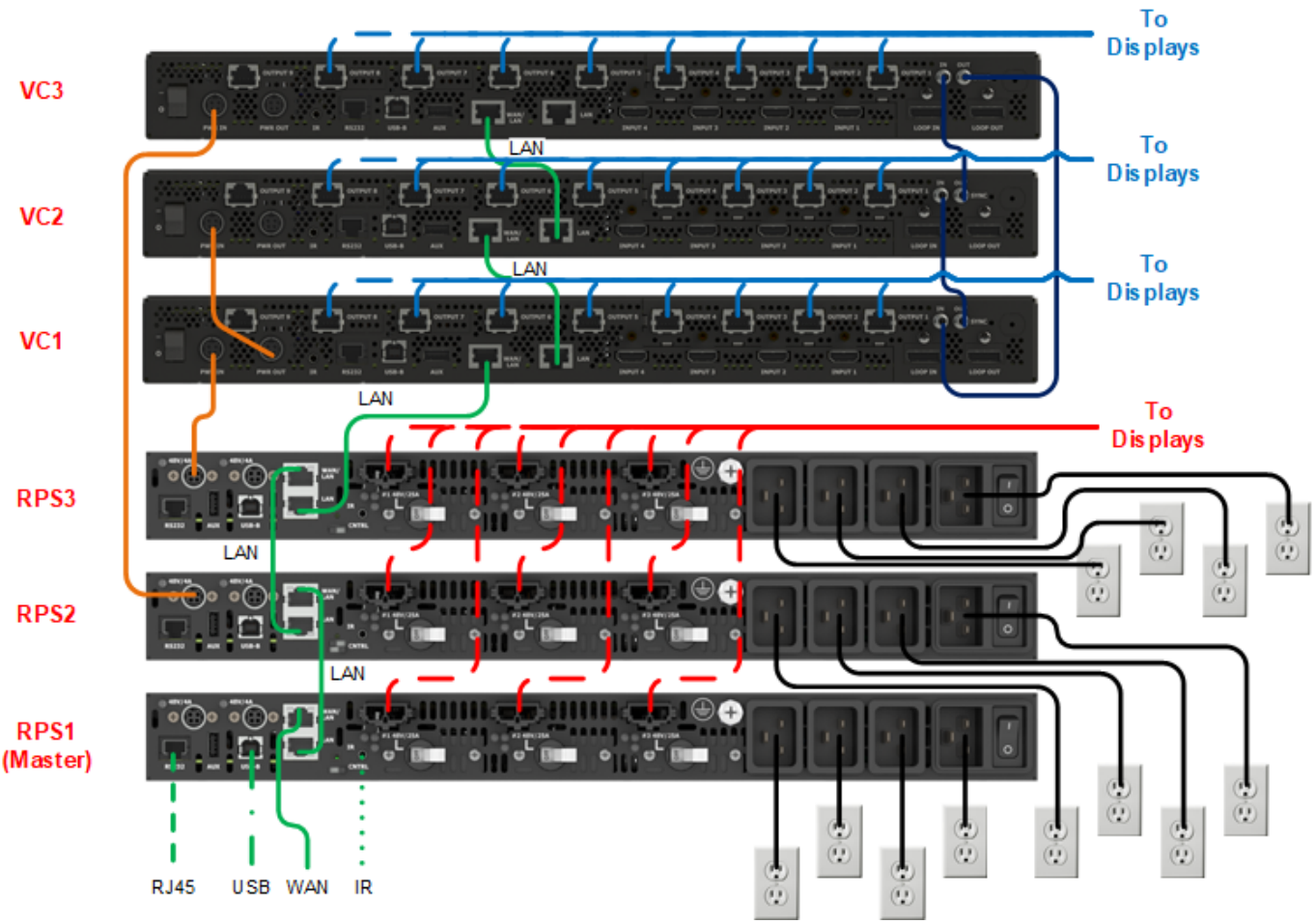


If power cables built were not ordered from the factory, ensure that the pinout on each end of the cable is correct for polarity. Cables built incorrectly may result in display damage.

Video Cable Routing

Before routing video cables to the displays, see "Design Guide" on page 46 for best results.

First, connect the RPS in a cascade manner and then connect the first VC to the LAN output of the last RPS in the cascade. Continue the cascade of the VCs like the RPS that had been connected previously.



Now connect all the power inputs of the VCs to the power outputs provided by the RPS. Depending on the number of VCs, they may need to be cascaded as above. Be sure the power input of the VCs connected and do not exceed the limit of the output on each connector of the RPS when cascading power. See "Calculating DC Power Requirements and Component Heat Load" on page 47 and RPS specifications on page 174.

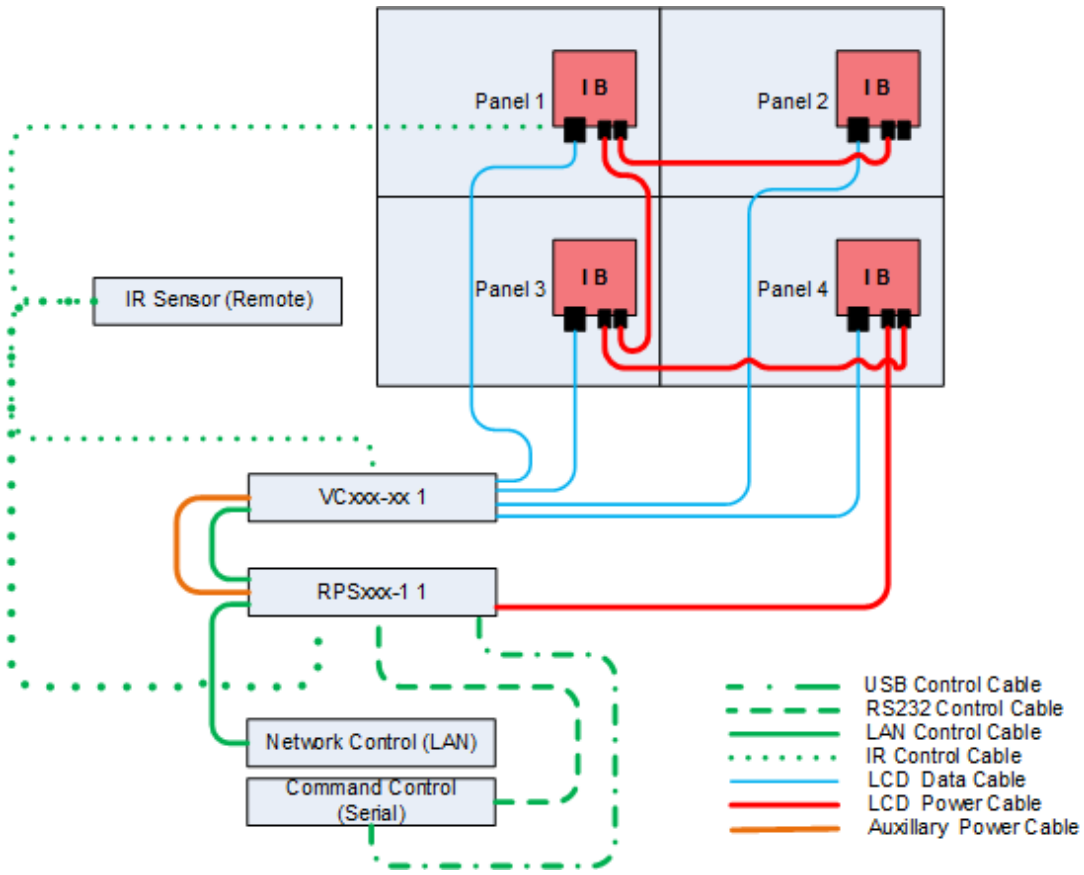
Depending on the setup, there is availability to connect control systems to the master as shown above. These control communication can be done via network as described above, serial control or remote sensor. Depending on the placement of these components, it is possible to place the remote IR sensor at the wall plugged into a display, but certain commands cannot be undone without communicating directly with the master later.

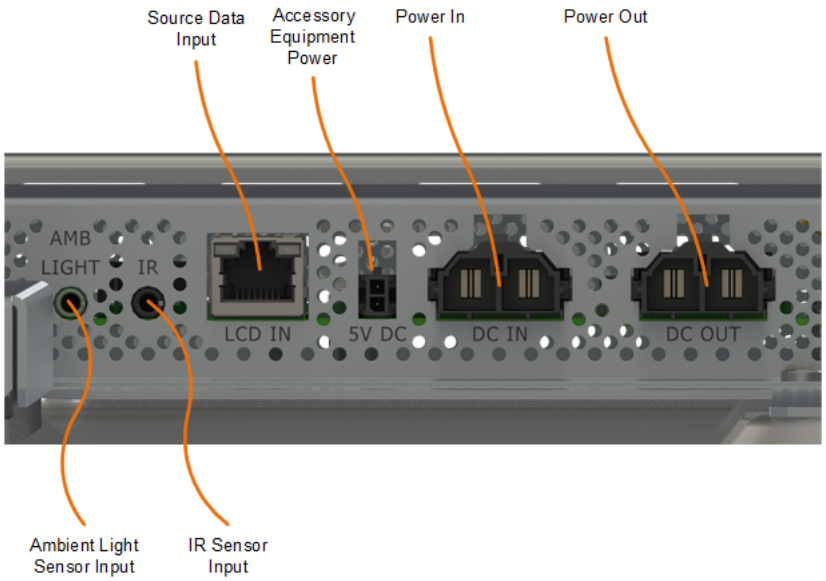
For example, the system has a power standby feature that can limit the power draw of an RPS to less than 3W. This can be activated through the remote via the IR sensor connected to any component. This is accomplished through the complete shutdown of all power outputs on a RPS, which in turn shuts down all components connected to a RPS. Any communication device connected to the displays or VCs will now have no effect due to lack of power. The only way to once again power the entire system is to communicate with the master RPS via one of the communication ports or via an IR sensor connected to the RPS.

Note: It is preferred that the communication ports of the master be used for control, however, any RPS in the local network chain can be used for this function.

Display Connection

Each 1920x1080 display connects to a VC via a data cable as shown below. This cable carries source data as well as commands that can change individual displays or globally over all displays. Additionally, data is sent back to the master detailing status and wall configuration.





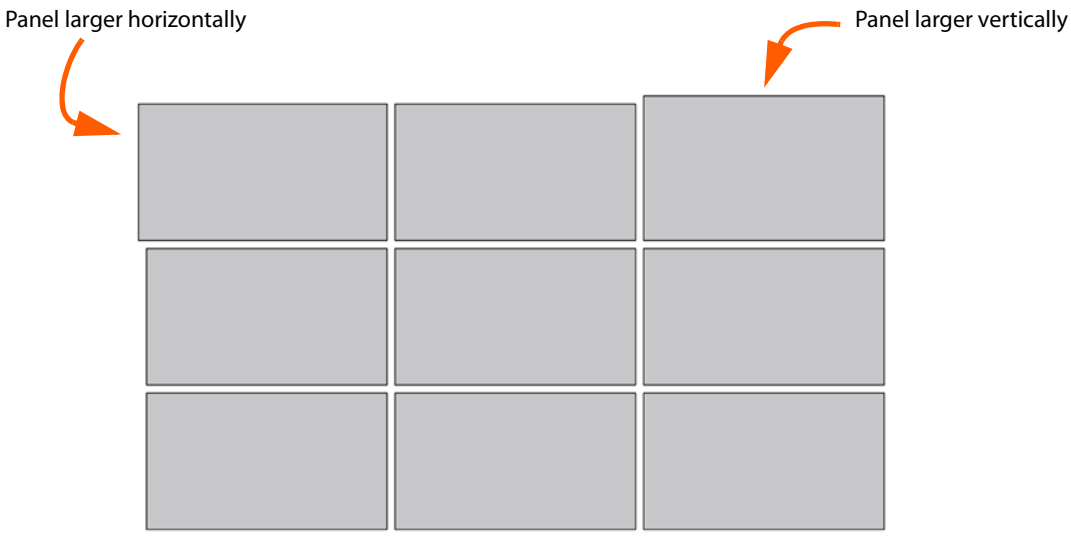
Installation Considerations; Tips for Adjusting Walls

The basic concept of installing LCDs in the wall is similar to installing brackets. Start from the center of the wall and build out the first row. As each row is completed, ensure the entire row is level.

Caution: It is important to check communication between the LCD displays to the video controller as each row is built. This will help minimize changes once the wall is fully installed.

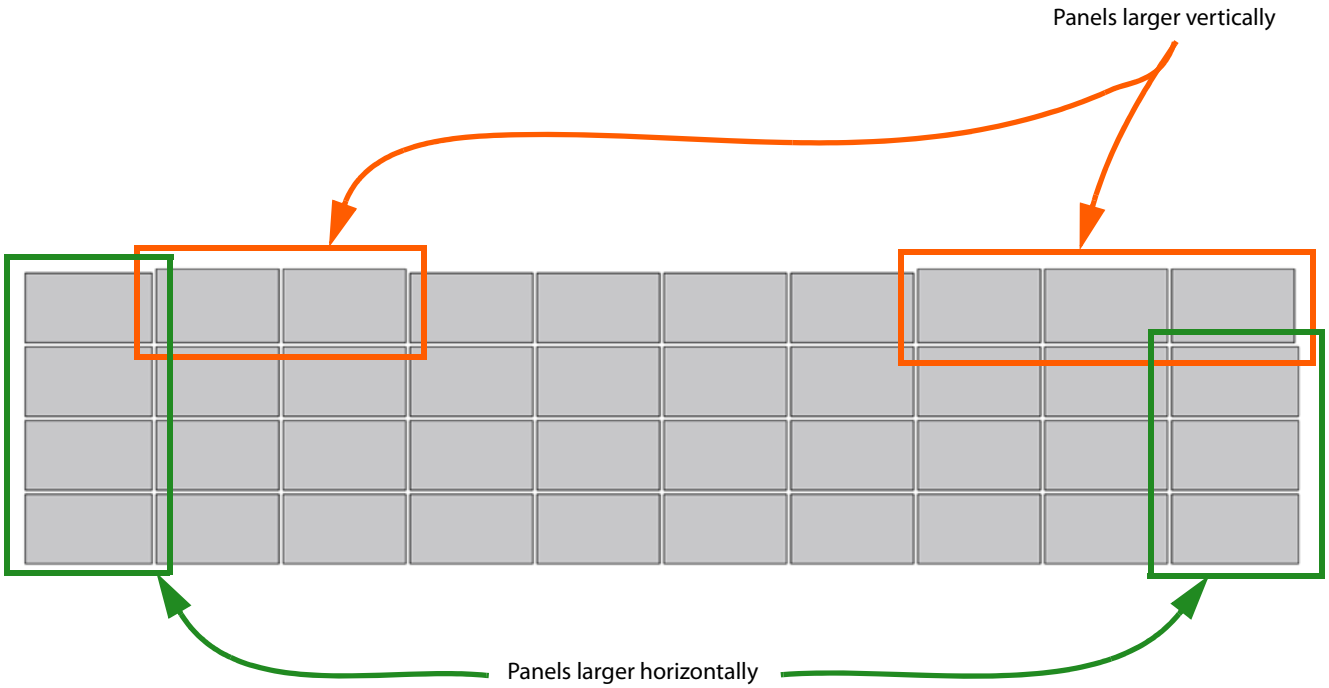
While the Planar EasyAxis mounts are designed to align the LCDs with one another, note that some LCDs may not match in overall size to the majority of LCDs. While most panels are the same size, there are some that can be larger or smaller by a minute amount. When this is the case, it may be difficult to align the seams of all units exactly.

For small walls, these larger or smaller panels can easily be moved to the outside corners (top, sides), depending on which dimension is larger or smaller than the others.



Panel sizes and spacing are exaggerated in this diagram.

For larger walls, it may be necessary to group these units into rows or columns throughout the installation or at the edges.



Panel sizes and spacing are exaggerated in this diagram.

Note: It is important to install displays so that there is a physical gap between units. Due to thermal expansion, module dimensions will grow after they have been turned on. This growth should stop after about one hour depending on ambient conditions. If the wall was installed without a proper gap between units, this can lead to the modules contacting one another and creating stress on the LCD. This stress can lead to bright spots or non-uniformity where the contact occurs and possibly damage to the LCD itself. When the units are turned off the LCD's will contract to their original size and the gaps will return to their installed size.

As with the mounts, LCDs should be installed in the middle of the wall first and then added outward from there. This enables use of the adjustments by splitting the tolerance build-up to the left and right.

Installing the First or Bottom Row

Note: Wearing the provided gloves will prevent smudges that would need to be cleaned later.

1. After successful in-box testing of the LCD display, remove the LCD that will be installed from the LCD shipping box.
2. Remove the LCD from the bag and then remove the mylar sheet and tape from the LCD module. *Be careful when removing the tape so the bezel is not damaged.*
3. *Two* people should lift the LCD into place. Each person should put one hand on the handle of the back of the display and one hand on the bottom of the display.

This picture shows an MX46 Landscape installation.

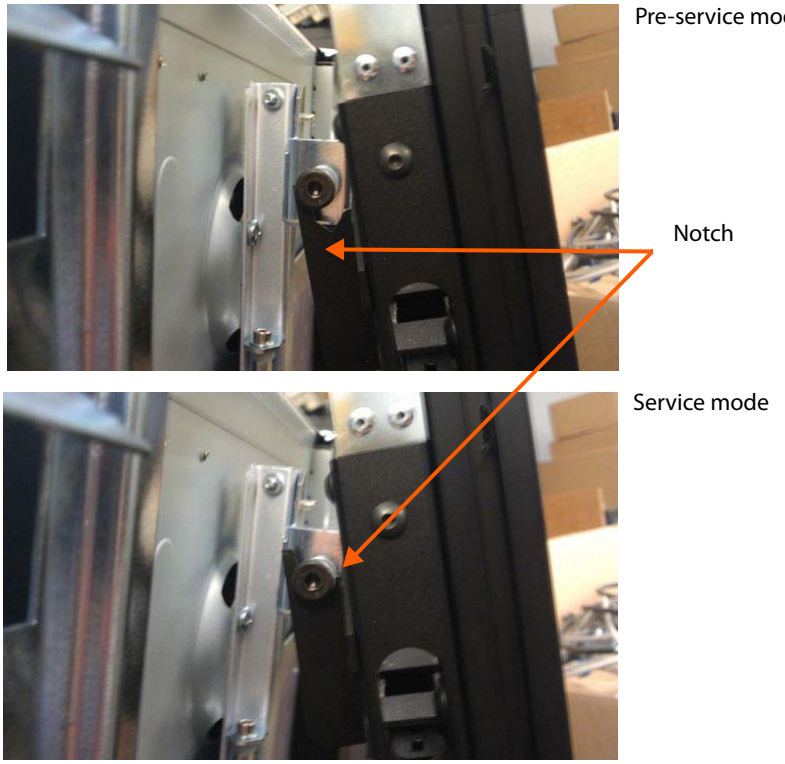
Caution: Be careful to limit contact with the thick edge of the bezel on the LCD, as electrical connections beneath the bezel can be easily damaged. Avoid resting the LCD on the corners, as doing so can cause damage. If the LCD needs to be rested against a surface, it should be rested face out and on the LCD edge that has the thinner bezel (LCD bottom surface).

Correct position
All for corners touching a solid surface
Angle no more than 10° from vertical

Incorrect position

Never rest the LCD on a corner!

4 Starting in the middle of the wall, slide the horizontal support pins on the back of the LCD into the notch of the LCD mount. The LCD module is now in the pre-service mode position.



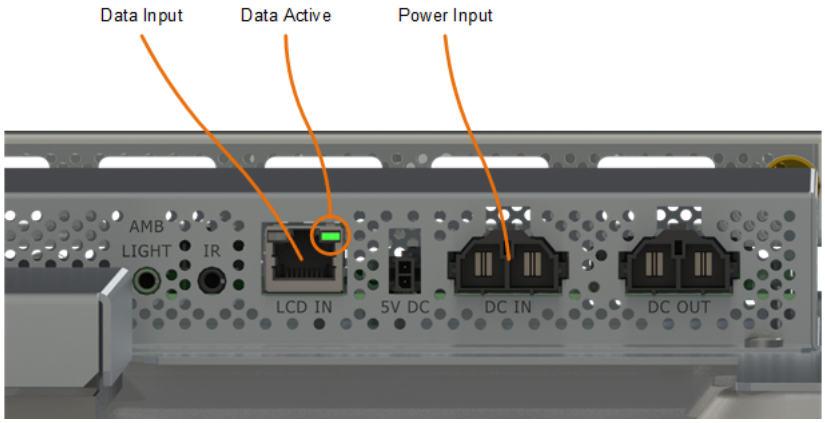
5 Connect the Cat 6 video cable from the video controller to the LCD IN connector on the bottom of the LCD.

Note: By default, VCs ship with the outputs set to 1920x1080 resolution. To change this to utilize a 3840x2160 panel, a VC will need to be connected to a 3840x2160 panel. When plugging a 3840x2160 panel into a VC for the first time, it will require a reboot of the system for the VC to switch to outputting a 3840x2160 signal. Not rebooting will result in unresponsive behavior such as no OSD, splash screen or image. It is recommended once all VCs are in place and powered, a 3840x2160 panel be powered and that this panel's connections (Primary and Secondary) be plugged into all VCs (Output 1 and Output 2) for a period of five seconds each to switch the VC to the correct output. Once all VCs have been connected, a reboot of the system will enable all VCs to function normally. If replacing an existing VC with a new VC, this same process will need to be implemented for the new VC.

Note: About connecting power supply cables: The power for one of the displays will come directly from the power supply module. Then power for the next display can be looped out of this first one into the second one. The order in which these are connected does not matter, however, if connecting to a panel position that does not have power, the display will not work until the previous positions are installed. See "Routing Power Cables" on page 89.

Note: Disconnecting power from a panel will disconnect power from any panels connected down the power chain.

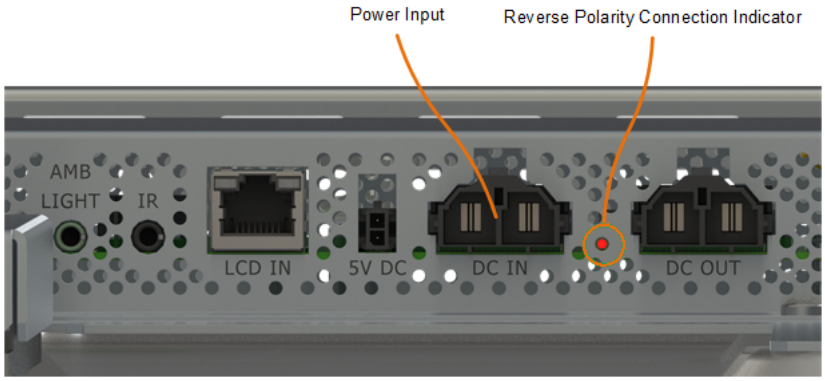
6 Connect the power cable from the power supply module to the power connector on the bottom of the LCD. The power cable may come directly from the power supply or from another LCD's DC Out.



1920x1080 Resolution Panels

7 Turn on the power supply and the video controllers. Make sure picture information is flowing in the video connection; look for the green light on the connector.

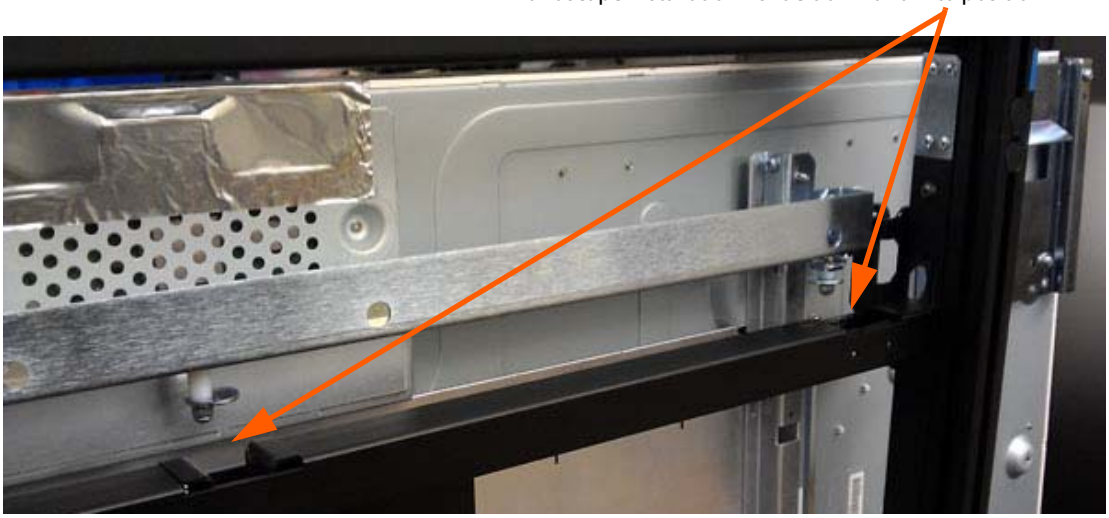
Note: If there is only a red light as noted below, then the power connection is reverse polarity. Remove the power cable and check for proper pinout.



Note: A splash screen will briefly appear after the system has been initialized and then a white field will remain on until a source is assigned or the pattern is removed through the user interfaces.

8 Slightly lift on the handles and move the panel toward the mount. Once the panel cannot move toward the mount further, the panel can be lowered so that the adjustment cams slip into their nests.

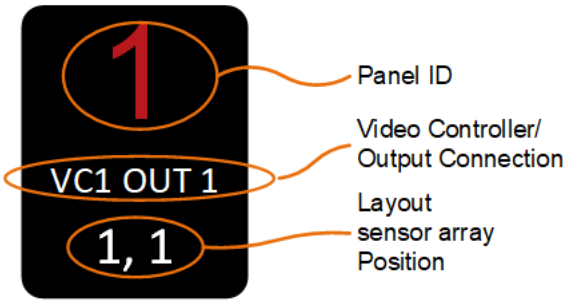
Landscape installation - Slide down and into position



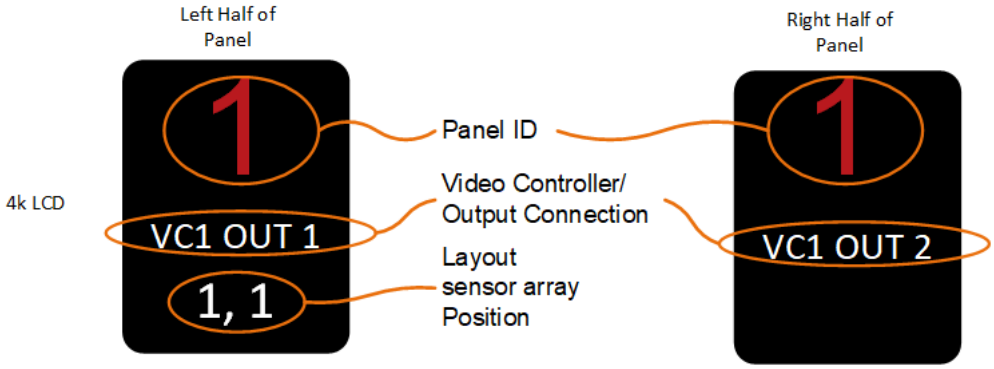
Portrait installation - Slide down and into position

Note: If the display is not seated properly, make sure the x-axis and z-axis adjusters are seated in the correct positions. (See steps **16**-**17** of this section.)

9 Verify the position sensors are working by displaying the on-screen menus on the LCDs. As a LCD is connected to the system, it is assigned an ID similar to how the remote components are assigned an ID. As displays are added, they are assigned the next successive number not previously assigned. This ID will change after the auto-layout procedure is completed. This will be done after the entire wall has been physically installed and connected.



1920x1080 Resolution Panels

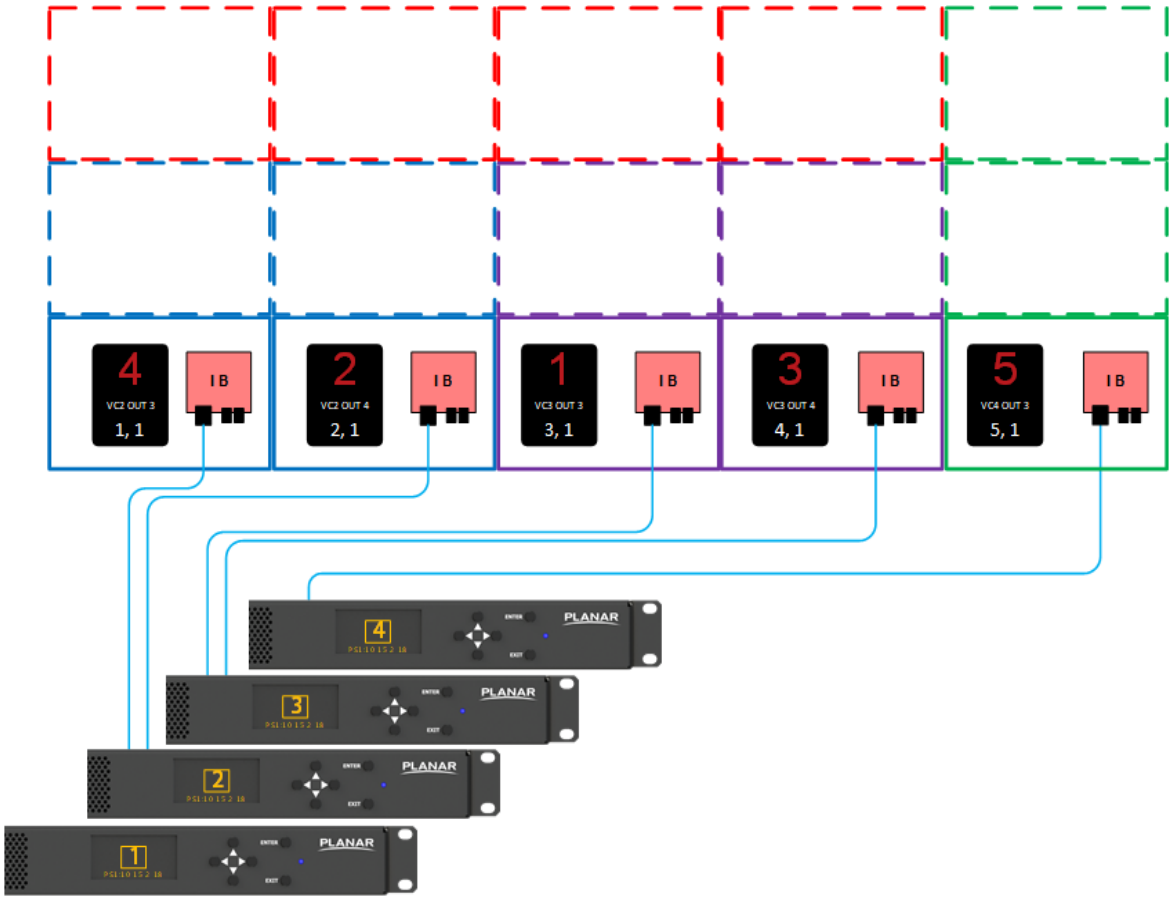


3840x2160 Resolution Panels

The panel ID can be found by clicking “MENU” (a complete guide to the OSD user interface can be found in the *WallDirector, RPS and Video Controller User Interface Guide*) on the remote and having access to the remote IR sensor plugged into a piece of active equipment. See "Mounting the IR Sensor" on page 110.

Note: If a display is connected and removed, the next new display connected will not overwrite the ID of the missing panel. It will be assigned the next number based on the system recognition of equipment. This ID will be changed through the auto-layout process or can be done manually by the installer.

Below is an example of a 5 wide x 3 high landscape configuration with the first row installed.

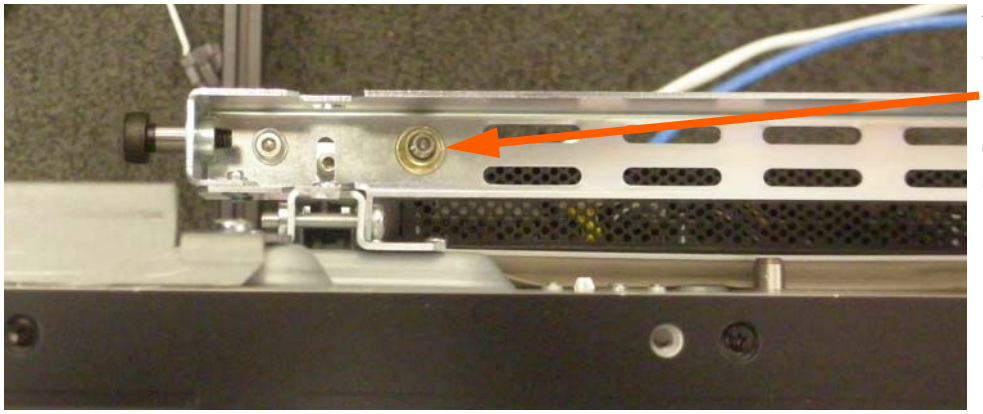


Note: The example above uses 1920x1080 panels and 4 output VCs instead of standard 9 output VCs.

10 For displays in the same row, make sure they are in a straight line using a digital level. Use this level to ensure the displays are plumb (true vertically for both sides and the front) and aligned from display to display. While the displays will be set to a nominal position prior to shipment, they might need minor adjustments, which are described in the following steps.

11 Each LCD will come from the factory in the nominal position. However, due to installation and manufacture tolerances, adjustments to the position may be required.

12 Starting with the center display, make sure it is level/parallel with the brackets. If it is not, use the two y-axis adjusters (one on each side) to accomplish this. Leave the other adjusters in their nominal positions.

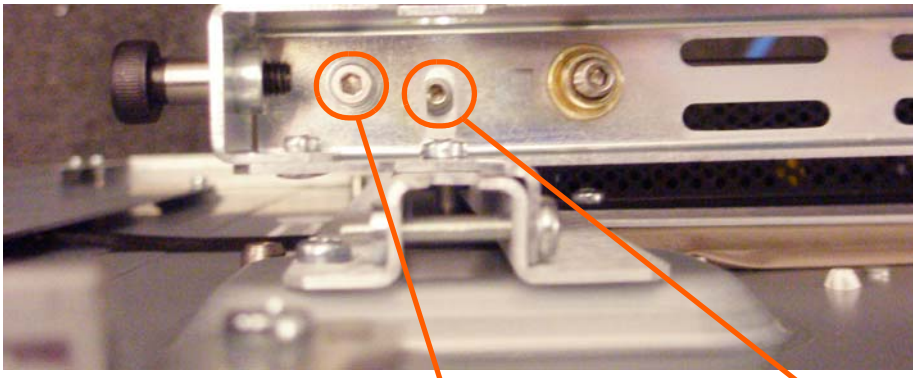


13 For the next display in the row, repeat steps **1**-**Note:** and then continue to step **14**.

14 When the next display in the row is installed, use the y-axis adjusters to level the display just as done with the previous one.

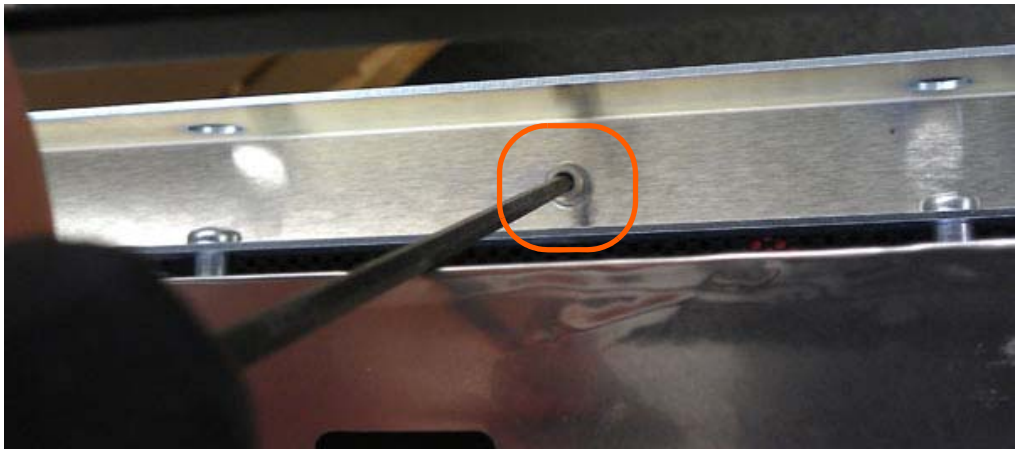
15 If the displays are not level with each other, fine-tune the y-axis adjusters of the last installed display until it is level with the rest of the displays in the row.

16 Adjust the top and bottom z-axis adjusters in each corner of the last installed display until it is flush with the display next to it.



There is a pair of Z-axis adjusters on each side.

17 Adjust the x-axis (in the middle of the support bar) of the last installed display so there is a 0.38mm (0.015") gap (approximate thickness of most business cards) between the displays.



18 If the gap is tapered, make slight adjustments to one of the y-axis adjustments to correct this. This adjustment can be done on both displays to reduce the effects on other alignments of the display. Keep in mind if adjusted too far out of level, it can cause issues with the alignment of subsequent displays.

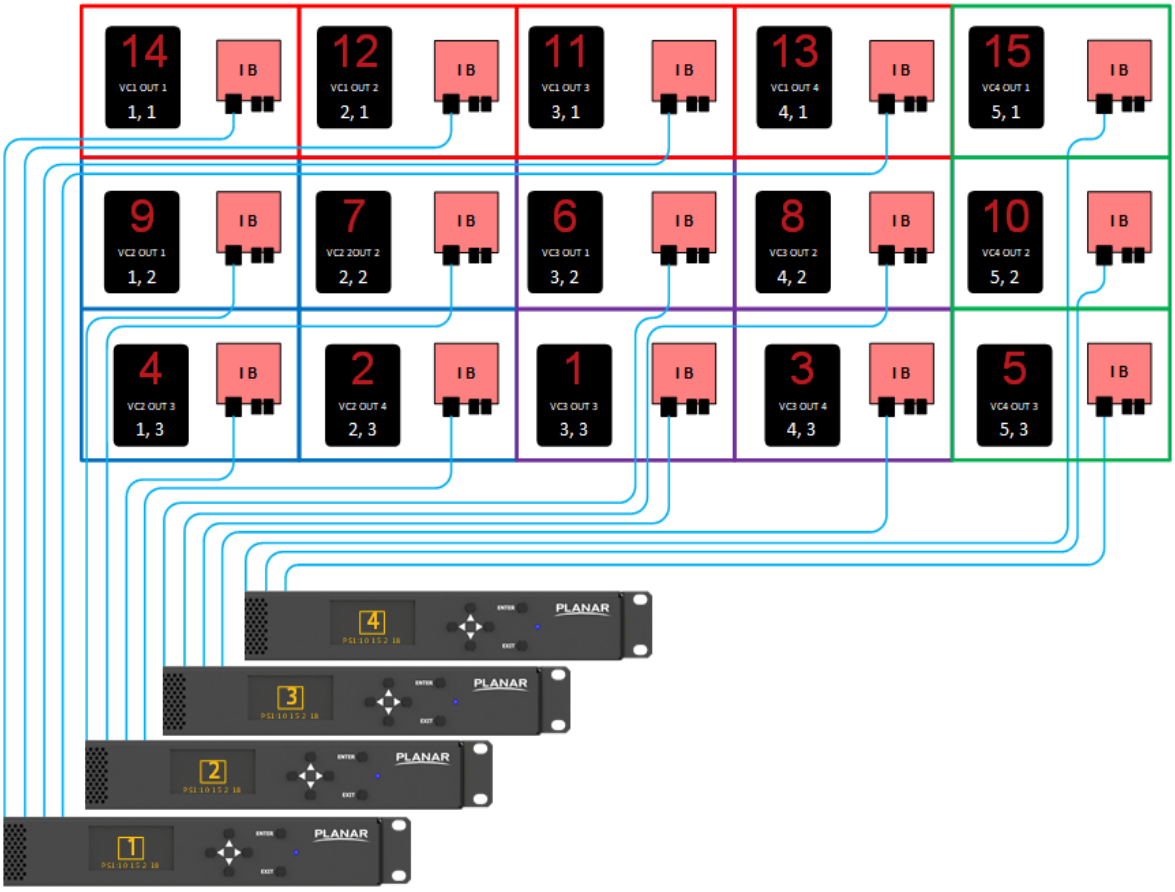
Note: A slight waviness in the gap is typical.

Installing Second and Subsequent Rows

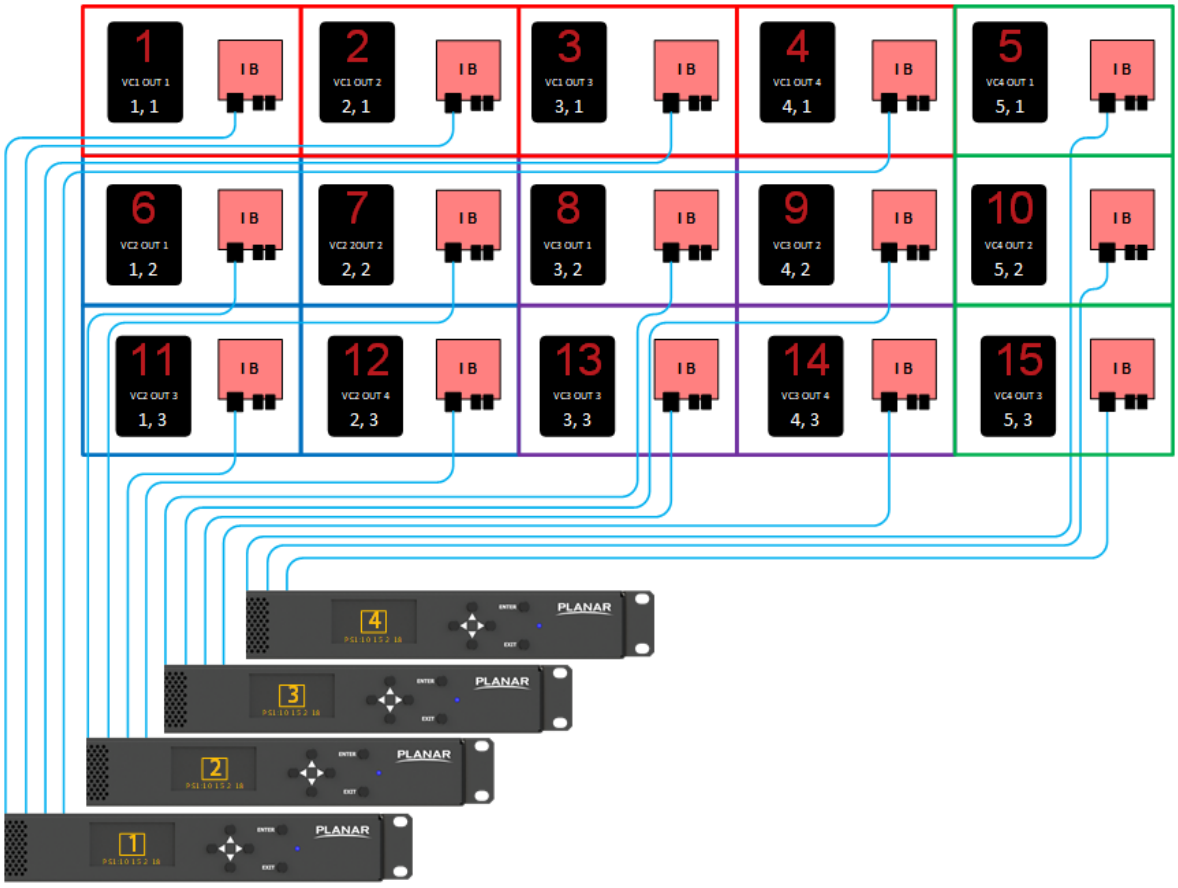
Caution: Depending on how the previous row was adjusted, when placing one display on top of another display, be sure to avoid contact between the displays. Damage may occur from the upper displays banging into or resting on the lower displays. Adjusting the y-axis screws on each panel downward is highly recommended to provide a stop so that panels do not contact each other when being installed.

1. Starting at the center display of the next row to be installed, follow steps **1**-**8** of "Installing the First or Bottom Row" on page 96.
2. Make sure the first display in the row is plumb with the display below it using the x-axis adjuster.
3. Using the y-axis adjusters, set the horizontal gap between the displays at 0.38mm (approximate thickness of most business cards).
4. Adjust the z-axis corners of the last installed display until it is flush with the display next to it. Depending on the adjusted corner, this may require that the display be put in service mode. The alignment of the bottom corners might need to be re-adjusted as each new display is installed in the row.
5. Repeat steps **1**-**4** of this section to install subsequent displays in this row.

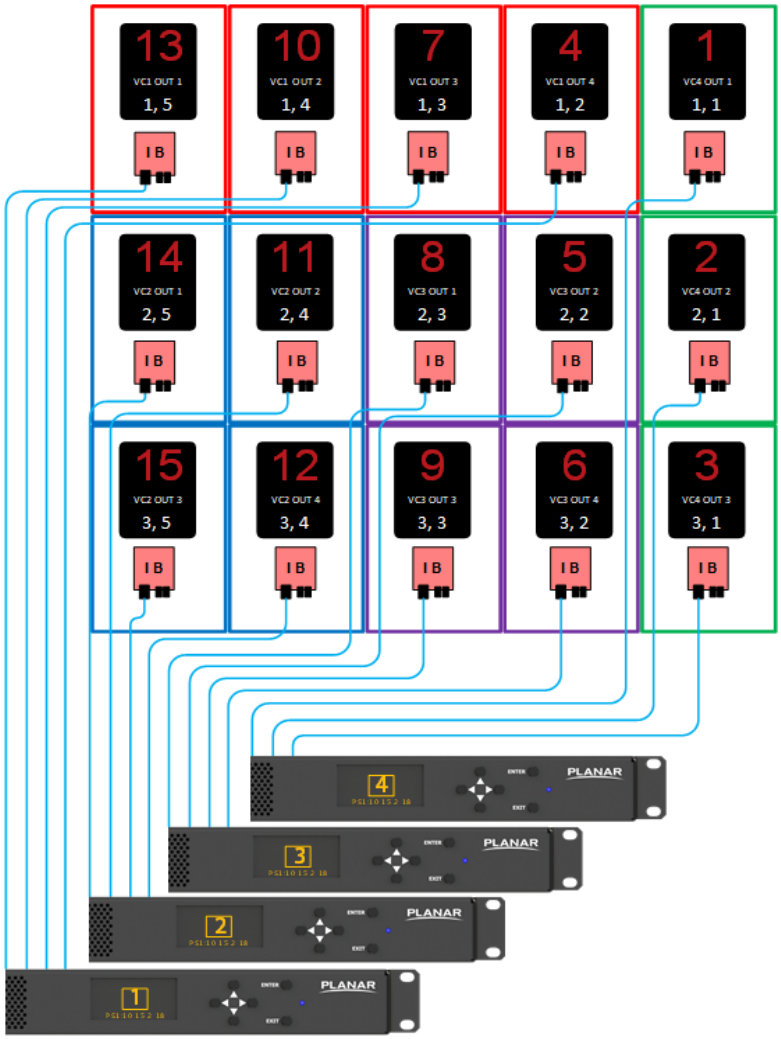
Once the wall is complete, the default panel IDs will look like the example below.



It is not important where the Panel IDs are on the wall for the system, but it is important that once the system is completely installed, it is locked so further additions do not affect the other components. To do this, the auto-layout feature is available in the OSD and in WallDirector to determine where they physically are with respect to one another and create a virtual grid that matches what has been installed. See "Matrix Layout Menu" on page 117.

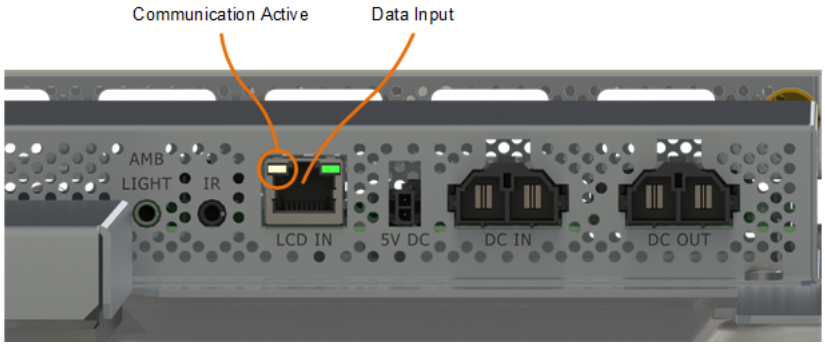


If the wall were a portrait installation, the resulting auto-layout and panel ID would follow the scheme below. Basically, this is working as if a landscape wall were rotated 90° clockwise from the front.



If an auto position sensor is not responding correctly, it is possible to have a situation where a display will not know its position within the wall. This is usually indicated by 2 or more panels having the same (X, Y) address within the wall. The (1, 1) display should always be in the top left corner for landscape installs and the top right corner for portrait installs as viewed from the front of the display. Any other panel can be fixed by using manual mode within the software to assign a display's location. Changing this will override the position sensors data.

Note: Before using Manual Mode for the layout, verify that communication between the panel and the VC is active. This can be determined by verifying that the yellow light blinks when a command is either sent or received by the panel.



1920x1080 Resolution Panels

Mounting the IR Sensor

Before mounting the IR sensor, keep the following point in mind:

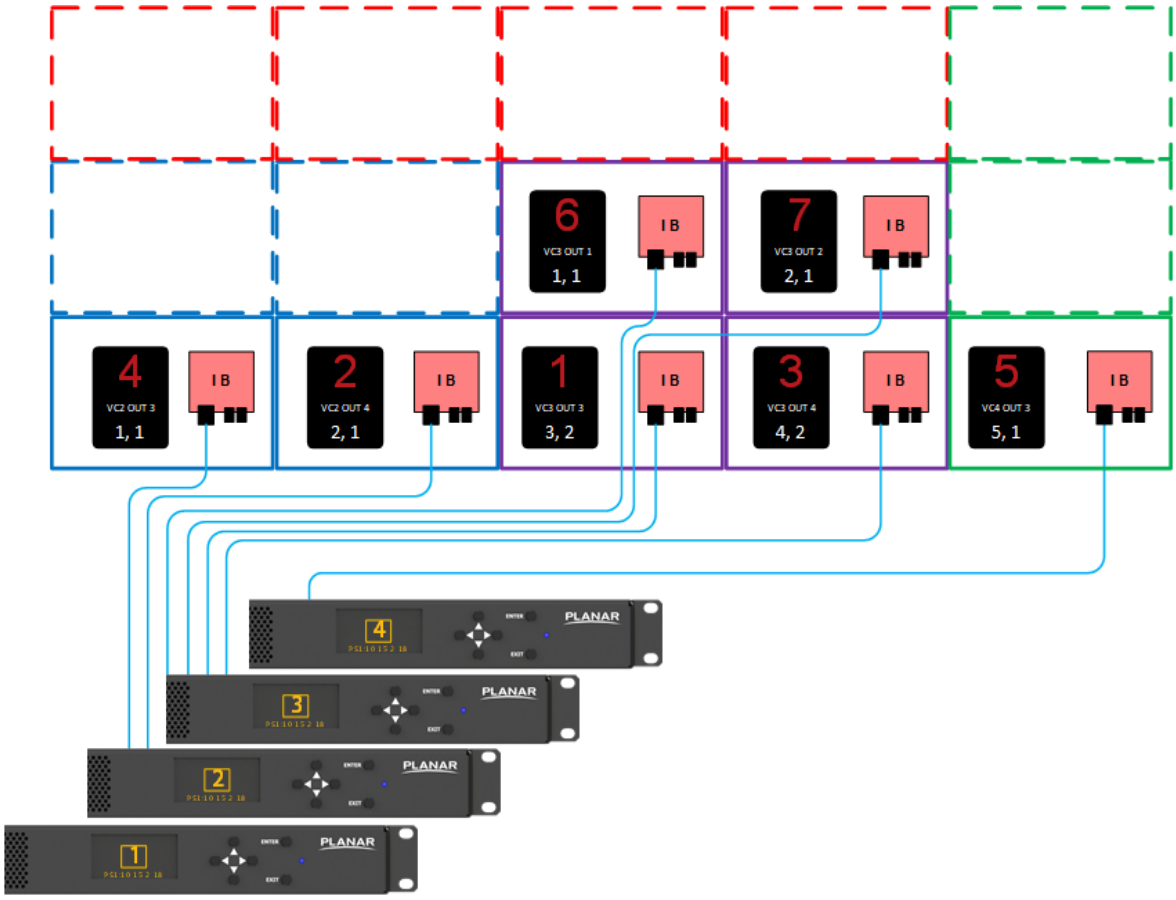
- No matter which display a menu is on, the remote will need to be pointed towards the IR sensor that controls the entire wall.

Connecting the IR Sensor

Connect the IR remote sensor to any RPS, video controller or LCD display. See the diagram on page 93 for a visual example of this connector location. Connection to the RPS is recommended for using the remote control if the low power mode will be used.

See "Standby Power Wiring" on page 64.

Verify the position sensors are working by the same method as described when installing the first row. The example below shows how IDs in the array may appear as displays are connected.



Mounting the Ambient Light Sensor

The ambient light sensor is an optional module used to change the brightness of the displays based upon the light conditions of the room where the wall is located. The OSD contains the software setup for this sensor and can be manipulated to give desired results. For best results, it is important to locate this sensor in a position which best typifies the changing ambient light—sunlight, overhead lighting—conditions seen by the front of the installed wall. Do not mount it behind a wall or in a place where there is no change in ambient light, because no change in brightness will occur if the sensor is unable to detect changes in ambient light. For a properly setup system, the wall will increase or decrease it's brightness when the ambient light intensity changes.

Video Controller Front Panel

A complete guide to the front panel user interface can be found in the *WallDirector, RPS and Video Controller User Interface Guide*.

The front panel keypad and display are designed to perform some basic operations for the system and provide a level of diagnostic information. The main menu may be accessed by clicking any button and navigated from there by using the arrow buttons. Action items may be initiated by the right arrow button or the ENTER button while the EXIT button will navigate up a menu level.

When the power switch is activated, the status LED will initially light to indicate power is applied and then briefly shut off during the VC boot process. Additionally, the fans will initially start at maximum speed. During normal operation, the status LED will be lit to indicate that the VC is powered and ready for operation and the fans will run at the speed required to keep the system optimally cooled based on ambient and system temperatures. The LED will blink when commands are recognized by the system, either through the remote or through commands over the serial protocol. The LED will also blink to indicate if a firmware upgrade is in process or finished. See the *WallDirector, RPS and Video Controller User Interface Guide* for more information.

Configuring a Clarity Matrix G3 LCD Video Wall

Video Wall Settings

Most video wall setup will be done through the Planar WallDirector software (see the *WallDirector, RPS and Video Controller User Interface Guide*), however, the OSD has much of the functionality required to do basic setup of displays and source routing. Additionally, the system is capable of serial communication over multiple connections within either the RPS or VCs.

Serial Communication

Control and status requests may be performed by other equipment such as a PC or standard controller module. The system has three main means for these systems to connect and a comprehensive command set to perform automated and user actuated tasks. Refer to the *RPS and Video Controller RS232 User Guide* for information on the types of connections and commands that may be used for the system.

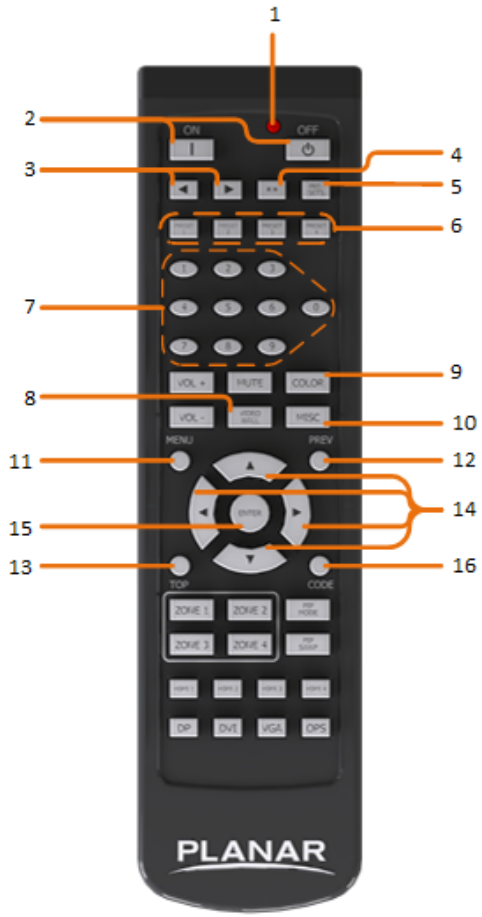
Basic Image Software Configuration Steps

Configure the displays by performing steps in the following order:

1. Matrix Layout - see "Matrix Layout Menu" on page 117.
2. Color Balance the displays - see "Adjusting Color Balance" on page 119.

Remote Definition

Below is a description of the basic functionality of the remote for use with the On Screen Display.



Number	Symbol	Description
1	LED	Indicates button has been pressed; feedback for remote code programming
2	ON/OFF	Turns the system on or off. Equipment affected depends on Power Mode setup.
3	◀ ▶	Color Balance Menu only; Moves control between previous and next display
4	**	Color Balance Menu only; Selects All displays for control (LCD only)
5	PRE-SETS	Shortcut to Presets Menu
6	PRESET1-4	Shortcut to display Presets 1 thru 4
7	0-9	Keypad for numeric entry
8	VIDEO WALL	Shortcut to Big Picture Menu
9	COLOR	Shortcut to Color Balance Menu (LCD only)
10	MISC	Shortcut to Brightness Menu
11	MENU	Shortcut to display the OSD
12	PREV	Navigates to previous level of menu
13	TOP	Moves OSD highlight bar to top of current menu
14	◀▶▲▼	Navigation arrows for menus
15	ENTER	Selects the highlighted item in the menu
16	CODE	Used when programming a custom remote code

Firmware Update

Note: After connection of all equipment, It is recommended to update the firmware to the latest revision. The latest firmware is located on the Planar Portal website (http://partners.planar.com/). For more information about the firmware features, read the readme files that comes with firmware package.

Firmware on the video controller can be updated by three different methods:

1. Using the web-based UI as described in the *WallDirector, RPS and Video Controller User Interface Guide*.

2. Using the Serial command as described in the *RPS and Video Controller RS232 User Guide.*

3. Automatically by inserting a USB into the AUX port with a file named *autorun.zip* or *autorun.pkg* that corresponds to the firmware version desired. This may require a renaming of the file to *autorun.zip* or *autorun.pkg* prior to insertion.

VC Rear Panel

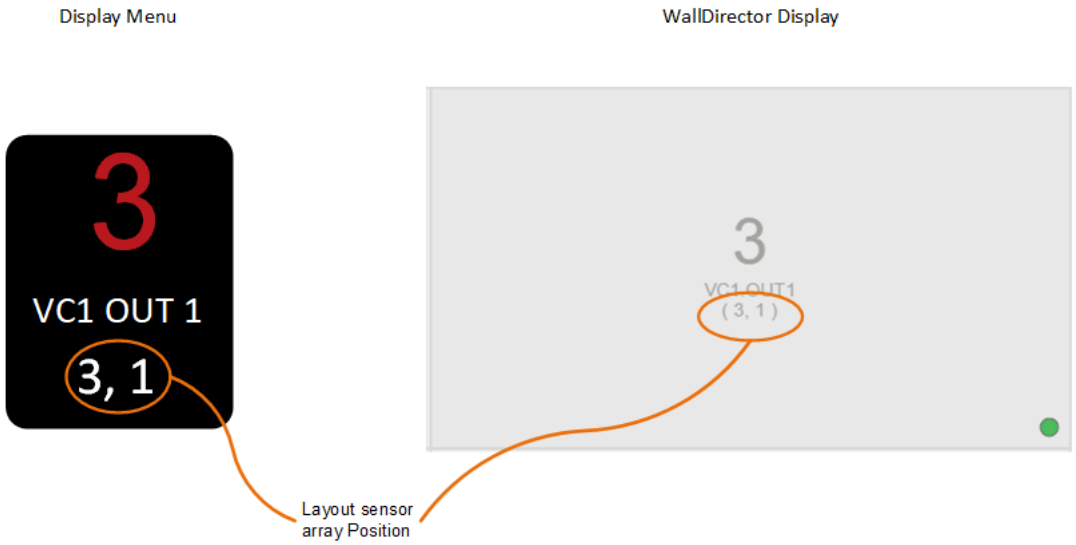
Firmware uploading is indicated by the control LED previously mentioned during the power on sequence. Once a firmware package is recognized as being new, the light will blink slowly (1 second on followed by 1 second off) while the data is copied to the system. The light will blink quickly during a firmware update and indicate success (steady off for 4 seconds followed by 1 second on) or failure (blinking 5 seconds on followed by 5 seconds off). Once the light indicates a firmware update is in process, then the USB device may be removed. Upon successful update, the power supply requires a hard power for changes to take effect.

Note: The system pre-checks the version to be uploaded with the existing firmware version. If they are the same, the update process aborts and the unit goes back to normal operation.

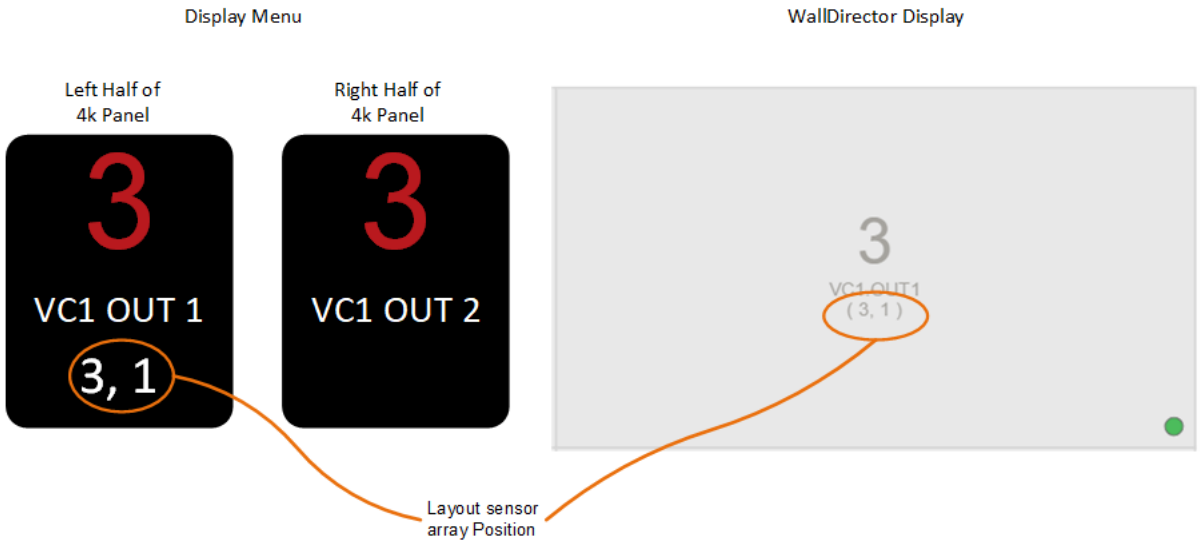
If the update fails for some reason, verify the firmware versions of both the RPS and the RPSM(s) of the system are correct on the media chosen for upload and try again. If the same firmware exists on the system components and on the media, the update was successful.

Matrix Layout Menu

After installing all the displays and making sure that all sensors are working properly, an Auto Layout should be initiated. To be sure the sensors are all working, each panel should display its own unique X, Y coordinates in the WallDirector software or OSD.



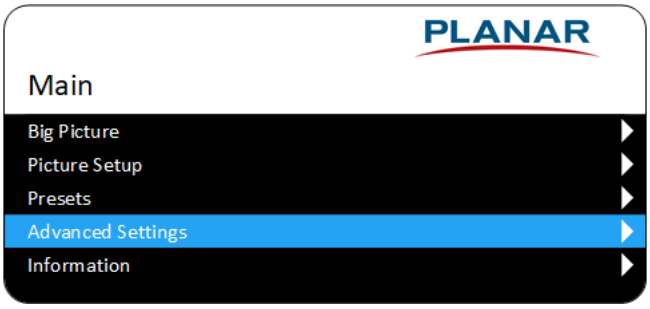
For 3840x2160 displays, the information corresponding to WallDirector will be contained within the VC output "odd" connections (1 and 3, depending on physical connection).

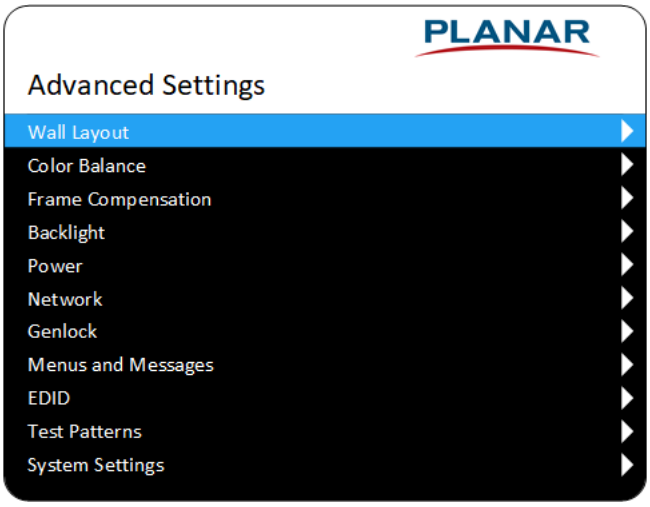


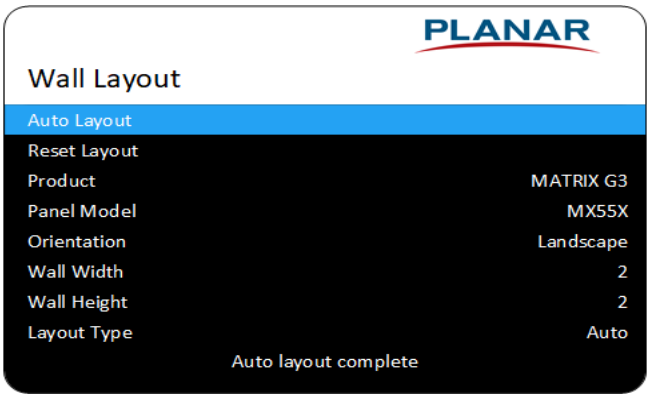
If a panel displays a duplicate coordinate, then a manual layout setup should be performed through WallDirector.

Note: In manual mode, the position data for these points will match as they correspond to the position sensor data. In WallDirector, the left menu bar will communicate the actual position as configured. All other information will use the as configured information.

Auto Layout can be done through either WallDirector (see *WallDirector, RPS and Video Controller User Interface Guide*) or OSD as shown below.



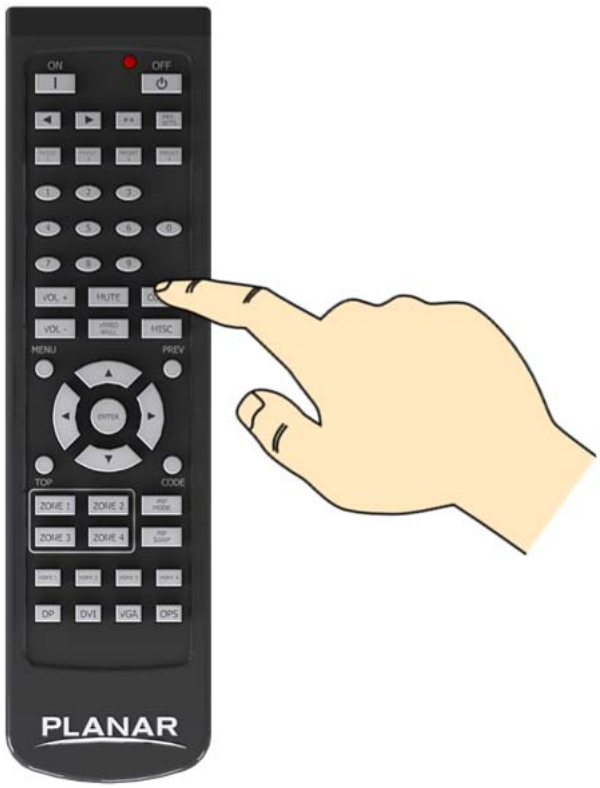




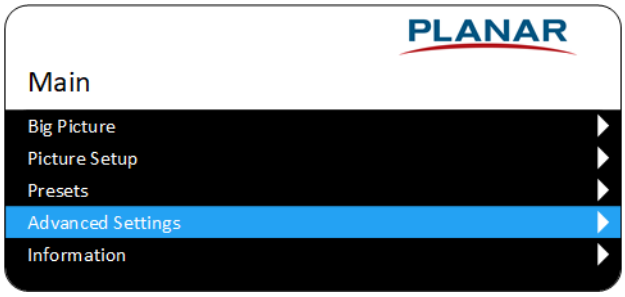
The menu will change as panels are added in Default Layout mode, but once in Auto or Manual Layout it will remain as shown unless a Reset Layout is initiated. Additionally, in Default Layout, the Wall Width and Height may not match physically what is installed, but this will be corrected once Auto or Manual Layout is completed.

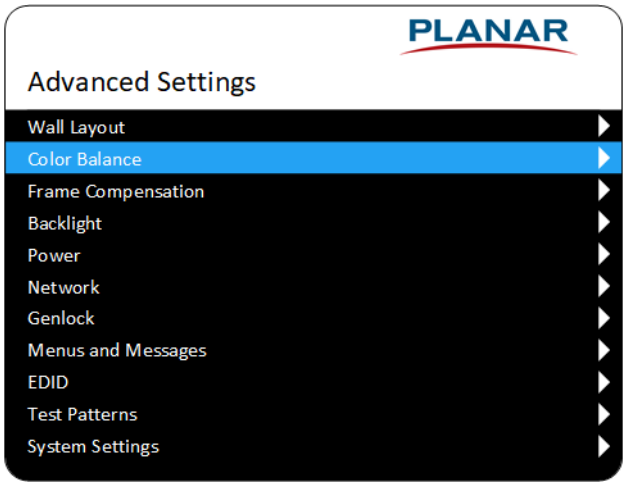
Adjusting Color Balance

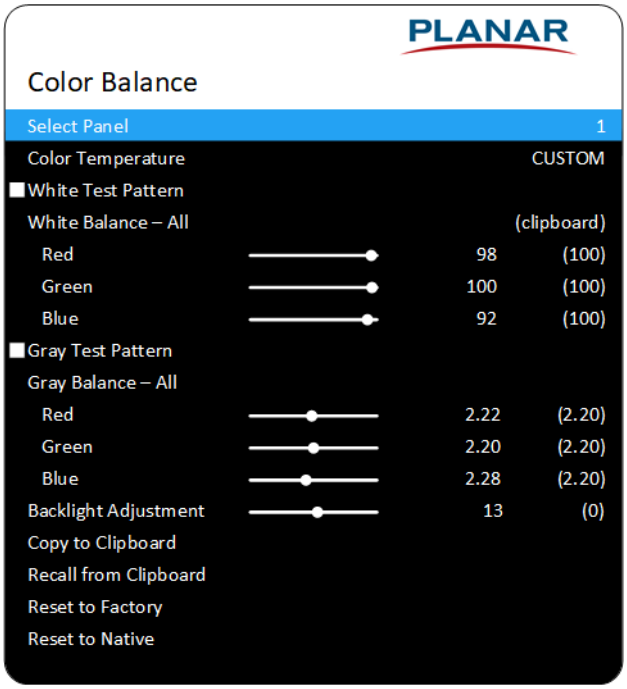
Color Balance is used to select the color temperature of each display, as well as to match the colors of adjacent displays when several displays are arranged in an array. When a yellow car moves across a video array from one display to another, it should have the same color for the whole trip, not change from yellow to tan to orange.

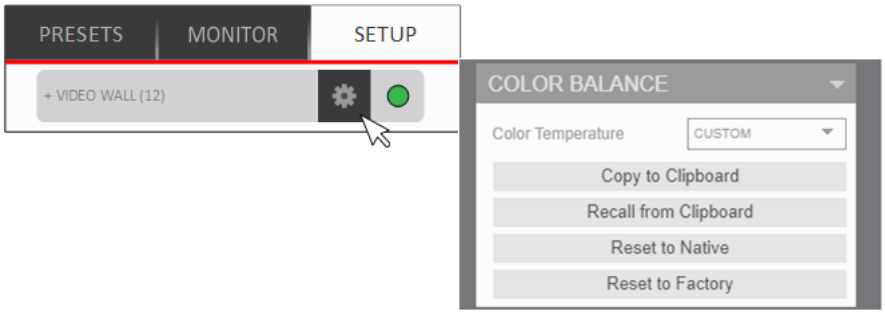


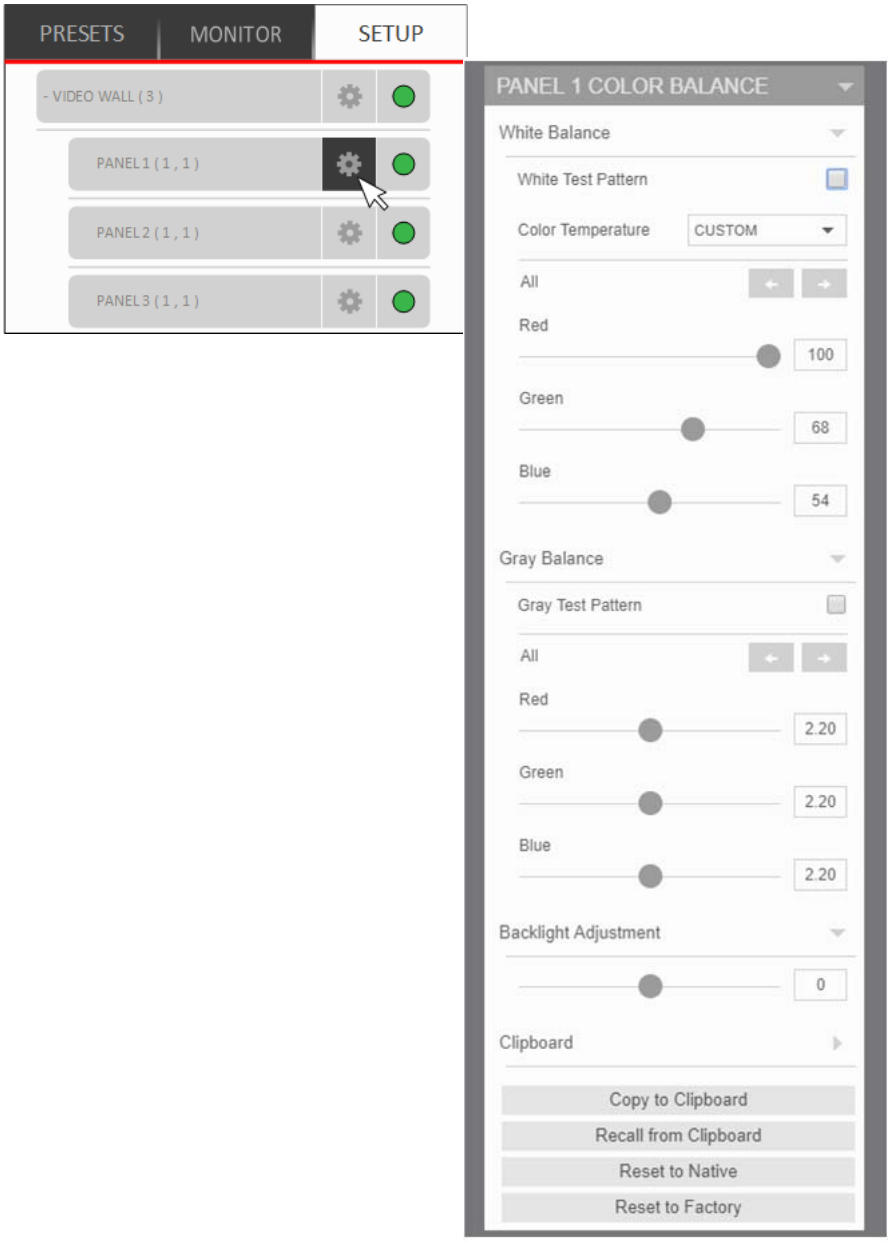
Colors vary slightly from one display to the next, because of slight variations in the backlights and displays. This cannot be avoided, but can be compensated for with color balancing. Color balance may be adjusted either through the WallDirector software (see the *WallDirector, RPS and Video Controller User Interface Guide*) or through the OSD as shown below.








PRESETS
MONITOR
SETUP
+ VIDEO WALL (12)
COLOR BALANCE
Color Temperature
CUSTOM
Copy to Clipboard
Recall from Clipboard
Reset to Native
Reset to Factory


PRESETS
MONITOR
SETUP
- VIDEO WALL (3)
PANEL 1 (1 , 1)
PANEL 2 (1 , 1)
PANEL 3 (1 , 1)
PANEL 1 COLOR BALANCE
White Balance
White Test Pattern
Color Temperature
CUSTOM
All
Red
100
Green
68
Blue
54
Gray Balance
Gray Test Pattern
All
Red
2.20
Green
2.20
Blue
2.20
Backlight Adjustment
0
Clipboard
Copy to Clipboard
Recall from Clipboard
Reset to Native
Reset to Factory

Understanding Color Temperature

Different "pure white" light sources do not always have the same color. For instance, light from an incandescent bulb has more yellow than light from direct sunlight. Similarly, LCD light sources and films have slight variations that will affect individual panel appearances when comparing one to another. "Color Temperature" is a way of measuring these color differences. In general, higher color temperature numbers are bluer or "cooler." There may be a reason for wanting the video wall to be a specific color temperature. For example, in a television studio application where the video wall will be on camera, it is best to have a low color temperature. Clarity Matrix defaults to the brightest setting possible, which is 100 in the RED, GREEN and BLUE lines under WHITE BALANCE. A different color temperature may be chosen by setting it in the COLOR BALANCE menu.

Adjusting Color Temperature

Select the COLOR TEMPERATURE line in the COLOR BALANCE menu and then select from 3200°K (Warm), 5500°K, 6500°K, 8500°K (Cool) or NATIVE. For the brightest display, select the NATIVE option.

Changing the color temperature changes the three WHITE BALANCE values. Additionally, the WHITE BALANCE values can be changed individually to create a custom color temperature. Once the values have been changed, a new CUSTOM option is available on the COLOR TEMPERATURE line.

Note: Resetting Color Balance: Most displays in a shipment are color balanced at the factory. If this has happened, the Color Balance menu will show a CUSTOM Color Temperature when first turning the displays on. If color adjustments are made to a display, the original values can be recalled with the RESET TO FACTORY command. To start with the brightest possible display and do custom color balancing, use RESET TO NATIVE.

Color Balancing Multiple Displays

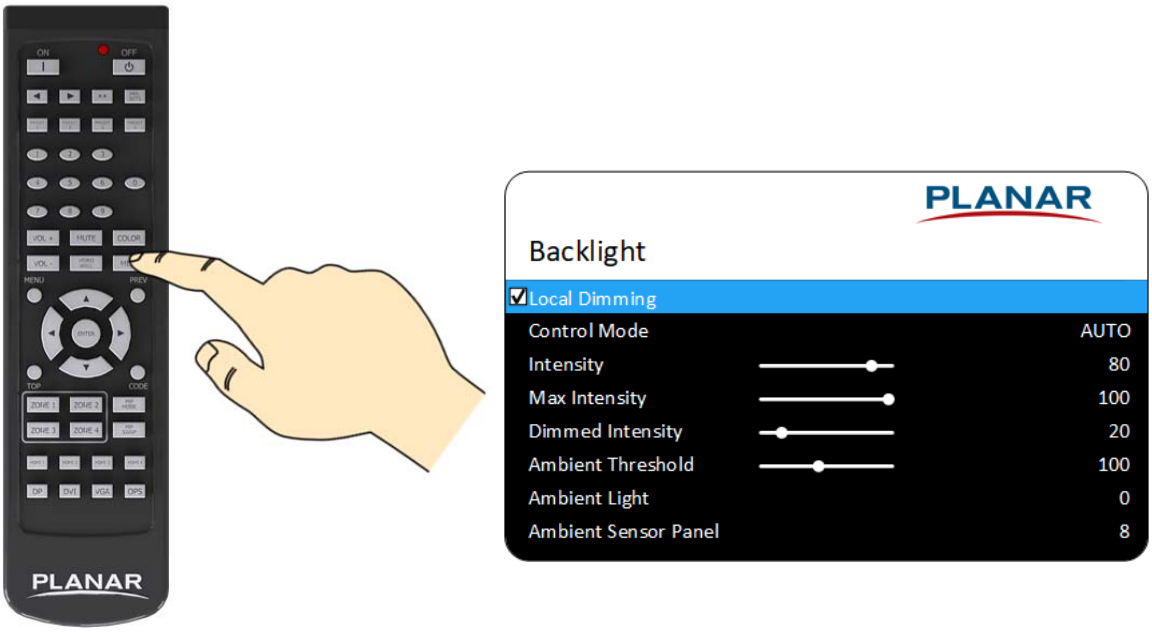
Color balancing by eye is subjective. It may seem strange at first, but it gets easier with practice. Fortunately, all of the colors do not need to be matched, only the whites and grays. It is not necessary to achieve a perfect white or a perfectly colorless gray. It is only necessary that all the displays look alike when they display white and gray. Color balancing should be done from a distance of more than 3m (10ft) away from the display or at the typical viewing position. Viewing off axis can result in poor color match results due to the color shift inherent in all LCD panels when viewed at an angle.

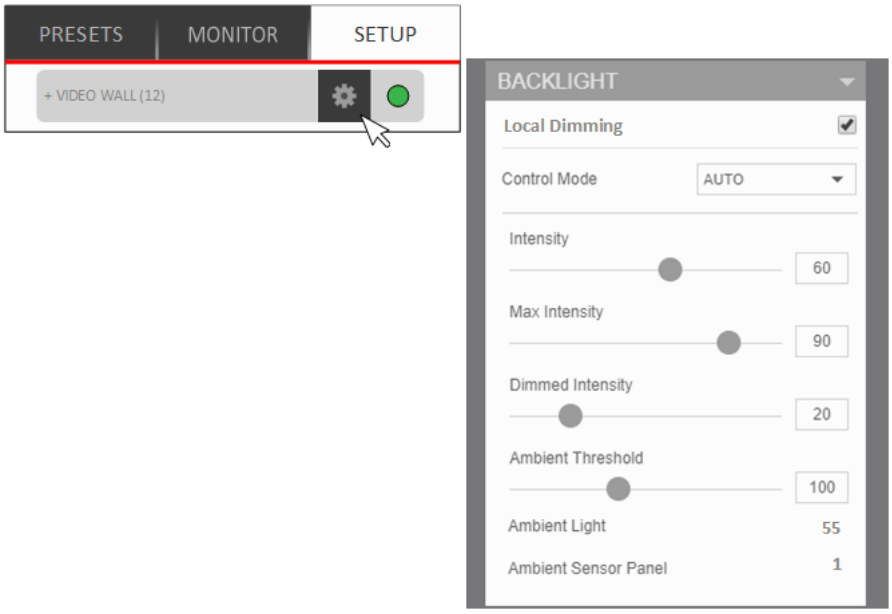
Caution: Never try to match the colors of the displays with the black and white level controls or with the video controls.

Caution: Color blind individuals, even a little bit, should not color balance the array. Have someone else color balance the wall.

1. Turn on all the displays in the array and let them warm up for at least 5 minutes. The backlights must be thoroughly warm before doing color balance.

2 Press MISC on the remote to open the BACKLIGHT CONTROL menu or browse to in WallDirector. Set the global backlight level to the desired brightness. Setting the Backlight Intensity to less than 100 will allow brightness adjustment in the brighter direction on individual panels as needed in step 8.

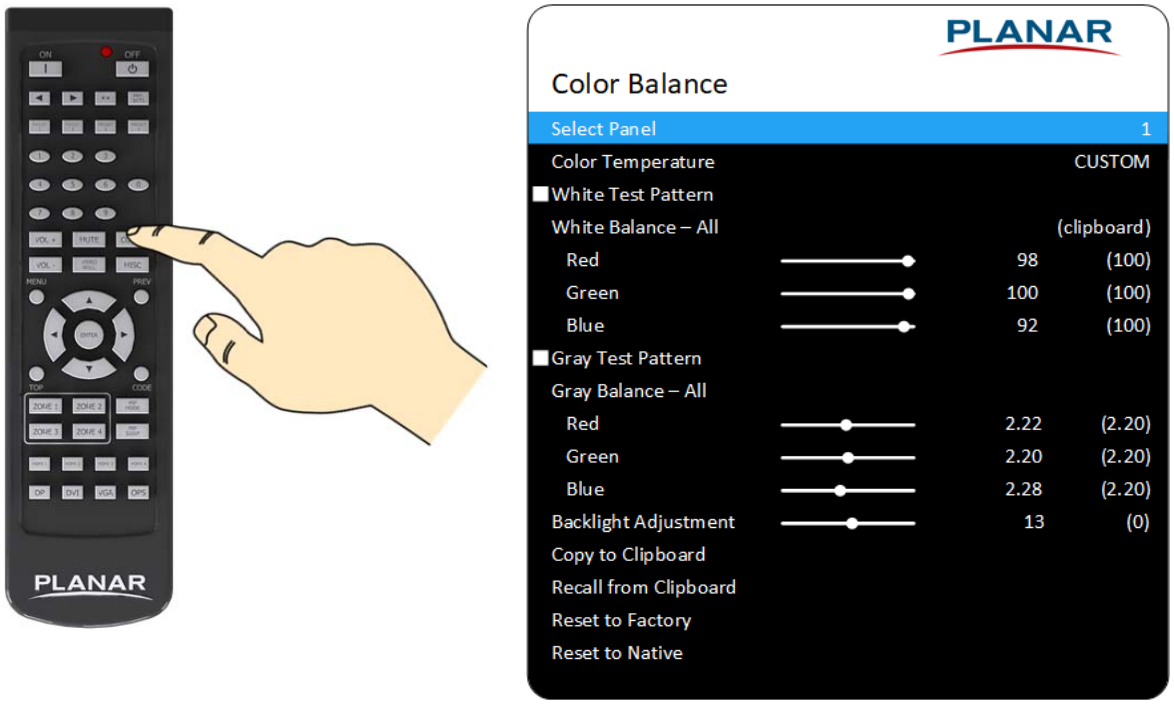


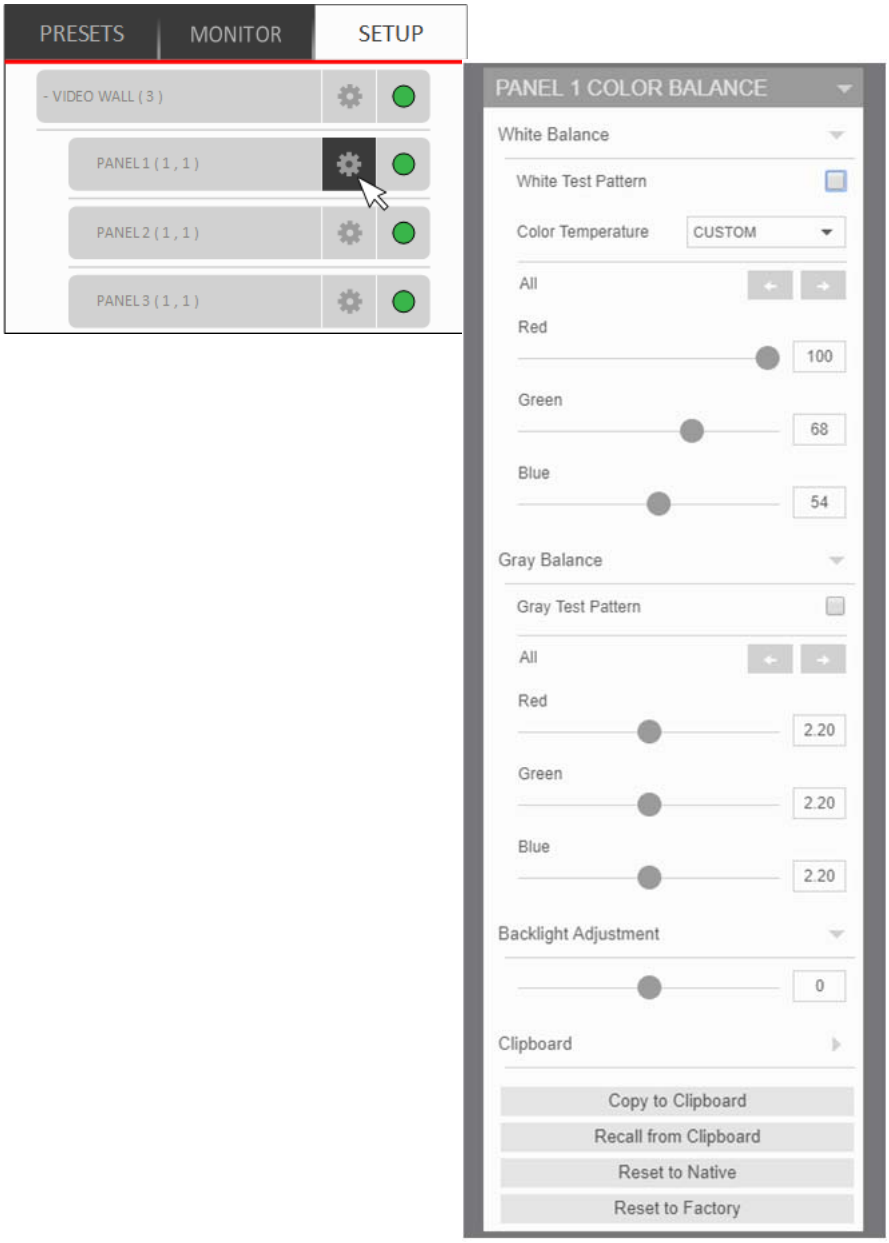


Note: If the sum of the Intensity and Backlight Adjustment number for a panel needs to go beyond 100 to match at any point, the overall wall intensity should be lowered to the point where this number does not exceed 100. However, the Backlight Adjustment should in theory always be lowered as stated in step 8.

Note: For products that have Local Dimming available, uncheck this feature while color balancing. After color balancing is finished, re-enable this feature for best results.

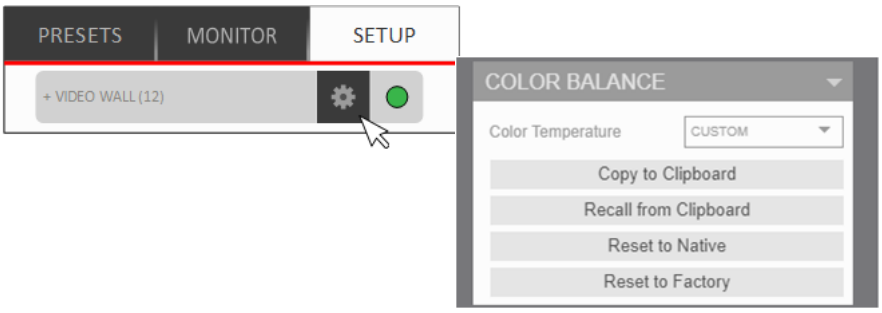
3 Open the COLOR BALANCE menu by pressing the COLOR button on the remote or browse to in WallDirector.





4 Press the * * button or select "All" in WallDirector to control all displays.

5 If the array has never been color balanced, make sure to start with the same COLOR TEMPERATURE setting on each display.

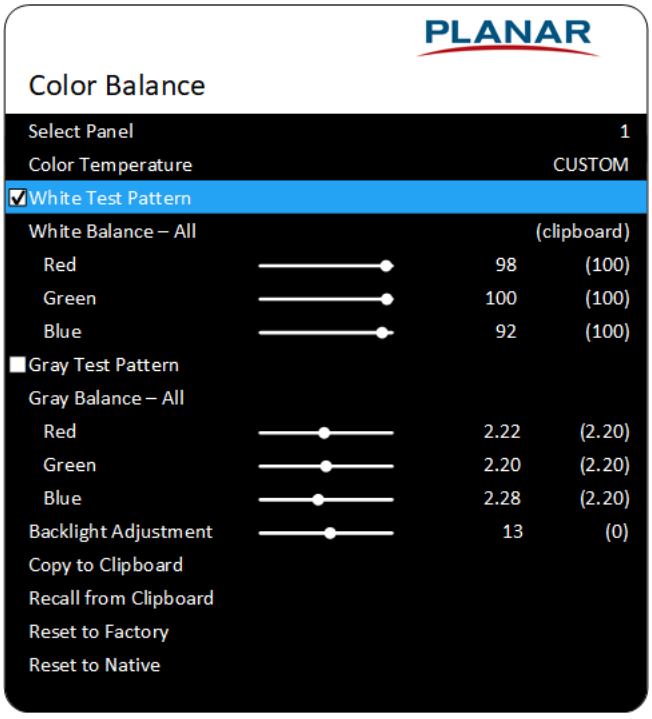


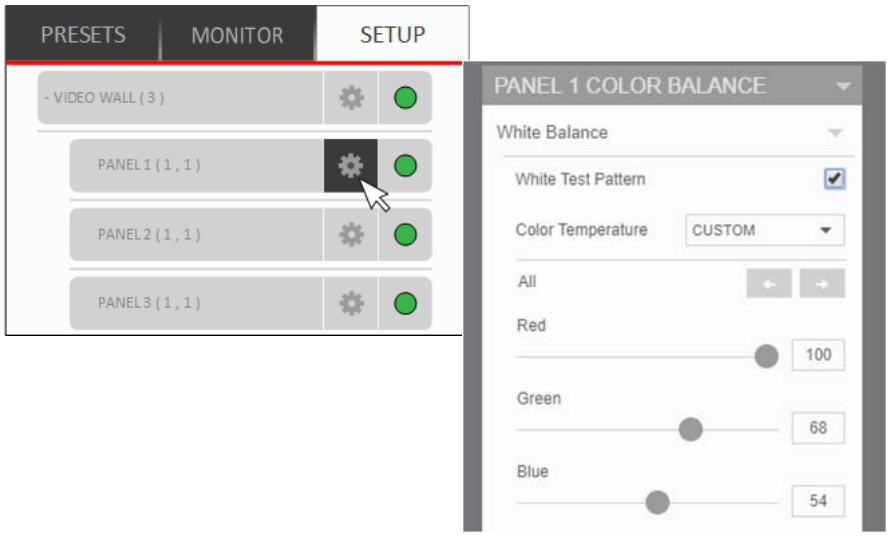
a If there is not a specific color temperature, use NATIVE, which is the brightest. Otherwise, choose a color temperature that is closest to the desired results.

b If the display has been color balanced before, it will display CUSTOM in the COLOR TEMPERATURE line, because the balance values don't match any of the pre-set color temperatures.

c To reset all displays to the factory default setting, highlight "Reset to Factory" and press ENTER.

6 Highlight the WHITE TEST PATTERN line and press ENTER. This will show the white test pattern on all displays.





Note: Always use the *internal* Test Patterns for color balancing, *not* an external pattern.

7 When all displays are white, find the *least bright* display in the array. This will typically be the "baseline" display and will not be adjusted. All other displays will be adjusted to this baseline display.
The least bright display is picked due to the ability to only adjust brightness down. When the color point values are 100, the display is as bright as it can get. This step is adjusting for slight variations in backlight brightness.

8 Choose a display next to the baseline display and adjust its BACKLIGHT ADJUSTMENT to make its overall brightness match the baseline display. (If adjusting down will not match the baseline, the darkest display may not have been chosen. Start the process again from step 7.)

9 Continue with other adjacent displays until the overall backlight brightness matches on all displays.

Note: The backlight adjustment does not affect the color of the display. Additionally, the color balance may only be good for the backlight intensity chosen. If the intensity for the final application will be different, the colors may not exactly match. It is always best to color balance for the intended application.

10 Choose a display next to the baseline display and adjust its white values (red, green and blue) to make its color match the baseline display. Concentrate on the center of the displays, not the adjacent edges. Do *not* adjust the gray values at this time.

11 Continue with other adjacent displays until all the displays have the same appearance when white.

Note: White balance and gray balance may be an iterative process where displays will need to be adjusted multiple times as other surrounding panels are adjusted.

12 When all displays look the same when displaying the White test pattern, highlight the GRAY TEST PATTERN line and press ENTER. This will show the gray pattern on all displays.

13 Choose any display as the new baseline display. It does not need to be the baseline display used for white.

14 Adjust the gray values for all the displays until they match the baseline display. Do one display at a time. Again, match the center part of the picture, not the edges.

15 When all displays match in gray, highlight the GRAY TEST PATTERN line and press ENTER. Press MENU to close all the menus.

16 If there is a need to start over, select RESET TO FACTORY or RESET TO NATIVE and press ENTER. (See Resetting Color Balance in the Note on page 122.)

Tips for Color Balancing

- COPY TO CLIPBOARD will save all the current settings to a temporary memory. More adjustments can be made to see if it gets better or worse. RECALL FROM CLIPBOARD will restore these saved settings. The clipboard is only for testing. These values are not saved when AC power is off.
- Stand back from the array and directly in front of it to get an overall view.
- Small changes are difficult to see at first, particularly with white. When it cannot be determined which color to change, pick one at random and change it 4 or 5 steps. The result will be either better or worse. If worse, go the other way with that color. If that is also worse, put this color back where it started and do the same with another color. If every change makes the match worse, the color must be close to the ideal point.
- Removing red has the same effect on hue as increasing blue and green together.
- Changes in the white values affect the gray values but changes in gray values do not affect the white values.
- Color balance values are saved on the LCD Interface board, so they will be correct for the display even if it is moved to a different Video Controller output.

Basic Functionality

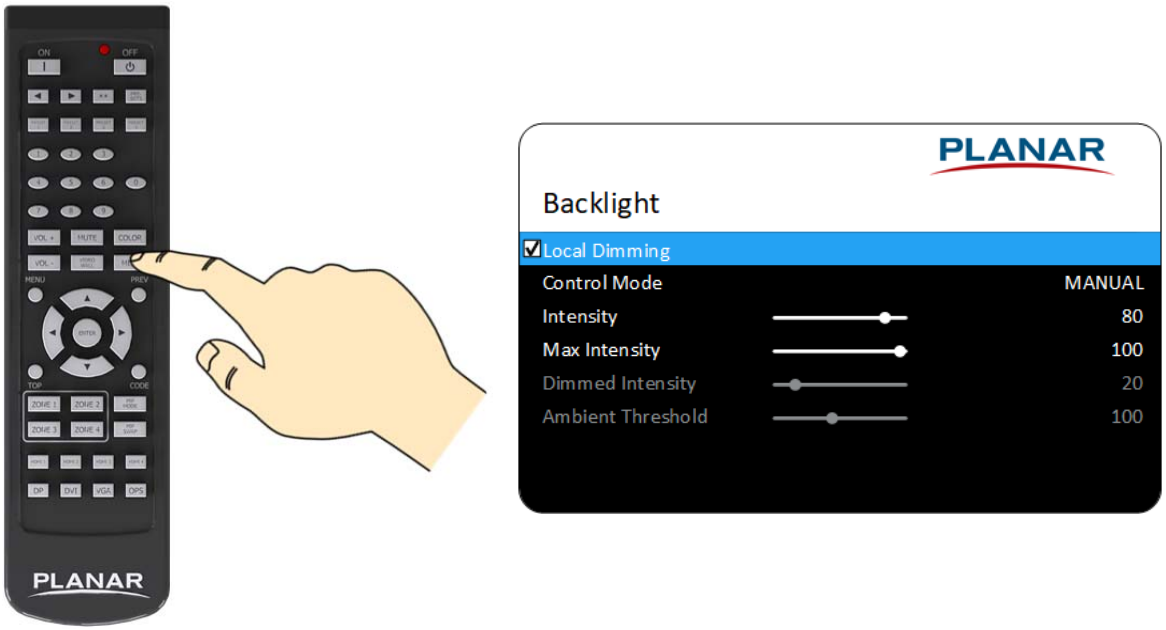
Below are some basic functions of the Clarity Matrix G3 system to help get started. For a full list and explanation of capabilities as well as how to access, see the *WallDirector, RPS and Video Controller User Interface Guide* or *RPS and Video Controller RS232 User Guide*.

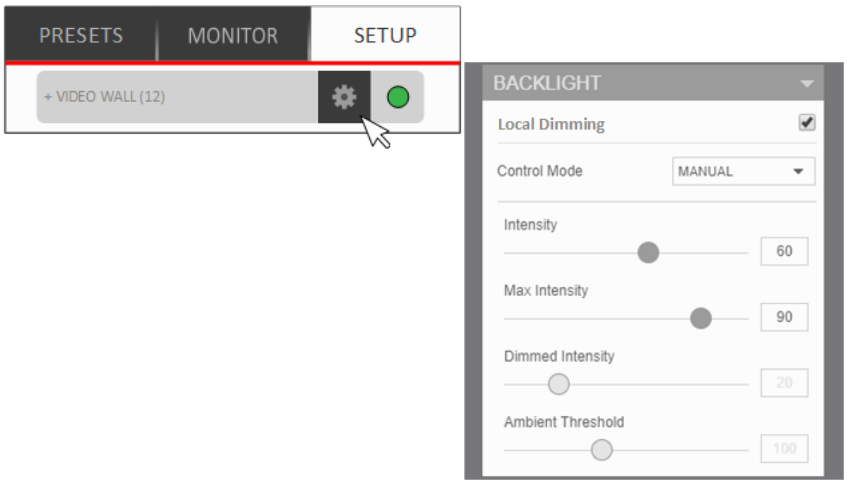
Backlight Control

The backlight is optimized for the LCD operation. For normal operating conditions, the backlight can be adjusted for maximum brightness if desired. If the system is operating at higher altitudes up to 2000 meters, it is recommended that the backlight be set at a reduced intensity. Running at maximum intensity at high altitudes can affect the lifetime expectancy.

Note: To extend the backlight life, it is recommended that the lowest backlight brightness that works for the application is used. This will reduce power consumption, heat output and reduce the chances of TIR from occurring. (See "What is Temporary Image Retention?" on page 12.)

To open the BACKLIGHT CONTROL menu, press MISC on the remote.



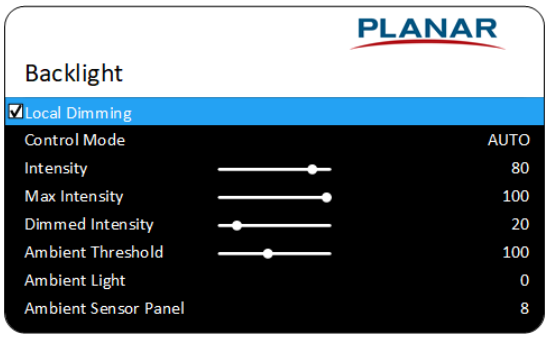


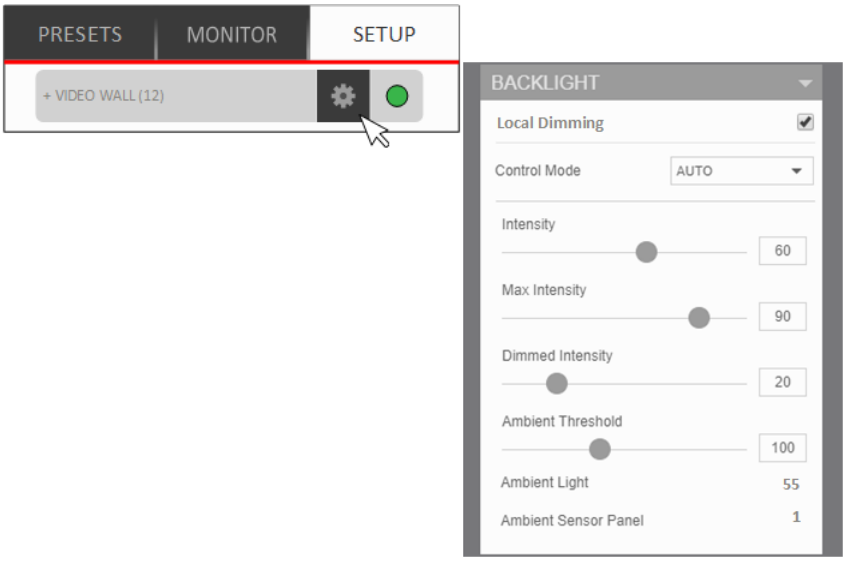
Control Mode

When BACKLIGHT CONTROL MODE is **Manual**, the menu above will be displayed.

When BACKLIGHT CONTROL MODE is **Auto**, the menu below will be displayed.

Note: Auto Backlight Control works only when an Ambient Light sensor is installed.





Intensity

The backlight intensity can range from 0-100 in increments of 10. If the system is operating at higher altitudes up to 6500ft (2000m), it is recommended that backlight intensity be reduced for lifetime performance.

Dimmed Intensity (Backlight Control Mode is AUTO only)

This sets the intensity of the backlight when the ambient light is below the threshold. Set this value to an acceptable brightness when the room may be at its darkest. This will reduce the power required for panels and the image will be more comfortable for viewers.

Ambient Threshold

This value determines the ambient light intensity required to switch the backlight between Backlight Intensity and Dimmed Intensity. A greater value keeps the brightness at the set Backlight Intensity while a lower value sets the brightness to the Dimmed Intensity. The backlight change will occur when the Ambient Light is five points different from the Ambient Threshold for greater than three minutes. This value is to be determined through observation of the environment as to what is appropriate for the end user. The measured Ambient Light on the OSD will give the value to set the Dimmed Intensity to once conditions have been determined as appropriate. Range is 0 to 255.

Ambient Light Sensor Software Setup

Follow these instructions to make sure the system will work properly. Be sure the ambient light sensor is installed as recommended on page 112.

1. Set Backlight Control Mode to AUTO.
2. Adjust the Dimmed intensity value to the desired setting. This can be determined by mimicking the dim conditions and determining the proper Backlight Intensity under 'Manual' mode.
3. Adjust the Ambient Threshold to the desired value. This can be determined by using the Ambient Light reading from the sensor when the dim conditions were mimicked.
4. Set Backlight Control Mode to MANUAL.
5. Set Backlight Intensity to desired value under bright operating conditions.
6. Reset the Backlight Control Mode to 'Auto'. The system will now change the intensity automatically based on the values provided. if these values need to be changed, repeat this procedure.

Controlling EDID Behavior

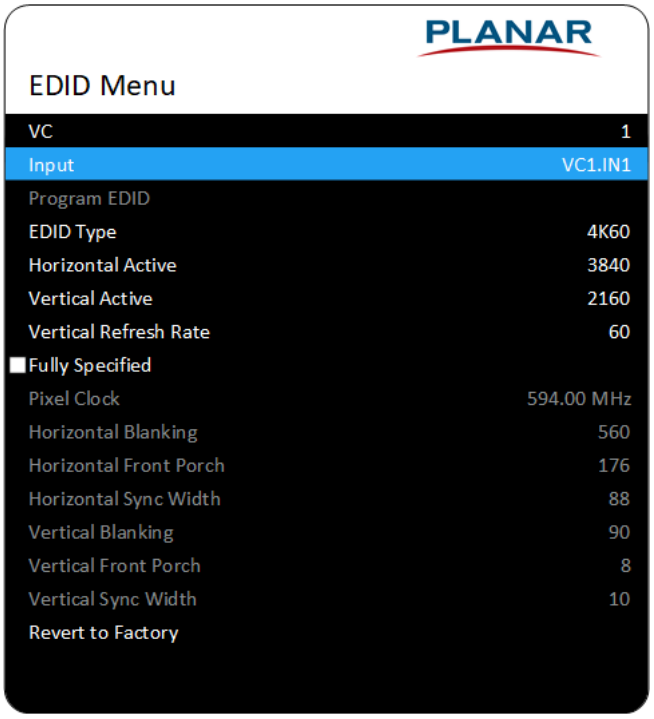
EDID (Extended Display Identification Data) is the standard protocol for a display to communicate to a picture source what kind of display it is, what its capabilities are.

Planar displays present to the picture source a default EDID that is not always optimum for the task. Sometimes for best performance, values may need to be changed. Examples:

- Use the **Preferred Timing** field in the EDID even though the desired resolution exists elsewhere in the EDID list.
- The need for a non-standard resolution to accomplish mullion compensation without scaling the image.
- The display is configured in a Planar Big Picture Plus, and it is desired to output one-to-one pixels. The standard EDID can't accommodate all possible Planar Big Picture Plus combinations.
- The location has 50Hz power and the EDID timing should be set to 50Hz rather than the default 60Hz.

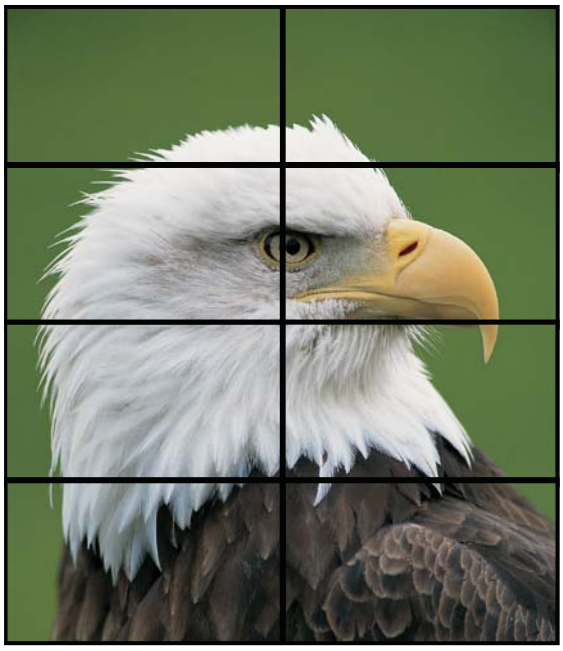
It is possible to specify detailed timing for the EDID by setting the horizontal active, vertical active, and vertical refresh rate. The system will then calculate the rest of the parameters by using the CVT reduced blanking formula. All of the timing parameters may be specified manually.

All this can be done in the EDID menu. Open the on-screen menu and from the MAIN MENU select ADVANCED OPTIONS > EDID.



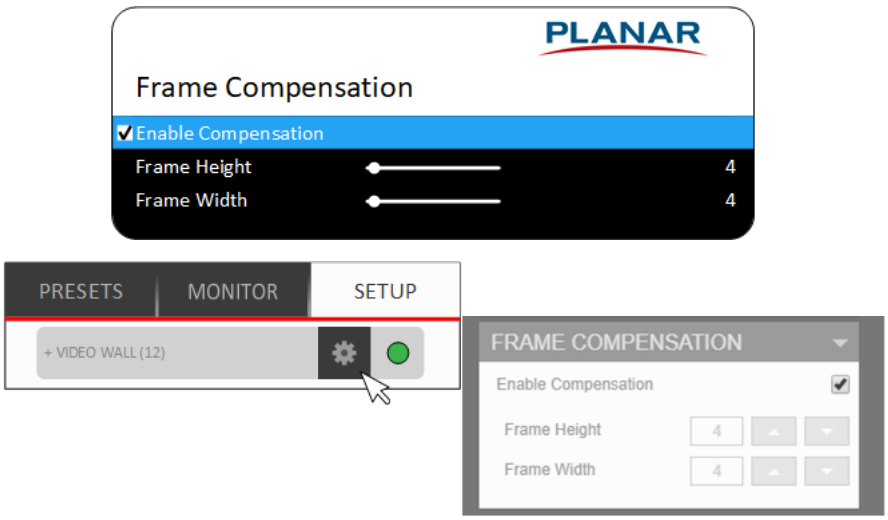
Frame Compensation

When video displays are used in an array, the intent is to display a large version of an image. However, even the thinnest of mullions can make the image appear incorrect. Notice the eagle's eye here.

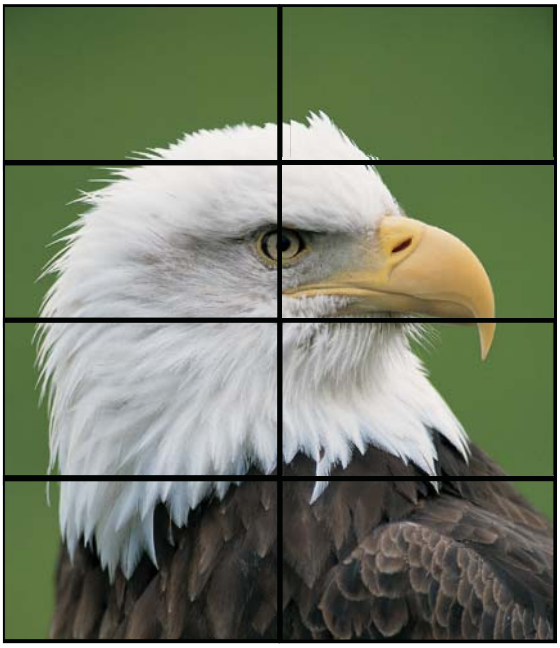


One way to fix this is to adjust the image. Imagine looking out a window made up of many panes of glass. The image seen is partially obscured by the frames, but the mind will assemble the image and ignores the frames.

Note: Frame Compensation is also known as mullion or bezel compensation.



Frame compensation basically mimics the mind's function by "hiding" portions of the picture (as if the mullions were actually hiding the image) and allow the distributed image to appear as one very large image.



To ensure images containing diagonal lines remain correctly aligned, turn on Frame Compensation.

Depending on how closely each display image is to another will determine how much of the picture to "hide" behind the display's mullions and the space between displays.

Frame Height and Frame Width

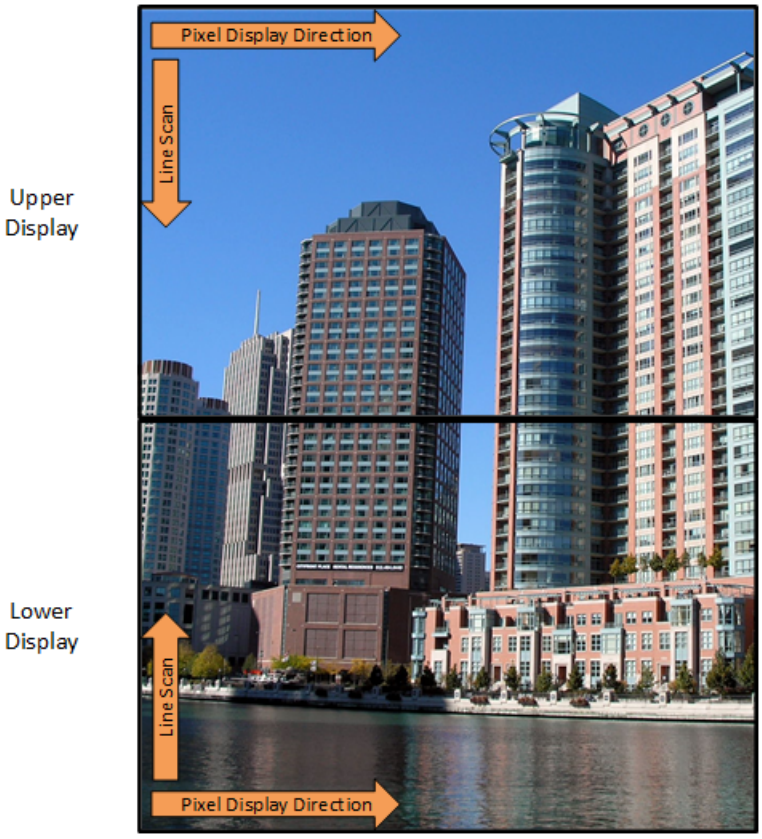
Frame Height can be set to hide pixels at the top and bottom of images. Frame Width can be set to hide pixels to the left and right of images. The Frame Height and Frame Width numbers default to the correct numbers for the system-recognized display, assuming they are tiled at the minimum gap between displays. If the installation leaves more space between the frames, increase these numbers until the image looks correct.

WallSync

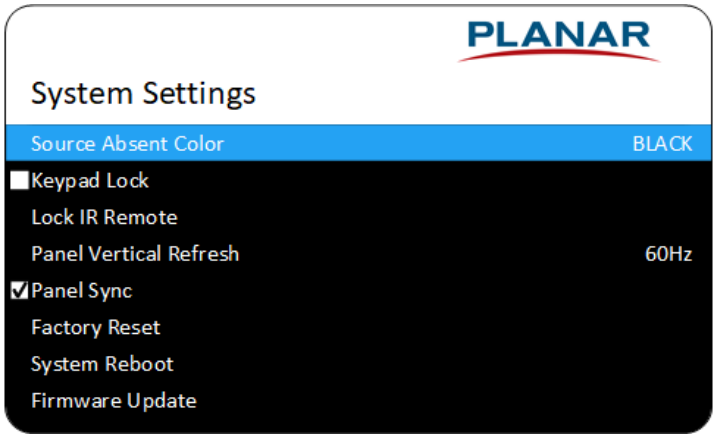
Video wall displays typically suffer from frame tearing between panels during horizontal panning of an image. This most notably happens between two displays located above and below one another. Notice the mis-alignment of the buildings below.

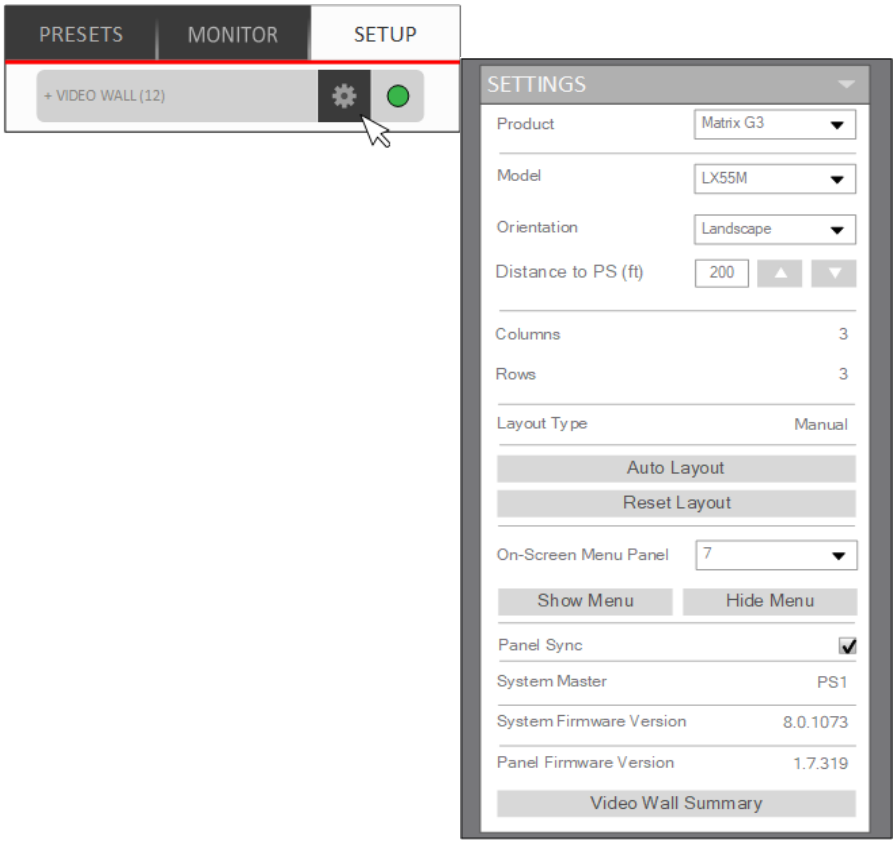
The typical way a single frame of data is sent to the panel is each pixel is sent to the upper-left corner and continues on like reading a book across and then down to the next line. By the time the last row of pixels are displayed on the top display, the lower display has already displayed the adjacent corresponding data. The Clarity Matrix G3 enables a method where it automatically recognizes which is the even row display in an array and corrects that row(s). For the even row display(s), the system corrects the

image by changing the first pixel displayed to be the lower-right corner of the display and continues horizontally and upward. This results in the correct corresponding data between panels to be displayed at the same time, eliminating tearing or mis-alignment of the image.



To enable this feature, check the box in the OSD or WallDirector as shown below.





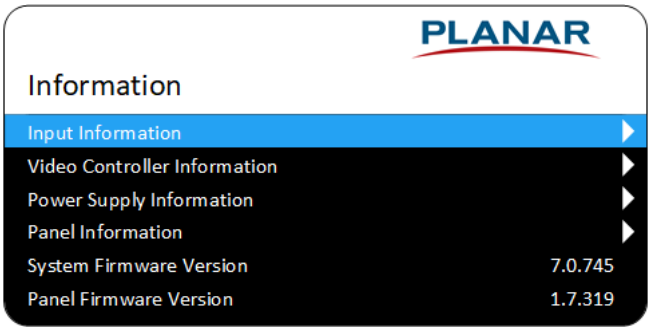
System Status

Most of the submenus available from the INFORMATION menu are not used on a regular basis.

To check status information for the system or to see usage information, use the COMPONENT INFORMATION menus, which are explained in the following sections.

Checking System Component Status

The UNIT STATUS menu shows information for the LCD, video controller and the power supply. This can be a helpful troubleshooting tool if there are operational issues with one of the system components.



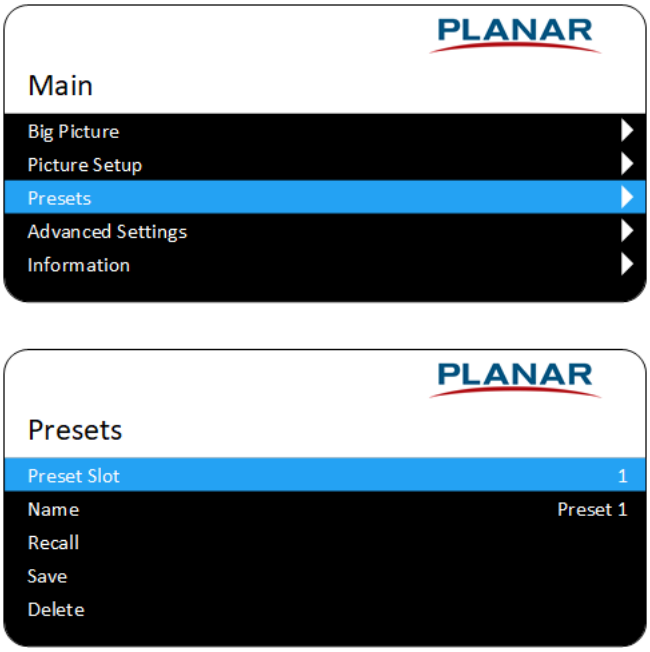
Presets (Slots)

Presets are saved information in slots for all the zones in the video wall. Zone information saved consists of the following:

- Source routed to zone
- Position of zone in wall
- Size of zone in wall
- Justification and aspect ratio of source routed to zone
- Overscan of source within zone
- Source crop within zone

Managing Presets Using the OSD

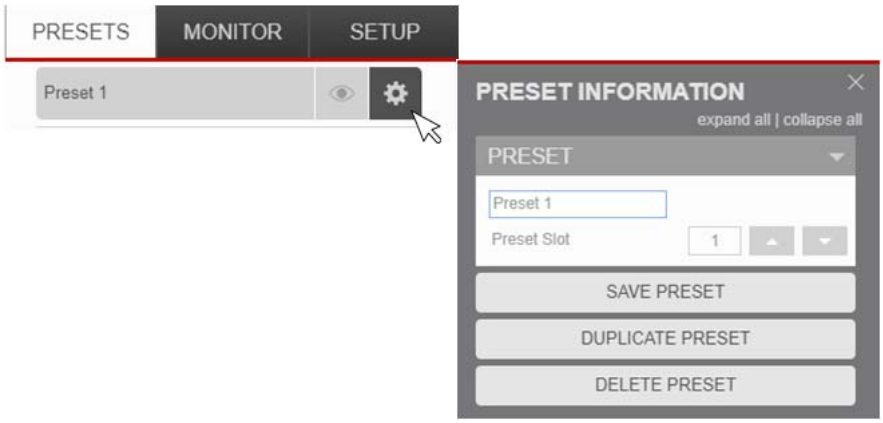
Saving, recalling and deleting presets can be done in the Presets menu. Open the on-screen menu and from the MAIN MENU select PRESETS.



Field	Description
Preset Slot	Adjusts the preset slot number to recall a layout from.
Name	The user assigned name of the preset. A name can be edited for a preset from the WallDirector software. This is read only in the OSD.
Recall	Activates the selected preset.
Save	Saves the selected preset.
Delete	Deletes the selected preset.

Managing Presets Using the WallDirector

Setting up zones and saving the configuration as a preset can be done using the **Presets** tab in the WallDirector.

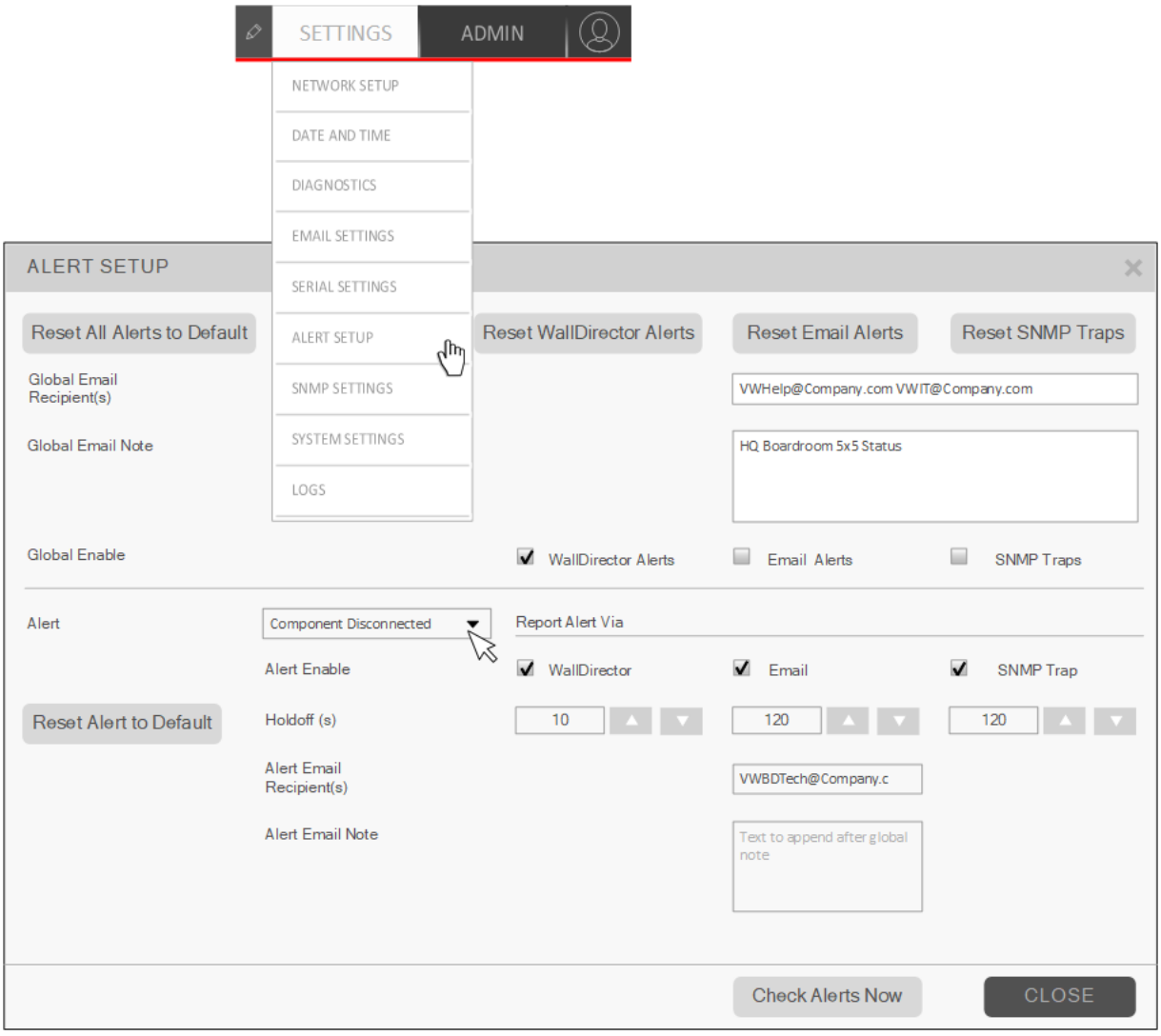


Alerts

Certain aspects of system status are available on a push notification basis, either through WallDirector, Email or SNMP. Setup and maintenance of alerts may be done either through WallDirector or serial commands. See the *WallDirector-RPS and Video Controller User Interface Guide* for detailed information.

Managing System Alerts

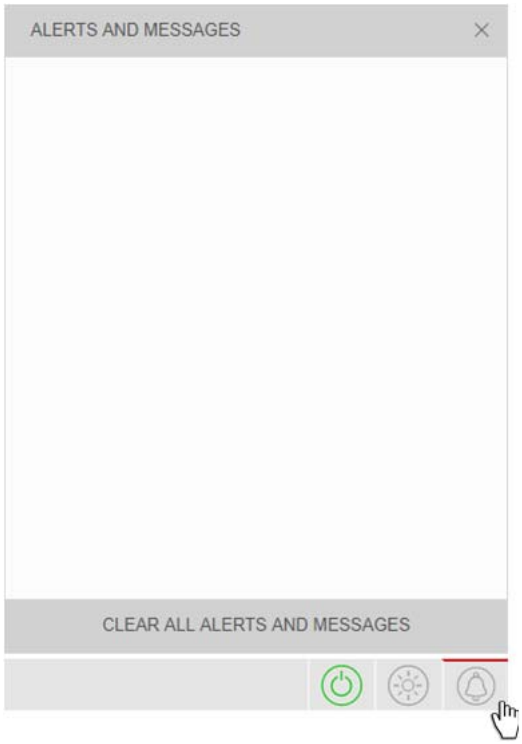
Selecting **Alert Setup** under **Settings** opens a dialog box that allows the configuration of system alerts via the previously mentioned methods. By default, WallDirector automatically displays the status of components within the wall in the System Alerts window. To use, Email and SNMP each need to be set up before they can be effectively enabled.



Global enable must be checked for any alerts to be communicated via the desired method. If Email alerts and SNMP Traps are the desired method of notification, both must be checked. There are a number of items that may be monitored for the system and each has the ability to independently change the trigger time and threshold for the reporting via each method. For instance, a WallDirector notification may display well in advance of an email to allow a person monitoring the system an opportunity to evaluate and correct a system issue.

Additionally, not all items in the list may need to be monitored by all means of communication. These may be checked on an individual basis depending on the desired outcome. For Email alerts, it is possible to have a different email address(es) for each enabled alert, apply a global email address(es) for all enabled alerts or a combination where multiple email addresses are notified. Subject lines will be formatted like *"Alert: 'System IP Address', 'Alert Condition': 'Component'"* or *Alert:10.15.0.156, Temperature: VC 3*. Notes applied to either location will be sent in the email body and provide a simple way of filtering on a system identifying text or phrase. Additional information in the email body are the date and time of an alert and if available, the actual value that triggered the alert.

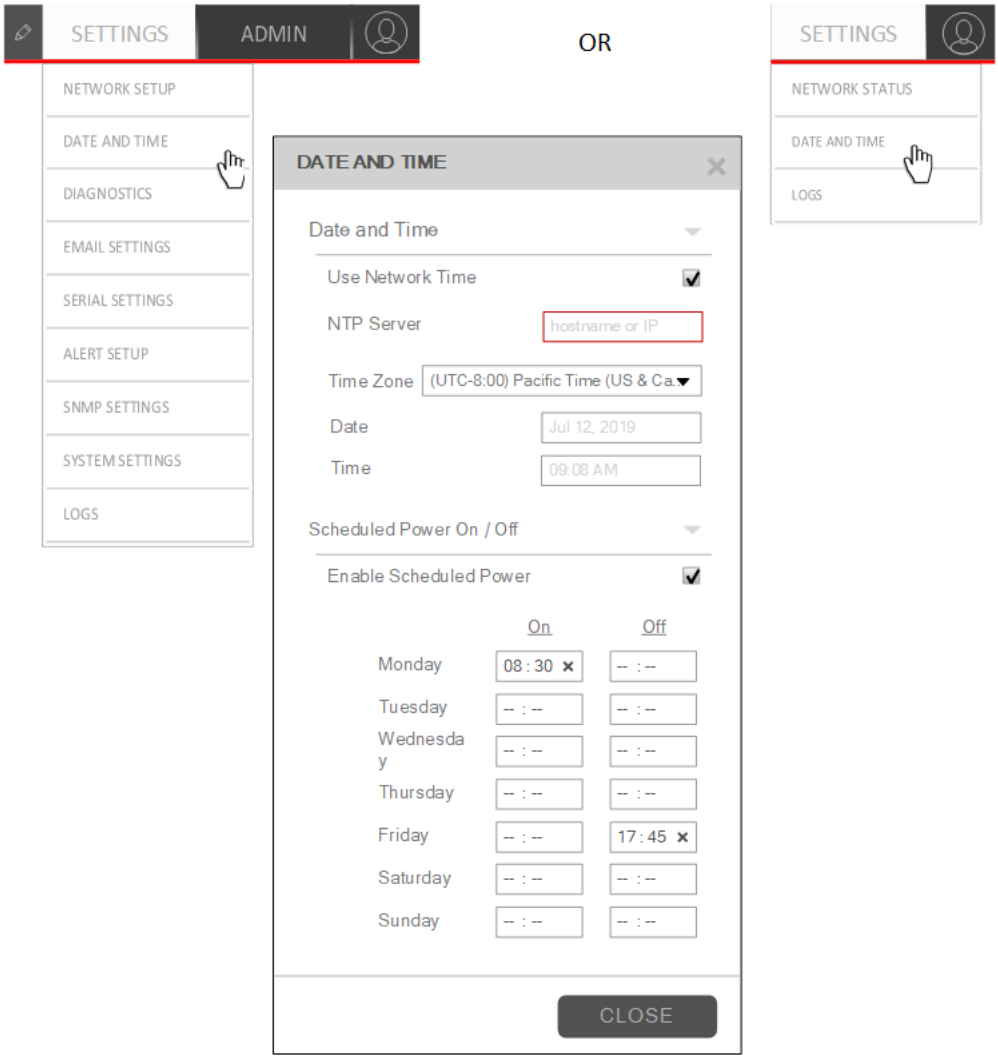
For WallDirector, a popup window in the lower right corner of the window will briefly flash any alert event that is currently happening with the system and then fade away. The current alerts may be accessed by clicking the alarm bell icon in the lower-right corner.



The alarm bell may be one of four colors indicating the severity of the alert. Red is the most severe, affecting the system performance now or imminently. Yellow means the desired results may not be achieved via the configuration. Blue indicates information that does not affect system performance or configuration. No color denotes the system has no alerts in the log. To clear alerts from the log, click the **Clear All Alerts and Messages** button, or click the '**X**' button to clear each individually.

Scheduling

The system has the ability to schedule a single time on and a single time off per day. See *WallDirector – RPS and Video Controller UI Guide* for more information.

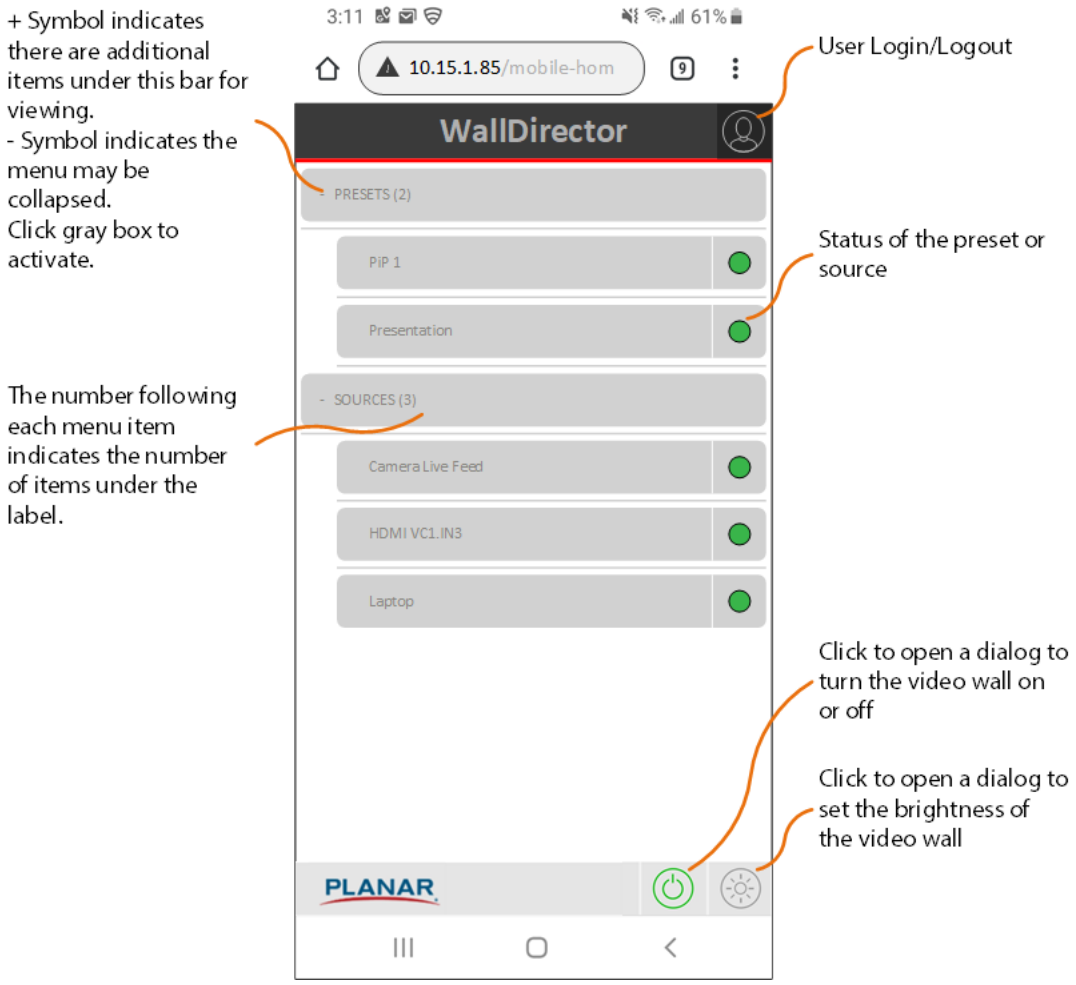


The Real Time Clock (RTC) for scheduling and runtime hours is maintained by either the RPS or VC battery. The equipment's battery life is directly affected by the uptime of the equipment. This should be taken into consideration as once a battery has exhausted it's power the equipment has a potential to cause unexpected behavior within the system. Under normal circumstances where an RPS/VC are under power for approximately 16 hours a day, the battery will last approximately 7 years. However, equipment kept in storage (spares) have a shelf life of approximately 2 years. Batteries should be replaced by a trained service technician.

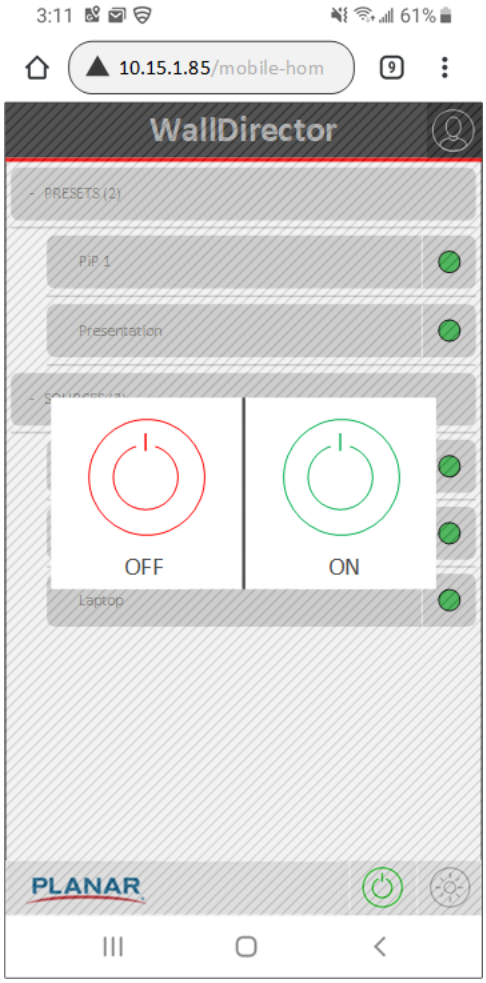
Note: Fast Start power mode is considered 24 hours per day for both the RPS and the VC and Low Power mode is still considered 24 hours per day for an RPS. 24 hours per day will allow for an approximate 10 year lifecycle.

Mobile Device Access

Access to the video wall's basic functions is available through any mobile device on the same network as the system.



When selecting the power button, a window will appear requesting which function is desired. Click ON or OFF will place the system in the Standby Mode for the system. Selecting either ON or OFF or clicking anywhere off the window will remove the window from the screen.



When selecting the brightness button, a window with a slider to increase or decrease the brightness. The slider will adjust the brightness in increments of 10. Clicking anywhere off the slider will remove this window.

Specifications

Clarity Matrix LCD Display Specifications for LX46X, MX46X, LX46U, MX46U, LX46U-3D

Parameter	Product					
	LX/MX46X		LX/MX46U		LX46U-3D (_, TOP, BOT)	
Panel						
Width	40.3"	1019mm	40.2"	1022mm	40.2"	1022mm
Height	22.7"	573mm	22.7"	577mm	22.7"	577mm
Diagonal overall	46"	1168mm	46"	1168mm	46"	1168mm
Depth installed	3.5"	90mm	3.5"	90mm	3.6"	91mm
Weight	33lbs	15.0kg	33lbs	15.0kg	35lbs	15.9kg
ERO product depth	3.7"	94mm	3.7"	94mm	n/a	
ERO product weight	47lbs	21.8kg	47lbs	21.8kg	n/a	
LCD Mount						
Width - Landscape	31.9"	809mm	31.9"	809mm	31.9"	809mm
Height - Landscape	20.8"	528mm	20.8"	528mm	20.8"	528mm
Width - Portrait	22.7"	576mm	22.7"	576mm	n/a	
Height - Portrait	38.3"	973mm	38.3"	973mm	n/a	
Weight - Landscape	7lbs	3.2kg	7lbs	3.2kg	7lbs	3.2kg
Weight - Portrait	9lbs	3.9kg	9lbs	3.9kg	n/a	
Orientation	Landscape or Portrait, Max vertical tilt of +/- 10°				Landscape (only)	
Maximum stack height	Unlimited (landscape/portrait)				Unlimited landscape	
Rear clearance required	None					
Aspect ratio	16:9 (landscape) 9:16 (portrait)				16:9 (landscape)	
Backlight life	50,000 (half brightness)					

Clarity Matrix LCD Display Specifications for LX55U, MX55U, LX55X, MX55X, MX55X2, LX55X2, LX55M, MX55M

Parameter	Product							
	LX/MX55U		LX/MX55X		LX/MX55M		LX/MX55X2	
Panel								
Width	47.8"	1213mm	47.7"	1211.8mm	47.66″	1210.5mm	47.71″	1211.9mm
Height	26.9"	684mm	26.9"	682.6mm	26.82″	681.2mm	26.77″	682.7mm
Diagonal overall	55"	1396mm	55"	1396mm	55″	1396mm	55″	1396mm
Depth installed	3.5"	90mm	3.6"	90mm	3.6″	90mm	3.6″	91mm
Weight	43lbs	19.5kg	43lbs	19.5kg	39lbs	17.7kg	44lbs	19.8kg
ERO product depth	3.7"	94mm	3.7"	94mm	3.7″	94mm	3.7″	95mm
ERO product weight	62lbs	28.1kg	62lbs	28.1kg	58lbs	26.3kg	63lbs	28.4kg
LCD Mount								
Width - Landscape	32.9"	837mm	32.9"	837mm	32.9″	837mm	32.9″	837mm
Height - Landscape	25"	636mm	25"	636mm	25″	636mm	25″	636mm
Width - Portrait	26.6"	677mm	26.6"	677mm	26.6″	677mm	26.6″	677mm
Height - Portrait	45.9"	1165mm	45.9"	1165mm	45.9″	1165mm	45.9″	1165mm
Weight - Landscape	8lbs	3.6kg	8lbs	3.6kg	7.5lbs	3.4kg	7.5lbs	3.6kg
Weight - Portrait	10lbs	4.5kg	10lbs	4.5kg	10.4lbs	4.7kg	10.4lbs	4.5kg
Orientation	Landscape or Portrait, Max vertical tilt of +/- 10°							
Maximum stack height	Unlimited (landscape/portrait)							
Rear clearance required	None							
Aspect ratio	16:9 (landscape) 9:16 (portrait)							
Backlight life	50,000 (half brightness)							

Planar Video Controller External Connections

Function	Connector	Notes
Input Power	MiniDin 4-pin	Pins 3 and 4 GND
Output Power	MiniDin 4-pin	Pins 3 and 4 GND
Video Input	HDMI	
Video Output	RJ45	
Video Loop In/Out	DP	
Control Loop In/Out	RJ45	
Remote IR Sensor	3.5mm Jack 3-conductor	
Aux Control Port	RJ45/USB-B	RS232/USB 2.0
Service Port	USB-A	
Genlock Loop In/Out	HDBNC	

Planar Video Controller Specifications

Description	VC4H-BP+	VC9H-BP+	Notes
Input Voltage (V_{DC})	24-48		
Power Draw (W)	65	75	Max
Max Controllers Power Looped	3	2	Same model looped, connected to RPS
HDMI Input Specification	4x2.0		
DisplayPort Input Specification	1x1.2		
HDR Compliance	HDR10 (4.2.2 12bit or 4.2.0 10/12bit)		Per HDMI specification
HDCP Compliance	2.2 (HDMI)/1.3 (DP)		
Genlock	Black Burst/Tri-level		
Control Protocol	TCP/IP		1G
Video Transmission Distance	200’/60m; (6561’/2km with extender)		STP CAT6a cable; extender using single mode fiber
Video Output Ports	4	9	
Height	1.7”/44mm		1U
Width	19”/483mm		Rack mount
Depth	10.2”/260mm		No cables
Weight	8lbs/3.6kg		

Clarity Matrix LCD Display Optical Specifications

Specification	Minimum	Typical
Screen brightness MX55M, MX55X2 MX55U, MX46U, MX55X, MX46X LX55U, LX46U, LX55X, LX55X2, LX46X, LX55M LX46U-3D (Thru circular polarized glasses combined left eye/right eye)	 600cd/m 600 cd/m 450 cd/m	 700cd/m 800 cd/m 500 cd/m 190 cd/m
Contrast ratio MX55U, MX55X, LX55U, MX46U, LX46U, LX55X, MX46X, LX46X LX46U-3D Cross Talk % (white/black) LX/MX55M, MX/LX55X2 (Sequential) (Dynamic)	 2500:1 800:1 20000:1	 3500:1 40:1 1100:1 30000:1
Brightness Uniformity	75%	
Viewing Angle, horizontal & vertical unless otherwise noted below LX46U-3D (Vertical View Angle @ 20% Cross Talk)		±178° ±16°

Clarity Matrix LCD Display Optical Specifications

Specification	Typical
Color gamut	72% NTSC 100% EBU
Color CIE - Native	
MX46X LCD module	
Red (x,y)	0.640, 0.330
Green (x,y)	0.300, 0.600
Blue (x,y)	0.150, 0.060
White (x,y)	0.275, 0.298
MX46U LCD module	
Red (x,y)	0.640, 0.330
Green (x,y)	0.300, 0.600
Blue (x,y)	0.150, 0.060
White (x,y)	0.277, 0.294
MX55U LCD Module	
Red (x,y)	0.645, 0.330
Green (x,y)	0.300, 0.620
Blue (x,y)	0.150, 0.060
White (x,y)	0.277, 0.294
LX46X LCD module	
Red (x,y)	0.640, 0.330
Green (x,y)	0.300, 0.600
Blue (x,y)	0.150, 0.060
White (x,y)	0.275, 0.298
LX46U LCD module	
Red (x,y)	0.640, 0.330
Green (x,y)	0.300, 0.600
Blue (x,y)	0.150, 0.060
White (x,y)	0.277, 0.294
LX55X LCD module	
Red (x,y)	0.646, 0.337
Green (x,y)	0.303, 0.615
Blue (x,y)	0.152, 0.060
White (x,y)	0.277, 0.294
LX55U LCD module	
Red (x,y)	0.645, 0.330
Green (x,y)	0.300, 0.620
Blue (x,y)	0.150, 0.060
White (x,y)	0.277, 0.294
MX55X LCD module	
Red (x,y)	0.646, 0.337
Green (x,y)	0.303, 0.615
Blue (x,y)	0.152, 0.060
White (x,y)	0.277, 0.294
LX46U-3D LCD module	
Red (x,y)	0.640, 0.330
Green (x,y)	0.300, 0.600
Blue (x,y)	0.150, 0.060
White (x,y)	0.275, 0.298

Specification	Typical
MX55M LCD module	
Red (x,y)	0.647, 0.330
Green (x,y)	0.313, 0.609
Blue (x,y)	0.154, 0.056
White (x,y)	0.279, 0.292
LX55M LCD module	
Red (x,y)	0.647, 0.330
Green (x,y)	0.313, 0.609
Blue (x,y)	0.154, 0.056
White (x,y)	0.279, 0.292
MX55X2 LCD module	
Red (x,y)	0.646, 0.329
Green (x,y)	0.311, 0.605
Blue (x,y)	0.155, 0.049
White (x,y)	0.269, 0.272
LX55X2 LCD module	
Red (x,y)	0.646, 0.330
Green (x,y)	0.311, 0.603
Blue (x,y)	0.155, 0.047
White (x,y)	0.270, 0.274
Color Temperature Presets	3200K, 5500K, 6500K, 8500K
Native color temperature MX55U, MX55X, LX55U, MX46U, LX46U, LX55X, MX46X, LX46X MX55M, LX55M, MX55X2, LX55X2	10,000K 9300K
Number of colors	16.7M
Native resolution (all 46" and 55" models)	1920 x 1080 pixels

Environmental Specifications

Specification	Maximum	Minimum	Optimal	Notes
Temperature operating, LCD operating, Video Controller	35° C/95° F 40° C/104° F	5° C/41° F -10° C/14° F	20° C/68° F 20° C/68° F	All performance specifications are maintained within this temperature range. 0km to 3km (0FT to 10kFT)
non-operating, LCD non-operating, Video Controller	60° C/140° F 85° C/185° F	–20° C/–4° F –20° C/–4° F	20° C/68° F	0-90% RH, non-condensing
Acoustic Noise LCD Video Controller	<30dBA 45dBA			No Fan
Altitude (barometric pressure) LCD Video Controller	2km/6.7kft 3km/10kft			
Humidity operating, LCD operating, Video Controller	80% R.H. 80% R.H.	20% R.H. 20% R.H.		non-condensing

Note: This is the minimum supported signal mode table. Signal timings and formats other than those listed below may also be supported.

Signal Compatibility

Signal Type	Resolution	Frame Rate (Hz)	Line Rate (kHz)	Pixel Rate (MHz)	HDMI – RGB	HDMI – YCBCR	DisplayPort – RGB	DisplayPort – YCBCR	References
PC	640x480	59.94	31.469	25.175	x	x	x	x	VESA DMT
	640x480	72	37.861	31.5	x		x		VESA DMT
	640x480	74.99	37.5	31.5	x		x		VESA DMT
	640x480	85	43.269	36	x		x		VESA DMT
	800x600	56	35.156	36	x		x		VESA DMT
	800x600	60.32	37.89	40	x		x		VESA DMT
	800x600	72	48.077	50	x		x		VESA DMT
	800x600	75	46.875	49.5	x		x		VESA DMT
	800x600	85.06	53.674	56.25	x		x		VESA DMT
	848x480	60	30	21.68	x		x		VESA CVT
	1024x768	50	40.6	54.57	x		x		VESA CVT-R
	1024x768	60	47.816	63.5	x		x		VESA CVT
	1024x768	60	48.363	65	x		x		VESA DMT
	1024x768	70	56.476	75	x		x		VESA DMT
	1024x768	75.03	60.023	78.75	x		x		VESA DMT
	1024x768	85.03	68.677	94.5	x		x		VESA DMT
	1024x1024	60	32.331	42.677	x		x		VESA DMT
	1152x864	70.012	63.851	94.5	x		x		VESA DMT
	1152x864	75	67.5	108	x		x		VESA DMT
	1152x864	84.999	77.094	121.5	x		x		VESA DMT
	1280x768	49.929	39.593	65.25	x		x		VESA CVT
	1280x768	60	47.4	68.25	x		x		VESA DMT
	1280x768	60	47.776	79.5	x		x		VESA CVT

Signal Compatibility (Continued)

Signal Type	Resolution	Frame Rate (Hz)	Line Rate (kHz)	Pixel Rate (MHz)	HDMI – RGB	HDMI – YCBCR	DisplayPort – RGB	DisplayPort – YCBCR	References
PC	1280x768	74.893	60.289	102.25	x		x		VESA CVT
	1280x768	84.837	68.633	117.5	x		x		VESA CVT
	1280x960	60	60	108	x		x		VESA DMT
	1280x960	75	75	126	x		x		VESA DMT
	1280x960	85.002	85.938	148.5	x		x		VESA DMT
	1280x1024	60.02	63.981	108	x		x		VESA DMT
	1280x1024	75.02	79.976	135	x		x		VESA DMT
	1280x1024	85.02	91.146	157.5	x		x		VESA DMT
	1360x768	60	47.712	85.5	x		x		VESA DMT
	1366x768	60	50	80	x		x		VESA DMT
	1400x1050	49.965	54.113	100	x		x		VESA CVT
	1400x1050	60	64.7	101	x		x		VESA CVT-R
	1400x1050	60	65.317	121.75	x		x		VESA CVT
	1400x1050	74.867	82.278	156	x		x		VESA CVT
	1600x1200	60	75	162	x		x		VESA DMT
	1680x1050	49.974	54.121	119.5	x		x		VESA CVT-R
	1680x1050	59.954	65.29	146.25	x		x		VESA CVT
	1920x1080	49.929	55.621	141.5	x		x		VESA CVT
	1920x1080	59.95	66.587	138.5	x		x		VESA CVT-R
	1920x1200	49.932	61.816	158.25	x		x		VESA CVT
	1920x1200	59.95	74.038	154	x		x		VESA CVT-R
	2560x1440	60	88.79	241.5	x		x		VESA CVT-R
	2560x1600	60	98.76	268.627	x		x		VESA CVT-R
	3840x2160	24	52.438	209.75	x		x		VESA CVT-R

Signal Compatibility (Continued)

Signal Type	Resolution	Frame Rate (Hz)	Line Rate (kHz)	Pixel Rate (MHz)	HDMI – RGB	HDMI – YCBCR	DisplayPort – RGB	DisplayPort – YCBCR	References
PC	3840x2160	25	54.625	218.5	x		x		VESA CVT-R
	3840x2160	30	65.688	262.75	x		x		VESA CVT-R
	3840x2160	50	110.55	442	x		x		VESA CVT-R
	3840x2160	60	133.32	533.25	x		x		VESA CVT-R
Specialty	960x1080	60	66.66	75.66	x		x		VESA CVT-R
	960x2160	60	133.32	149.31	x		x		VESA CVT-R
	960x3240	60	199.92	223.91	x		x		VESA CVT-R
	960x4320	60	266.58	298.56	x		x		VESA CVT-R
	1920x2160	24	52.44	109.07	x		x		VESA CVT-R
	1920x2160	25	54.65	113.67	x		x		VESA CVT-R
	1920x2160	30	65.73	136.71	x		x		VESA CVT-R
	1920x2160	50	110.55	229.94	x		x		VESA CVT-R
	1920x2160	60	133.32	277.3	x		x		VESA CVT-R
	1920x3240	24	78.65	163.58	x		x		VESA CVT-R
	1920x3240	25	81.95	170.45	x		x		VESA CVT-R
	1920x3240	30	98.58	205.04	x		x		VESA CVT-R
	1920x3240	50	165.85	344.96	x		x		VESA CVT-R
	1920x3240	60	199.92	415.83	x		x		VESA CVT-R
	1920x4320	24	104.86	218.1	x		x		VESA CVT-R
	1920x4320	25	109.28	227.29	x		x		VESA CVT-R
	1920x4320	30	131.43	273.37	x		x		VESA CVT-R
	1920x4320	50	221.1	459.88	x		x		VESA CVT-R
	1920x4320	60	266.58	554.48	x		x		VESA CVT-R
	3840x1080	24	26.38	105.5	x		x		VESA CVT-R

Signal Compatibility (Continued)

Signal Type	Resolution	Frame Rate (Hz)	Line Rate (kHz)	Pixel Rate (MHz)	HDMI – RGB	HDMI – YCBCR	DisplayPort – RGB	DisplayPort – YCBCR	References
Specialty	3840x1080	25	27.48	109.9	x		x		VESA CVT-R
	3840x1080	30	32.97	131.88	x		x		VESA CVT-R
	3840x1080	50	55.3	221.2	x		x		VESA CVT-R
	3840x1080	60	66.66	266.64	x		x		VESA CVT-R
	3840x3240	24	78.65	314.59	x		x		VESA CVT-R
	3840x3240	25	81.95	327.8	x		x		VESA CVT-R
	3840x3240	30	98.58	394.32	x		x		VESA CVT-R
	3840x4320	24	104.85	419.42	x		x		VESA CVT-R
	3840x4320	25	109.28	437.1	x		x		VESA CVT-R
	3840x4320	30	131.43	525.72	x		x		VESA CVT-R
	5760x1080	24	26.38	156.14	x		x		VESA CVT-R
	5760x1080	25	27.48	162.65	x		x		VESA CVT-R
	5760x1080	30	32.97	195.18	x		x		VESA CVT-R
	5760x1080	50	55.3	327.37	x		x		VESA CVT-R
	5760x1080	60	66.66	394.62	x		x		VESA CVT-R
	5760x2160	24	52.44	310.44	x		x		VESA CVT-R
	5760x2160	25	54.65	323.52	x		x		VESA CVT-R
	5760x2160	30	65.73	389.12	x		x		VESA CVT-R
	5760x3240	24	78.65	465.59	x		x		VESA CVT-R
	5760x3240	25	81.95	485.14	x		x		VESA CVT-R
	5760x3240	30	98.58	583.59	x		x		VESA CVT-R
	7680x1080	24	26.38	206.78	x		x		VESA CVT-R
	7680x1080	25	27.48	215.4	x		x		VESA CVT-R
	7680x1080	30	32.97	258.48	x		x		VESA CVT-R

Signal Compatibility (Continued)

Signal Type	Resolution	Frame Rate (Hz)	Line Rate (kHz)	Pixel Rate (MHz)	HDMI – RGB	HDMI – YCBCR	DisplayPort – RGB	DisplayPort – YCBCR	References
Specialty	7680x1080	50	55.3	433.55	x		x		VESA CVT-R
	7680x1080	60	66.66	522.61	x		x		VESA CVT-R
	7680x2160	24	52.44	411.12	x		x		VESA CVT-R
	7680x2160	25	54.65	428.45	x		x		VESA CVT-R
	7680x2160	30	65.73	515.32	x		x		VESA CVT-R
	7680x3240	23	75.32	590.54	x		x		VESA CVT-R
Apple Mac	640x480	60	31.5	25.2	x	x	x	x	VESA DMT
	1024x768	59.278	48.193	64	x		x		VESA DMT
	1024x768	74.927	60.241	80	x		x		VESA CVT
	1152x870	60	54.17	82.34	x		x		VESA DMT
	1152x870	75.062	68.32	104.94	x		x		VESA DMT
	1280x800	60	49.7	83.499	x		x		VESA DMT
	1440x900	60	55.935	106.5	x		x		VESA CVT
	1600x900	60	56	118.35	x		x		VESA DMR
	1680x1050	60	65.34	146.36	x		x		VESA CVT
	2560x1440	60	88.79	241.5	x		x		VESA CVT-R
	2560x1600	60	98.76	268.627	x		x		VESA CVT-R
	3840x2160	24	52.438	209.75	x	x	x	x	VESA CVT-R
	3840x2160	25	54.625	218.5	x	x	x	x	VESA CVT-R
	3840x2160	30	65.688	262.75	x	x	x	x	VESA CVT-R
	3840x2160	50	110.55	442	x	x	x	x	VESA CVT-R
	3840x2160	60	133.32	533.25	x	x	x	x	VESA CVT-R

Signal Compatibility (Continued)

Signal Type	Resolution	Frame Rate (Hz)	Line Rate (kHz)	Pixel Rate (MHz)	HDMI – RGB	HDMI – YCBCR	DisplayPort – RGB	DisplayPort – YCBCR	References
SDTV	480p	59.94	31.46	25.175	x	x	x	x	SMPTE 293M, CEA-861-E
	576p	50	31.25	27	x	x	x	x	ITU-R BT.1358, CEA-861-E
	1080i*	50	28.125	74.25	x	x	x	x	SMPTE 274M, CEA-861-E
EDTV	1080i* (Aus)	50			x	x	x	x	SMPTE 295M, AS 4933.1-2005, CEA-861-E
HDTV	1080i*	60	33.75	74.25	x	x	x	x	SMPTE 274M, CEA-861-E
	720p	50	37.5	74.25	x	x	x	x	SMPTE 296M, CEA-861-E
	720p	60	45	74.25	x	x	x	x	SMPTE 296M, CEA-861-E
	1080p	24	27	74.25	x	x	x	x	SMPTE 274M, CEA-861-E
	1080p	25	28.125	74.25	x	x	x	x	SMPTE 274M, CEA-861-E
	1080p	30	33.75	74.25	x	x	x	x	SMPTE 274M, CEA-861-E
	1080p	50	56.25	148.5	x	x	x	x	SMPTE 274M, CEA-861-E
	1080p	60	67.5	148.5	x	x	x	x	SMPTE 274M, CEA-861-E

Signal Compatibility (Continued)

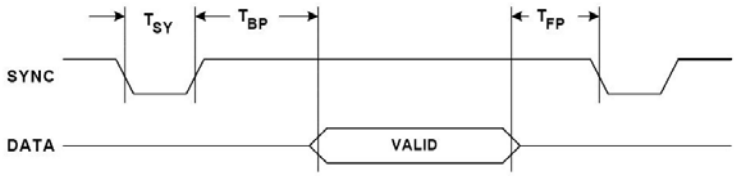
Signal Type	Resolution	Frame Rate (Hz)	Line Rate (kHz)	Pixel Rate (MHz)	HDMI – RGB	HDMI – YCBCR	DisplayPort – RGB	DisplayPort – YCBCR	References
UHDTV	3840x2160	24	54	297	x	x	x	x	SMPTE ST 2036-1:2009, HDMI 1.4b
	3840x2160	25	56.25	297	x	x	x	x	SMPTE ST 2036-1:2009, HDMI 1.4b
	3840x2160	30	67.5	297	x	x	x	x	SMPTE ST 2036-1:2009, HDMI 1.4b
	3840x2160	50	112.5	594	x	x	x	x	SMPTE ST 2084, HDMI 2.0b
	3840x2160	60	67.5	297	x	x	x	x	SMPTE ST 2084, HDMI 2.0b 4.2.0
	3840x2160	60	135	594	x	x	x	x	SMPTE ST 2084, HDMI 2.0b
	4096x2160	24	54	297	x	x	x	x	SMPTE ST 2036-1:2009, HDMI 1.4b
	4096x2160	25	56.25	297	x	x	x	x	SMPTE ST 2036-1:2009, HDMI 1.4b
	4096x2160	30	67.5	297	x	x	x	x	SMPTE ST 2036-1:2009, HDMI 1.4b
	4096x2160	50	112.5	594	x	x	x	x	SMPTE ST 2084, HDMI 2.0b
	4096x2160	60	67.5	297	x	x	x	x	SMPTE ST 2084, HDMI 2.0b 4.2.0
	4096x2160	60	135	594	x	x	x	x	SMPTE ST 2084, HDMI 2.0b

* 1080i motion adaptive resolution available on HDMI input 1 only. HDMI 2, 3, and 4 inputs support an enhanced BOB algorithm.

Input Minimum Sync and Blanking Specifications

Parameter	Symbol	Minimum Horizontal Setting	Minimum Vertical Setting
Sync pulse width	Tsy	2 pixels	2 lines
Sync back porch width	Tbp	20 pixels 64 (tri-level sync)	3 lines
Sync front porch width	Tfp	1% of HRes	1 line

Note: The following illustration shows the timing characteristics for the Input Sync, Front Porch and Back Porch.



Remote Power Supply Operation and Features

Items of note for operation:

- If an RPS is switched off or placed in low power mode, there is a 30 second wait time until the RPS will begin its boot process. Additionally, if the same RPSM is removed and reinstalled prior to 30 seconds passing, there is a minimum 30 second wait time prior to that RPSM being ready to output power. The breaker switch is best for resetting power to displays.
- If there is a sudden loss of load to the RPS and then a sudden addition of load to the RPS during operation, the RPS will reboot. If the breaker switch is used to power down and up equipment, it is best to do this cycle one at a time.
- The RPS will not enable DC output power unless all RPSM are installed and associated AC power is applied for any particular configuration. If the unit is AC powered prior to installing all the RPSM, a power reset is required.
- Each breaker is fixed at 25A. Loads for more than a few seconds beyond this point will trip the breaker.
- Only Planar branded RPSMs are rated to work in this system.
- Fans within the system are internally thermally controlled. The system has been designed to nominally run at 40dB or less at 25°C (77°F), 0m (0kft). Acoustic noise beyond this point is dictated by the power draw and environmental conditions.

The RPS will come with open bays and a corresponding number of Remote Power Supply Modules (RPSM).

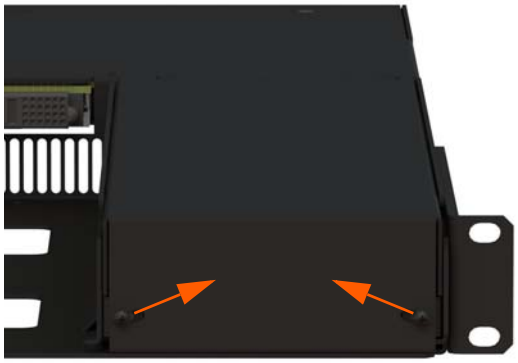
Removing Shipping Support

Depending on configuration, the remote power supply may have a shipping support. This must be removed prior to installation. To remove, pull the front of the remote power supply forward until it snaps free. This part may be discarded.

The RPSM are shipped in their own box within the larger RPS box to prevent shipping damage that may occur. If a redundant module was ordered, the N+1 bay in the RPS must have its cover removed.

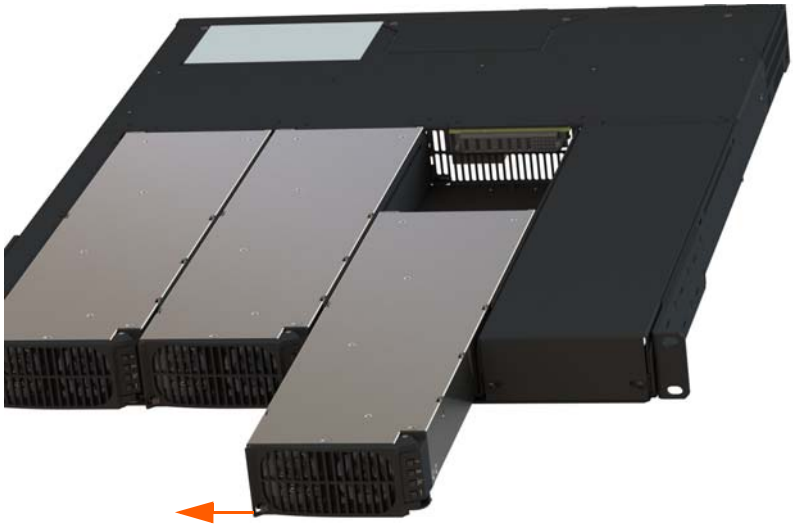
Removing the Cover

1. Loosen the two screws holding the cover in place approximately 8-10 turns.
2. Pinch the screws in the direction indicated by the arrows while pulling the cover out the front of the unit.

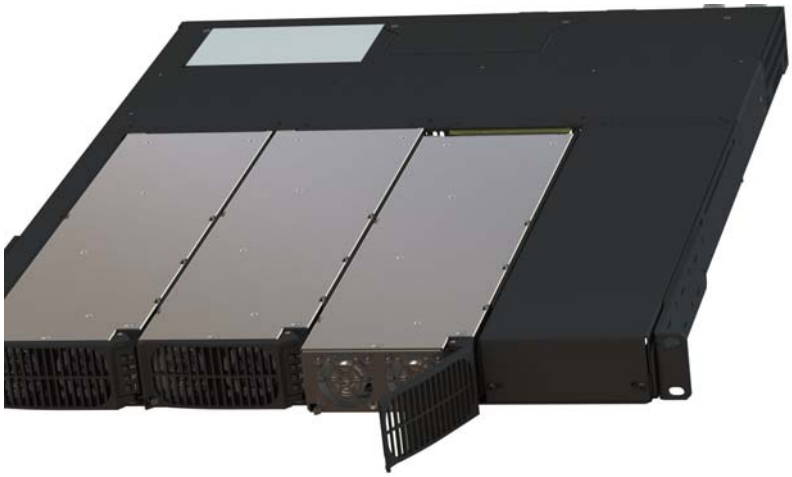


Installing the RSPM

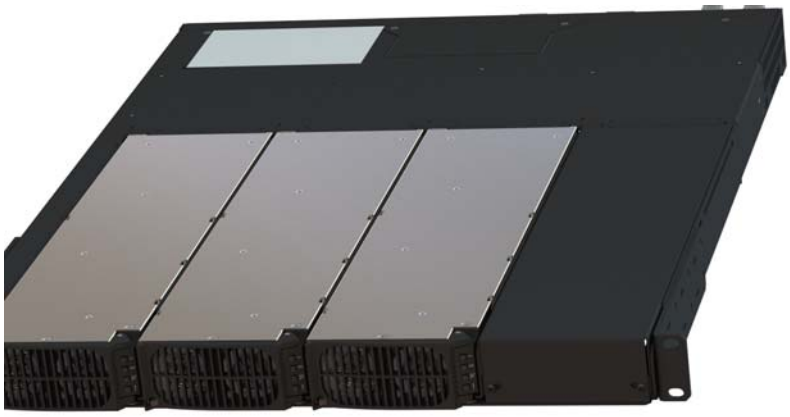
1. Slide the unit in the RPS channel desired in the orientation shown.
2. Push the spring latch on the front of the RPSM to release the vent door and open as far as it will go.



3. Slide the RPSM into the slot until it will not move any further.



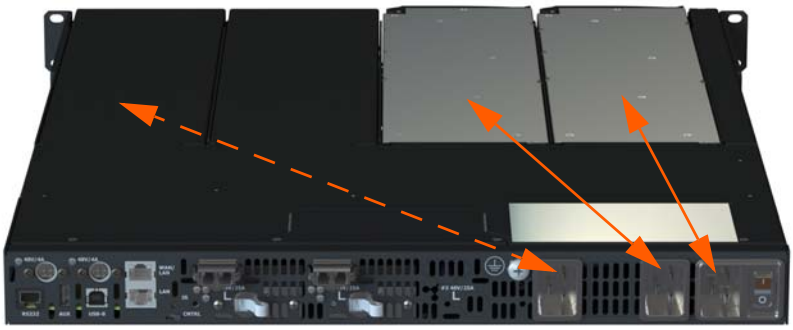
4 While continuing to gently push, rotate the vent door until it snaps in place and it is again held by the spring latch.



5 Repeat this procedure for each empty bay in the RPS before turning the system on.

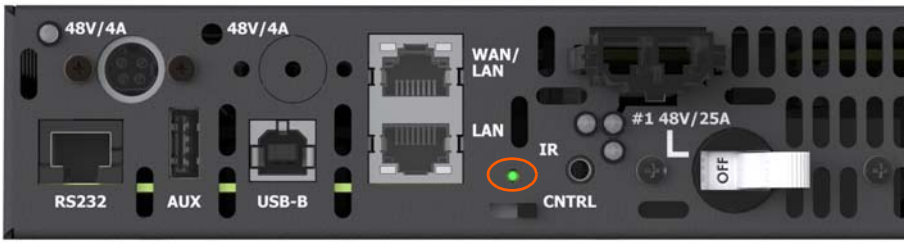
Note: RPSMs are hot-swappable as long as the power draw does not exceed the maximum power draw of the remaining RPSM(s). Removal of a RPSM is opposite of the installation. Additionally, removal of the RPSM disables the AC relay in the system until a new RPSM is installed.

6 Plug in AC power to each inlet associated with the RPSM that has been installed.



Note: If redundancy is not part of the configuration, this AC inlet does not need an external connection.

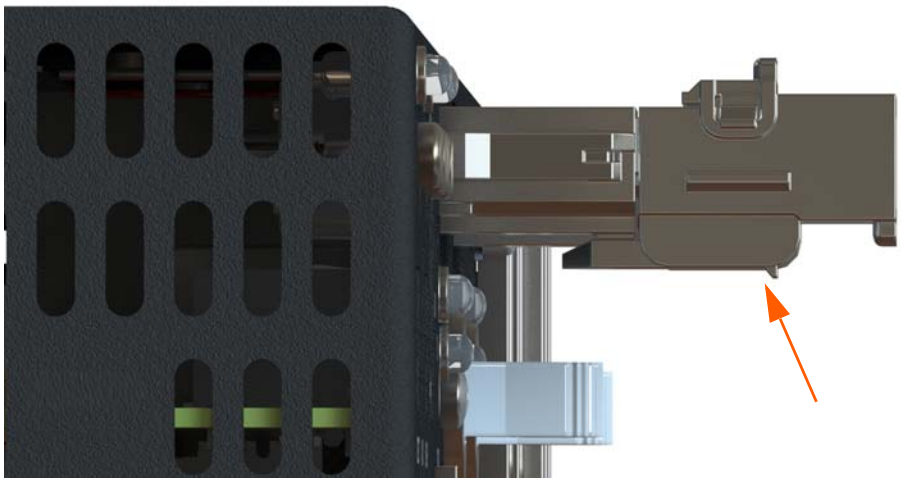
Toggling the switch on AC circuit 1 enables the power to be applied to all circuits via a standby power supply in the system that controls AC relays to all the RPSM. The RPS is set to automatically power up all the RPSM. Please note the green blinking light by the control switch on the back blinks 2 times per second while booting the system.



Once the green light is solid green or off, verify the front of the RPSM modules indicate that DC out is active. This means the RPS outputs on the back of the unit are ready for use.

Plug the required DC cables to the equipment in and if needed switch the breaker to on to enable the outputs. The connector is locking and requires the latch to be pushed down when disconnecting. See the picture below of the connector with arrow indicating where to press.

Note: Orientation of the connector is latch down so it may be difficult to see.



The system has the ability to go into standby mode with a power draw of less than 3W. The RPS comes with a remote IR sensor and remote. Using the ON and OFF keys on the remote with the IR sensor plugged in is one way to activate this feature.

Firmware Update

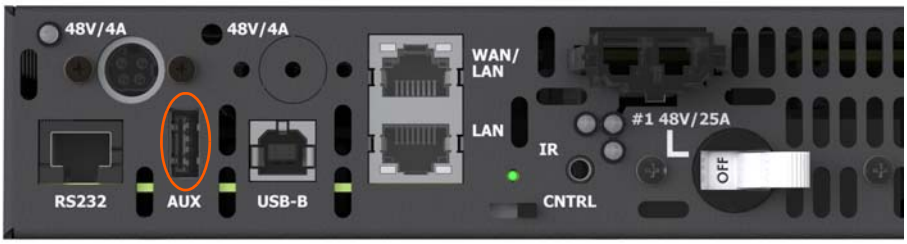
Note: After connection of all equipment, It is recommended to update the firmware to the latest revision. The latest firmware is located on the Planar Portal website (http://partners.planar.com/). For more information about the firmware features, read the readme file that comes with the firmware package.

Firmware on the power supply can be updated by three different methods:

1. Using the web-based UI as described in the *WallDirector, RPS and Video Controller User Interface Guide*.

2. Using the Serial command as described in the *RPS and Video Controller RS232 User Guide*.

3 Automatically by inserting a USB into the AUX port with a file named *autorun.zip* or *autorun.pkg* that corresponds to the firmware version desired. This may require a renaming of the file to *autorun.zip* or *autorun.pkg* prior to insertion.

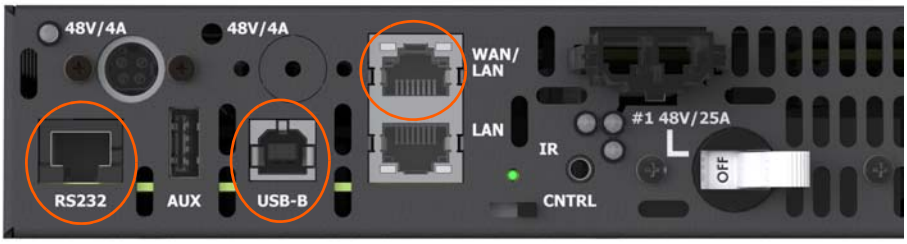


Firmware uploading is indicated by the control LED previously mentioned during the power on sequence. Once a firmware package is recognized as being new, the light will blink slowly (1 second on followed by 1 second off) while the data is copied to the system. The light will blink quickly during a firmware update and indicate success (steady off for 4 seconds followed by 1 second on) or failure (blinking 5 seconds on followed by 5 seconds off). Once the light indicates a firmware update is in process, then the USB device may be removed. Upon successful update, the power supply requires a hard power for changes to take effect.

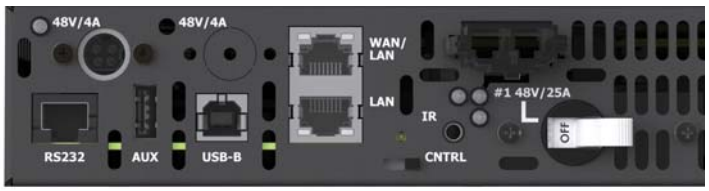
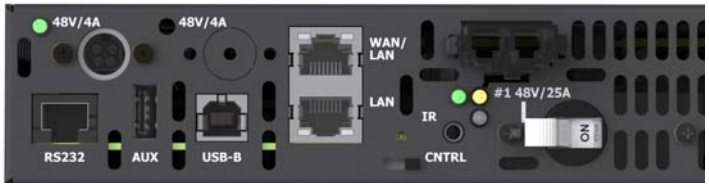
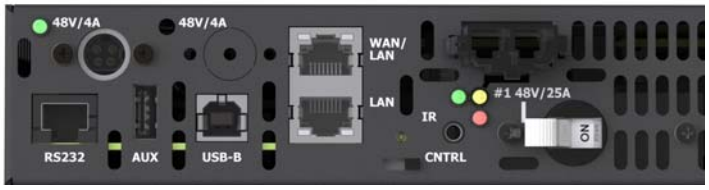
Note: The system pre-checks the version to be uploaded with the existing firmware version. If they are the same, the update process aborts and the unit goes back to normal operation.

Power Supply Control

Another way to control or monitor the power supply is through the serial communication using the commands listed in the *RPS and Video Controller RS232 User Guide* using the RS232, USB or Ethernet connections.



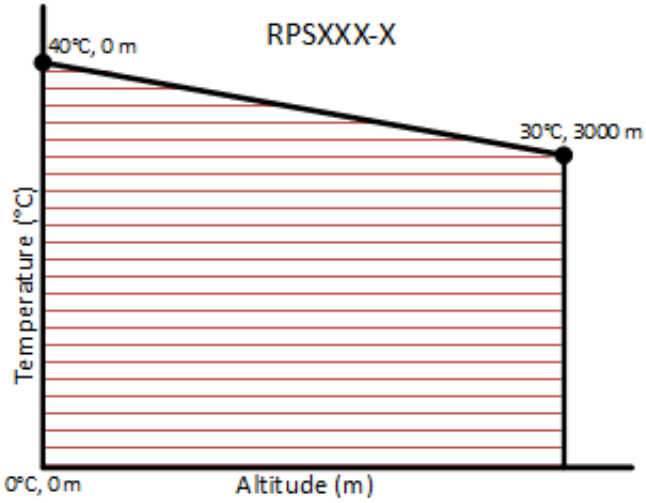
Power Supply Status Indicators

RPS Status LEDs	Description
	No AC power applied.
	AC power applied and system booting. LED flashes while system is initializing. LED will flash slowly while system is in standby.
	DC power active on auxiliary power connector(s)
	DC power active on main power connection. Power draw on connection is 0-80% of capability. Switch must be in 'ON' position.
	DC power active on main power connection. Power draw on connection is 81-95% of capability. Switch must be in 'ON' position.
	DC power active on main power connection. Power draw on connection is 96-100% of capability. Switch must be in 'ON' position.
	DC power not active on main power connection. Power draw on connection is greater than capability. Switch automatically switched to 'OFF' position.

RPSM Status LEDs	Description
	No AC power applied.
	AC power applied and good.
	DC power output enabled
	DC power output enabled, service warning non-critical issue
	DC output disabled, thermal shutdown
	Fault condition, replace module

Function	Connector	Notes
Input power	IEC320-C20	2-4x
Main Output Power	Molex MinFit Sr. 2pin	Pin 1 GND
Aux Output Power	MiniDIN 4-pin	Pins 3, 4 GND
Aux Ground	M10 Screw	
Control Loop In/Out	RJ45	
Remote IR Sensor	3.5mm Jack 3-conductor	
Aux Control Port	RJ45/USB-B	RS232/USB 2.0
Service Port	USB-A	

Description	RPS110-X	RPS220-X	Notes
Input Power	100-120V_{AC}, 15A 200-240V_{AC}, 7.3A	200-240V_{AC}, 15A	
Input Frequency	50-60Hz		
Inrush Current	≤40A		Per AC Circuit
Power Factor	0.97		Minimum @50-100% Load
Main Output Power	48V_{DC}, 25A		Max Each Connector
Aux Output Power	48V_{DC}, 4A		Max Each Connector
Control Protocol	TCP-IP		1G
Standby Power	<0.3W		
Height	1.7"/43.4mm	2.6"/65.9mm	
Width	18.9"/478.3mm		
Depth	23.41"/594.6mm		No cables
Main Chassis Weight	-1: 10lbs/4.5kg -2: 12.2lbs/5.5kg -3: 14.4lbs/6.5kg	-1: 14.4lbs/6.5kg -2: 16.6lbs/7.5kg -3: 18.8lbs/8.5kg	
RPSM Weight	2.4lbs/1.1kg		
Acoustic Noise	<60dBa		
Operating Temperature	See Chart Below		Optimal 68°F/20°C
Storage Temperature	-5°F to 185°F, -20°C to 85°C		0-90% RH, non-condensing
Operating Altitude	See Chart Below		
Operating Humidity	0-80% RH		Non-condensing


RPSXXX-X
40°C, 0 m
30°C, 3000 m
Temperature (°C)
0°C, 0 m
Altitude (m)

Clarity Matrix Fiber Video Extension Guide

The Clarity® Matrix® has added to its mission-critical capabilities with the Fiber Video Extension option. The Clarity® Matrix® Fiber Video Extension option provides a more secure and longer distance option for extending the video signal from the rack electronics to the Clarity Matrix displays.

Features of the Fiber Video Extension option include:

- Utilizes LC style Duplex fiber optic cable to extend the video signal
- Allows the Video Controller and the Fiber Video Extension module to be placed up to 6561 feet/2000 meters away from the Matrix wall with standard single-mode fiber cable and provided SFP+ transceiver or up to 10 kilometers with single-mode fiber cable and compatible transceivers
- Extends the IR remote control over the fiber cable and compatible transceiver
- Extends the USB signal for the Matrix MultiTouch sensor and can power the touch sensor from a Matrix LCD display

This section covers the unpacking, installation and troubleshooting of the Fiber Video Extension option.

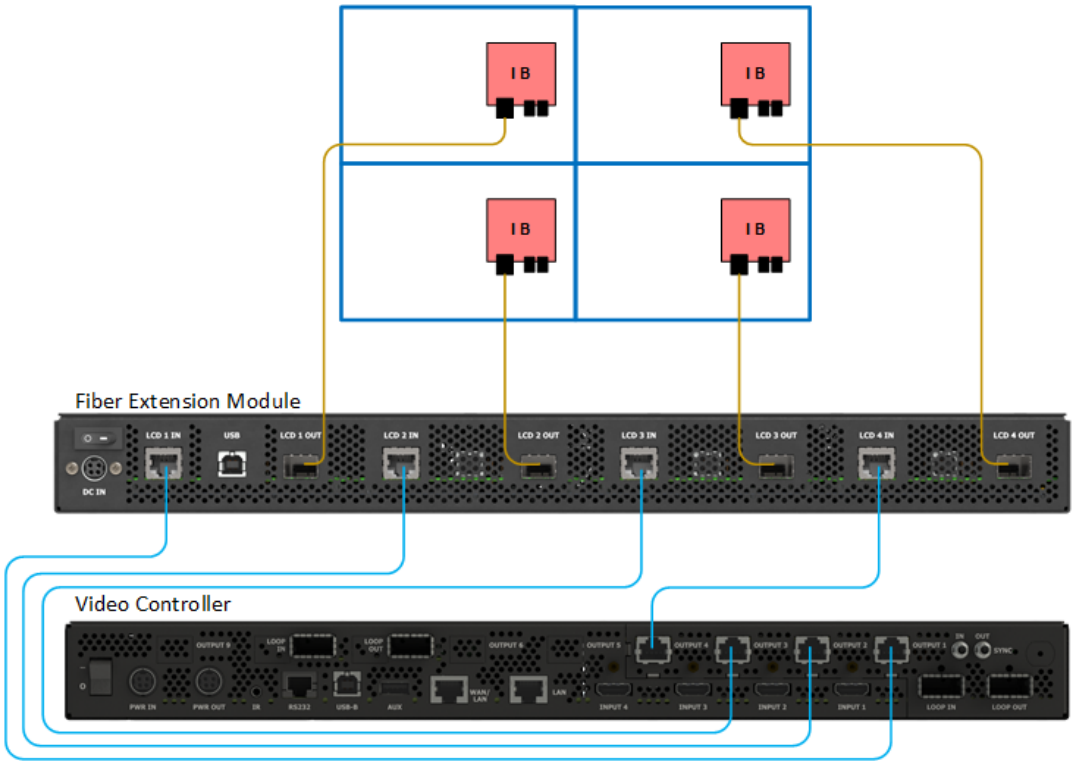
General and technical information regarding fiber optics can be found here: http://www.thefoa.org.

For specific fiber termination details, please reference the information supplied by the termination kit and/or fiber cable manufacturer.

System Architecture

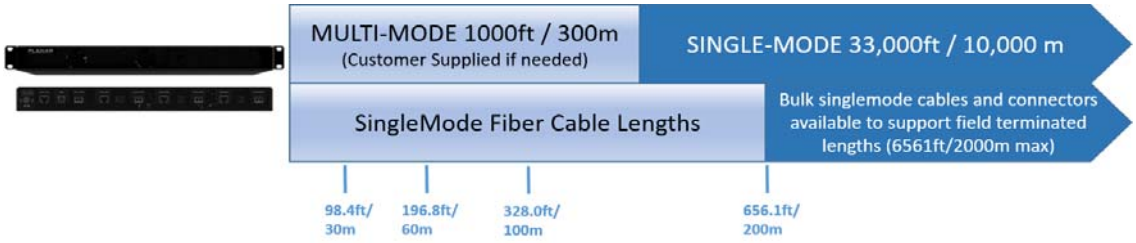
The Fiber Video Extension module is the main component of the Fiber Video Extension option. It works with the Video Controller to send images to the LCD modules.

The following example shows the connections for a basic video wall.



Supported Fiber Cable Lengths

The following graphic illustrates the supported fiber cable lengths for the Fiber Video Extension module. Planar supplies multi-mode transceivers, but the Fiber Video Extension module is also compatible with single-mode transceivers available from third parties.



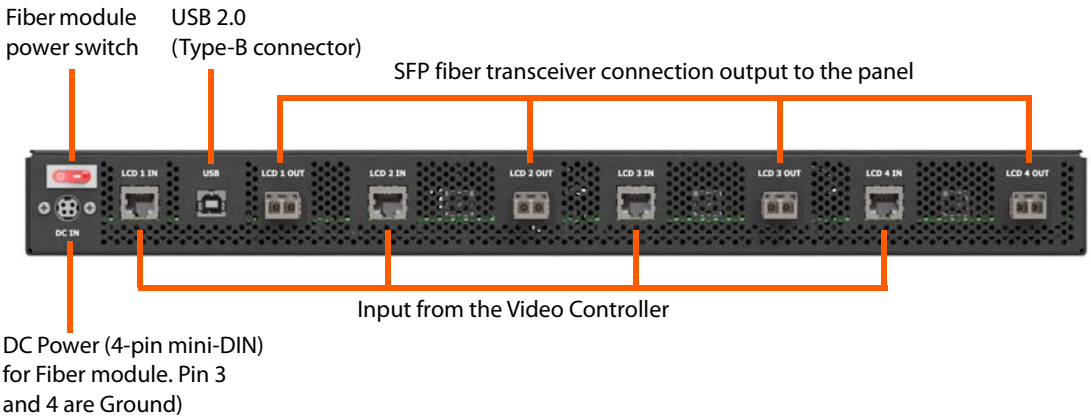
Note: To accommodate the Fiber Video Extension module extended distance difference from the maximum Power Supply distance, Video Controllers may need to be separated from the Power Supply module and powered from an optional $48V_{DC}$ Power Brick.

Note: For longer fiber lengths up to 10km, the installer must supply SFP+ 10G single-mode transceivers (in place of the Planar supplied 2km single mode transceivers) with compatible OS1/OS2 duplex single-mode cables.

Fiber Video Extension Module – Front View

Air intake – keep clear

Fiber Video Extension Module – Rear View



Installing the Fiber Video Extension

Unpacking the Box

The following items are included with the Fiber Video Extension module:

Part	Description	Number	Picture
Fiber Video Extension module	Extends the Video Controller with fiber optic cable out to the LCDs.	1	
Transceiver	Connections for the fiber optic cable.	4	
CAT6 patch cables (1 m)	Connects the Video Controller to the Fiber Video Extension module.	4	
USB cable (3 m)	Connects a PC to the Fiber Video Extension module for USB devices located at the panel, such as a touch sensor.	1	
Power cable (4ft)	Connects the power supply module to the video controller.	1	

Optional Accessories

- LC terminated OS1 9/125um single mode duplex plenum fiber optic cable – 30m/98.4ft
- LC terminated OS1 9/125um single mode duplex plenum fiber optic cable – 60m/196.8ft.
- LC terminated OS1 9/125um single mode duplex plenum fiber optic cable – 100m/328ft.
- LC terminated OS1 9/125um single mode duplex plenum fiber optic cable – 200m/656.1ft.
- Bulk OS1 9/125um single mode duplex plenum fiber optic cable – 2000m/6561ft.
- 9/125 um single mode LC Unicam, OS1/OS2 fiber connector – 1 piece.
- Pre-polished kit for field termination of multi-mode and single-mode LC, SC and ST® compatible connectors. Includes precision flat cleaver, 1.25 and 2.50 mm VFL ferrule adapters and all required fiber preparation, cleaning tools and materials.
- Wall Power Adapter. Used when unable to power from VC or RPS.

Connecting Cables

This procedure provides steps for how to connect the Fiber Video Extension module to the Video Controller and the LCDs.

1 On the Video Controller, plug one end of the CAT 6 video cables into the Output connections. Plug the other end into the LCD In connections on the Fiber Video Extension module. Keep Output 1 connected to LCD In 1, Output 2 to LCD In 2, etc. so the software interface aligns with the hardware.

2 On the Fiber Video Extension module, do the following:

- **a** Remove the dust plug from the fiber channels to be used on the extension module.
- **b** Insert the transceivers into the LCD Out connections.
- **c** Remove the black cap from the end of each of the transceivers.
- **d** Plug one end of the fiber optic cables into the transceivers.

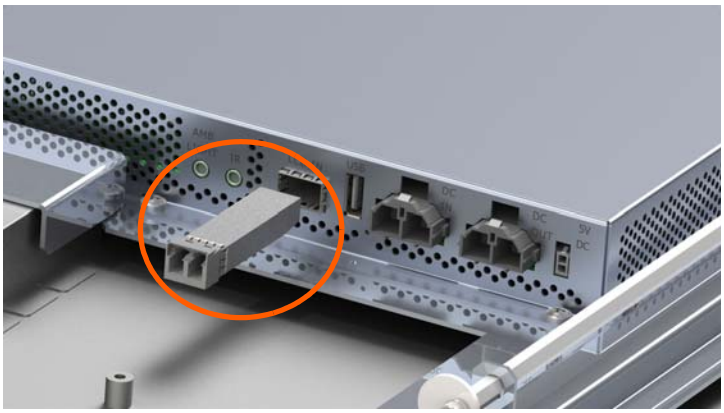
3 On the Panel Interface Board of each LCD, do the following:

   a Remove the dust plug from the transceivers.

   b Insert a transceiver into the LCD In connection.

   c Remove the black cap from the transceiver.

   d Plug the other end of the fiber optic cable into the transceiver following the scheme as determined through the Design Guide (see page 46).



4 Connect the 4 pin DC cable from the RPS/VC or the DC power brick to the Fiber Video Extension module. Plug the AC power cord into a power source if needed.

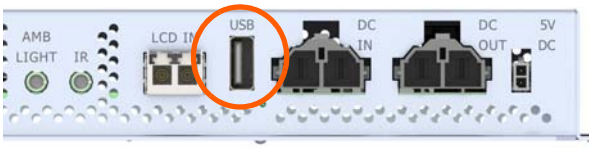
Note: The Fiber option display does not have an LED indicator to determine if communication is working between the VC and the display. Communication to the fiber video extender box can be determined by the green light on the VC.

Connecting the USB Option

The Fiber Video Extension also incorporates an embedded USB extension in the fiber optic cable, eliminating the need for a third party USB extension when using Clarity® Matrix® MultiTouch interactive LCD video wall displays and other USB devices at the video wall. The LCD modules can also provide power for Clarity Matrix MultiTouch, eliminating the need for separate AC power connection at the video wall.

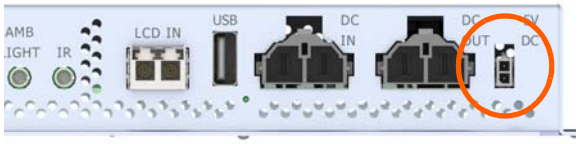
Follow these steps to set up the USB option.

1. Connect the touch sensor USB cable to a LCD Panel connected to the "LCD 1" output on the Fiber Video Extension module.



LCD Panel I/O

2. Use the power adapter cable to connect all points of power on the touch sensor to the 5V Aux port on any convenient LCD Panel.



3. Connect the touch control PC to the Fiber Video Extension module via USB (shown below). Be sure the USB cable is connected to the same Fiber Video Extension module as in step 1.

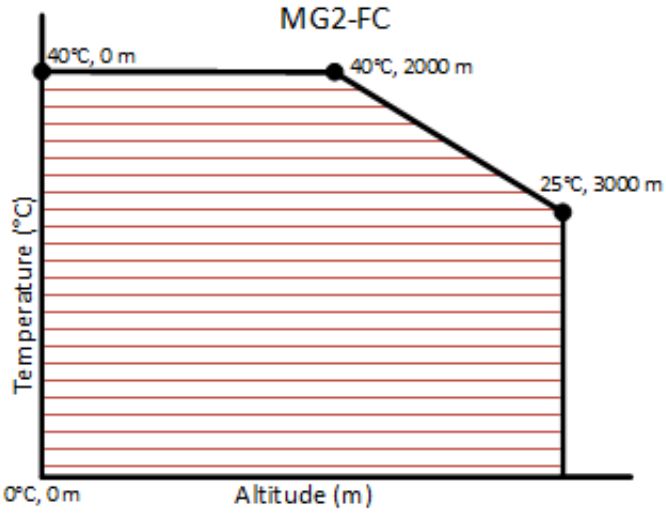
Fiber Video Extension Module

Specifications

Fiber Video Extension Module Specification

Function	Connector	Notes
Input power	MiniDin 4-pin	Pins 3 and 4 GND
Output power	MiniDin 4-pin	Pins 3 and 4 GND
Video Input	RJ45	
Video Output	SFP+	
USB Control Port	USB-B	USB 2.0

Description		Notes
Input Voltage (V_{DC})	24-48	
Power Draw (W)	50	Max
DiplayPort Input Specification	1x 1.2	
Video Transmission Distance	6561'/2km	Single Mode Fiber
Video Input Ports	4	RJ45
Video Ouput Ports	4	SFP+ LC Duplex
Height	1.7"/44mm	1U
Width	19"/483mm	Rack mount
Depth	20.4"/518mm	No cables
Weight	13.5lbs/6.1kg	
Acoustic Noise	<45dBa	
Operating Temperature	See Chart Below	Optimal 68°F/20°C
Storage Temperature	-5°F to 185°F, -20°C to 85°C	0-90% RH, non-condensing
Operating Altitude	See Chart Below	
Operating Humidity	0-80% RH	Non-condensing


MG2-FC
40°C, 0 m
40°C, 2000 m
25°C, 3000 m
Temperature (°C)
0°C, 0 m
Altitude (m)

Clarity Matrix 3D

Introduction

The Clarity Matrix 3D system is designed for professional 3D visualization environments seeking a large format, flicker-free, thin profile, stereoscopic display. The Clarity Matrix 3D adds a new dimension to the Matrix LCD Video Wall family, utilizing its unique design with an ultra-shallow install depth of only 3.6”/93mm, integrated mounting system, and rack electronics and power supplies to create exceptional 3D visualization.

The Matrix cutting edge ultra-narrow bezel LCD’s technology is combined with a 3D optical system and passive glass that, when tiled together, enable viewing and analysis of 3D images across the entire video wall. This approach to 3D visualization provides a more comfortable viewing experience versus active glasses solutions. Other benefits to passive glasses include lighter weight, no batteries are required, and they are less expensive than active solutions. This unique design utilizes the standard Matrix rack power supply and electronic components, as well as the same mounting system.

The Clarity Matrix 3D system uses three main components: the 3D Matrix video wall, passive 3D glasses, and a workstation with a graphics card that supports row interlaced content. The first two are provided by Planar. The workstation is supplied by the customer with an appropriate graphics card. See "Graphic Card/Workstation Requirements" on page 188 for more information.

Wide Viewing Angles

Clarity Matrix 3D offers wide viewing angles, enabling multi-user use with acceptable stereo contrast over varying viewing angles. Having a wide viewing angle, both vertically and horizontally, ensures a more comfortable and superior viewing experience.

Additionally, the Clarity Matrix 3D displays increase vertical viewing capability by offering specialized top and bottom row products to further enhance the customer experience.

3D and 2D

The Clarity Matrix 3D can also display conventional 2D images while maintaining the capability of a multi-purpose, high resolution video wall display. The Matrix 3D is compatible with numerous graphics cards and 3D visualization software tools in various applications.

Passive Glasses

Passive glasses 3D are superior to active shutter glasses 3D because passive glasses create less fatigue and eye strain when viewing 3D images. The Clarity Matrix 3D also delivers great brightness and contrast levels unachievable with other 3D display technologies. The circular polarized passive glasses used with the Matrix 3D are less expensive, lighter weight, and don't require batteries.

Each Clarity Matrix 3D video wall comes equipped with four pairs of passive glasses. Planar also sells additional sets of glasses. Contact a sales representative for more information.

Cleaning Passive Glasses

It is recommended that a dry microfiber cloth be used to clean the passive glasses. Stubborn stains may be removed with a cloth moistened with a solution of mild soap and water.

System Setup

3D panels come in three variations; Top, Middle and Bottom. Typical installation of a three high wall is to install as noted; however, it may differ based on the horizontal viewing height. If the wall is installed such that the bottom row is at a user eye level, it may be best to install two Middle units and a Top unit. If a four high wall is to be installed where the eye level is in the middle, it may be best to install two Middle units between the Top and Bottom units.

It is recommended that frame compensation be disabled for 3D applications. If it is not disabled, it may be necessary to alter native content and/or the graphics card output to a non-standard resolution. Disabling frame compensation may be done through the OSD or WallDirector.

Source/Compatibility Requirements

In order for the Clarity Matrix 3D system to work correctly, the setup must meet the following requirements:

- The source from the customer-provided workstation needs to be a row interleaved/interlaced format.
- The image from the workstation cannot be scaled. Doing so will affect the performance of the 3D image.
- Ensure that frame compensation is turned off in the system. Frame compensation has a similar effect as scaling. To turn frame compensation off, refer to the *WallDirector, RPS and Video Controller User Interface Guide*.

Graphic Card/Workstation Requirements

The Matrix 3D system is compatible with any graphics card that can support row interleaved/interlaced content. First, choose the correct graphics card, and follow the recommendations from the graphic card manufacturer for which workstation to purchase. For assistance in selecting a graphics card and workstation, contact Planar's Technical sales team for recommended solutions. Once the graphics card and workstation arrive, three things will need to be done:

- Install the graphics card. Refer to the specific graphics card instructions on how to install it into a workstation.
- Set up the interleaved/interlaced mode on the graphics card.
- If bezel compensation is enabled for the Matrix panels, increase the output resolution of the graphics card to match the number of bezels multiplied by the frame compensation value for both X and Y.

Installing Optional Accessories

These instructions show how to install the optional stud adapter bracket for the Clarity Matrix G3 LCD Video Wall.

Note: These instructions apply *only* to **Clarity Matrix with G2 Architecture** walls.

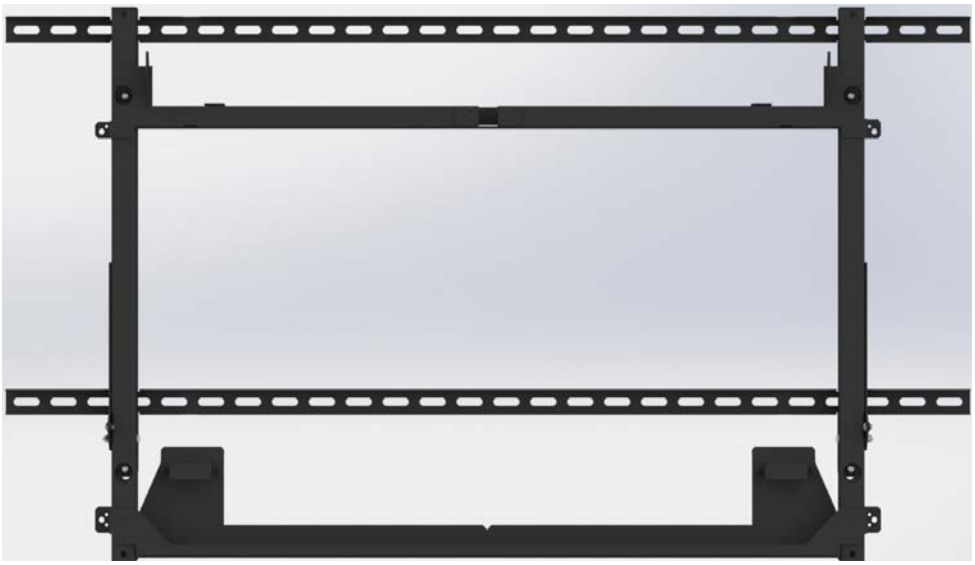
Wall Adapter Bracket

For each LCD module, the stud adapter bracket kit contains the following items:

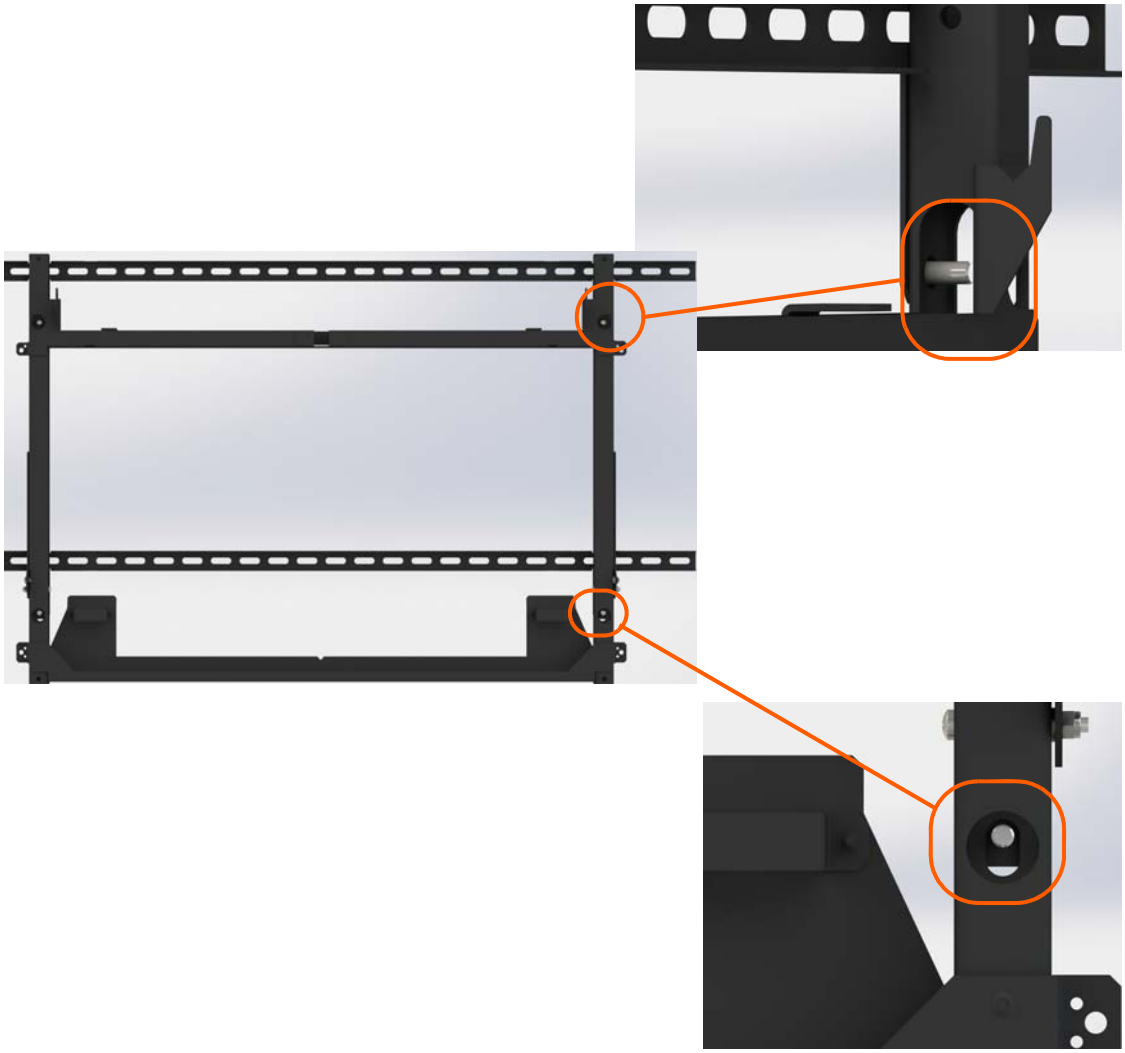
- 2 Adapter brackets

- Four M6 nuts/washers

1 Install the LCD mount on the adapter brackets.



2 Install an M6 washer/nut in each mount point of the LCD mount.



3 Repeat steps **1**-**2** for each LCD module that will be mounted to a wall.

Cosmetic Trim

For each LCD module, the cosmetic trim kit varies depending on the order:

- Left/Right, Top/Bottom Trim
- M4 x 0.7 Phillips flathead black screw (Note that the screw length is not to exceed what shipped with the product. Penetration beyond the specified depth may damage the panel.)

Note: Trim mounting holes may be hidden under tape around the edge of the LCD. Align the product-specific trim with the front edge* of the LCD to find the holes. Use a pencil or similar sharp object to break the tape where the hole is. If there is no hole under the tape, be sure that you have the trim to be installed on that particular edge.

*For ERO, hold the trim about 1/8" (3mm) back from the front of the LCD.

Planar's Technical Support Website

General product support can be found by visiting http://www.planar.com/support/. The following table lists items that are accessible at this location.

Document Name	Contents
Product Outline Drawings	2D drawings of system components and installation parameters.

Downloading Additional Documentation

For more technical information, visit https://partners.planar.com. This site is for verified partners and requires a username and password for access.

1. Enter your login and password information.
2. Navigate to the Clarity Matrix product page.

The following table lists items that are accessible at this location.

Document Name	Contents
Installation Guide	Information for installers and technicians to install and configure displays.
Serial Command Guide	Information on connection to the system components and commands available for use through the serial interface.
Product CAD Models	3D models of system components.
Software	Firmware updates and diagnostic tools.

Regulatory Information

Manufacturer's Name: Planar Systems, Inc.
Manufacturer's Address: 1195 NE Compton Drive, Hillsboro, OR 97006
Declares that the product: Clarity® Matrix® G3 LCD Video Wall System
Conforms with the provisions of:

Council Directive 2014/30/EU on Electromagnetic Compatibility;

EN55032:2012 Radiated and Conducted Emissions from Multimedia Equipment

EN55035:2017 Immunity of Multimedia Equipment

Including:	EN61000-4-2	Electrostatic Discharge
	EN61000-4-3	Radiated Immunity
	EN61000-4-4	Electrical Fast Transients
	EN61000-4-5	Line Surge
	EN61000-4-6	RF Conducted Susceptibility
	EN61000-4-8	Magnetic Field Immunity
	EN61000-4-11	Voltage Dips and Interrupts
And:	EN61000-3-2	Harmonic Current Emissions
	EN61000-3-3	Voltage fluctuations and Flicker

Council Directive 2014/35/EU on Low Voltage Equipment Safety:

EN62368-1:2014+A11:2017 Safety of audio/video, information and communication technology equipment

The Technical Construction File required by this Directive is maintained at the corporate headquarters of Planar Systems, Inc., 1195 NE Compton Drive, Hillsboro, OR 97006.

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

Industry Canada (ICES-003): This Class A digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.
Any changes or modifications to the display not expressly approved by Planar could void the user's authority to operate this equipment.

RoHS: Clarity Matrix G3 LCD Video Wall components are fully compliant with the directive 2011/65/EU as amended by commission delegated directive (EU) 2015/863

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