Clarity Matrix HX60 Installation Guide

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RoHS Compliance Statement

The Clarity Matrix Video Walls are fully RoHS compliant.

ADA Compliance Statement

The Clarity Matrix HX60 video walls are compliant with the Americans with Disabilities Act.

Installation Guide Part Number

Part Number: 020-1191-00B

Table of Contents

Introduction

The Clarity Matrix LCD Video Wall System uses cutting edge technology to provide a video wall solution using commercial-grade 60" high bright LCDs in challenging, bright ambient light environments. The narrow-bezel results in a 7.1mm tiled image-to-image gap between images on adjacent panels in a video wall. Each LCD module is a WXGA format with a 1366 x 768 resolution. Each LCD module has a 6.5mm combined bezel gap, creating virtually seamless arrays of any configuration. The HX60 has an aspect ratio of 1.77 (16:9) and accepts a wide range of input DVI signals from VGA to UXGA.

With Planar's Advanced Performance LED (AP/LED™) backlight, the Clarity Matrix HX60 delivers deep blacks and outstanding contrast utilizing algorithms that turn off the backlights when darker or black content is displayed. In addition to superb contrast ratios that Planar's AP/LED backlight provides, this technology provides reduced power consumption while still achieving maximum brightness.

The EasyAxis™ mounting system supports landscape and portrait orientation, free-standing wall deployment and flying wall applications. Because the panels are self-supporting, Clarity Matrix HX60 can support unlimited stacking height.

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

Safety Information

This display was designed with safety in mind. If you don't heed the safety warnings and cautions, you could get hurt. The safety warnings are on stickers in various places in and on the display.
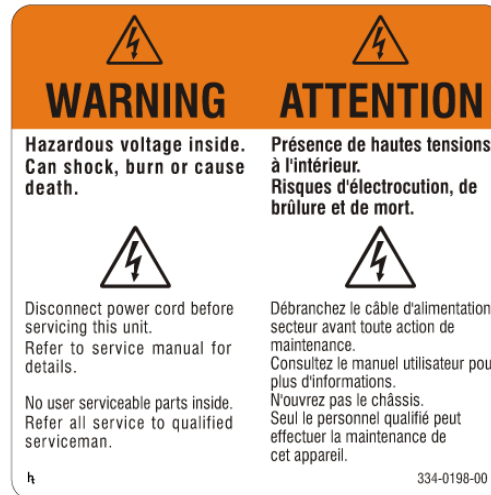
Important Safety Instructions

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 LCD Video Wall 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. The wide blade or the third prong is provided for your safety. When the provided plug does not fit into your 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 LCD Video Wall products.

10 Only use the attachments/accessories specified by the manufacturer.

11 Unplug all Clarity Matrix LCD Video Wall products during lightning storms or when unused for long periods of time.

12 You must follow all National Electrical Code regulations. In addition, be aware of local codes and ordinances when installing your system.

13 Refer all servicing to qualified service personnel. Servicing is required when any of the Clarity Matrix LCD Video Wall 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.

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

15 Wall mounts must be secure. The wall must be strong enough to hold all LCD modules, brackets and cables. Each HX60 LCD module weighs about 80lbs (36.3kg). With protective optically bonded glass, the HX60 LCD module weighs about 11lbs (5kg).

16 Slight pressure on the LCD will cause distortion of the image. Heavier pressure will cause permanent damage. Clarity Matrix HX60s 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.

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

17 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: This product contains a lithium battery. There is a risk of explosion if the battery is replaced by an incorrect type. Dispose of the battery according to the instructions on the next page.

Important EMC Information

In order to meet Electromagnetic Compatibility (EMC requirements), the installer will need to add one clip on ferrite bead to the 24VDC power cable near each LCD.

European Union Disposal Information

English

☐ Disposal of old Electrical & Electronic Equipment (Applicable throughout the European Union and other European countries with separate collection programs)

This symbol found on your product or on its packaging, indicates that this product should not be treated as household waste when you wish to dispose of it. Instead, it should be handed over to an applicable collection point for the recycling of electrical and electronic equipment. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences to the environment and human health, which could otherwise be caused by inappropriate disposal of this product. The recycling of materials will help to conserve natural resources.

This symbol is only valid in the European Union. If you wish to discard this product, please contact your local authorities or dealer and ask for the correct method of disposal.

Español

☐ Deshecho de equipos eléctricos y electrónicos (aplicable a la Unión Europea y a otros países europeos con programas de reciclaje independientes)

La presencia de este símbolo en el propio producto o en su material de embalaje, indica que no se debe tratar como residuo doméstico cuando desee deshacerse de él. En su lugar, debe entregarlo en el punto limpio correspondiente de reciclaje de equipos eléctricos y electrónicos. Asegurándose de que este producto se desecha de forma correcta, ayudará a evitar posibles consecuencias negativas para la conservación del medioambiente y la salud humana, consecuencias que podrían darse si se deshace del producto de forma inadecuada. El reciclado de materiales ayuda a conservar los recursos naturales.

Este símbolo solamente es válido en la Unión Europea. Si desea deshacerse de este producto, póngase en contacto con las autoridades locales o con su distribuidor y pida información sobre el método de disposición adecuado.

Português

☐ Eliminação de equipamentos eléctricos e electrónicos usados (aplicável na União Europeia e noutros países europeus com programas próprios de recolha destes equipamentos)

Este símbolo, colocado no produto ou na respectiva embalagem, indica que o produto não deve ser tratado como lixo doméstico aquando da sua eliminação. Em vez disso, deve ser entregue num ponto de recolha de equipamentos eléctricos e electrónicos para posterior reciclagem. Ao garantir a correcta eliminação deste produto, estará a evitar consequências potencialmente negativas tanto para o ambiente como para a saúde humana. A reciclagem de materiais ajuda a preservar os recursos naturais.

Este símbolo apenas é válido na União Europeia. Se quiser eliminar este produto, contacte as entidades locais ou o seu fornecedor para ficar a saber qual o método de eliminação correcto.

Svenska

☐ Avfall av förbrukad elektrisk och elektronisk utrustning (Tillämpbart i hela Europeiska unionen och andra europeiska länder med separata samlingsprogram)

Den här symbolen som finns på din produkt eller på dess förpackning påvisar att produkten inte ska behandlas som hushållsavfall när du vill slänga bort den. Istället ska den lämnas över till en lämplig uppsamlingspunkt för återvinning av elektriska och elektronika utrustningar. Genom att tillförsäkra att den här produkten återvinns på ett riktigt sätt hjälper du till med att förhindra möjliga negative konsekvenser för miljön och mänsklig hälsa. Det kan annars orsakas på grund av olämplig sophantering av den här produkten. Återvinning av material kommer att hjälpa till att bevara naturtillgångar.

Den här symbolen är endast giltig inom den Europeiska unionen. Om du vill slänga bort den här produkten ska du kontakta lokala myndigheter eller återförsäljar, och fråga efter lämplig avfallsmetod.

Français

☐ Mise au rebut des équipements électriques et électroniques usagés (Valable dans l'ensemble de l'Union Européenne ainsi que dans les pays européens disposant de programmes distincts de collecte des déchets)

Ce symbole appliqué sur votre produit ou sur son emballage indique que ce produit ne doit pas être traité comme un déchet ménager lorsque vous voulez le mettre au rebut. Il doit au contraire être remis à un site de collecte agréé pour le recyclage des équipements électriques et électroniques. En veillant à ce que ce produit soit mis au rebut de façon adéquate, vous contribuerez à prévenir les conséquences potentiellement négatives sur l'environnement et sur la santé humaine qui risqueraient de se produire en cas de mise au rebut inappropriée de ce produit. Le recyclage des matériaux contribuera également à économiser les ressources naturelles.

Ce symbole n'est valable que dans l'Union Européenne. Si vous souhaitez mettre ce produit au rebut, veuillez prendre contact avec les autorités locales ou avec votre revendeur et renseignez-vous sur la méthode de mise au rebut correcte.

Italiano

☐ Smaltimento delle attrezzature elettriche ed elettroniche usate (applicabile in tutta la Comunità Europea ed altri Paesi Europei che applicano programmi di raccolta differenziata)

Il simbolo trovato sul prodotto, o sulla sua confezione, indica che il prodotto non può essere trattato come i domestici quando è il momento di smaltirlo. Al contrario, deve essere consegnato ad un centro di raccolta specializzato nel riciclaggio di attrezzature elettriche ed elettroniche. Assicurando che il corretto smaltimento di questo prodotto, si aiuterà a prevenire potenziali conseguenze negative sull'ambiente e sulla salute umana, che possono essere provocate da uno scorretto smaltimento di questa attrezzatura. I materiali riciclati aiuteranno a conservare le risorse naturali.

Questo simbolo è valido solo nell'Unione Europea. Per smaltire questo prodotto, mettersi in contatto con le autorità locali – o con il rivenditore – e chiedere informazioni sul corretto metodo di smaltimento.

Polski

☐ Usuwanie zużytego sprzętu elektrycznego i elektronicznego (Dotyczy krajów Unii Europejskiej i innych krajów europejskich z oddzielnymi programami zbiórki odpadów)

Obecność tego symbolu na produkcie lub na opakowaniu z produktem oznacza, że tego produktu nie można wyrzucać razem z odpadkami domowymi. Należy go przekazać do punktu zbiórki w celu poddania recyklingowi podzespołów elektrycznych i elektronicznych. Usunięcie tego produktu w prawidłowy sposób, pomoże w zabezpieczeniu przed negatywnym wpływem odpadów na środowisko i zdrowie ludzi, powodowanym przez niewłaściwe usuwanie produktu. Przetwarzanie materiałów pomaga w zachowaniu zasobów naturalnych.

Ten symbol obowiązuje wyłącznie w krajach Unii Europejskiej. Informacje dotyczące prawidłowej metody usunięcia tego produktu, można uzyskać u władz lokalnych lub u dostawcy.

Suomi

☐ Vanhojen sähkö- ja elektroniikkalaitteiden hävittäminen (Soveltuva kaikkialla Euroopan unionin alueella, sekä muissa Euroopan maissa, joilla on erilliset keräysohjelmat)

Jos tuotteessa tai sen pakkauksessa on tämä symboli, sitä ei pidä hävitettäessä käsitellä tavallisena kotitalousjätteenä, vaan se kuuluu toimittaa sähkö- ja elektroniikkalaitteiden kierrätyspisteeseen. Varmistamalla, että tämä tuote hävitetään asiaankuuluvalla tavalla autat estämään mahdollisia ympäristölle ja ihmisille koituvia negatiivisia seuraamuksia, joita sen vääränlainen hävittäminen voi aiheuttaa. Materiaalien kierrättäminen auttaa säilyttämään luonnonvaroja.

Tämä symboli on voimassa ainoastaan Euroopan unionin alueella. Jos haluat hävittää tämän tuotteen, ota yhteyttä paikallisiin viranomaisiin tai jälleenmyyjään ja tiedustele asiaankuuluvia hävittämistoimenpiteitä.

Deutsch

☐ Entsorgung von elektrischen & elektronischen Altgeräten (geltend für die europäische Gemeinschaft und andere europäische Länder mit separaten Sammelprogrammen)

Dieses Symbol, zu finden auf Ihrem Produkt oder dessen Verpackung, macht Sie darauf aufmerksam, dass dieses Produkt bei der Entsorgung nicht als Hausmüll behandelt werden darf. Statt dessen sollte es an eine Sammelstelle zum Recycling von elektrischen und elektronischen Altgeräten gegeben werden. Helfen Sie mit, potenziell schädliche Einflüsse auf Umwelt und Gesundheit, die durch eine unsachgemäße Entsorgung dieses Produktes entstehen können, zu vermeiden und entsorgen Sie dieses Produkt ordnungsgemäß. Recycling hilft, natürliche Rohstoffe einzusparen.

Dieses Symbol ist nur innerhalb der europäischen Gemeinschaft gültig. Wenn Sie dieses Produkt entsorgen möchten, wenden Sie sich bitte an Ihre örtliche Behörde und fragen Sie nach der ordnungsgemäßen Entsorgungsmethode.

Nederlands

☐ Verwijderen van oude elektrische en elektronische apparatuur (toepasselijk in de volledige Europese Unie en andere Europese landen met afzonderlijke programma's voor afvalverzameling)

Dit symbool dat op het product of zijn verpakking is aangebracht, geeft aan dat dit product niet mag worden behandeld als huishoudelijk afval als u het wilt wegwerpen. U moet het afgeven bij een specifiek verzamelpunt voor de recyclage van elektrische en elektronische apparatuur. Door te garanderen dat u dit product op de correcte manier wegwerpt, helpt u potentiële negatieve gevolgen voor het milieu en de menselijke gezondheid, die zouden kunnen worden veroorzaakt door een onrechtmatig wegwerpen van het product, te voorkomen. De recyclage van materialen helpt het behoud van natuurlijke bronnen.

Dit symbool is alleen geldig in de Europese Unie. Als u dit product wenst weg te gooien, dient u contact op te nemen met uw lokale instanties voor details over de gepaste methode voor afvalverwijdering.

Recommended Usage

In order to get the most out of your 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, as plasma displays do, 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 LCD manufacturer.

TIR is not covered under warranty. See standard warranty terms and conditions for details. Here are some guidelines to help you 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 LCD module's real-time clock, see "Setting the Clock/Scheduling an Event" on page 79.
  - To use your source computer's Power Options Properties, set up your computer to turn off the display when not in use. You also need to check the DPMS checkbox and set the DPMS DELAY box in the BACKLIGHT SETTINGS menu (MAIN MENU > ADVANCED OPTIONS > BACKLIGHT SETTINGS).
  - To use RS232 commands, see "RS232 Communication" on page 67.

Caution: For optimal performance, we suggest turning off the backlight power on the Matrix HX60 for four hours per day.

Normal Use Thermal Guidelines

Normal use of the LCD module, Quad controller module 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 module will be installed in a recessed area with an LCD surround or enclosure, ensure adequate openings are applied for proper air flow and ventilation.

At 2000 meters or below, the maximum ambient operating temperature for the LCD module cannot be above 35º C nor below the minimum ambient operating temperature of 5º C. For the Quad controller module and power supply module, the maximum ambient operating temperature cannot be above 45º C nor below the minimum ambient operating temperature of 10º C. If one of these conditions exists, 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 display within its nominal operating parameters.

Cooling Requirements

For optimal performance, active cooling by the installer should be planned for when the ambient temperature at the top 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.

System Architecture

The Clarity Matrix HX60 has three main electronic components: the LCD module, power supply module and the Quad controller module. The LCD module has a removable interface board, which connects to the off-board power supply and Quad controller modules. Using external modules produces less heat and allows for reduced and/or easier service of the LCD module itself.

LCD module - front view   LCD module - rear view

Power supply module   Quad controller module
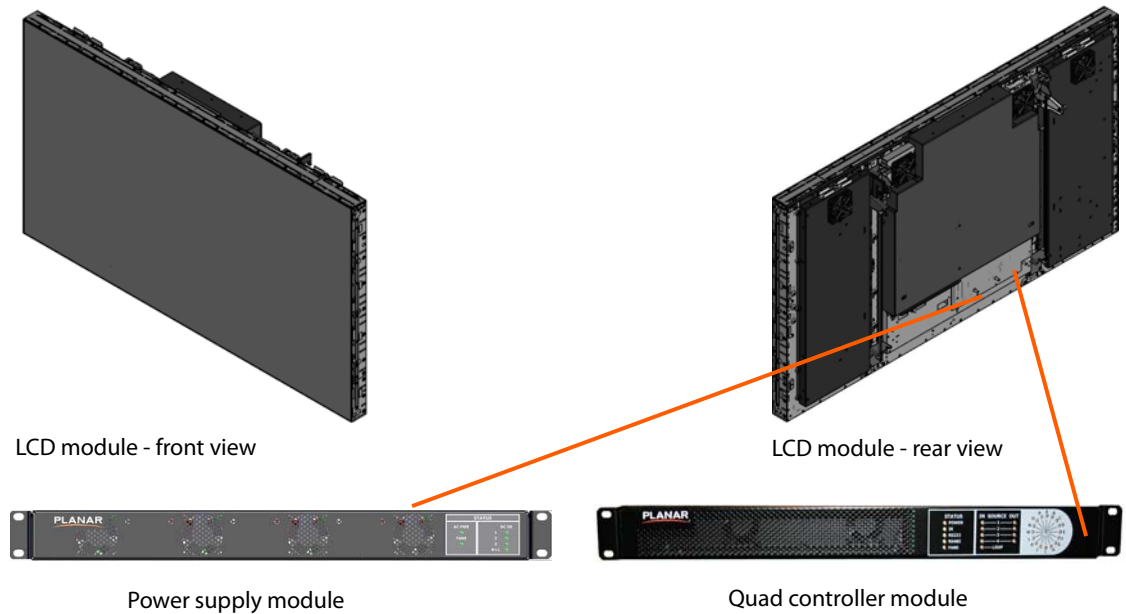
Some basic points to keep in mind:

- Each Quad controller module supports up to four LCDs.
- Each power supply module supports up to two LCDs.
- The first processor in the A Quad controller module (A1) is the master processor
- The master processor takes in the input from the IR remote sensor and/or the host RS232 commands.

EasyAxis Mounts, General Description

Planar-supplied mounts are used to secure the Clarity Matrix HX60 for display. Follow these instructions carefully.

Keep in mind the following general installation guidelines:

- Prior to installation, make sure you 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.

Matrix Video Wall

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

LCD Module

The LCD module is composed of a basic LCD without a cosmetic enclosure but with a mechanical subframe for mounting. The LCD module incorporates a simple interface board designed to distribute off-board power, video and control signals to the LCD module, keeping depth, weight, heat and points of potential failure to a minimum. The LCD blade-style module incorporates a bracket that is perfectly paired with the EasyAxis mount. The LCD module includes EasyAxis adjustment cams that facilitate precise six-axis alignment ensuring uniform, minimized image-to-image gap.
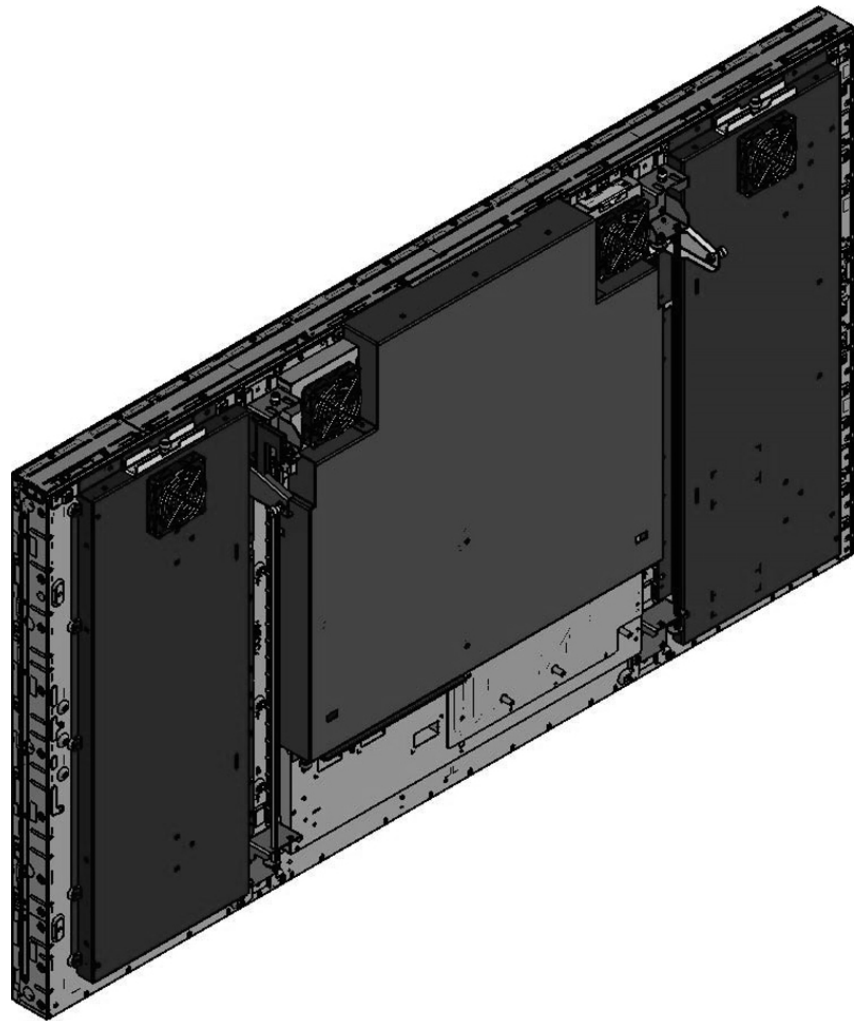
LCD Mounting Structure

The EasyAxis mounting system simplifies the task of installing and aligning the LCD modules while allowing for efficient in-wall service. EasyAxis is designed to be attached to a wall, used with optional free-standing bases or secured overhead in a flying configuration. 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 module in the video wall.
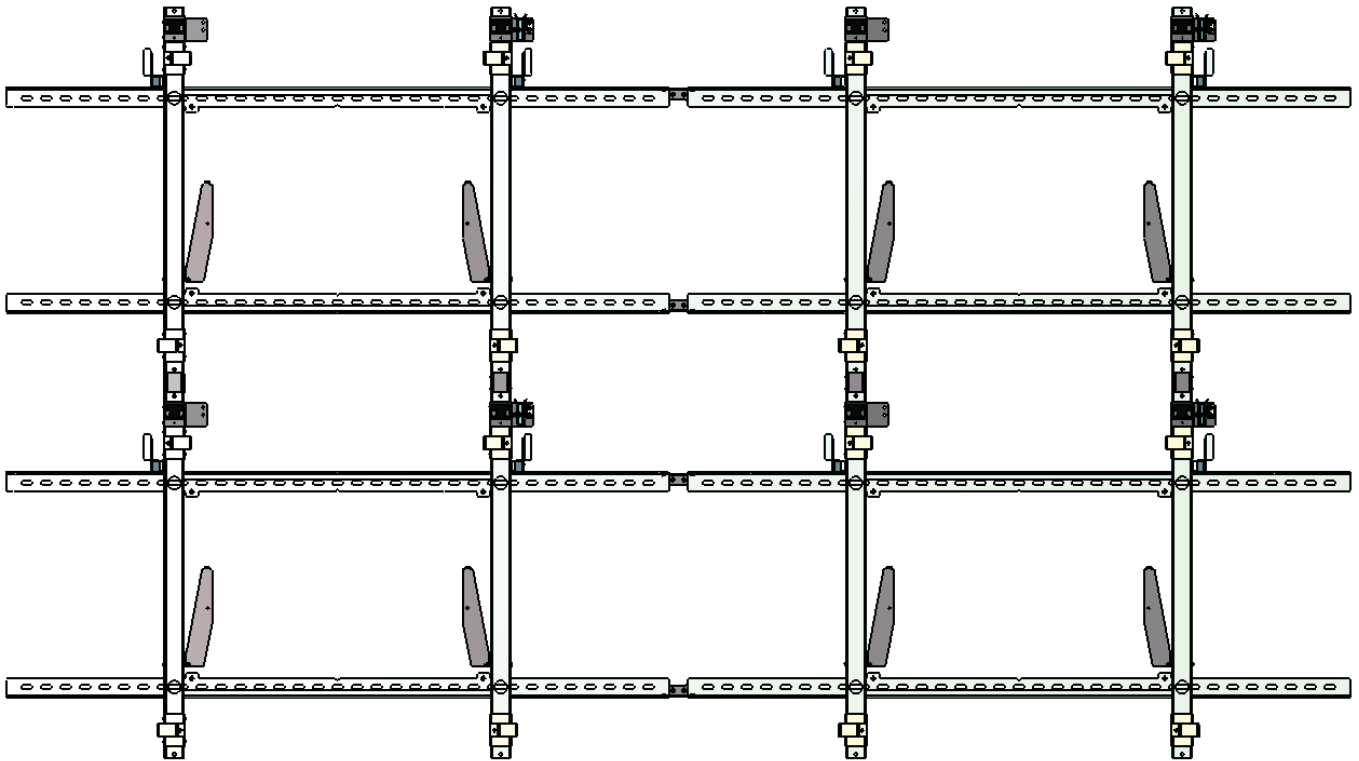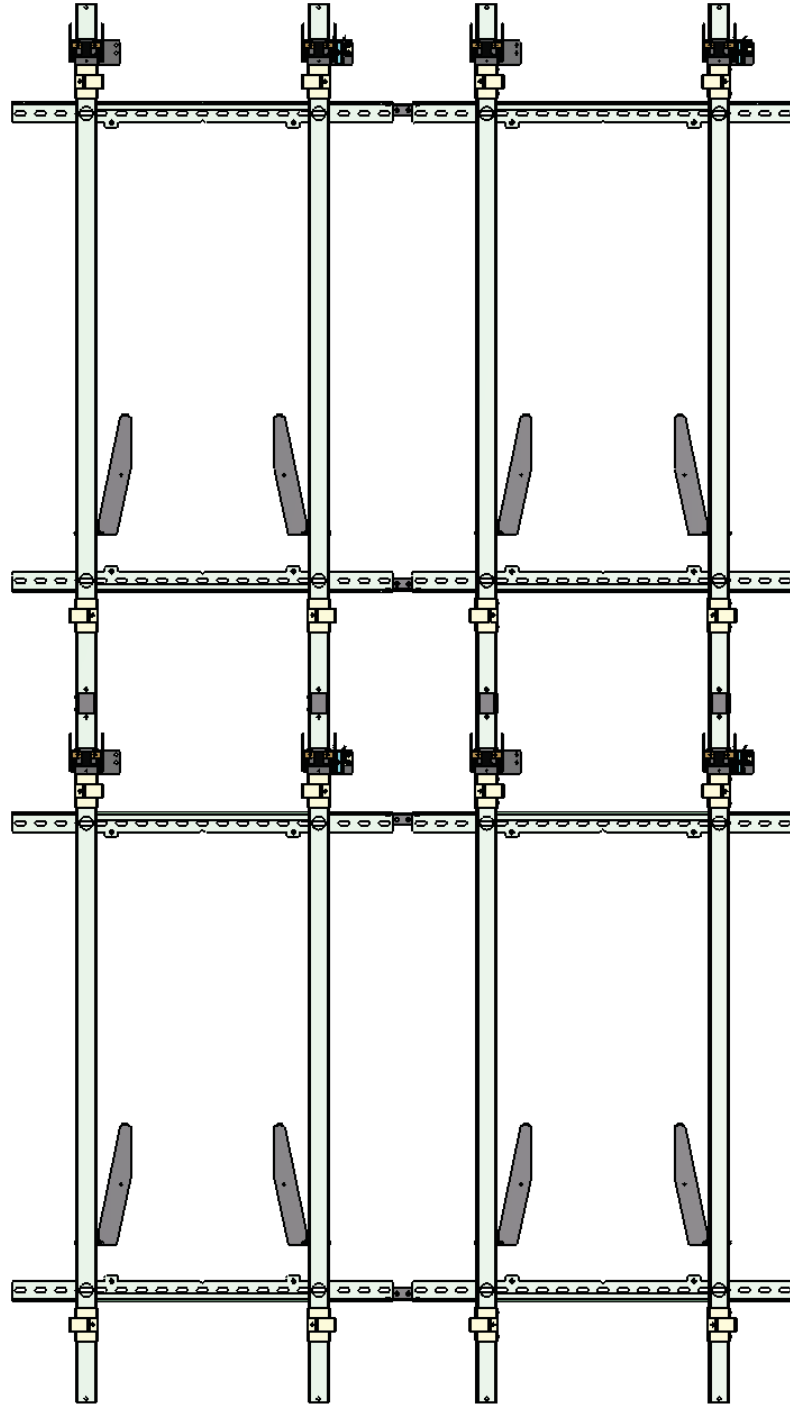
Note: This drawing shows portrait LCD mounts.

EasyAxis mounts are designed to facilitate the thinnest profile LCD video wall. The combination of the mount plus the Matrix LCD module's "blade" design results in video walls that measure 5.9 inches in depth, screen to wall for landscape installations and 6.5 inches for portrait installations.

Off-Board Equipment and Components

To reduce heat issues and to make servicing of the video wall easier, the two main Matrix components are modules that are separate from the LCD module itself. The Quad controller modules and power supply modules can be housed in an equipment rack that is typically situated away from the video wall itself.

Quad Controller Module

The Quad controller module contains four microprocessors, each of which manages the video information flowing to one LCD module. The Quad controller module routes up to four digital source inputs to the LCDs. For more information about what the different LEDs on the front of the Quad controller module mean, see "Quad Controller Status LEDs" on page 56.

Front View

Air intake - keep clear   Address selector

Rear View

Power switch   DVI-D digital   DVI-D digital   DVI-D Digital
                      input or Loop In   input   Loop Out

Communication/video   Air exhaust vents -   Power supply
to LCD   keep clear   monitor connection
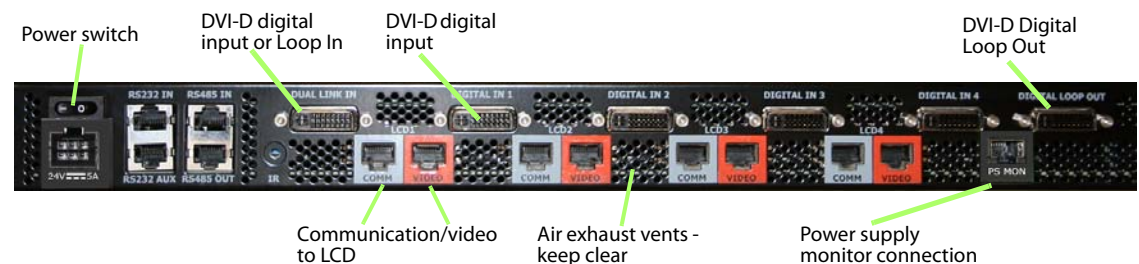
Power Supply Module

The power supply module provides power for up to two LCDs and one Quad controller module.

Front View

[19.0]
482

STATUS

AC PWR · DC OK
1
FANS · 2
3
N+1

[1.7]
44   1U

AIR INTAKE
KEEP CLEAR

POWER SUPPLY
STATUS INDICATOR

Rear View

REMOTE POWER OFF TRIGGER
MATES WITH ON-SHORE TECH
P/N OSTTJ0231530

POWER SUPPLY MONITOR LOOP
TO ANOTHER POWER SUPPLY (8P8C)

DC POWER OUT
MATES WITH MOLEX
P/N 39012065

DC POWER OUT
MATES WITH MOLEX
P/N 428160212

POWER SUPPLY MONITOR CONNECTION
TO CONTROLLER OR ADDITIONAL
POWER SUPPLY IN CHAIN (8P8C)

MAIN POWER
SWITCH

115/230 VAC
50/60Hz 15A
IEC C14 INPUT

EXHAUST VENTS
KEEP CLEAR

Installing a Clarity Matrix LCD Video Wall

This section explains how to install a Clarity Matrix HX60. We suggest that you read this entire section before you attempt to install the wall.

Before You Begin

Make sure you have all the items in the following lists before you begin unpacking and installing your Clarity Matrix HX60(s).

Tools/Equipment List

Depending on your installation, you may need one or more of the following items:

- Drill and bits
- Nut drivers
- Pencil
- 3mm hex key
- M6 (#1/4-20) wrench
- String/string level
- Digital/laser level
- Ladders/lift
- Back brace
- Stud finder (if hanging LCD modules on a wall)
- Quad controller module address adjustment tool (included in your accessory kit)

Other Things You May Need

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

Plan Your Installation

You should have a detailed plan of how the Clarity Matrix HX60 is to be configured. The plan should include calculations for the following:

- Floor/wall load. Make sure the floor/wall is strong enough to support the weight of the whole Matrix system.
- To determine the total power consumption, you will need to calculate the size of the wall first.
- The minimum space above the top LCD row for installation and servicing clearance is 2.0" for a landscape installation, with 3.5" recommended. For a portrait installation, the minimum space above the top LCD row for installation and servicing clearance is 1.5", with a recommended clearance of 3.0".
- Access to both sides of the Quad controller modules and the power supply modules.
- Ventilation and cooling requirements. Although most of the heating elements are not in the LCD itself, it is still important that you have proper cooling and ventilation for the entire Clarity Matrix HX60 and its off-board components.
- Power consumption of each individual component and the power consumption of the overall wall.

Component	Typical	Maximum	BTU Calculation
Power supply module	55W		55W x 3.42 = 171 BTU
Quad controller module	60W		60W x 3.42 = 205 BTU
HX60 LCD module	193W	460W	193W x 3.42 = 659 BTU

To calculate the overall power consumption of the wall, add the wattage of the first power supply module, plus the Quad controller module, plus two LCDs per power supply module. For example, using the table above for a 2 x 2 video wall, you would have the following calculation:

- 55W (Power supply module) +
- 60W (Quad controller module) +
- 386W (193W x 2 HX60 LCD modules)

Total Power consumption = 501W total power consumption

The add the wattage of the second power supply module and the remaining two LCDS to get the following calculation:

- 55W (Power supply module) +
- 386W (193W x 2 HX60 LCD modules)

Total Power consumption = 441W total power consumption

- Cable runs - Account for how long cable runs need to be and where they will be routed. The following table shows the maximum length allowed for power, data and video cables. The diagram below provides more detailed information about the supported cable lengths.

Cable Type	Maximum Length
Power cable	100 feet
COMM cable	500 feet
Video Cable	100 feet **Note:** You can use cable extenders to a maximum of 500 feet using four extender boxes. When using cable extenders, all increments should be 100 feet or less.

Prepare Your Installation Location

You should have prepared the area where you will install the Clarity Matrix HX60. The mounting structures must be fully designed to accommodate the installation of the LCD modules. You must also make sure there is enough room for the off-board components and any equipment racks that might house these components.

Installation Checklist

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

1 Unpack and install the LCD mount brackets.

2 Install Quad controller modules and power supply modules.

3 Run cables between LCD mount and brackets.

4 Install LCD modules.

Unpacking and Checking Accessories

Electronics Box

The following items are included in the electronics box.
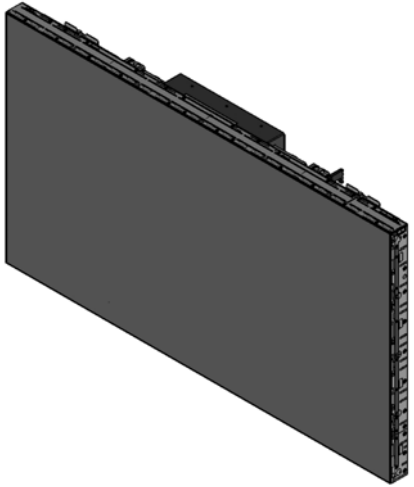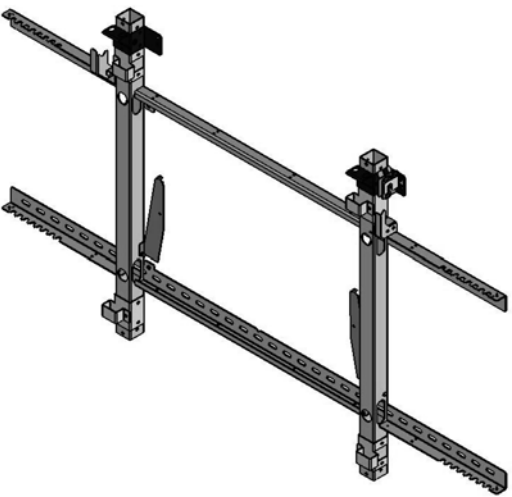
Part	Description	Per Quad/Power Supply	Picture
Quad controller module	Routes up to four digital source images to the LCDs.	1	
Power supply module	Supplies power for up to two LCDs and one Quad controller module.	1	
Power cable (4ft)	Connects the power supply module to the Quad controller module.	1	

Part	Description	Per Quad/Power Supply	Picture
RJ45 to RJ45 patch cable (1m)	One cable connects the Quad controller module to the power supply module. The other cable connects one Quad controller module to another.	2	

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

LCD Module Box

The following items are included in the LCD module box.

Part	Description	Picture
LCD module	1 or 2 per box depending on your order.	
LCD mount	1 or 2 per box depending on your order.	**Note:** This shows a landscape-oriented mount.
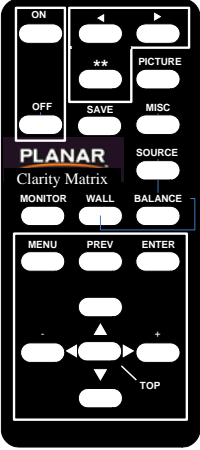
Accessory Box(es)

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	Spaces the LCD mounts.	Depends on configuration requirements.	
Horizontal bracket	Spaces the LCD mounts.	Depends on configuration requirements.	
AC power cable (3m)	Depending on your order, the cable will be for use in North America or Europe.	One per power supply module.	
Ferrite bead	Attached to each LCD to meet EMC requirements.	One per LCD panel.	

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	Used to control your on-screen menus.	2	
Installation manual	Provides detailed setup and configuration information.	1	
IR sensor	Connects to Quad controller module A. Mount in a convenient location near your wall. Typically, this might be near the master (A1) display. **Note:** Keep in mind that you need to point the remote towards where the IR sensor is mounted.	1	

Part	Description	Number Included	Picture
Cable labels	Used to help you identify each cable.	1 dispenser of 150 labels	
3mm assembly and alignment tool	Used to align modules.	2	
Quad controller module address adjustment tool	Used to set addresses of Quad controller modules.	2	

Optional Planar-Supplied Accessories

Make sure you have the following optional customer-supplied items as needed to complete your installation:

- Curved brackets
- Stud adapter bracket
- WallNet
- Wall adapter bracket (see "Wall Adapter Bracket" on page 187)
- Floor stand
- Outer edge/rear cosmetic trim (see "Cosmetic Trim" on page 189)
- Dual link DVI-D cable
- DVI-D cables to go from the source to the Quad controller module
- RS232 cables to link an external controller to the Quad controller module
- Cat 6 -STP video and data cables - Length varies per wall depending on configuration requirements and your sales order.
- Power cable (20ft-100ft) - Connects the power supply module to the LCD. Length varies per wall depending on configuration requirements and your sales order.
- IR sensor extender cable (3m) - Used to extend from the wall to the Quad controller module.
- Matrix Video Extender Box - The video extender box allows you to extend the distance of the Quad controller modules to the LCD modules in 100 foot increments.
- DVI booster - When using the Dual Link In connector for looping between the Quad controller modules, it may be necessary to add a DVI booster to avoid having data glitches occur in some installations due to increased noise sensitivity on that connector.
- Ambient light sensor - Used to detect changes in ambient light and make appropriate dimming or brightness changes to the backlights as necessary.

Wall Installation

Before you start building your wall, keep the following points in mind:

- A structure that is plumb and flat will greatly reduce issues with mounting and alignment of the Matrix system.
- Brackets are to be installed first - do not remove LCDs from their boxes until the entire wall of brackets is installed, level and plumb.
- For each row of brackets, build from the center outwards.
- After each row of brackets is built, check it for level and plumb.
- All brackets in a row should be level with the bracket next to it within ±0.1°. Each bracket should be square with the level surface by ±0.05°. Bracket wall planarity should not exceed ±0.5mm.
- It is important that you check communication between the LCD modules as you build each row! This will help minimize changes once your 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.

Installing the LCD Mount Structure

The EasyAxis mounting system is the most important part of the wall installation. The EasyAxis mounting system simplifies the task of installing and aligning the LCD modules while allowing for efficient in-wall service. EasyAxis is designed to be attached to a wall. When used in a wall-mount configuration, horizontal and vertical connection brackets ensure that each mount is precisely spaced from its neighbor in the video wall. The mount system also incorporates a service mode to accommodate front in-wall repair of any LCD module in the video wall with minimal disruption.
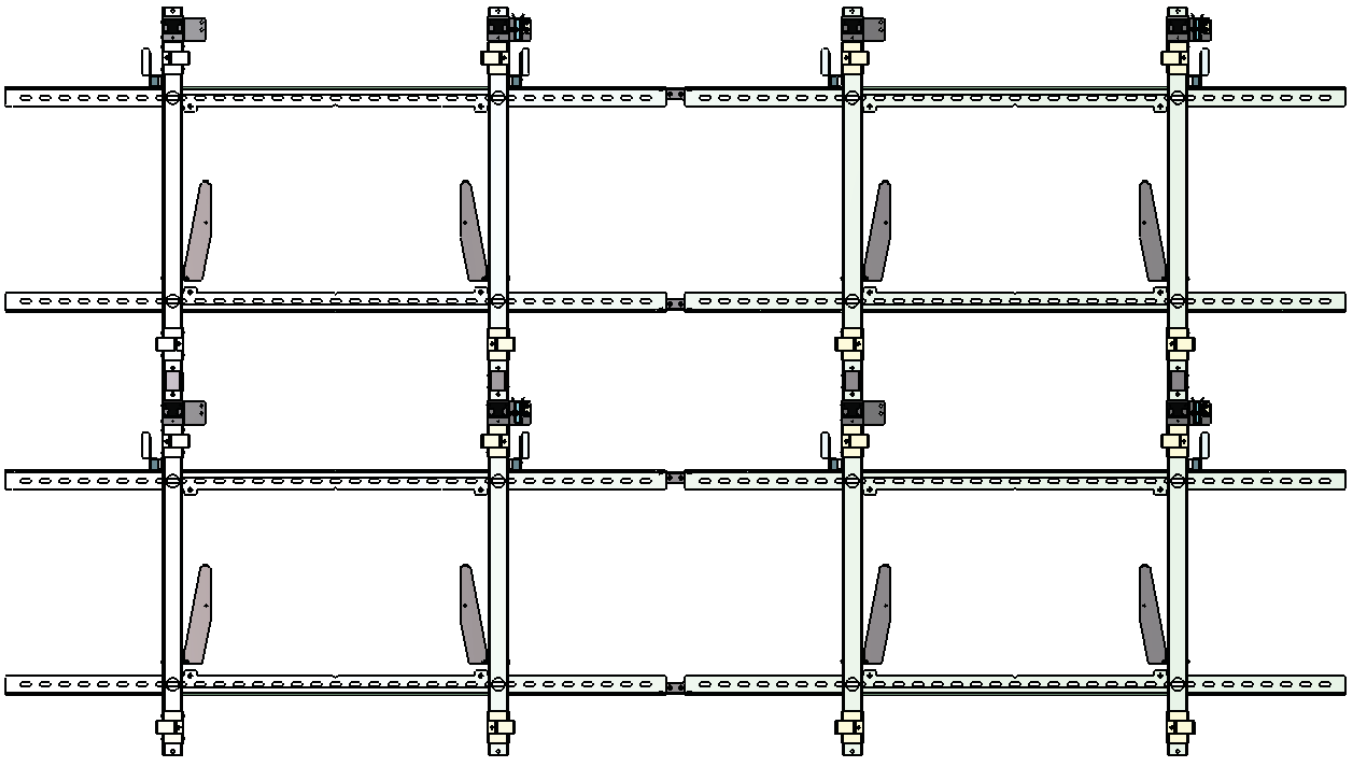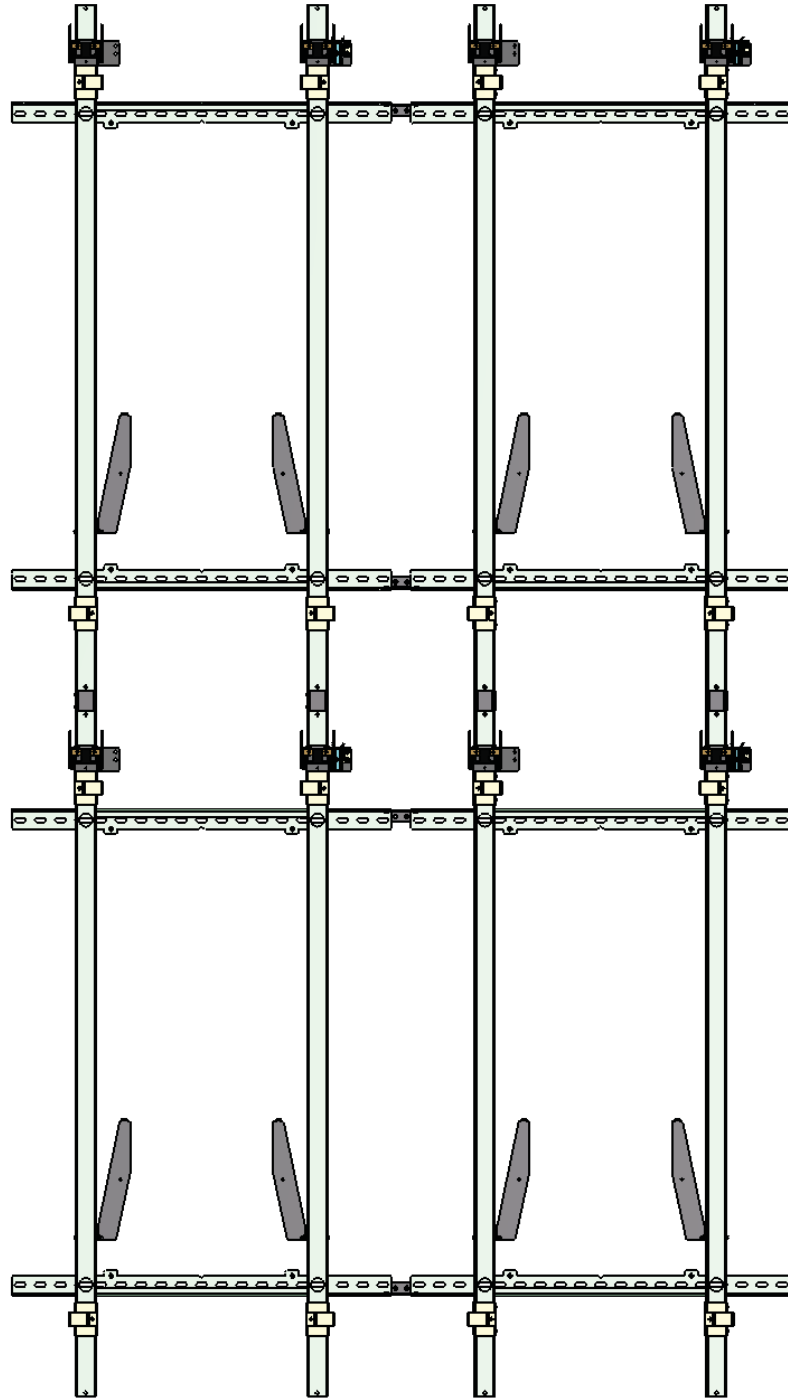
Note: This drawing shows portrait LCD mounts.

EasyAxis mounts are designed to facilitate the thinnest profile LCD video wall. The combination of the mount plus the Matrix LCD module's "blade" design results in video walls that measure 5.9 inches in depth, screen to wall for landscape installations and 6.5 inches for portrait installations.

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, you will need to insert shims 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 two standard brackets that are used for wall installation.

LCD mount
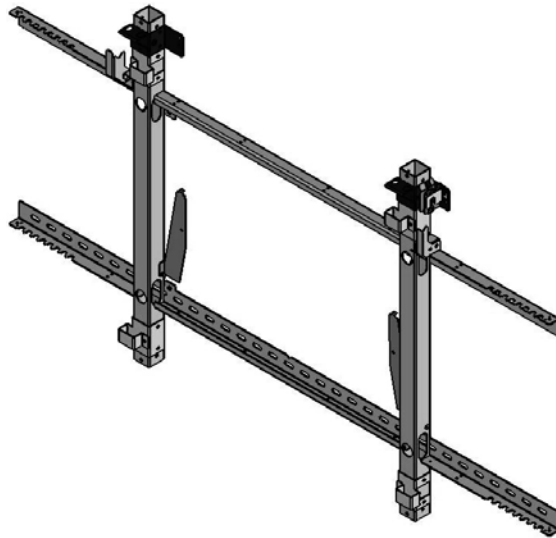
Note: This shows a landscape-oriented mount.

Horizontal bracket

Vertical bracket

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 following drawing to determine the location of the center mount based on the desired LCD location. The LCD mounts are designed to mount with either four M6 or #1/4-20 hardware and a washer.

Note: Brackets shown are for a standard landscape installation.

Note: Brackets shown are for a portrait installation.

Note: Brackets shown are for a landscape installation with protected optically bonded glass.

3 Mark on the wall vertically where the center of the display will be. Using a pencil, mark horizontally where the bottom center bracket will be. Use a string to continue the line for the rest of the desired wall. This will help maintain a level row as you progress installing the LCD mounts.

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

5 Using a level (a digital one is highly recommended), level the bracket as you keep in mind the string at the bottom.

6 Align the v-shaped notch on the LCD mount with the desired center of the LCD (this is done for the first bracket only).
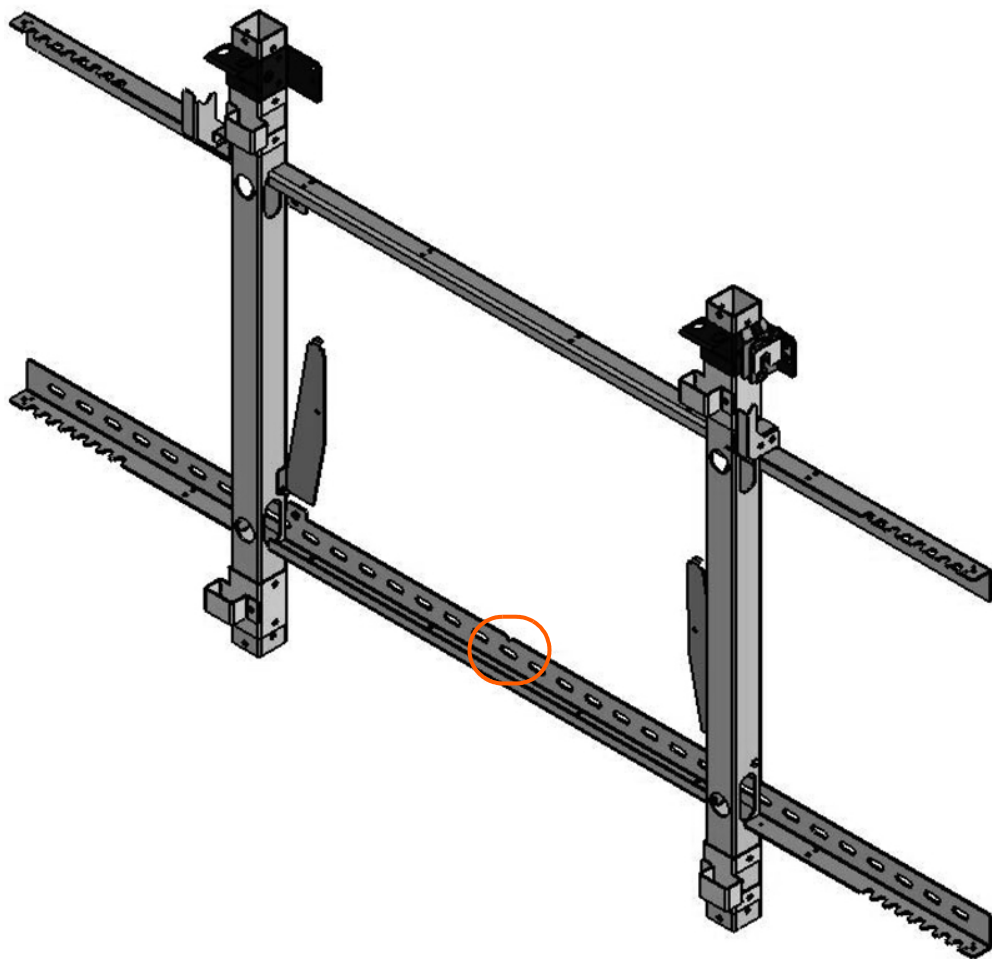
Note: The mount shown is for a landscape installation.
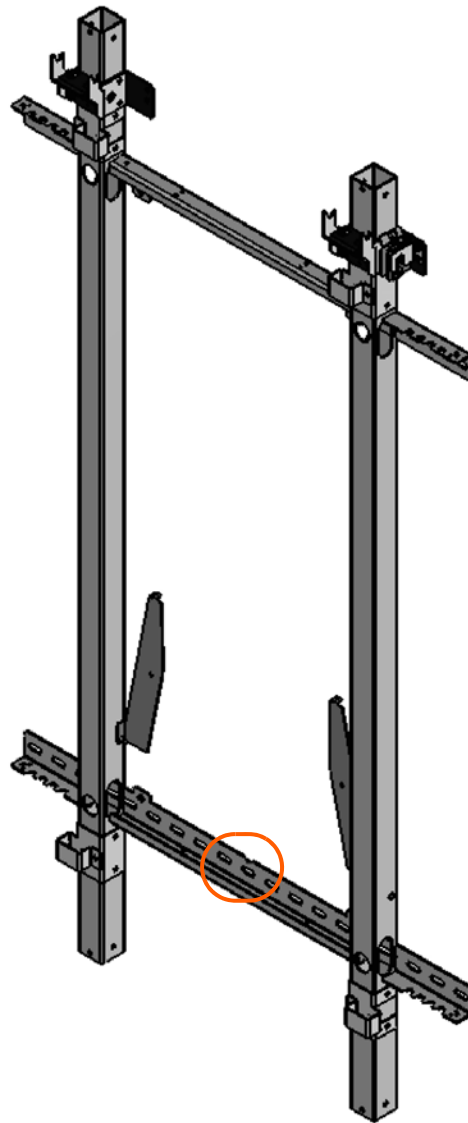
Note: The mount shown is for a portrait installation.

7   Tighten the screws as necessary.

Note: Be sure that as you tighten the screws, the wall is flat. If it is not, use shims near the mount points as necessary.

8   Attach horizontal brackets to the LCD mount that will attach to the next LCD mount you want to install.

9   Repeat steps **4-8** for the first row. Be sure to level all brackets with respect to the first mounted bracket.

10 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   Using two screws, mount vertical brackets to each LCD mount in the first row.
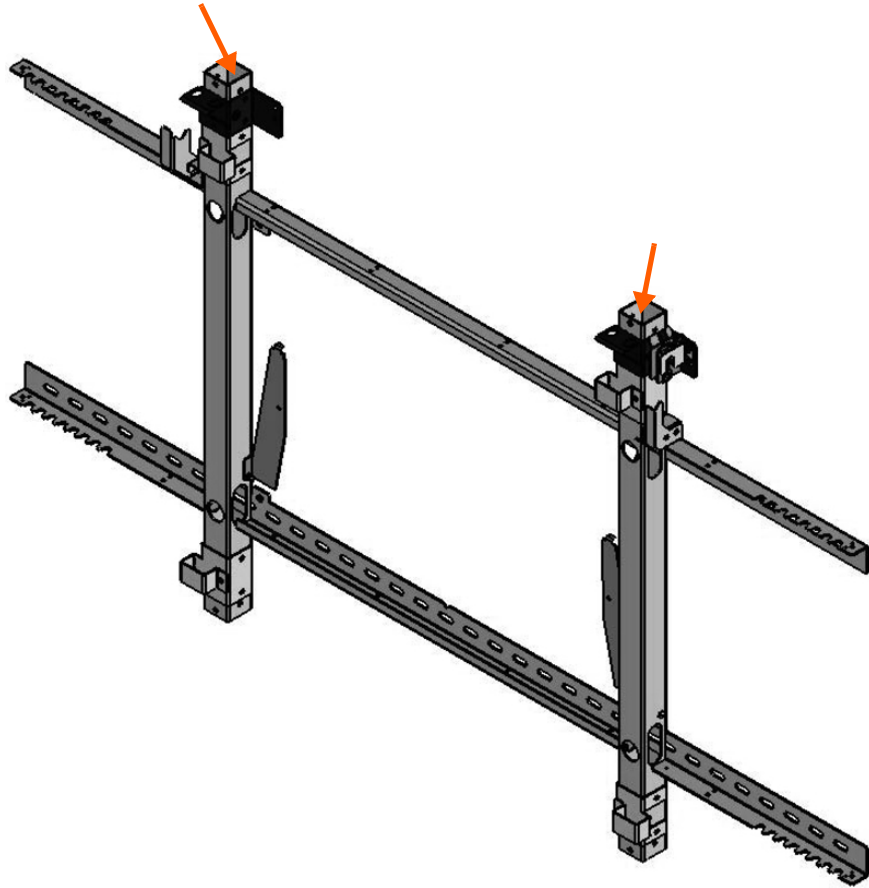
2   Install all the LCD mounts in this row and attach them with the two screws to the vertical brackets.

3   Loosely attach LCD mounts to the wall.

4   Install the horizontal brackets. As you add each new set of brackets, 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.

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

6   Repeat steps **1-5** for each row that you add.

Routing Cables

Before you install LCD modules, you need to route cables through the LCD mounts. Notches on the horizontal brackets make routing cables easier.

As you configure your wall, it important to think about how it will be set up and where the master (A1) display should be located. This does not need to be the upper left display in an array, but rather should be in a location that will be easily accessible. For example, if you have a 4 x 4 wall and it is easier to see on-screen menus in a lower row, the master (A1) display should be set up there.

1   Route power, data 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.
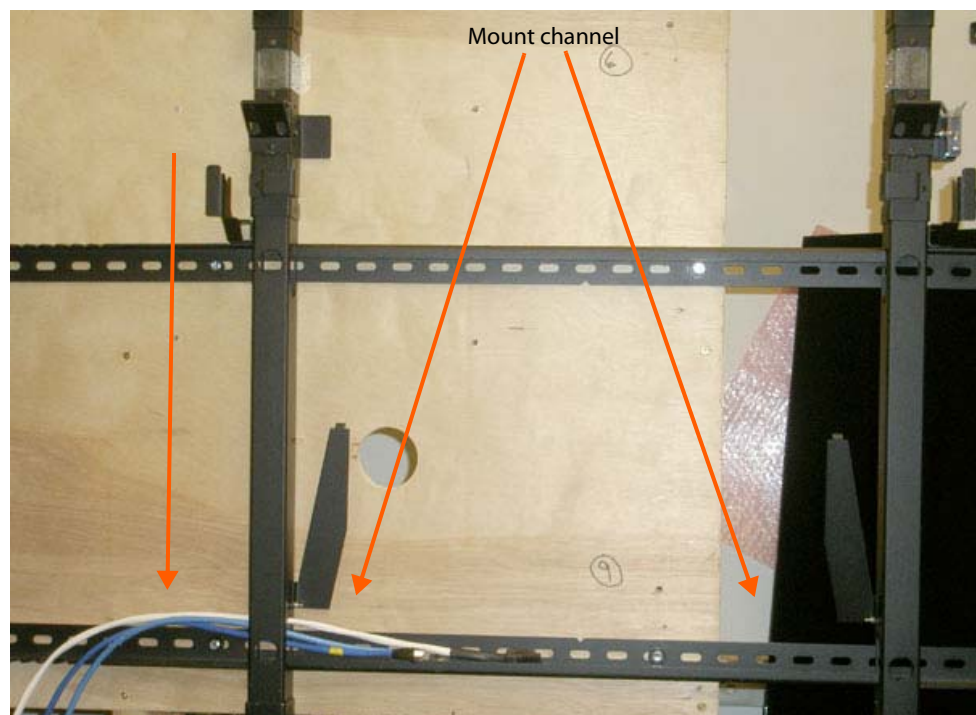
Mount channel

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

2 Route power, data and video cables from the brackets to the off-board equipment for the entire wall. For ease in troubleshooting and configuration, we recommend that you cable your wall together in "clusters." Use two power supply modules, one Quad controller module and (up to) four LCD modules in each cluster. Pick a rectangle of LCD modules and connect them all to the same power supply modules and the same Quad controller module. Then use one of these power supply modules to power that Quad controller module.
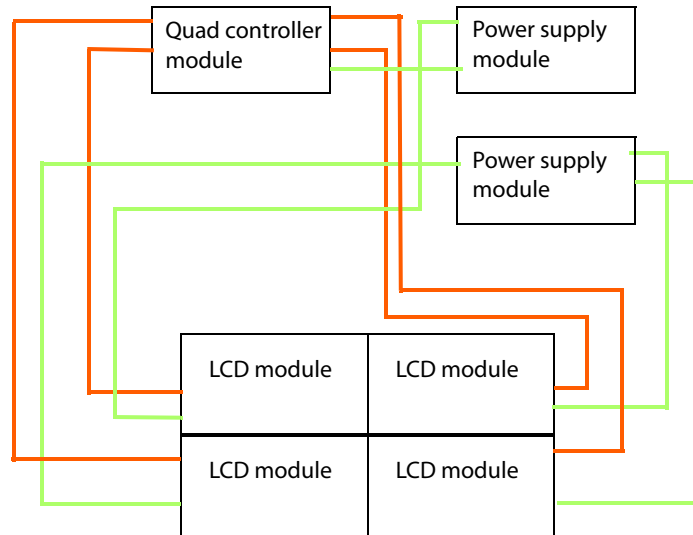
Note: For most configurations of the wall, you can choose any arrangement of rectangles. But for configurations that will have multiple sub walls, you will want to plan your configuration before choosing your clusters of LCDs. If you're not sure how to arrange the clusters, choose a 2 x 2 configuration. See "Understanding Wall Configuration" on page 115 for more information.

3 If the IR sensor will be mounted near the LCD wall, route the IR sensor cable now.

Note: Keep in mind that you need to point the remote towards where the IR sensor is mounted.

Placing Off-Board Module Equipment

Before you install your LCDs, first place your Quad controller modules and power supply modules in the area where they will be installed.

Plugging In Cables to the Off-Board Modules

Once the modules are placed, complete the following steps.

1 For the Quad controller module, plug the necessary data cables into the gray COMM connector and the video cables into the orange VIDEO connector.
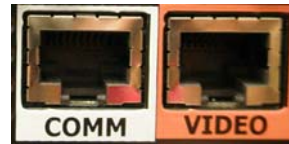
2 Plug one end of the power supply monitor cable into the MON LOOP from the first power supply module and the other end into the PS MON connector on the second power supply module.

3 For the Quad controller module and power supply module, plug one end of a power cable into the 24V connector on the Quad controller module and the other end into the CTRL PWR 24V, 5A connector on one of the power supply modules. Do this for each set of Quad controller modules and power supply modules.

4 For each set of Quad controller module and power supply modules, plug one end of the power supply monitor cable into the PS MON connector of the Quad controller module and the other end into the PS MON connector of one of the power supply modules.

5 For each power supply module, plug one end of the AC power cable into the power supply module and then the other end into the wall outlet.
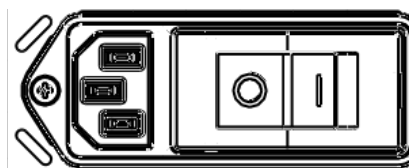
6 For each power supply module that will plug into an LCD, plug in one end of the longer power cable into one of the 24V connectors on the power supply module.

Rear of Quad controller module

Data

Video

Plug one end of the power cable into this connector and the other end into the power supply connector.

Rear of power supply module
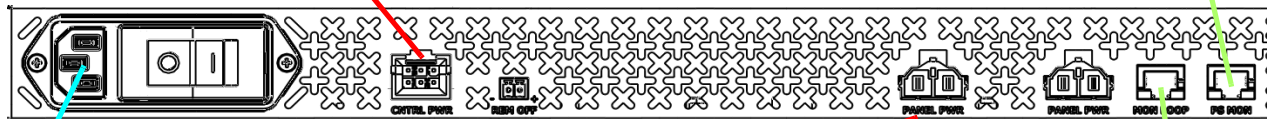
AC power to wall outlet

Power to Quad controller module

Power to LCD
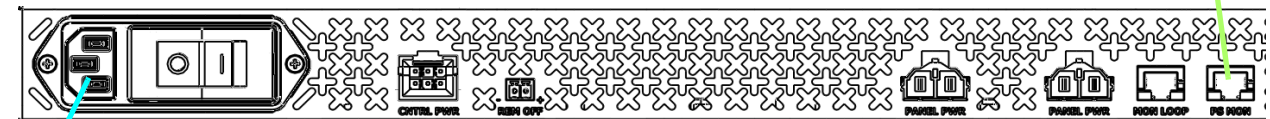
AC power to wall outlet

Power to LCD

Installing LCD Modules

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

Caution: It is important that you check communication between the LCD modules as you build each row! This will help minimize changes once your wall is fully installed.

Note: If you have the optional trim pieces, it is suggested that you install these pieces on the units that will be on the bottom, top and outer sides of the wall prior to installing the LCDs. For more information, see "Cosmetic Trim" on page 189.

Installing the First or Bottom Row

As you plug in and install each LCD module, turn it on to verify it works properly and to ensure that the position sensor is active. See step **10** of this section for more information.

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

1   Remove the LCD that you want to install from the LCD shipping box.

2   Remove the LCD from the bag and then remove the mylar sheet and tape from the LCD module.

3 Using two people, lift the LCD into place. Each person should hold the handle at the top of the LCD with one hand and place the other hand on the bottom of the display.

Landscape installation

Portrait installation

Caution: Be careful to limit contact with the thick edge of the bezel on the LCD, as it 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

Incorrect position

Never rest the LCD on a corner!

4 Slide the horizontal support bar on the back of the LCD into the notch of the LCD mount. The LCD module is now in the service mode position.

Notch

Service mode
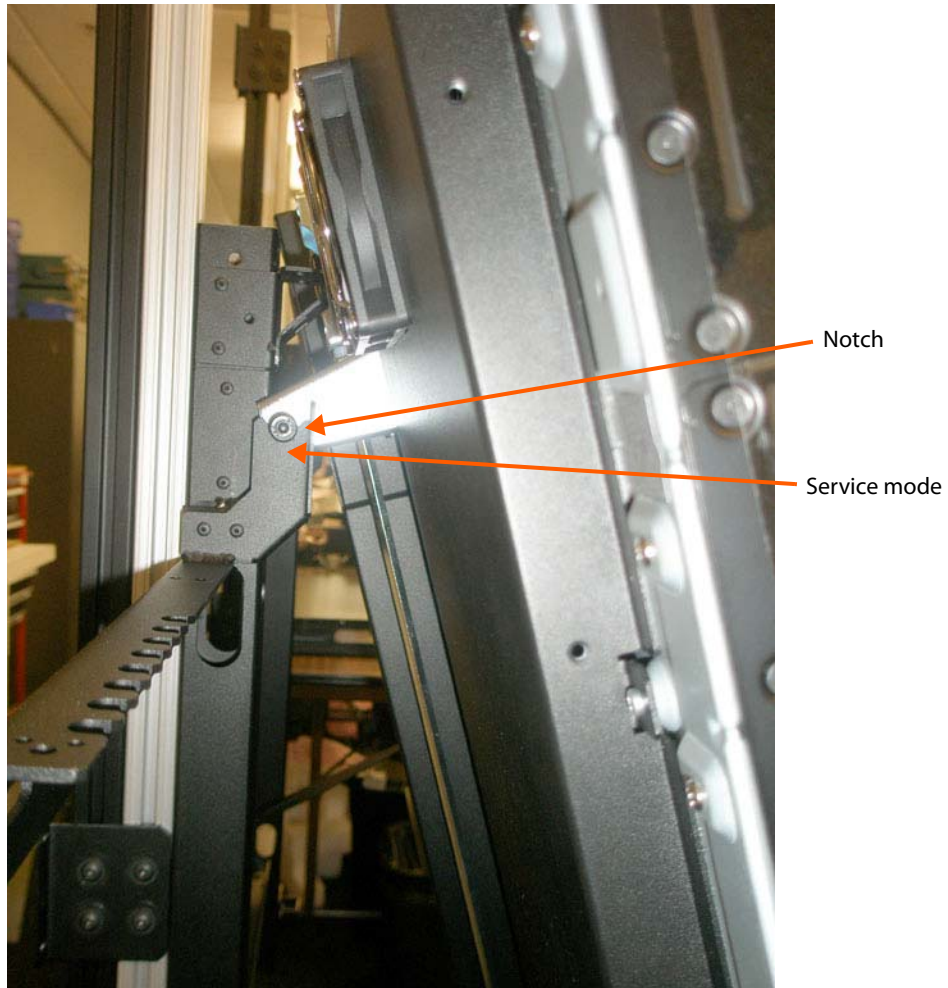
Note: This shows a landscape installation.

Service mode

Note: This shows a portrait installation.

5 Connect the Cat 6 data and video cables from the Quad controller module to the gray COMM and VIDEO connectors on the bottom of the LCD. Be sure to keep the cables in pairs; Do not connect the video cable from one LCD output into a different LCD module than the data cable on that output.
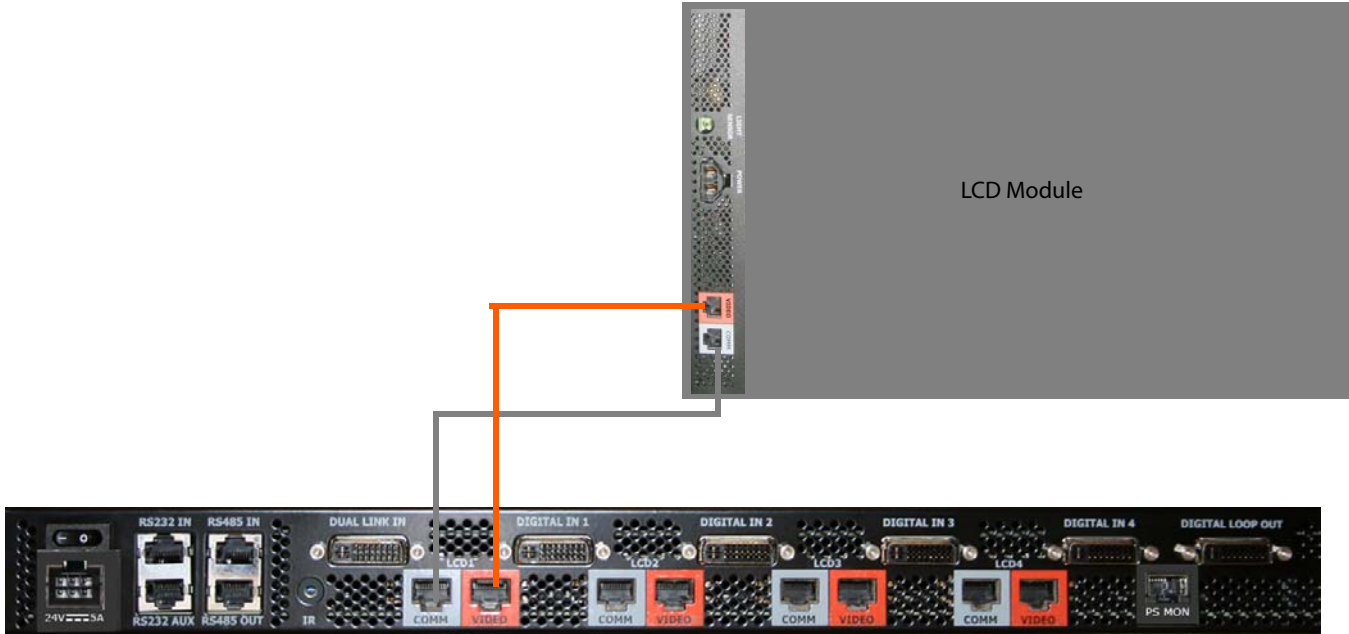
6 Connect one end of the power cable to the power connector on the LCD and the other end to the panel power connector on the power supply module.
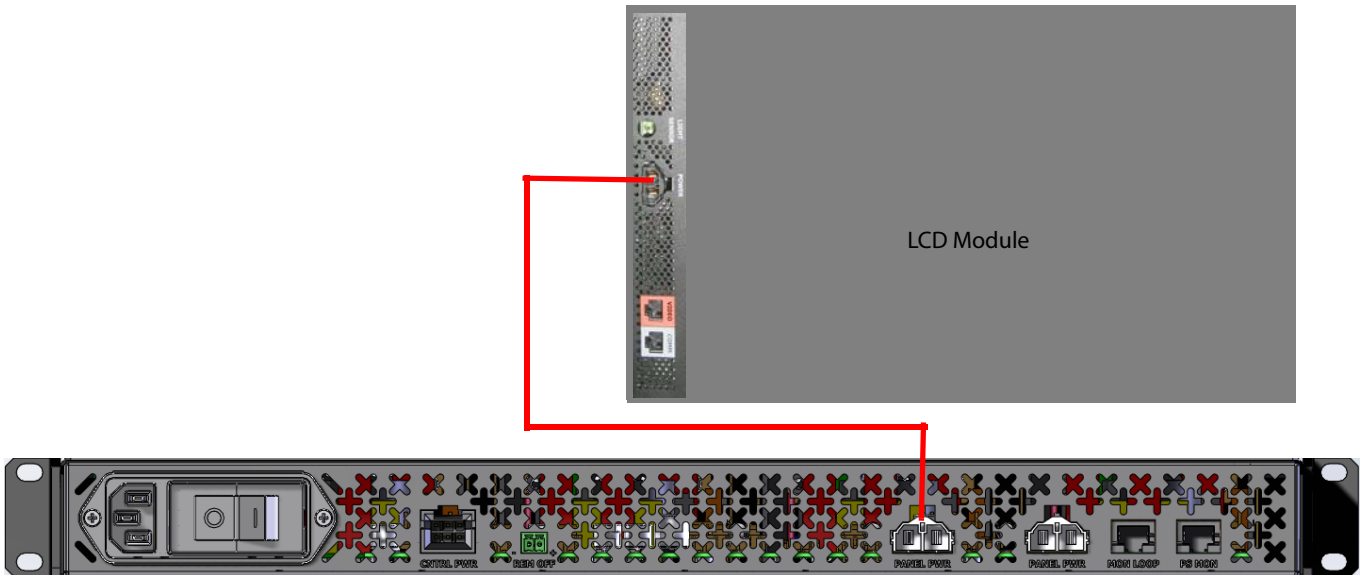
7 Make sure the Quad controller and power supply modules are turned on. Turn on the LCD module to make sure the data and video cables are feeding information to the LCD module. The **data** information is flowing correctly if you see a green light flashing next to the COMM cable. The **video** information is flowing correctly if you see solid green light next to the VIDEO connector. If you have accidentally reversed these two cables, you will not see green lights at all.

8 Verify that the LCD module is working by putting up a gray scale test pattern on the screen. If you see vertical streaks in the pattern, you will need to change the cable equalization (press MISC once on the remote) until it disappears. For more information about cable equalization, see "Cable Equalization & EDID" on page 76.

9 Slide the LCD into position, making sure that all four cams (two on top and two on the bottom) slide into place.

Cam   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 **17**-**18** of this section.)

10 Verify that the position sensors (see "Mounting the IR Sensor" on page 51) are working by displaying the on-screen menus on the LCDs. For landscape installations, the first LCD on the left in the row should always show the display ID of 1:1. For portrait installations, the first LCD on the right in the row should always show the display ID of 1:1. As you build the row out, the left (landscape) of the two numbers on each LCD should show an incremental number. In the first example below, you would expect to see 1 in the far left LCD, 2 in the next one, etc. In the second example, you would expect to see 1 in the far right LCD, 2 in the next one, etc. Each number must also be unique. If you see a duplicate number or no information at all, check your cabling to make sure everything is properly connected and all of your modules are turned on.

1:1	2:1	3:1

Note: Landscape configuration.

3:1	2:1	1:1

Note: Portrait configuration.

11 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, you might need to make minor adjustments, which are described in the following steps.

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

13 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.

Y-axis adjuster - landscape installation

14 For the next display in the row, repeat steps **1-11** and then continue to step **15**.

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

16 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.

17 Adjust the inside and outside z-axis adjusters of the last installed display until it is flush with the display next to it.

Outside Z-axis adjuster   Landscape installation - inside Z-axis adjuster
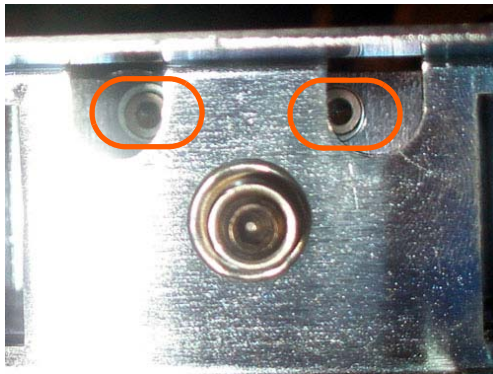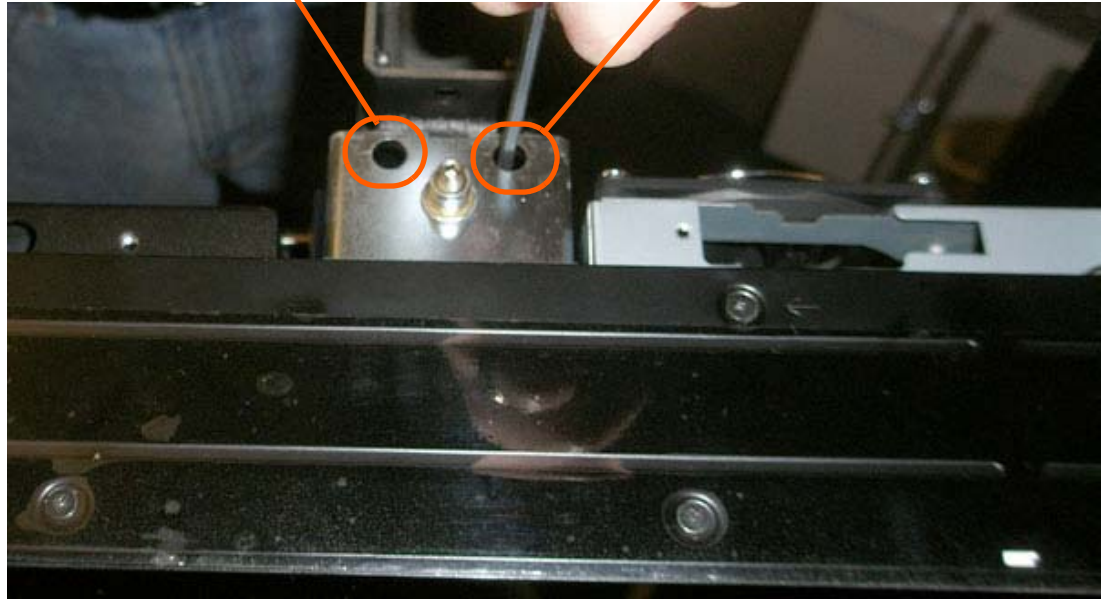
Close-up of Z-axis adjusters. They can be difficult to see from the top.

18 Adjust the x-axis of the last installed display so there is a .38mm gap (approximate thickness of a business card) between the displays.

X-axis adjuster - landscape installation

19 If the gap is tapered, you can make slight adjustments to the y-axis to correct it. This could be one or both displays that have the taper. Keep in mind if you adjust 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

1 Starting at the center display of the next row that you want to install, follow steps **1-9** of "Installing the First or Bottom Row" on page 39.

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.

2 Verify that the position sensors are working by displaying the on-screen menus on the LCDs. For landscape installations, the first LCD on the left in the row should always show the display ID of 1:1. For portrait installations, the first LCD on the right in the row should always show the display ID of 1:1. As you build the row out, the left (landscape) of the two numbers on each LCD should show an incremental number. In the first example below, you would expect to see 1 in the far left LCD, 2 in the next one, etc. In the second example, you would expect to see 1 in the far right LCD, 2 in the next one, etc. Each number must also be unique. If you see a duplicate number or no information at all, check your cabling to make sure everything is properly connected and all of your modules are turned on.

Check the number on the left when building a row.

Check the number on the right when building a column.

1:1	2:1	3:1
1:2	2:2	3:2
1:3	2:3	3:3

Note: Landscape configuration.

Check the number on the left when building a row.

Check the number on the right when building a column.

3:1	2:1	1:1
3:2	2:2	1:2
3:3	2:3	1:3

Note: Portrait configuration.

3 Make sure the first display in the row is plumb with the display below it using the x-axis adjuster.

4 Using the y-axis adjusters, set the vertical gap between the displays at .38mm (approximate thickness of a business card).

5 Adjust the z-axis corners of the last installed display until it is flush with the display next to it. The alignment of the bottom corners might need to be re-adjusted as each new display is installed in the row.

6 Repeat steps **1-5** of this section to install subsequent displays in this row.

7 When you are finished, check the wall one more time to make sure the display IDs are in the correct order. Use the example above as a reference.

Mounting the IR Sensor

Before you mount the IR sensor, keep the following points in mind:

- Because most menus will be controlled on the master (A1) display, it is suggested the you mount the IR sensor near this display.
- No matter which display a menu is on, you will still need to point the remote towards this one IR sensor that controls the entire wall.

Connecting the IR Remote

Connect the IR remote to Quad controller module A.

RS485 Quad Module Connections

Use the RS485 cables to connect the RS485 Out of each Quad controller module to the RS485 In of the next module. The order of the modules does not matter. You do not have to complete the loop - the RS485 In of the first module will remain empty, as will the RS485 Out of the last module. Unlike other Planar Clarity wall products, these connections must be made, even if you will not be controlling your wall through RS232.

Checking Your Connections

Below is a diagram of a basic configuration. This illustrates which cables are connected where. Use this to make sure you have correctly made all of the basic connections.
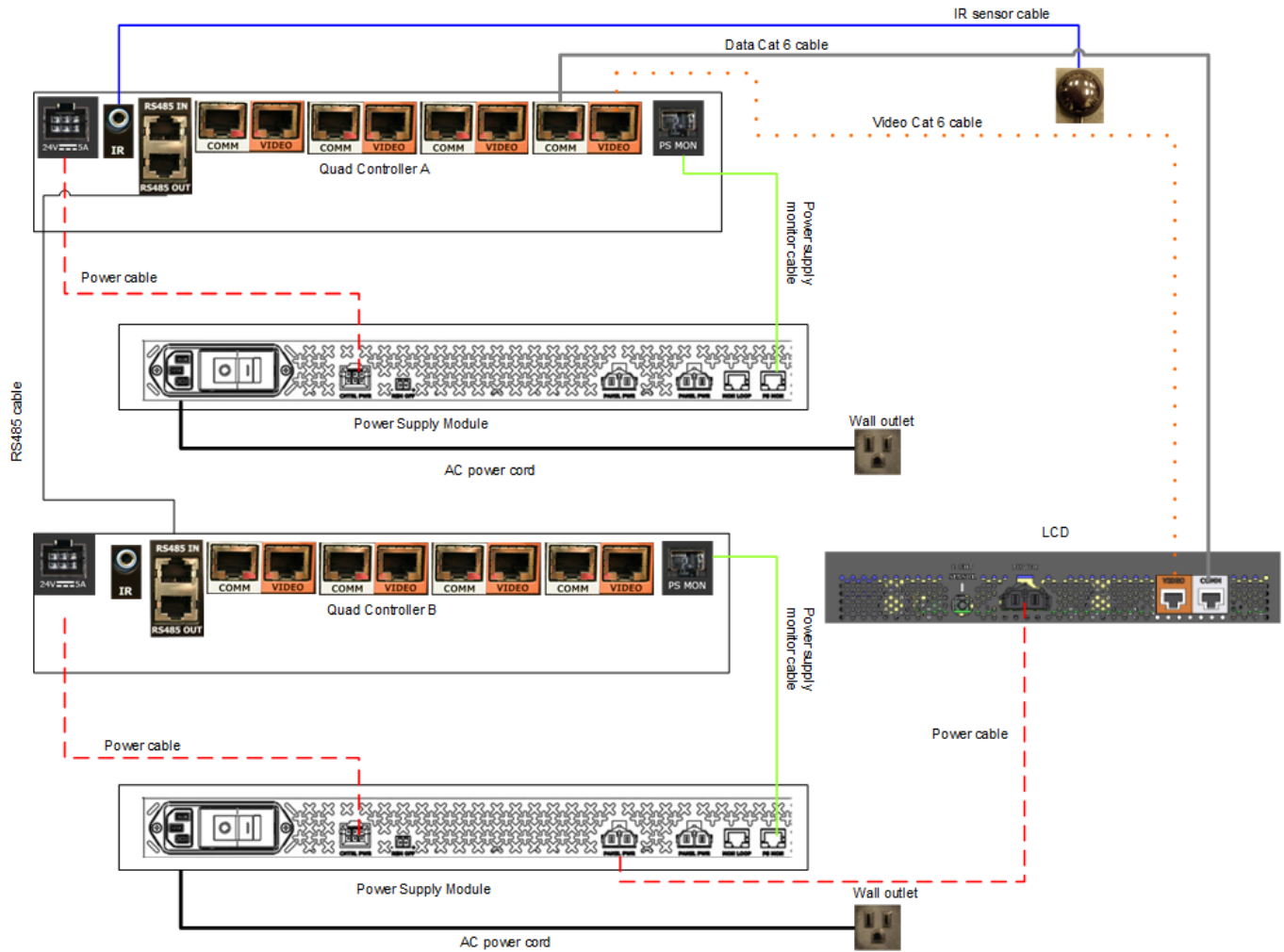
System Addresses

Each Quad controller module contains four microprocessor/scaler engines that each control one LCD. Each microprocessor has an address to which the master uses to communicate with. These are also the addresses that an external host computer will use when controlling the system through RS232. Unlike other Planar Clarity wall products, these addresses are determined by the system, not by the installer. Each Quad controller module has a letter address: A through P. This address is set via the address selector dial (see next page for a picture) on the front of the module. You must set this selector so that each Quad controller module in your system has a unique address. Each Quad controller module has four processors, numbered 1 through 4. The address of each processor is the combination of the Quad controller module letter address and the processor number address. For example, A1, A2, A3, A4, B1, B2, B3, B4, etc. Throughout this manual we will be using these addresses to refer to these processors.

Since each processor controls one LCD, we will also be referring to LCDs by this letter/number designation. Keep in mind that if you change where the video and data cables were connected for a particular LCD, its address will change. **An LCD's address is not determined by its position in the array, rather by its Quad controller module connection**.

Each Quad controller module also has four DVI input connections. These four inputs are closely associated with the corresponding LCDs. So in this manual we will also be referring to these connections by letter and number designations, A1, A2, A3, etc. Whether an address refers to an input, a processor, or an LCD will be apparent from the context.

Quad Module A, and specifically processor A1 has special duties. It is referred to in this manual as the master. The IR remote input, the (optional) host RS232 connection and the (optional) WallNet RS232 connections are all made on processor A. LCD A1 displays most of the menus.

Setting the Address of Each Quad Controller Module

For each Quad controller module that is connected to LCDs, you will need to set an address (similar to a unit ID) on the front of the Quad controller module. Using the Quad controller module address adjustment tool, manually turn the dial in the middle of the address selector to the letter you want to be identified with the LCDs connected to this Quad controller module. It is important to note that each module must be unique. So one Quad controller module needs to be A, the next B, etc.

Use the address adjustment tool to
turn this dial to the letter you want
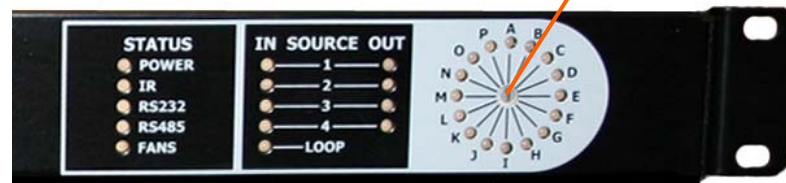
It is recommended that you set the addresses when the Quad controller modules are turned on. This make it easier to see LEDs as you switch between addresses. Once you have set the IDs how you want, it is recommended that you power cycle all Quad controller modules.

Connecting Sources

Note: If you do not want to connect your sources at this time, you can perform the Matrix Layout (see "Matrix Layout Menu" on page 69) and color balance (see "Adjusting Color Balance" on page 71) before sources are connected.

The digital inputs of the Clarity Matrix Video Wall give you the flexibility to create a variety of configurations that can be displayed. There are three basic ways that you will most likely use your video wall.

- Spread one picture over the entire video wall.
- Plug individual inputs into each LCD in the wall.
- Spread one picture over a section of the wall, or what we'll call a sub wall, and have individual inputs on the other displays.

Each Quad controller module has four DVI inputs, a Dual Link loop input and a Digital Loop Out. How you connect your sources may depend on what you want to do with the wall. Familiarize yourself with the configuration scenarios ("Understanding Wall Configuration" on page 115) before connecting your sources. If in doubt, connect each source to the Digital In connector that corresponds to the LCD connector where you want that source to be displayed. If you plan to use any form of the Clarity Big

Picture, cable the Digital Loop Out and Dual Link In connections as shown in "Loop-Through" on page 57. If you want to connect an analog source to the Clarity Matrix HX60, you will need to use an analog to DVI-D converter or matrix switcher that converts analog signals to DVI.

Quad Controller Status LEDs

LEDs on the front of the Quad controller module can indicate a number of different things. The following shows the most common occurrences.

Green when Quad controller is powered on

Flickers green when remote is used

Flickers green when an RS232 command is received

Green if LCD is connected
Red if no LCD is connected
Off if no LCD is connected

Flickers green when an RS485 command is received

Green when the Fan is running and Red if it isn't

Green if input is connected
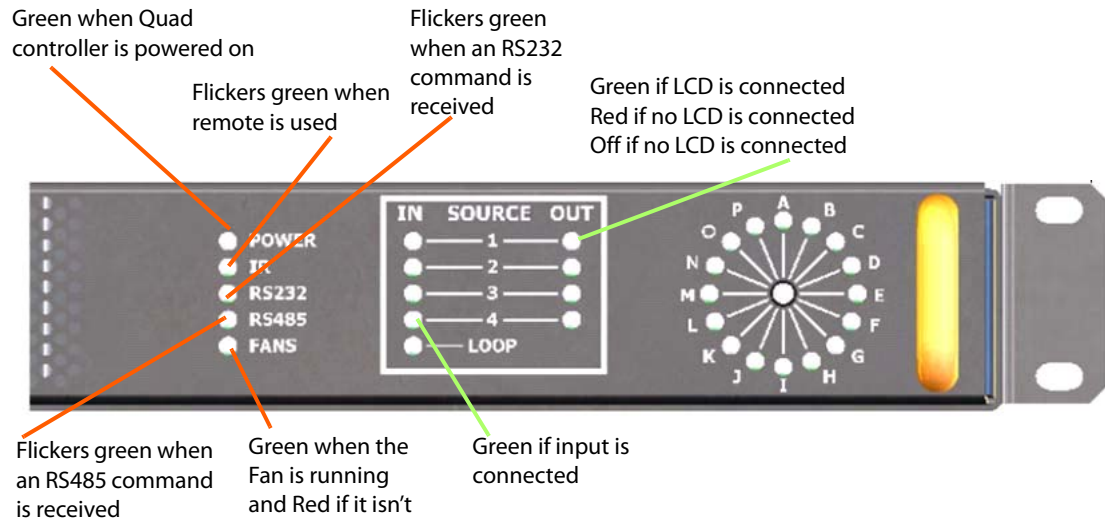
While the Quad controller module is updating its other three processors, the lights on the front have a distinctive pattern. Every other light in the circle will be illuminated. The Output lights will slowly change from red to green. One of the lights will be red when the other three are green. That is the processor which is currently being programmed. The entire process for all three processors should take about 20 minutes. Do not turn off the power during this time. Wait until all controllers have finished and the front panel lights have returned to normal. Then turn off the power to all modules one more time and power the system on as normal.

Loop-Through

All of the "Quick Configure" settings and many other configurations rely on the system being configured for loop through, as shown in the diagram below. Connect a DVI-D cable from the Digital Loop Out connector of the first Quad controller module to the Dual Link Input connector of the next Quad controller module. Connect the Digital Loop Out connector of the final Quad controller module to the Dual Link In connector of the first module, completing the loop. Below is an example of a basic loop through.
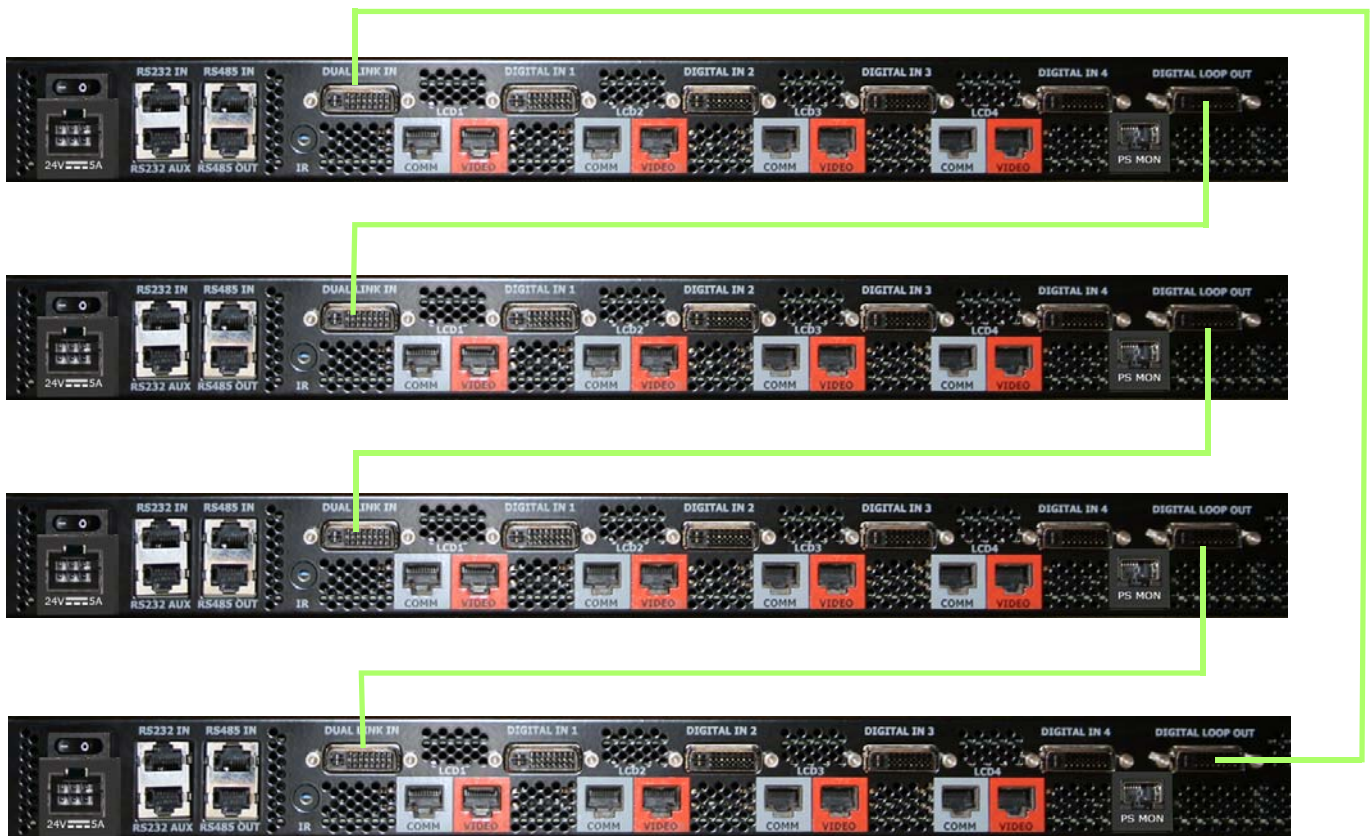
Configuring a Clarity Matrix HX60

Menu Settings

There are four different menu settings that are available when you open the on-screen menus: navigational, global, local and status. These will be described in more detail on the following pages.

Basic Configuration Steps

Configure your displays by performing steps in the following order:

1   Matrix Layout (global) - see "Matrix Layout Menu" on page 69.

2   Color Balance the displays (local) - see "Adjusting Color Balance" on page 71.

3   Configure Wall Settings. See "Understanding Wall Configuration" on page 115 for more information.

4   If you need to adjust the on-screen image, see "On-Screen Menus" on page 141 to see different menu options.

Master vs. Slave Displays

The master display is the LCD where the bulk of the on-screen menu configuration and off-board configurations will be controlled. The master display is the one plugged into the LCD 1 connector of Quad controller module A, which is identified on screen as A1. All other displays in the array are considered "slave" displays, which will receive many global software and hardware commands from the master (A1). Information specific to individual displays can be controlled on slave displays.

Menus and the Remote

All on-screen menus are controlled using a specific remote control created for the Clarity Matrix LCD Video Wall System. This remote allows you to access the four menu types: navigational, global, local and status. These menus are described below.
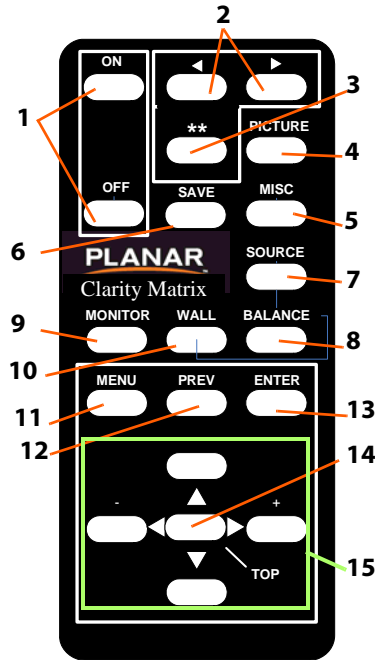
Note: Keep in mind that you need to point the remote towards where the IR sensor is mounted.

Remote Control Buttons

Number	Definition
1	Turn the display ON/OFF.
2	Move the target left or right.
3	Set the target to all at once.
4	With each press, go to Picture, Input Levels, Aspect Ratio, Picture Position, Zoom Top & Left, Zoom Bottom and Right.
5	With each press go to Miscellaneous submenu, main Miscellaneous Options menu, Backlight Settings and Serial Port Settings.
6	Press once for Recall, twice for Save.

Remote Control Buttons

Number	Definition
7	Takes you to the next Quick Configure setting (Big Picture, A1, A2, etc.)
8	Press once for the Color Balance menu.
9	With each press, go to Unit Status, Serial Port Status, Setup Summary and Test Patterns.
10	Open the Wall Configuration menu.
11	Bring up the on-screen menus.
12	Return to the previous menu.
13	Press to select a menu option.
14	Move the highlight bar to the top line of the menu.
15	Arrow keys move the highlight bar around on the menu to select the option you want.

Arrows on menu lines lead to other menus. Solid black arrows ▶ lead to navigational menus, hollow blue arrows > lead to status menus and hollow green arrows ▷ lead to slave menus.

Navigational Menus

Navigational menus appear only on the master display, which can be identified on screen by A1. These menus simply allow you to get to other menus, and there are no active functions directly available from them. The MAIN MENU and ADVANCED OPTIONS are navigational menus.

Advanced Options	PLANAR
Color Balance	▷
Size and Position	▶
Miscellaneous Options	▶
Backlight Settings	▶
Serial Port Settings	▶
Set Clock / Schedule Events	▶

Global Menus

Global menus can only be controlled on the master (A1) display. Any changes made to global menus will result in changes to the entire wall. The following menus are globally controlled:

- Wall Configuration
- Matrix Layout
- Quad Module Route
- Picture
- Memory
- Diagnostics
- Test Patterns
- Miscellaneous Options
- Backlight Settings
- Serial Port Settings
- Set Clock/Schedule Events
- Factory Settings

Status Menus

Status menus appear on all displays simultaneously and show information specific to each display. Status menus are informational and no settings can be changed. The following menus are status menus:

- Picture Information
- Unit Status
- Serial Port Status
- Setup Summary
- Hours
- Program Information

Local Menus

Local menus allow you to make changes to a specific display as needed. This allows you to better fine-tune certain settings, such as scaling or overscan. Local menus can appear on any display, either one at a time or all at once. You will need to select which display you want to control by using the target control buttons on the remote control. The following menus are locally controlled:

- Wall Setup
- Input Levels
- Aspect Ratio
- Color Balance
- Size & Position
- Picture Position
- Zoom Top & Left
- Zoom Bottom & Right
- Viewport Top & Left
- Viewport Bottom & Right

This button puts the local menu onto all displays at once.
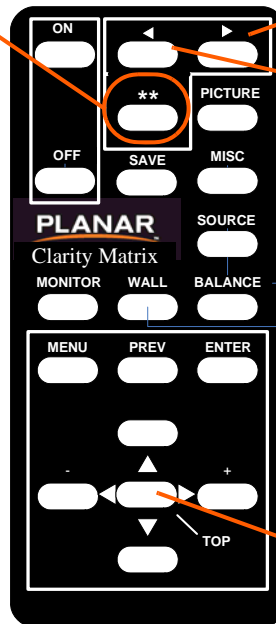
These arrows move the local menu to the next display in the array.
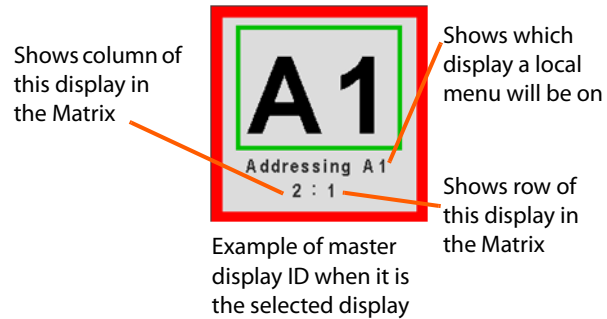
Top button

When displaying locals menus on all LCD modules at the same time, the highlight bar might be on a different line on each menu. Use the TOP button to simultaneously move the highlight bar to the same place on all menus.

Display IDs

LCD displays are identified with a letter and a number, called a display ID. The letter is set on the front panel of the Quad controller module (see "Setting the Address of Each Quad Controller Module" on page 55). The number is chosen by the connector to which the display is connected.

If this display will show local menus, the display ID has a green square around it. The master (A1) display has a red square around it.

Shows column of this display in the Matrix

Shows which display a local menu will be on

A 1

Addressing A1
2 : 1

Shows row of this display in the Matrix

Example of master display ID when it is the selected display

Clarity Matrix HX60 Installation Guide

RS232 Communication

RS232 control is not necessary for operation, but is a convenient way to control displays from a computer at a distance. If your installation will not use RS232 control, skip this section.

Everything you can do with the remote, you can do with RS232 commands. Plus, you can send inquiries to the displays and find out the current settings and values.

RS232 connections are made with cables like Ethernet straight-through cables. This is the common type of LAN connection cable sometimes called a Cat 5 cable.

Note: It is important that the RJ45 cable has "straight through" connections. To see if your cable is correct, hold the two connectors side by side with the ends pointing in the same direction. Look at the sides of the connectors that do not have the locking tab. If the colors of the wires inside the connectors are the same left to right for both connectors, this is the correct cable. If the colors are mirror reflections of each other, it is the wrong type.

You need an adapter to go from the computer's 9-pin serial output connector to an RJ45 connector. Adapters of this type are readily available at computer and electronic supply stores. The adapter is not pre-wired. You will make three connections inside the adapter, as described below.

Wiring the adapter

To go from 9-pin D-sub serial connector on the back of the computer to an RJ45 connector, use a standard RJ45-to-9-pin adapter. Wire it internally as shown. The wiring shown for this adapter is correct for *straight-through* cables. Straight-through cables are wired 1-to-1, 2-to-2, etc.

	RJ45	9-pin
Yellow wire	6	3
Black wire	3	2
Green wire	5	5

RJ45 looking into the socket
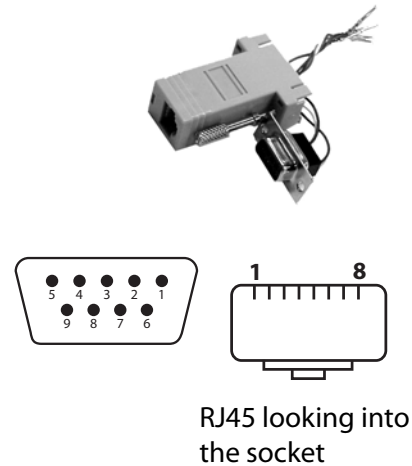
Connecting RS232 Cables

1   Connect the 9-pin adapter to the serial output connector of the controlling computer. (This computer does not have to be the same one as the computer used as a picture source.) The serial output is sometimes called the Comm Port, and sometimes there is more than one.

2   Connect a cable from the RJ45 adapter to the In connector of the Quad controller module A.

For more information about configuring RS232 communications, see "Serial Port Settings and Diagnostics" on page 103.

RS232 port connection is on the Quad controller module. Only connect to Quad module A. Otherwise, the connection won't work.

Matrix Layout Menu

The Matrix LCDs are equipped with sensors that allow them to know their position in the array. The master (A1) keeps track of this information and displays it in the MATRIX LAYOUT menu. To start the automatic discovery process, go to the MATRIX LAYOUT MENU (MAIN MENU > WALL CONFIGURATION > MATRIX LAYOUT) and select the AUTO option. The discovery process takes about 5-10 seconds for the entire wall.

Caution: You **must** complete this step before performing any other on-screen menu configurations!

Matrix Layout <Enter> to update matrix layout								**PLANAR**
Auto			**Quick**			**Reset**		**
A1	**A2**	**A3**						
B1	**B2**	**B3**						
C1	**C2**	**C3**						

Note: The first time you open this menu, it will be populated from A1 all the way through P4, no matter how many modules you have.

Depending on how your wall is set up, one of four scenarios could occur:

- Auto Layout Complete - The discovery process completed without errors.
- No Auto Layout has been performed - For more information, see "Troubleshooting" on page 155.
- Error in the Layout - This might appear if an LCD is in service mode. For more information, see "Troubleshooting" on page 155.
- If your array is larger than nine wide or nine high, you will not be able to see the entire layout on this menu. A message will appear that indicates this.

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 you see a yellow car move across a video array from one display to another, you want it to 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 you can compensate for it with color balancing.

Caution: In order to maintain temperature specifications, displays with protective optically bonded glass installed have a lower maximum brightness. Do not attempt to color balance a mixture of displays with and without protective optically bonded glass.

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. "Color Temperature" is a way of measuring these color differences. In general, higher color temperature numbers are bluer or "cooler." You may have a reason for wanting your display to be a specific color temperature. For instance, if you are using the Clarity Matrix HX60 in a television studio where you will be videotaping the content, you will want a low color temperature. The Clarity Matrix HX60 defaults to the brightest setting possible, which is 100 in the RED, GREEN and BLUE lines under WHITE BALANCE. You may choose a different color temperature 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. If you want the brightest display, select the NATIVE option.

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

Color Balancing Multiple Displays

Color balancing is subjective. It may seem strange at first, but it gets easier with practice. Fortunately, you don't have to match all the colors; you only have to match 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.
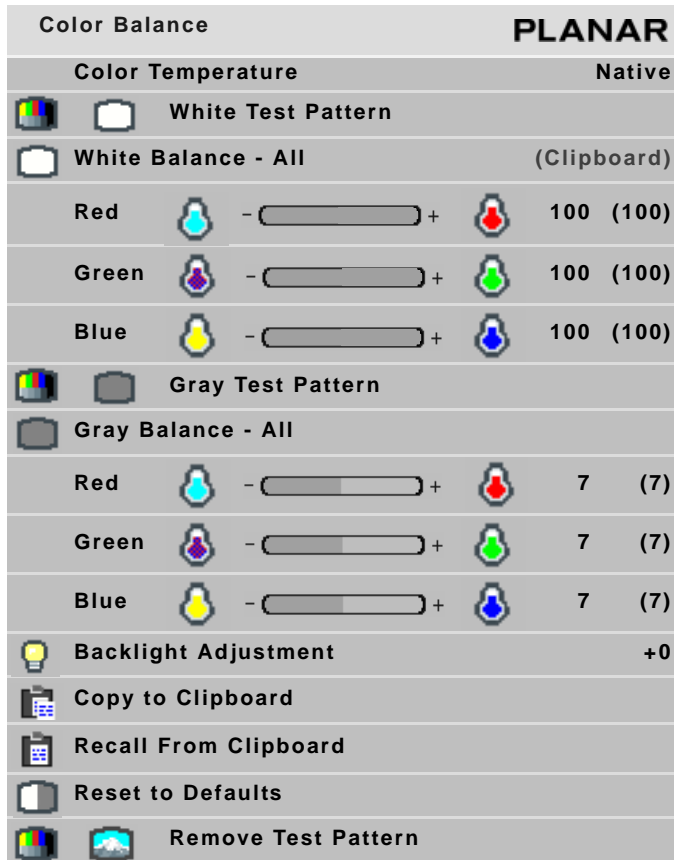
Caution: Never try to match the colors of the displays with the black and white level controls or with the video controls.

Caution: If you are color blind, even a little bit, do not color balance your 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 five minutes. The backlights must be thoroughly warm before you color balance.

2 Press MISC twice on the remote to open the BACKLIGHT CONTROL menu. Confirm that the BACKLIGHT INTENSITY is greater than 1.

Backlight Control	**PLANAR**
☑ **Auto Backlight on**	
☐ **Turn Backlight Off When No Source (DPMS)**	
DPMS Delay	1 hr
Backlight Control Mode	**Manual**
Backlight Intensity – ⟮▭⟯ +	**10**
AP/LED – ⟮▭⟯ +	**0**

3 Open the COLOR BALANCE menu by pressing BALANCE on the remote.

Color Balance	**PLANAR**
Color Temperature	**Native**
White Test Pattern	
White Balance - All	**(Clipboard)**
Red – ⟮▭⟯ +	**100 (100)**
Green – ⟮▭⟯ +	**100 (100)**
Blue – ⟮▭⟯ +	**100 (100)**
Gray Test Pattern	
Gray Balance - All	
Red – ⟮▭⟯ +	**7 (7)**
Green – ⟮▭⟯ +	**7 (7)**
Blue – ⟮▭⟯ +	**7 (7)**
Backlight Adjustment	**+0**
Copy to Clipboard	
Recall From Clipboard	
Reset to Defaults	
Remove Test Pattern	

Note: The color balance menu is a local menu. For more information about navigating local menus, see "Local Menus" on page 64.

4 Press the ** button to show the menu on all displays.

5 If the array has never been color balanced, make sure you start with the same color temperature setting on each display. If you are not interested in achieving a specific color temperature, use NATIVE, which is the brightest. 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.

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 be the "baseline" display, and you will *not* adjust it. All other displays will be adjusted to this baseline display.
Why pick the "least bright" display? Why not pick the brightest and adjust to it? When the white value is 100, the display is as bright as it can get. You are 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 you can't bring this setting down to match the baseline, maybe you didn't choose the darkest display.)

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.

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.

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 you 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 REMOVE TEST PATTERN line and press ENTER. Press MENU to close all the menus.

Tips for Color Balancing

- COPY TO CLIPBOARD will save all the current settings to a temporary memory. You can then make more adjustments 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.
- Color balance values are saved for all input sources in the same memory location.
- 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 you don't know 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 you started and do the same with another color. If everything you do makes the match worse, you must be close to the ideal point.
- Removing red has the same effect on hue as increasing blue and green together. The COLOR BALANCE menu slider bars have colored bulbs at each end to tell you what the effect will be of moving a color toward that end.
- Changes in the white values affect the gray values but changes in gray values do not affect the white values.

Advanced Options

Advanced options are used mostly for fine tuning and will rarely need to be used. The most commonly used items in the ADVANCED OPTIONS menu are described in the following sections:

- Color Balance: see "Adjusting Color Balance" on page 71
- Backlight Settings: see "Backlight Control" on page 89
- Miscellaneous Options: see "Miscellaneous Options" on page 76

The less commonly used options are covered in the following sections of this manual:

- Size and Position: see "Adjusting Position" on page 93
- Serial Port Settings: see "Serial Port Settings and Diagnostics" on page 103
- Set Clock/Schedule Events: see "Setting the Clock/Scheduling an Event" on page 79

Main Menu	**PLANAR**
Wall Configuration	▶
Picture	▶
Memory	▶
Diagnostics	▶
Advanced Options	▶
Program Information	>

Advanced Options	**PLANAR**
Color Balance	▷
Size and Position	▶
Miscellaneous Options	▶
Backlight Settings	▶
Serial Port Settings	▶
Set Clock / Schedule Events	▶

Miscellaneous Options

The MISCELLANEOUS OPTIONS menu contains several unrelated settings. The MISCELLANEOUS "slave" menu is the first menu to appear when you press the MISC button. To access the main MISCELLANEOUS OPTIONS menu, press MISC twice on the remote.
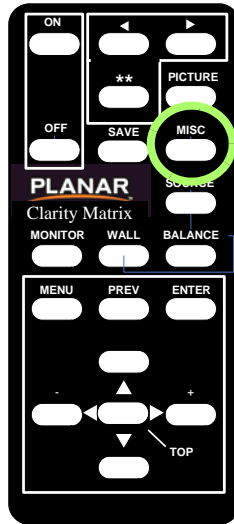
Miscellaneous Options	**PLANAR**
Cable Equalization & EDID	▷
🕐 Menu Timeout	Never Time Out
Rotate Menu	None
☐ Hide Source Absent Message	
☑ Allow Frame Lock	

Cable Equalization & EDID

Select the green arrow to pull up the MISCELLANEOUS "slave" menu.

Miscellaneous	**PLANAR**
Cable Equalization	1
☑ EDID (Plug and Play)	
EDID Detailed Timing 1	1366 x 768
EDID Detailed Timing 2	2732 x 1536 60Hz (2x2)
*** Copy Settings to All Displays	

The CABLE EQUALIZATION line adjusts the long line video system to compensate for cable type and length. The default cable equalization is a mid range value that should allow an image to be seen no matter what the cable configuration actually is. Press the ** button to be sure it is on all displays and then use up/down arrows until you get an image on the master (A1). If you can't see images on the other displays, use the target < and > buttons to move the CABLE EQUALIZATION lines to those displays to adjust individually. It may be easier to complete the Matrix Layout on the master before attempting to adjust CABLE EQUALIZATION on the slaves.

Note: It is possible to have this value so off that no video can be seen.

The EDID (PLUG AND PLAY) line allows the source computer's video card to query the display and send the correct resolution. Most video cards work with Planar displays. For the few that don't, you may need to turn off Plug and Play and manually specify the video card settings based on the display's capabilities.

The EDID DETAILED TIMING 1line is part of the Plug and Play information that informs the source computer about the native resolution of the display. This field is automatically set to the native resolution of the product. In some cases, you may want your source computer to output a resolution different than the native one. Some video cards will not output certain resolutions based on what they find in the EDID DETAILED TIMING line. If this is the case, you can change this line to try to "trick" your card into outputting the desired resolution. Use your -/+ keys to select one of the most common resolutions: 1280 x 720, 1360 x 768, 1366 x 768 or 1920 x 1080.

The EDID DETAILED TIMING 2 line allows you to choose various multiples of the resolution in the EDID DETAILED TIMING 1line. This gives some video cards the additional information they need to allow them to output large resolutions for sub wall configurations, such as 2 x 1 or 1 x 2. The vertical refresh rate used is also shown in this line, since the system cannot handle a 60Hz refresh rate for some of the higher multiples. Based on the resolution you selected in EDID DETAILED TIMING 1, you can select specific resolutions, wall configurations and refresh rates, as shown in the table below.

EDID Detailed Timing 1	EDID Detailed Timing 2	Wall Size	Refresh Rate
1280 x 720	1280 x 720	1 x 1	60
1360 x 768	1360 x 768	1 x 1	60
1360 x 768	2720 x 768	2 x 1	60
1360 x 768	1360 x 1536	1 x 2	60
1360 x 768	2720 x 1536	2 x 2	60
1360 x 768	1360 x 2304	1 x 3	30
1360 x 768	4080 x 768	3 x 1	60
1360 x 768	1366 x 3072	1 x 4	30
1366 x 768	1366 x 768	1 x 1	60
1366 x 768	2732 x 768	2 x 1	60
1366 x 768	1366 x 1536	1 x 2	60
1366 x 768	2732 x 1536	2 x 2	60
1366 x 768	1366 x 2304	1 x 3	30
1366 x 768	4080 x 768	3 x 1	60
1366 x 768	1366 x 3072	1 x 4	30
1920 x 1080	1920 x 1080	1 x 1	60

Note: Changes to either of these lines can take a few seconds to update. It is suggested that you pause briefly after making each selection to allow for this update to complete.

Menu Timeout

Determines how long the on-screen menus will be displayed; the range is 0-60 seconds; NEVER TIME OUT means the menus will remain on screen until you choose to turn them off.

Rotate Menu

Makes the menus readable when the display is arranged in portrait or landscape orientation. ROTATE MENU does not rotate the picture. It only arranges the menus so they read the same way the picture does. To use the display in portrait mode, your source image must be rotated.

Hide Source Absent Message

If for some reason a source disappears and you do not want to display a message that the source is absent, check this box.

Allow Frame Lock

Frame lock causes the display to synchronize its vertical refresh timing with that of the incoming source. This prevents frame tearing or frame dropping. To frame lock, the incoming signal must be within the refresh parameters of the display itself, which is from 49 Hz to 61 Hz.

Setting the Clock/Scheduling an Event

The Clarity Matrix HX60 can be easily programmed to schedule specific events, such as turning the display on or off.

1 To access the SET CLOCK/SCHEDULE EVENTS menu, press MENU on the remote and from the MAIN MENU, select ADVANCED OPTIONS > SET CLOCK/SCHEDULE EVENTS.

Main Menu	PLANAR
Wall Configuration	▶
Picture	▶
Memory	▶
Diagnostics	▶
Advanced Options	▶
Program Information	>

Advanced Options	PLANAR
Color Balance	▷
Size and Position	▶
Miscellaneous Options	▶
Backlight Settings	▶
Serial Port Settings	▶
Set Clock / Schedule Events	▶

```
Set Clock / Schedule Events                    PLANAR

    Press <ENTER> to set clock and schedule events

 Current  Date/Time:    Mon    Feb    28   2010    10:40

        01 07:30    Daily              Turn On

        02 21:30    Daily              Turn Off

        03 12:30    Mondays            Recall #04

        04 16:00    Wednesdays         Recall #23

        05 02:00    Apr 1       2010  Clk +1 Hr

        06 02:00    Oct 28      2010  Clk -1 Hr

        07

        08

        09

        10

        11

        12

        13

        14

        15

        16

        17

        18

        19

        20
```

2   Press ENTER to open the EVENT popup menu.

3   Do one of the following:
- To set the clock, see "Setting the Clock" on page 81.
- To schedule an event, see "Scheduling an Event" on page 81.

Setting the Clock

Use the following instructions to set the clock.

1   If 0 is not already selected in the Event # line, use the -/+ keys to select it.

Event # (0= set clock)	0
Frequency	Never
Action	No Action
Slot to Recall	1
Day of Week	Tuesday
Year	2010
Month	03
Date in Month	02
Hour	21
Minute	30

2   Depending on the changes you want to make, update any of the following lines:
   • Year
   • Month
   • Date in Month
   • Hour
   • Minute

Note: Time is calculated using a 24-hour clock. For example, if the current time is 9:30 p.m., set the Hour line to 21 and the Minute line to 30.

3   When you are finished making the appropriate changes, press ENTER to see the new time at the top of the SET CLOCK / SCHEDULE EVENTS menu.

4   Press MENU to close the menu system.

Scheduling an Event

The most important event that can be "scheduled" for the Clarity Matrix HX60 is to turn it on or off. Scheduling an automatic shut off time for the Clarity Matrix HX60 helps ensure that Temporary Image Retention does not occur. The following events can be scheduled:

   • Turn display off/on
   • Set the clock ahead/back 1 hour
   • Recall a memory slot

Use the following instructions to schedule an event.

1. Use the -/+ keys to select the "event number" you want to correspond to this event.

2. Use the up/down arrows to select the FREQUENCY line. Use the -/+ keys to scroll through the list until you find the selection you want. The following frequencies can be selected:
    - One Time (e.g. to set clock ahead one hour in the spring)
    - Daily (e.g. to turn the display on/off)
    - Weekly

Event # (0= set clock)	1
Frequency	Daily
Action	No Action
Slot to Recall	1
Day of Week	Wednesday
Year	2010
Month	02
Date in Month	24
Hour	0
Minute	0

Note: If you have set up a one time event, the frequency will show "Never" once the event has occurred. You can schedule the event to occur again by changing the frequency back to "One Time" and then correcting the date and time.

3. Use the up/down arrows to select the ACTION line. Use the -/+ keys to scroll through the list of Action items until you find the one you want. The following actions can be selected:
    - Turn Unit Off
    - Turn Unit On
    - Recall Slot
    - Set Clock Ahead 1 Hour
    - Set Clock Back 1 Hour

4. Do one of the following:
    - If you selected "Recall Slot" in the previous step and want to recall a memory slot other than the one shown, go to step **5**.
    - If you did **not** select "Recall Slot" in the previous step, go to step **6**.

5 Use the up/down arrows to select the SLOT TO RECALL line. Use the -/+ keys to scroll through the list until you find the selection you want.

Event # (0= set clock)	3
Frequency	Weekly
Action	Recall Slot
Slot to Recall	4
Day of Week	Monday
Year	2010
Month	05
Date in Month	03
Hour	12
Minute	30

Note: If you select a memory slot that has not been set up, no action will occur.

6 Depending on the frequency you selected and the change you want to make, update any of the following lines:
- Day of Week
- Year
- Month
- Date in Month
- Hour
- Minute

Note: Time is calculated using a 24-hour clock. For example, if you want your display to turn off at 9:30 p.m., set the HOUR line to 21 and the MINUTE line to 30.

7 Continue setting up events until you are finished. Changes are automatically saved each time you move from line to line.

8 When you are finished making the appropriate changes, press ENTER to see the new events on the SET CLOCK / SCHEDULE EVENTS menu.

9 Press MENU to close the menu system.

Aspect Ratio Settings

The aspect ratio of any picture is its width divided by its height. W/H = Aspect Ratio

The native aspect ratio of the Clarity Matrix HX60 is 1.77. This is sometimes referred to as 16:9 for 1.77. The native resolution of the Clarity Matrix HX60 is 1366 x 768 with a WXGA format.

Many pictures do not have this aspect ratio. Standard television, VGA, SVGA, and XGA signals are 1.33. Movies from DVDs vary depending on the original film format, but are often 1.85. The larger the number, the "wider" the picture seems.

When the incoming picture is a different aspect ratio from the screen, the display gives you six choices (see SCALE MODE submenu options) to make it fit.

Scale Mode Settings

1 To select the Scale Mode, press PICTURE on the remote three times.
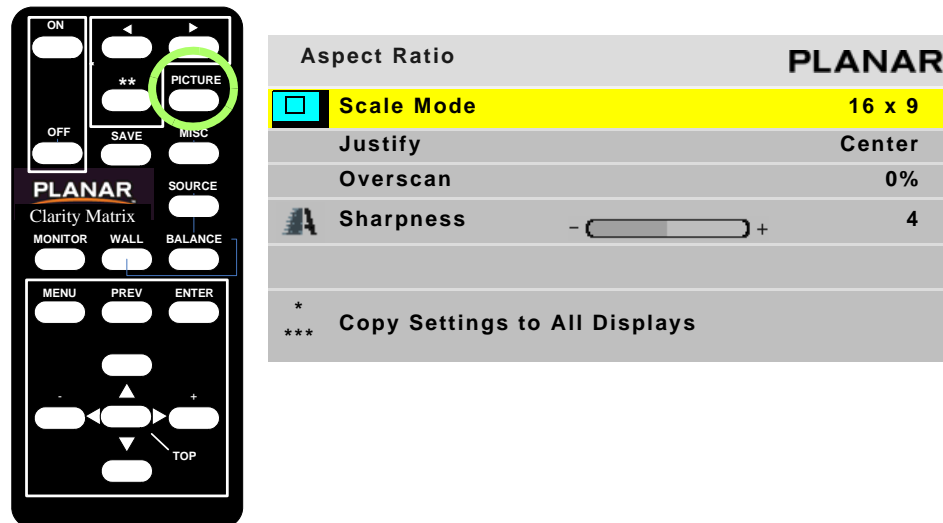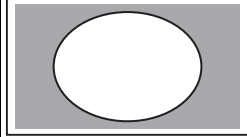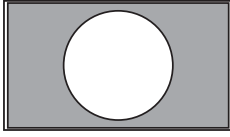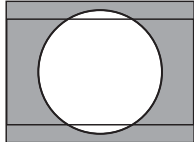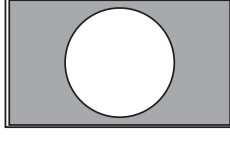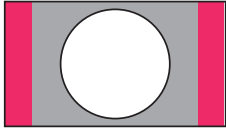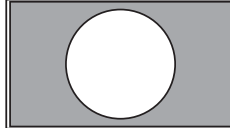
2 With SCALE MODE highlighted, press ENTER. The SCALE MODE submenu displays.
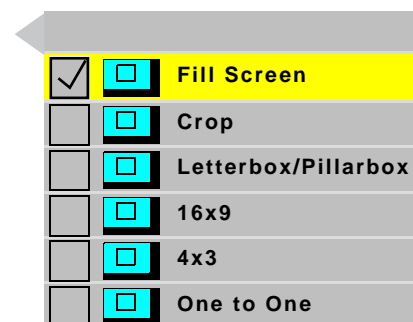
The scale modes are "radio" buttons; you can only choose one at a time.

Note: The display is not capable of compressing the image in one direction while stretching it in the other. For example, if you try to display a UXGA (1600 x 1200) on an Clarity Matrix HX60 in a 1 x 2 column arrangement (1366 x 768) at Fill All, the display will letterbox the image and the following note will appear at the bottom of the menu: "Can't display Change Scale Mode." You can leave the scale mode at Fill All or change it to Letterbox. You can also select Crop or One to One.
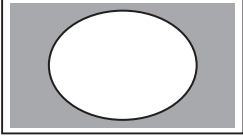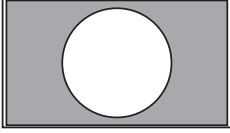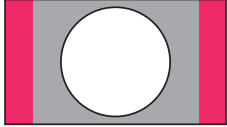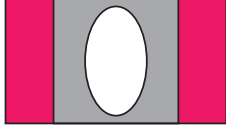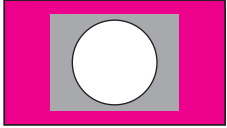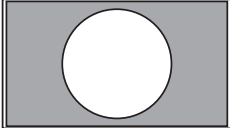
Note: The SCALE MODE menu icons change to indicate the effect each mode will have on the picture based on the JUSTIFY and SCALE MODE settings, and the source resolution.

Scale Mode	Affect on Input Type on 16 x 9 Display	
	4 x 3 source (e.g. Standard Video or VGA/SVGA/XGA)	16 x 9 source (e.g. 1080i or WXGA computer source)
Fill Screen	Stretches width of image	Displays full image without distortion
	Fill Screen makes the picture fit top-to-bottom and left-to-right, regardless of how this stretches or compresses the picture. Fill All distorts the picture, when the aspect ratio of the incoming picture is not the same as the display.	
Crop	Crops top and bottom of image; fits width of image without distortion	Displays full image without distortion
	Crop expands non-native aspect ratio pictures until the *second* edges touch the border and lets the other edges of the picture fall outside the display and get cropped.	
Letterbox/ Pillarbox	Fits height of image without distortion; fills width with border	Displays full image without distortion
	Letterbox/Pillarbox expands the picture until the first edges (top-bottom or left-right) touch the border of the display, and then fills in the other sides with a solid color.	

Scale Mode	Affect on Input Type on 16 x 9 Display	
	4 x 3 source (e.g. Standard Video or VGA/SVGA/XGA)	16 x 9 source (e.g. 1080i or WXGA computer source)
16 x 9	Stretches image to fill width without affecting height	Displays full image without distortion
(16 x 9) forces the aspect ratio to 16 x 9 (1.77), the standard for many DVD movies. This will distort any picture other than 16 x 9 aspect ratio pictures. 16 x 9 can be used to display anamorphic DVDs on an array.		
4 x 3	Fits height and width of image without distortion; fills width with border	Fits height of image, compresses width and fills with border
(4 x 3) forces a 4 x 3 (1.33) aspect ratio, the ratio of standard television.		
One to One	Displays image without distortion at actual size

Example above represents a VGA input displayed on one LCD module | Displays full image without distortion

Example above is for 1366 x 768 input displayed on one LCD module |
| **One to One** maintains the original size and aspect ratio of the picture. This may leave blank areas on all four sides. For instance, a VGA picture (640 x 480) on a 16 x 9 display will occupy only a small area in the center of the screen. The primary use of One to One is to display the image without scaling artifacts.

The One to One Scale Mode will produce different cropping results and the image size will be different for each input resolution. | | |

Justify Settings

Justify determines how the picture will be placed in a wall of displays. For a single display, Justify determines placement on the screen. For a wall of displays, if the image is not large enough to fill all the displays in the wall, some will be left blank.

Top/Left

Positions the image starting with the top, leftmost display, then across and down.

Center

Positions the image starting with the center of the image in the center of the wall spreading out equally to all displays.

Bottom/Right

Positions the image starting with the bottom, rightmost display, then across and up.

Overscan

This is used to hide blank areas and stray lines in the edges of an image. The lower the overscan setting, the more of the optical image that is seen. Standard CRT televisions have an overscan of about 5%, which may actually hide content or images that you want to see.

Sharpness

Sharpness settings determine how crisp the image should be. There are sixteen levels of sharpness, where 0 is the softest and 15 is the sharpest. Seven is the default.

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 you are operating at higher altitudes up to 2000 meters, it is recommended that you run the backlight 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 you use the lowest backlight brightness that makes sense for your application. This will reduce power consumption, heat output and the chances of TIR from occurring. (See "Recommended Usage" on page 5)

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

Backlight Control	PLANAR
☑ Auto Backlight on	
☐ Turn Backlight Off When No Source (DPMS)	
DPMS Delay	1 hr
Backlight Control Mode	Manual
💡 Backlight Intensity – ⊂▭⊃ +	10
💡 AP/LED – ⊂▭⊃ +	0

Note: The last two lines will only appear on the master (A1) display.

Auto Backlight On

If AUTO BACKLIGHT ON is checked, the display turns on the backlights soon after AC power is applied. It won't wait for a remote control or RS232 command.

This is the normal mode for applications where the displays will be on 24 hours a day. This way, no one has to manually turn on the backlights after a power failure.

Caution: To prevent temporary image retention (TIR), is recommended that you do **not** leave the Clarity Matrix HX60 on for 24 hours a day. To get the most out of your display, see "Recommended Usage" on page 5.

If the displays normally have the backlights off for part of the day or night, do not check this box. Otherwise a power failure at night would turn on the backlights.

Turn Backlight Off With No Source and DPMS Delay

When checked, TURN BACKLIGHT OFF WITH NO SOURCE (DPMS) causes the backlights to turn off after the source goes absent for the length of time specified in the DPMS DELAY line. If this line is not checked, the backlights remain on indefinitely. To specify an amount of time after which the source is absent that the backlights will shut off, enter that number in the DPMS DELAY line.

Backlight Control Mode

There are two modes for backlight control: manual and auto. Depending on which option you select, the BACKLIGHT CONTROL menu will change.

Manual Backlight Control

This mode is useful when the Clarity Matrix HX60 is in a room with no outside windows and unchanging ambient light levels.

1   Set the BACKLIGHT CONTROL MODE to MANUAL.

Backlight Control	**PLANAR**
☑ Auto Backlight on	
☐ Turn Backlight Off When No Source (DPMS)	
DPMS Delay	1 hr
Backlight Control Mode	Manual
Backlight Intensity – ⊂▭⊃ +	10
AP/LED	Low

2   Adjust the BACKLIGHT INTENSITY to a comfortable brightness. A lower brightness will increase backlight life.

Caution: Changing a failed backlight is a job for a qualified service technician. It is done at the factory, not in the field. Contact your Planar dealer for more information.

Auto Backlight Control

1   Set the BACKLIGHT CONTROL MODE to AUTO.

Backlight Control	**PLANAR**
☑ Auto Backlight on	
☐ Turn Backlight Off When No Source (DPMS)	
DPMS Delay	1 hr
Backlight Control Mode	Manual
Backlight Intensity – ⊂▭⊃ +	10
AP/LED	Low
Ambient Threshold – ⊂▭⊃ +	99Lux
Ambient Light	239 Lux

2   Set the AMBIENT THRESHOLD to an ambient light level at which the backlight will change intensity. If the current AMBIENT LIGHT (shown on the bottom line) drops below the threshold, the backlight dims; if it rises above the threshold, the backlight brightens.

Note: You must have an ambient light sensor in order for this feature to work. For more information, contact Planar's Sales department.

Note: Ambient light is a relative value, and is pertinent only to the Clarity Matrix HX60. It is not an absolute value. You may get different ambient light values with a handheld light meter.

Backlight Intensity

The backlight intensity can range from 1-10. Confirm that the BACKLIGHT INTENSITY is greater than 1. If you are operating at higher altitudes up to 2000 meters, it is recommended that you run the backlight at a reduced intensity.

AP (Advanced Performance)/LED

The AP/LED line allows you to control local dimming of a backlight in order to enhance the crispness of the black content, as well as to show more contrast between black and white images. The following options are available: off, low, medium and high. The higher the option you select, the lower amount of power will be used.

Adjusting Position

Position moves the picture on the screen but does not move the menus.

Picture Position

Open the PICTURE POSITION menu (MAIN MENU > ADVANCED OPTIONS > SIZE AND POSITION > PICTURE POSITION). The four arrow keys move the picture on the screen.

Picture Position	**PLANAR**
Use arrow keys to move image	
⬌	
Horizontal Position	**168**
Vertical Position	**19**
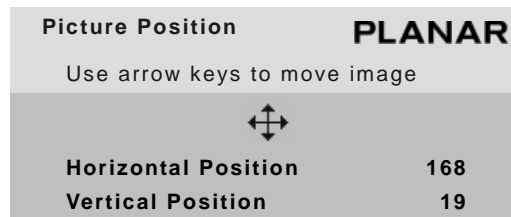
The numbers for HORIZONTAL POSITION and VERTICAL POSITION refer to the number of pixels from sync to the first displayed pixel. These numbers get smaller as the picture moves up and to the left.

Horizontal Position

Shows the number of pixels from the beginning of H sync to the first active pixel. Because there are many black pixels after H sync, this number will not be zero when the picture is at the left border of the screen.

Vertical Position

Shows the number of lines from V sync to the first active line, so it will not be zero when the picture is at the top of the screen.

Note: Adjusting the VERTICAL POSITION too far may cause the image to jump or hop. If the image appears to flicker or hop, readjust the VERTICAL POSITION.

Adjusting Position

Spreading Images Across the Wall

For the Clarity Matrix HX60, you will need to set up a variety of options that relate to how each display fits into the wall. Whether you use Planar's Big Picture^{TM} or an external video processor, your goal is to make the picture fit together properly at the edges.

Using an External Video Processor

The processor divides a single picture into several sections and sends each part on a separate cable. Connect these cables to the proper display.

You can still position the picture with the display controls. With most processors, you can position and zoom the picture with the processor controls.

Using the Quick Configure Feature

The Clarity Matrix HX60 contains sensors that easily configure the layout of your wall. Quick Configure sets up the routing (see "Understanding Wall Configuration" on page 115) and the Big Picture Setup (see below) automatically. If you have a more complicated setup and want to manually configure your wall, use the BIG PICTURE SETUP menu.

Using the Matrix Layout

This feature is described earlier in the manual. For more information, see "Matrix Layout Menu" on page 69.

Using Planar's Big Picture^{TM}

To use Planar's Big Picture^{TM}, you must set the values in the BIG PICTURE SETUP menu for the same wall size on all the LCDs in the wall using the Big Picture feature.

Wall Configuration	**PLANAR**
Quick Configure Big Picture Big Picture A3	▶
Big Picture Setup	▷
Matrix Layout	▶
Quad Module A Route	▶
Quad Module B Route	▶
Quad Module C Route	▶
☑ Enable High Resolution and Dual Link Inputs	
Synchronize High Resolutions	

Big Picture Setup	**PLANAR**	
Matrix Position	3x3	1:1
Wall Width		3
Wall Height		3
Unit Column		1
Unit Row		1
☐ Wall Mode		
☐ Frame Compensation		
Frame Height		10 pixels
Frame Width		10 pixels
*** Copy Settings to All Displays		
No Big Picture Key installed		

Matrix Position

Shows the current size of the wall and the position of the currently selected display.

Wall Width and Wall Height

These show the number of displays wide and high for the *picture*. This may be different from the physical size of the wall. You could build a 4 x 3 array of displays and use WALL MODE to put a single picture on the four displays in the upper left corner, for instance. Using the QUICK CONFIGURE line on the WALL CONFIGURATION menu will set these automatically.

Unit Column and Unit Row

These represent the position of the display in this "array." For example, in the 4 x 3 array of displays shown below, Unit numbering starts at the top left corner of the array. This display would have a Unit Column value of 1 and a Unit Row value of 1. Using the QUICK CONFIGURE line on the WALL CONFIGURATION menu will set these automatically.

Unit Row 1 Unit Column 1	Unit Row 1 Unit Column 2	Unit Row 1 Unit Column 3	Unit Row 1 Unit Column 4
Unit Row 2 Unit Column 1	Unit Row 2 Unit Column 2	Unit Row 2 Unit Column 3	Unit Row 2 Unit Column 4
Unit Row 3 Unit Column 1	Unit Row 3 Unit Column 2	Unit Row 3 Unit Column 3	Unit Row 3 Unit Column 4
Unit Row 4 Unit Column 1	Unit Row 4 Unit Column 2	Unit Row 4 Unit Column 3	Unit Row 4 Unit Column 4

Wall Mode

When checked, this turns on the Planar's Big Picture**TM** feature. When not checked, the display shows the whole picture. Using the QUICK CONFIGURE line on the WALL CONFIGURATION menu will set these automatically.

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 break up the image oddly.
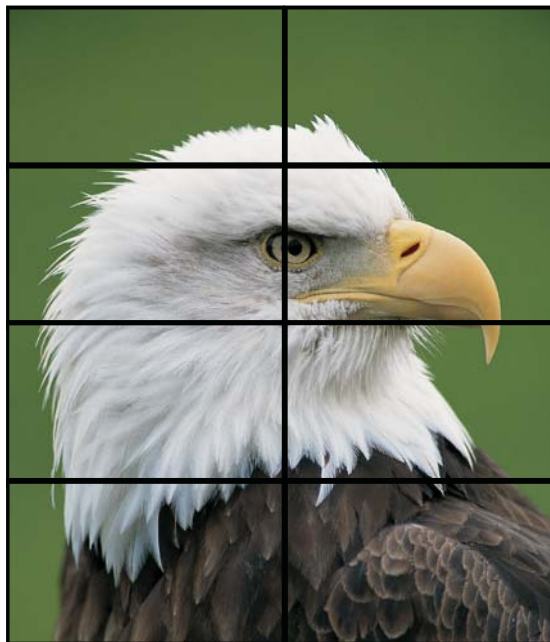
One way around this is to adjust the image. Imagine looking out a window made up of many panes of glass. The image you see is partially obscured by the frames, but your mind assembles the image and ignores the frames.

Frame compensation allows you to mimic 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.
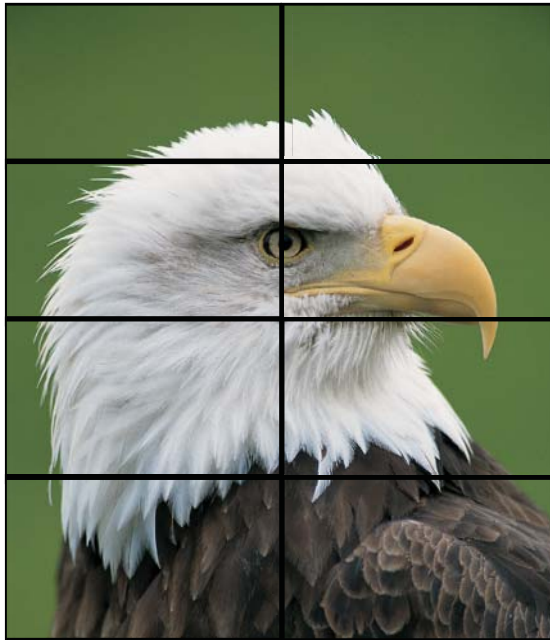
To ensure images containing diagonal lines remain correctly diagonal, turn on Frame Compensation.

Depending on how closely you space the displays, you must 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 your display, assuming they are tiled with the frames tightly together. If your installation leaves more space between the frames, you will need to increase these numbers.

Zoom and Viewport

Zoom fits the edges of a large picture - one that covers many displays' screens - from side to side and top to bottom.

To access the Zoom menus, select MAIN MENU > ADVANCED OPTIONS > SIZE AND POSITION. Then select the ZOOM TOP & LEFT menu or the ZOOM BOTTOM & RIGHT menu.

You can zoom the sides up to +100 pixels *larger* in each direction. You can also zoom the sides up to −100 pixels *smaller*, but only if that side is not the edge of the overall picture.

Zoom Menu Entries

Image Resolution

Shows the resolution of the source picture.

This Unit

Shows the number of pixels this display is using of all the incoming pixels.
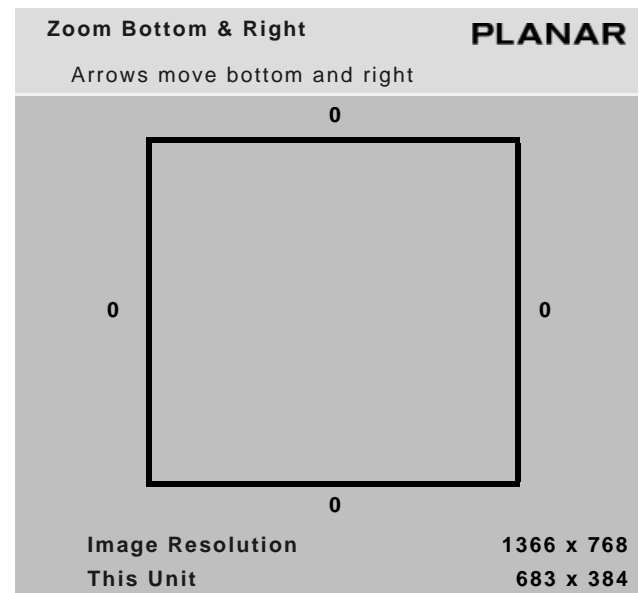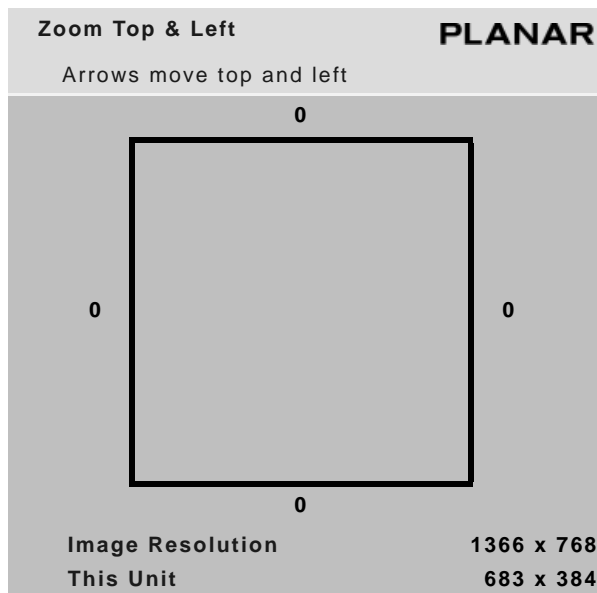
Viewport Adjustment

Use the VIEWPORT menu (MAIN MENU > ADVANCED OPTIONS > SIZE AND POSITION > VIEWPORT WINDOW) to adjust the number of pixels actually used on the display. You can't increase this number, but you can reduce it.

Main Menu	**PLANAR**
Wall Configuration	▶
Picture	▶
Memory	▶
Diagnostics	▶
Advanced Options	▶
Program Information	>

Advanced Options	**PLANAR**
Color Balance	▷
Size and Position	▶
Miscellaneous Options	▶
Backlight Settings	▶
Serial Port Settings	▶
Set Clock / Schedule Events	▶

Size & Position	**PLANAR**
Picture Position	▷
Zoom Window Top & Left	▷
Zoom Window Bottom & Right	▷
Viewport Window Top & Left	▷
Viewport Window Bottom & Right	▷
Reset All Windows to Default	
* *** Copy Settings to All Displays	

Note: The COPY SETTINGS TO ALL DISPLAYS line will only appear if this menu is on the master display (A1).

Viewport Top & Left	**PLANAR**
Arrows move top and left	

```
              0
    ┌──────────────────┐
    │                  │
 0  │                  │  0
    │                  │
    └──────────────────┘
              0
```

Display Resolution	1366 x 768
Viewport	1366 x 768

Viewport Bottom & Right	**PLANAR**
Arrows move bottom and right	

```
              0
    ┌──────────────────┐
    │                  │
 0  │                  │  0
    │                  │
    └──────────────────┘
              0
```

Display Resolution	1366 x 768
Viewport	1366 x 768
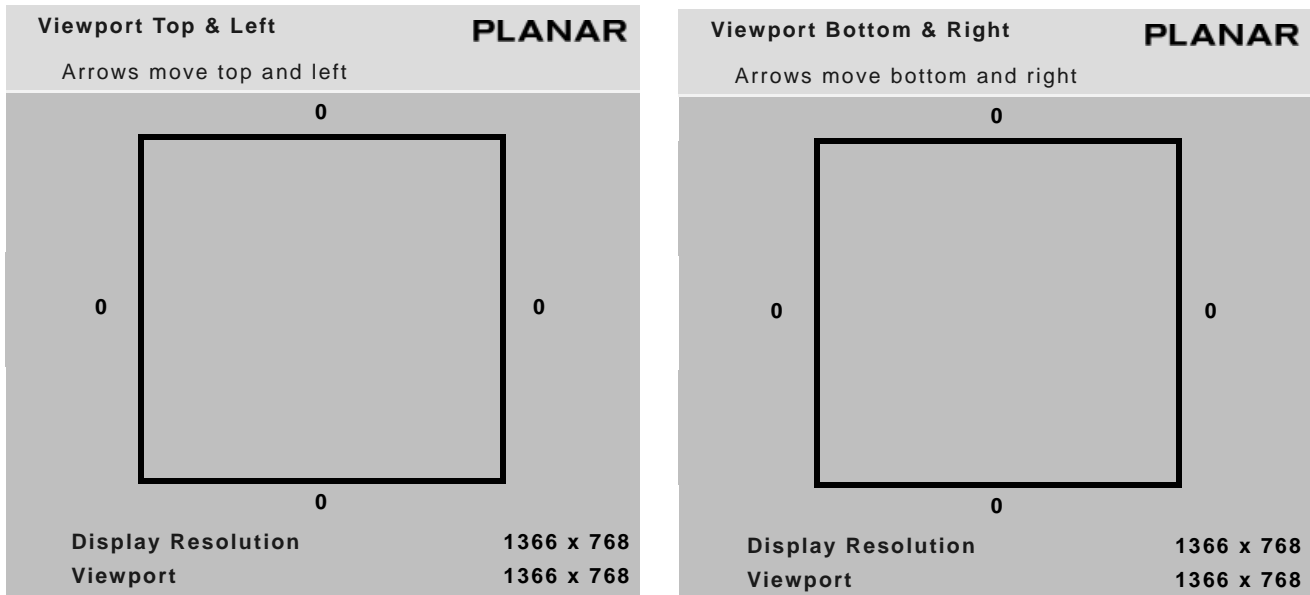
Display Resolution

Shows the resolution of the display. This has nothing to do with the resolution of the source picture.

Viewport

Shows the number of display pixels being used.

Serial Port Settings and Diagnostics

If you want to control the displays remotely with RS232 commands from a computer, read this section. For more information, see "RS232 Communication" on page 67. RS232 is also used to upgrade the firmware of the Quad controller modules.

Diagnostic information is available from the UNIT STATUS and HOURS menus. For more information, see "Diagnostics" on page 105.

Serial Port Settings

To access the SERIAL PORT SETTINGS menu, press MONITOR twice on the remote.
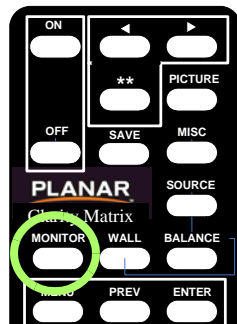
ASCII Response Type

Determines what type of data will be returned to the computer. For human-readable text in a serial program, choose SYMBOLIC. For computer-read data, use NUMERIC or DATA ONLY.

ASCII Response Terminator

Will be determined by what your serial program wants to see at the end of every transmission from the display.

Baud Rate

Must be the same as that used by the controlling computer. The baud rate is *not* automatically set, as it is with modem communications. It must be manually set here **and** at the computer to match each other.

Note: For firmware upgrades, you don't need to adjust the baud rate.

Serial Port Status

The SERIAL PORT STATUS menu provides diagnostic information for the serial port. To view RS232 port status, select MAIN MENU > DIAGNOSTICS > SERIAL PORT STATUS. You will see the status of the serial port that has had the most recent activity. To view the status on a different serial port, use the arrow key.

Serial Port Status RS232 ▶	PLANAR
<ENTER> to clear; +/- to select different serial port	
Commands Received	34
Replies Sent	34
Last Packet Type	Operation
Last Packet Address	Not Addressed
Bytes Received	921
Bytes Sent	773
UART Framing Errors	4
UART Overflow Errors	0
Group A Unit: 1 19200 Baud	
	Most Recent
…115, 111, 108, 117, 105, 111, 110, 63, 13	
.st--1?.st--2?.st--3?.lcd.vertical-resolution?.	

Controlling With RS232 Commands

The RS232 protocol - the "rules" for controlling displays with RS232 commands - are described in a separate document. See "Accessing Planar's Technical Support Website" on page 205 to see how to get to the web page. Then look for Clarity Matrix HX60 and under that the *RS232 Guide.*

Diagnostics

Most of the submenus available from the DIAGNOSTICS menu are not used on a regular basis. Examples of these menus can be found in "On-Screen Menus" on page 141.

To check status information for the system or to see usage information, use the UNIT STATUS and HOURS menus, which are explained in the following sections.

Checking Unit Status

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

Unit Status A1		PLANAR	
Matrix		1366 x 768	
010-1168	Rev 06		
LCD			
Temperature	25 °C	Backlight	OK
Voltage	24	Fan	OK
Quad Module			
Temperature	31 °C	Fan	OK
Power Supply			
PS1	OK	Fan	OK
PS2	OK		
PS3	OK		
PS4	OK		
Redundant	OK		

Note: The QUAD MODULE and POWER SUPPLY lines only appear on processor number 1 of each Quad controller module.

LCD

Indicates the current internal temperature at one point inside the LCD. This is not the highest or the lowest temperature of the LCD, nor an indicator of ambient temperatures. Also shows if the backlight temperature is operating within a normal range and whether or not the fan inside in the Quad controller module is operating. If the voltage is below 22, there is an issue with power to the LCD. This will mostly likely be an issue with cable length or quality of the cable between the power supply module and the LCD module.

Quad Module

Indicates the current internal temperature at one point inside the Quad controller module. This is not the highest or the lowest temperature of the LCD, nor an indicator of ambient temperatures. Also shows whether or not the fan inside in the Quad controller module is operating.

Power Supply

Indicates if individual power supplies within the power supply module are operating correctly.

Note: In order for this menu to show power supply module information correctly, the PS MON cable must be plugged in. If it is not plugged in, you will see the message "PS MON CABLE IS NOT CONNECTED."

Checking System Usage

The HOURS menu shows the hours the system and backlights have been in use. It also shows the average LCD usage information.

Hours	PLANAR
System Time	00636:45
Backlight Time	00532:00
Average Hours Per Day	12
Number of Days > 20 Hours	0

Note: The last two lines will only appear on the master (A1) display.

System Time

Number of hours the system has been plugged in. This number is counted by Quad controller module A.

Backlight Time

Number of hours that the LCD has been turned on. This information is stored in the LCD interface board.

Average Hours Per Day

Shows the average number of hours per day an LCD has been on.

Number of Days > 20 Hours

Shows the number of days that an LCD display has been on more than 20 hours per day. This feature helps installers keep displays within the normal use thermal guidelines. For more information, see "Normal Use Thermal Guidelines" on page 6.

Saving and Recalling Configurations

Advantages of Saving Configurations to Memory Slots

- You can compare multiple settings quickly
- You don't have to repeat settings when comparing entire configurations
- You can revert to a known good setting when testing new configurations

What the Memories Store

The following settings can be stored in a memory slot and recalled when needed:

- Selected source
- Resolution (and much more about the signal)
- Sharpness
- Position and size (zoom settings)
- Everything in the ASPECT RATIO menu
- Brightness, Contrast, Hue and Saturation for video sources

All of this is stored separately for each memory slot. As an example, you could store multiple different wall setups and switch between them quickly.

Global Storage

The following settings are stored globally; that is, they are stored at the display level and are the same for all memory slots.

- Everything in the MISCELLANEOUS OPTIONS menu
- All the HOURS settings
- All the COLOR BALANCE settings

Memory: What Is Saved? And Where?

In the display, some parameters (values) are associated with the mode. The mode is primarily the horizontal and vertical resolution and the vertical frequency of the incoming source picture. It is more than that, but if you think of it this way, you will be close enough. Some parameters are associated with the input. The parameters specific to mode and input are saved in memory slots.

Some parameters are global. They are independent of the mode or input, and are not saved to memory slots, as shown in the table below.

Parameter	Saved in Slot	Global
ASCII Response Term.		x
ASCII Response Type		x
Auto Backlight On		x
Baud Rate		x
Black Level: R, G & B	x	
Brightness (video)	x	
Color Balance (all values)		x
Contrast (video)	x	
Hue	x	
Justify	x	
Menu Timeout		x
Overscan	x	
Plug and Play (EDID)		x
Position, Horizontal	x	
Position, Vertical	x	
Saturation	x	

Parameter	Saved in Slot	Global
Sharpness	x	
Viewport Window Bottom	x	
Viewport Window Left	x	
Viewport Window Right	x	
Viewport Window Top	x	
Wall Height	x	
Wall Mode	x	
Wall Unit Column	x	
Wall Unit Row	x	
Wall Width	x	
White Level: R, G & B	x	
Zoom Window Bottom	x	
Zoom Window Left	x	
Zoom Window Right	x	
Zoom Window Top	x	

Saving Configurations

1 Set up the display the way you want it.

2 Press the SAVE button twice.

	1		9		17		25		33
	2		10		18		26		34
	3		11		19		27		35
	4		12		20		28		36
	5		13		21		29		37
	6		14		22		30		38
	7		15		23		31		39
	8		16		24		32		40

The SAVE grid menu displays. This menu contains 40 numbered memory slots.

3 Using the arrow keys on the remote, navigate to a slot:
- An unchecked slot number allows you to save new settings.
- A checked slot has settings already saved to it. If you want, you can overwrite what's already saved.

4 Press ENTER. The SAVE SLOT menu displays.

Save	PLANAR
Slot Number	(Current) 1
Save Now	(will overwrite occupied slot)
Name	DI 1366x768
Source	Digital
Colorspace	RGB
Resolution	1366 x 768
Wall	2 x 2 1:1
Scale/Justify	One to One / Center
Position/Overscan	168,19 / 0%
Zoom UL/ LR	+0,+0 / +0,+0
Viewport UL/LR	+0,+0/ +0,+0
Frequency/Phase	1602 / 22.5°
Sharpness	Normal
Black Level	63 55 57
White Level	166 170 169

Note: This menu shows all the settings that will be saved. You can't change anything but the name in this menu. The appearance of this menu is somewhat different for digital and video sources, reflecting what is saved for them.

    a   If the current settings exactly match what is already in the memory, (CURRENT) will appear in the SLOT NUMBER line.

    b   If the memory already had data, and the only change is to the name, the phrase "will update name of occupied slot" appears in the SAVE NOW line.

    c   If this memory already has something stored in it, the phrase "will overwrite occupied slot" appears in red on the SAVE NOW line. This is the only warning.

    d   If none of these messages appear, this slot is empty.

5   Select SAVE NOW and press ENTER. The display instantly stores all the current settings into that memory slot.

Changing the Name of the Memory Slot

The default name is an abbreviation of the source connector, resolution, and if Wall Mode is on, wall settings. In the following example, the name tells you that the source is connected to Digital, which displays 1366 x 768, is part of a 2 x 2 array, and is the display in the upper left corner (column 1, row 1).

1   If you want a more descriptive name, select NAME and press ENTER.
A little bar appears beneath the NAME line.

    a   Use the + or - keys to move the yellow selector under the character you want to change.

b   Use the up/down arrows to change the character.

2   When you are finished, press PREV.

3   Select SAVE NOW and press ENTER.

Note: If you use RS232 controls, you can also use commands to send a string name to a memory slot, saving time.

Recalling Stored Configurations

1   Press SAVE once to open the RECALL GRID menu.

2   Navigate to the slot you want to recall. When navigating, you can only go to the checked numbers. All the slots with checks have something stored in them. The others are grayed out.

3 Press ENTER to open the RECALL SLOT menu.

Recall		PLANAR
Slot Number		17
Recall Now		
Name	DI 1366x768	
Source		Digital
Colorspace		RGB
Resolution		1366 x 768
Wall	2 x 2	1:1
Scale/Justify	One to One / Center	
Position/Overscan		168,19 / 0%
Zoom UL/ LR	+0,+0 /	+0,+0
Viewport UL/LR	+0,+0 /	+0,+0
Frequency/Phase		1602 / 22.5°
Sharpness		Normal
Black Level	63 55	57
White Level	166 170	169

Note: If this slot number has exactly the same settings that are currently being used, a (CURRENT) message appears on the top line.

The name of the memory is listed here, as well as all the important parameters (data) stored in that memory slot.

4 If the name is *not* the one you want, press PREV and choose another memory.

5 In the RECALL SLOT menu, RECALL NOW is selected. Press ENTER to recall the parameters currently displayed in the menu.

6 We suggest that you create a list of memory slots that contains each slot number, name and description.

Deleting a Configuration

1 Go to the MEMORY menu (MAIN MENU > MEMORY).

Memory	PLANAR
Recall	▶
Save	▶
Delete	▶

2 Select DELETE and press ENTER.
This opens the DELETE grid menu with 40 numbered memory slots.

Delete				PLANAR
1 ☐	9 ✓	17 ☐	25 ☐	33
2 ☐	10 ☐	18 ☐	26 ☐	34
☐ 3 ✓	11 ☐	19 ☐	27 ☐	35
☐ 4 ☐	12 ☐	20 ☐	28 ☐	36
☐ 5 ☐	13 ☐	21 ☐	29 ☐	37
☐ 6 ☐	14 ☐	22 ☐	30 ☐	38
☐ 7 ☐	15 ☐	23 ☐	31 ☐	39
☐ 8 ☐	16 ☐	24 ☐	32 ☐	40

3 Navigate with the arrow keys to the slot you want to delete and press ENTER.
When navigating, you can only go to the checked numbers. All the slots with checks have something stored in them. The others are grayed out.

4 In the DELETE SLOT menu, DELETE NOW is selected.

Delete		PLANAR
Slot Number		17
Delete Now		
Name	DI 1366x768	
Source		Digital
Colorspace		RGB
Resolution		1366 x 768
Wall	2 x 2	1:1
Scale/Justify	One to One / Center	
Position/Overscan		168,19 / 0%
Zoom UL/ LR	+0,+0 /	+0,+0
Viewport UL/LR	+0,+0/	+0,+0
Frequency/Phase		1602 / 22.5°
Sharpness		Normal
Black Level	63 55	57
White Level	166 170	169

5 Press ENTER.

Confirm Slot Delete		PLANAR
Are you Sure?	Yes	No

6 Use the left arrow to make the YES red and press ENTER.

Confirm Slot Delete		PLANAR
Are you Sure?	Yes	No

Note: It is not necessary to delete the data in a memory slot before saving new data. Saving will overwrite the stored data. (See "Saving Configurations" on page 109)

Understanding Wall Configuration

The Matrix system is quite flexible. Its digital inputs can be displayed on the LCD modules in a variety of ways. However, it is not quite as flexible as a high cost matrix switcher system. This section contains examples of common scenarios that can be accomplished with the Matrix system.

Do you want to spread one source image across more than one LCD?

No → See Scenario 1: Individual Inputs

Yes

Do you have a Video Processor?

Yes → How Many LCDs will each Processor Output Drive?
- 1 → See Scenario 1: Individual Inputs
- 2 → See Scenario 5: Two Sub Walls per Quad Controller
- 3 or 4 → See Scenario 4: 1 Sub Wall per Quad Controller

No

Will one source image spread across the whole wall (as opposed to part of the wall)?

Yes → See Scenario 2: Clarity Big Picture

No → How many sub walls will you have at one time?
- 1 → See Scenario 3: One Sub Wall
- More than 1 → Is more than one sub wall bigger than 4 LCDs?
  - No → See Scenario 6: Multiple Sub Walls
  - Yes → See Scenario 7: Multiple Large Sub Walls

Configuration Scenarios

Read through the following scenarios and use the flowchart on the previous page to find the ones that apply to your installation. If you fall into more than one scenario, make sure that the cabling of the system is the same for all of your configurations.

Configuration of a wall can be broken down into three parts: *cabling*, *source routing* and *wall configuration*.

Cabling consists of how the LCD modules are connected to the Quad controller modules, how the Quad controller modules Dual Link In and Loop Out connections are made and how the sources are connected to the Digital inputs.

Source Routing consists of configuring the internal video switches on each Quad controller module. These switches control which inputs are displayed on which outputs within the Quad controller module and are set on the QUAD MODULE ROUTE menu. For most of the scenarios, it is not necessary to know the details of how these switches are set, but for more complex scenarios, it is necessary to understand these switches. For an example of the QUAD MODULE ROUTE menu, see "Wall Configuration and Submenus" on page 142.

Wall Configuration consists of setting up the scaling chips in each of the four processors on the Quad controller module so the correct piece of the image is displayed on each LCD. Because the Clarity Matrix has position sensors, these settings can be done automatically in many of the scenarios.

Standard Cabling Scenarios

Scenarios 1, 2 and 3 all use what we're calling standard cabling. It does not matter which LCDs are cabled to which Quad controller module. Scenarios 2 & 3 require standard loop through cabling, as shown on page 118.

Scenario 1: Individual Inputs
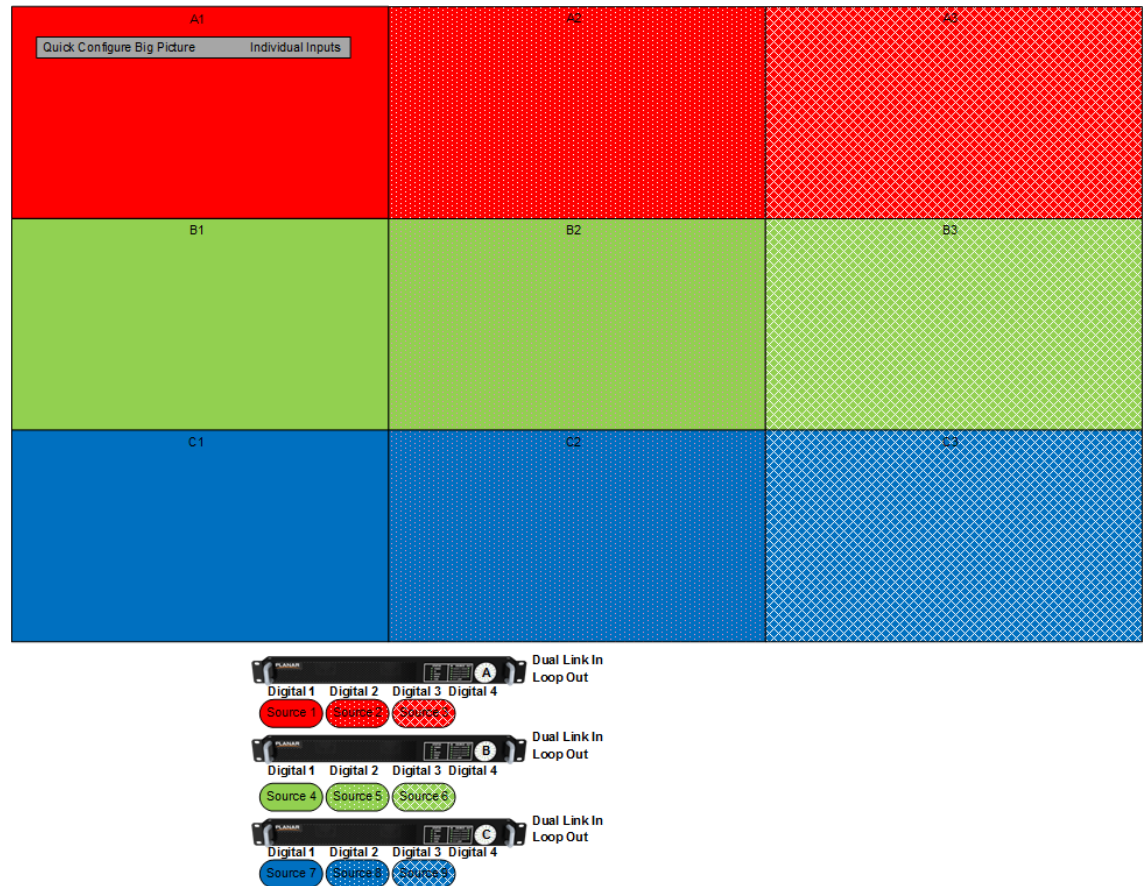
Note: 3 x 3 wall with individual inputs

The simplest way to configure a Clarity Matrix system is where each LCD displays the video from one and only one of the inputs. This scenario will be used most often with a video processor such as a Magenta Processor.

Cabling

To cable a system for individual inputs, keep in mind that you will need to be able to tell your video processor which inputs are in which position. So you will probably want to put the displays in some logical order in the Quad controller modules. If you have unused LCD connectors in your Quad controller module, do not use those corresponding inputs. The above example shows the cabling for this scenario. There is no need to cable the Loop Out or Dual Link In connectors for this scenario.

Source Routing

There is a quick configuration for this scenario. In order to route the sources for individual inputs, choose individual inputs for the QUICK CONFIGURE BIG PICTURE line in the WALL CONFIGURATION menu.

Wall Settings

Big Picture is not used in this scenario, so WALL MODE should be set to off on the BIG PICTURE SETUP menu for all displays. The Quick Configure setting takes care of this for you.

Scenario 2: Clarity Big Picture

When in Clarity Big Picture, one source is spread over the entire wall. In the Clarity Matrix product, any input can easily be used as the source for Big Picture.
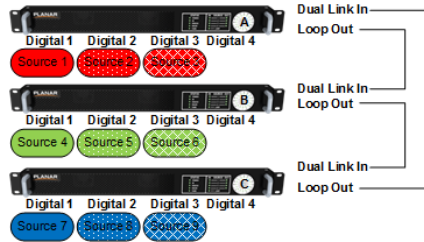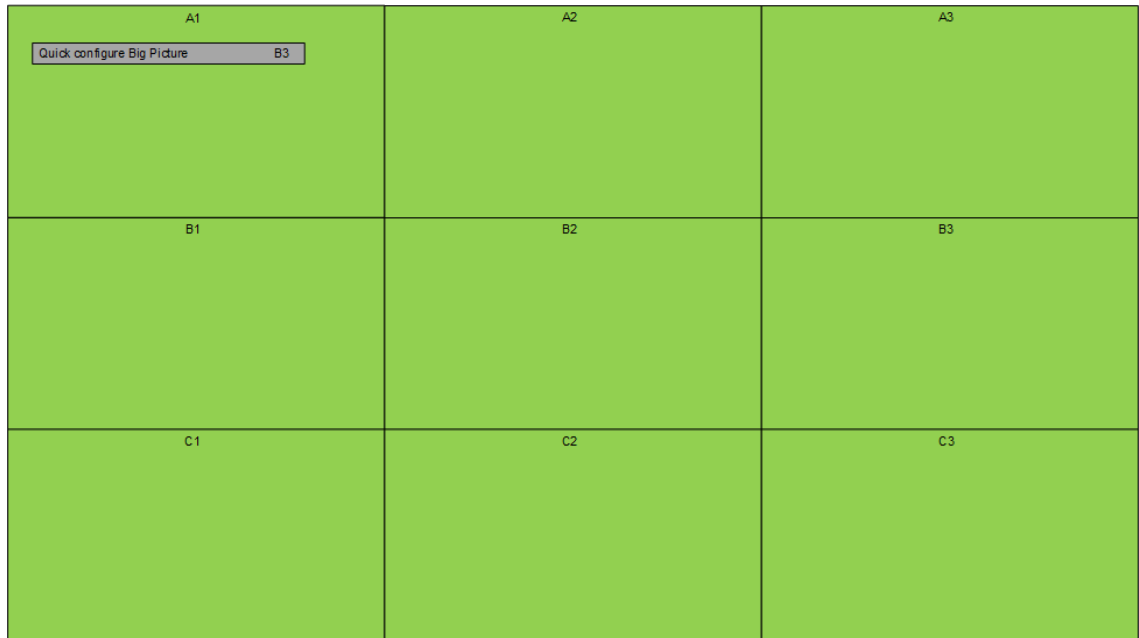
Note: 3 x 3 wall using Clarity Big Picture. Any input can be spread over the whole wall.

Cabling

Because the Clarity Matrix has position sensing, LCDs can be cabled to the Quad controller modules in any way that is convenient. Keep in mind that most of the configuration menus will appear on the module connected to LCD 1 on the A Quad controller module. So you may want to put that one in a convenient location.

The Loop out connector of each Quad controller module should be connected to one of the Digital In 1-4 connectors. The final Loop Out connector should be connected back to one of the Digital In 1-4 connectors on the first module.

If all Digital In connectors are occupied by sources on a particular module, you can connect the Loop Out connector to the Dual-Link In connector instead. When using the Dual Link In connector for looping between the Quad controller modules, it may be necessary to add a DVI booster to avoid having data glitches occur in some installations due to increased noise sensitivity on that connector.
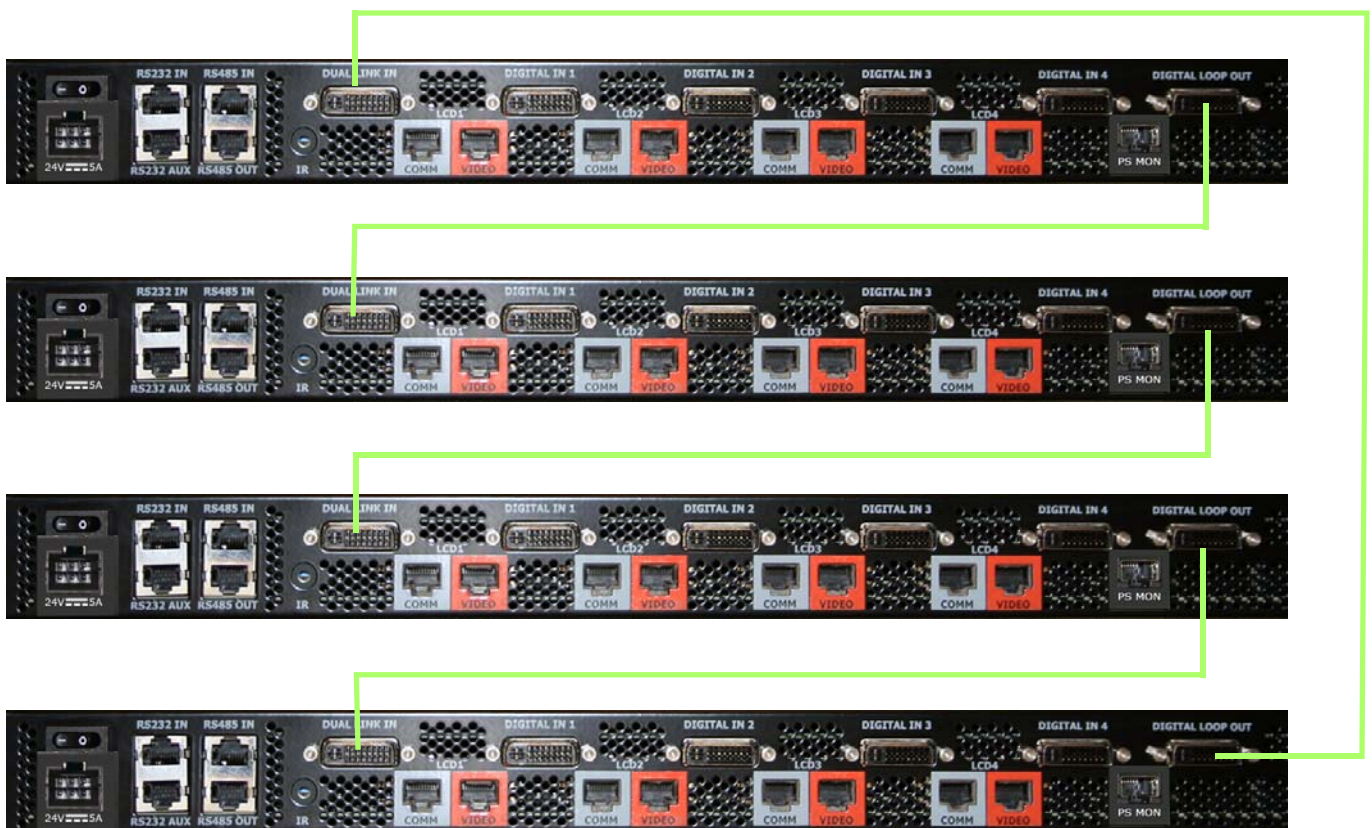
Note: Cabling video loop connections.

Source Routing

There is a quick configuration for Clarity Big Picture. Choose the input you want to display on the whole wall for the QUICK CONFIGURE BIG PICTURE line in the WALL CONFIGURATION menu. In order for this Quick Configure to work correctly, you must have previously allowed the system to discover its display positions by choosing AUTO in the MATRIX LAYOUT menu.

Wall Configuration

Each display's wall configuration is set up automatically by the Quick Configure setting. Wall Mode is turned on, the wall width and wall height is set to the width and height of the Matrix, and each display's row and column are setting according to its position.

Scenario 3: One Sub Wall and Individual Inputs

In this scenario, one input is spread over multiple LCDs, while the rest of the LCDs display individual inputs. This scenario may be used in a control room, where each display is monitoring a particular source, and at a command, one input may be magnified for more detailed viewing. The size of the sub wall in this scenario does not matter. Two of the examples show a 2 x 2 sub wall in a 3 x 3 Matrix, but you could also have a 3 x 5 sub wall in a 6 x 6 wall, or any other configuration. The restriction is that there is only one sub wall in the Matrix. The other displays are showing individual inputs.

Cabling

The cabling for this scenario is the same as for the Big Picture scenario. The Quad controller modules must be looped together by use of the Dual Link In and Loop Out connectors (see page 119 for an example). There is no restriction on which displays are connected to which Quad controller modules, but you will want to cable them in an orderly fashion so it is easy for you to associate each input with a particular Quad controller module.

Source Routing

There are no quick configure settings for this scenario. You will need to set up the source routing and wall settings for each sub wall configuration and save those settings to a slot (see "Saving Configurations" on page 109). To set up source routing, use the QUAD MODULE ROUTE menu for each Quad controller module. This menu has two parts, each of which gives a different view of the same settings. If you use one part of the menu, the other will automatically update. The following diagrams use only the lower part of the menu. For simplicity, the rest of the menu is not shown.

In the following diagrams, the settings from the QUAD MODULE ROUTE menu are shown on the side of the diagram and these menus will appear on display A1.
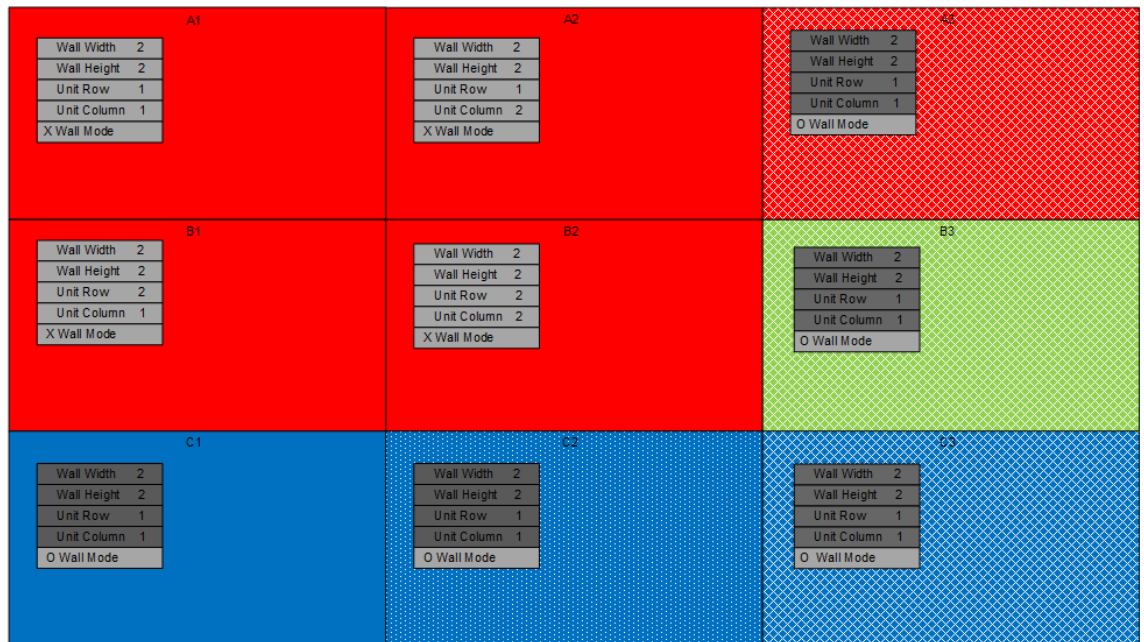
Wall Settings

Once the source is routed, you still need to tell each processor which portion of the source to show. This is done in the BIG PICTURE SETUP menu on each processor. An LCD that is displaying an individual source should have WALL MODE turned off. An LCD that is part of a sub wall should have its height and width parameters set to the sub wall height and width, and its unit row and column parameters set to the row and column within that sub wall.

In the diagrams that follow, a darkened bar over a settings means that setting is not necessary for this scenario and it doesn't matter to what it is set.

Note: 3 x 3 Matrix with 2 x 2 sub wall, upper left displaying source A1.

Note: 3 x 3 Matrix with 2 x 2 sub wall, lower right displaying source B2.

Quad Module Route A	
Switch 1	Digital 1
Switch 2	Digital 2
Switch 3	Digital 3
Switch 4	Loop
Internal Loop	Digital 1
X External Loop	Dual Link In
Use Loop	External

Quad Module Route B	
Switch 1	Loop
Switch 2	Loop
Switch 3	Digital 3
Switch 4	Digital 4
Internal Loop	Digital 1
X External Loop	Digital 1
Use Loop	External

Quad Module Route C	
Switch 1	Loop
Switch 2	Loop
Switch 3	Digital 3
Switch 4	Digital 4
Internal Loop	Digital 1
X External Loop	Dual Link In
Use Loop	External

A1

Wall Width	2
Wall Height	2
Unit Row	1
Unit Column	1
O Wall Mode	

A2

Wall Width	2
Wall Height	2
Unit Row	1
Unit Column	1
O Wall Mode	

A3

Wall Width	2
Wall Height	2
Unit Row	1
Unit Column	1
O Wall Mode	

B1

Wall Width	2
Wall Height	2
Unit Row	1
Unit Column	1
X Wall Mode	

B2

Wall Width	2
Wall Height	2
Unit Row	1
Unit Column	1
X Wall Mode	

B3

Wall Width	2
Wall Height	2
Unit Row	1
Unit Column	1
O Wall Mode	

C1

Wall Width	2
Wall Height	2
Unit Row	2
Unit Column	1
X Wall Mode	

C2

Wall Width	2
Wall Height	2
Unit Row	2
Unit Column	1
X Wall Mode	

C3

Wall Width	2
Wall Height	2
Unit Row	1
Unit Column	1
O Wall Mode	

A — Digital 1 Digital 2 Digital 3 Digital 4 — Source 1, Source 2, Source 3 — Dual Link In, Loop Out

B — Digital 1 Digital 2 Digital 3 Digital 4 — Source 4, Source 5, Source 6 — Dual Link In, Loop Out

C — Digital 1 Digital 2 Digital 3 Digital 4 — Source 7, Source 8, Source 9 — Dual Link In, Loop Out

Note: 3 x 3 Matrix with 2 x 2 sub wall, lower left displaying source B1.

Standard Cabling With Restrictions on LCD Placement

Scenarios 4, 5 & 6 require a little more planning than the previous scenarios. The LCD modules are cabled to specific Quad controller modules, depending on how they will be used in sub walls. A system cabled for one of these scenarios can also use scenarios 1, 2 or 3.

Scenario 4: One Sub Wall Per Quad Controller Module

This scenario uses an external video processor, but saves on the number of outputs required for that processor. Each output of the processor drives four LCDs.

Note: 4 x 4 Matrix with one source per Quad controller module.

Cabling

Cable the LCDs so each Quad controller module controls a 2 x 2 square of LCDs. The order within the square does not matter because the position sensors will be used. Cable each output of the video processor to the same numbered input in each Quad controller module. This could be Digital 1, Digital 2, Digital 3 or Digital 4. It is not necessary to cable the Loop Out connector of the Quad controller module.

Source Routing

The Quick Configure Quad setting in the WALL CONFIGURATION menu is used to configure this scenario. If you have cabled the sources to Digital 1, use Quick Configure Quad 1, if you have cabled the sources to Digital 2, use Quick Configure Quad 2 etc.

Wall Settings

By choosing the Quick Configure, the system will configure each LCD automatically. Because the settings are different for each LCD, the system must send many commands to each LCD. Quick Configure Quad takes a bit longer to respond than other Quick Configure settings. Note that the LCDs connected to each Quad controller module must be in a rectangle. If they are not, the wall settings will not be set, although the source routing will still take place. The rectangle does not have to be 2 x 2. For example, a wall may not have even multiples of four LCDs. Quick Configure Quad will set the wall parameters to the number and size of LCDs on that Quad controller module, be it 2 x 1, 1 x 2, 1 x 3 etc. The external video processor outputs must be configured accordingly.

Scenario 5: Two Sub Walls Per Quad Controller Module

This scenario uses an external video processor, but saves on the number of outputs required for that processor. Each output of the processor drives two LCDs.
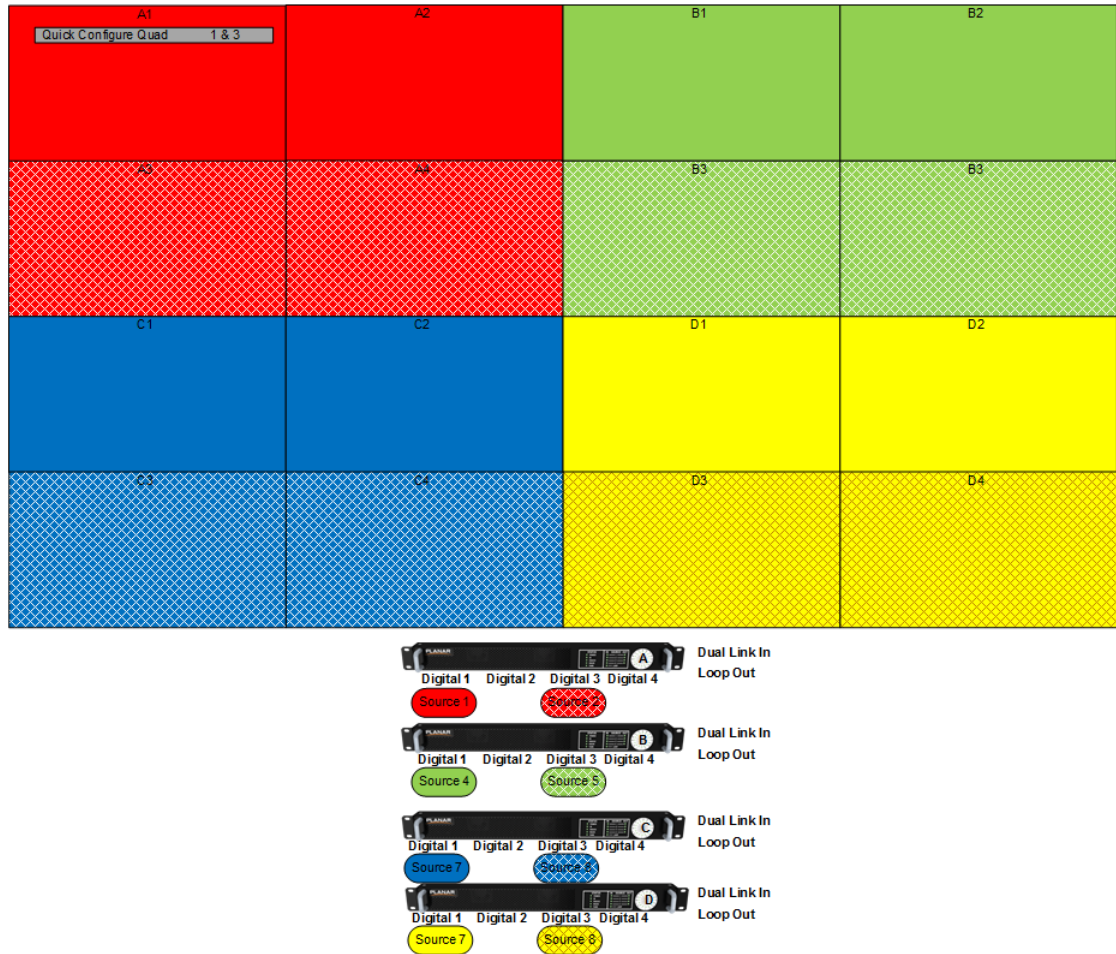
Note: 4 x 4 Matrix with two high resolution sources per Quad controller module.

Cabling

Cable the LCDs so that each pair of LCDs you will use for a sub wall are adjacent to each other. These can be 1 x 2 or 2 x 1 rectangles; the position sensors will be used to determine how they are arranged. Cable the outputs of the video Digital 1 and Digital 3. The source on Digital 1 will be spread over LCD 1 and LCD 2. The source on Digital 3 will be spread over LCD 3 and LCD 4. It is not necessary to cable the Loop Out connector of the Quad controller module.

Source Routing

The Quick Configure Quad setting in the WALL CONFIGURATION menu is used to configure this scenario. Use Quick Configure Quad 1 & 3.

Wall Settings

By choosing the Quick Configure, the system will configure each LCD automatically. Because the settings are different for each display, the system must send many commands to each LCD. Quick Configure Quad takes a bit longer to respond than other Quick Configure settings.

Scenario 6: Multiple Sub Walls

It is possible to have more than one sub wall at one time on a Clarity Matrix HX60 if certain rules are followed:

- One sub wall can be any size and use any input. This sub wall will use the External Loop.
- All the other sub walls must fit within a single Quad controller module. This means they will be 2 x 2 or smaller.

Quad Module Route A

Switch 1	Digital 1
Switch 2	Loop
Switch 3	Loop
Switch 4	Loop
Internal Loop	Digital 1
X External Loop	Dual Link In
Use Loop	External

Quad Module Route B

Switch 1	Loop
Switch 2	Loop
Switch 3	Loop
Switch 4	Loop
Internal Loop	Digital 3
X External Loop	Dual Link In
Use Loop	Internal

Quad Module Route C

Switch 1	Loop
Switch 2	Loop
Switch 3	Loop
Switch 4	Digital 4
Internal Loop	Digital 1
X External Loop	Dual Link In
Use Loop	External

Quad Module Route D

Switch 1	Loop
Switch 2	Loop
Switch 3	Digital 3
Switch 4	Loop
Internal Loop	Digital 1
X External Loop	Digital 1
Use Loop	External

A1
Wall Width	2
Wall Height	2
Unit Row	1
Unit Column	1
O Wall Mode	

A2
Wall Width	4
Wall Height	4
Unit Row	1
Unit Column	2
X Wall Mode	

B1
Wall Width	2
Wall Height	2
Unit Row	1
Unit Column	1
X Wall Mode	

B2
Wall Width	2
Wall Height	2
Unit Row	1
Unit Column	2
X Wall Mode	

A3
Wall Width	4
Wall Height	4
Unit Row	2
Unit Column	1
X Wall Mode	

A4
Wall Width	4
Wall Height	4
Unit Row	2
Unit Column	2
X Wall Mode	

B3
Wall Width	2
Wall Height	2
Unit Row	2
Unit Column	1
X Wall Mode	

B3
Wall Width	2
Wall Height	2
Unit Row	2
Unit Column	2
X Wall Mode	

C1
Wall Width	4
Wall Height	4
Unit Row	3
Unit Column	1
X Wall Mode	

C2
Wall Width	4
Wall Height	4
Unit Row	3
Unit Column	2
X Wall Mode	

D1
Wall Width	4
Wall Height	4
Unit Row	3
Unit Column	3
X Wall Mode	

D2
Wall Width	4
Wall Height	4
Unit Row	3
Unit Column	4
X Wall Mode	

C3
Wall Width	4
Wall Height	4
Unit Row	4
Unit Column	1
X Wall Mode	

C4
Wall Width	2
Wall Height	2
Unit Row	1
Unit Column	1
O Wall Mode	

D3
Wall Width	2
Wall Height	2
Unit Row	1
Unit Column	1
O Wall Mode	

D4
Wall Width	4
Wall Height	4
Unit Row	4
Unit Column	4
X Wall Mode	

PLANAR A — Dual Link In / Loop Out
Digital 1 — Source 1, Digital 2 — Source 2, Digital 3 — Source 3, Digital 4 — Source 4

PLANAR B — Dual Link In / Loop Out
Digital 1 — Source 4, Digital 2 — Source 5, Digital 3 — Source 6, Digital 4 — Source 6

PLANAR C — Dual Link In / Loop Out
Digital 1 — Source 7, Digital 2 — Source 8, Digital 3 — Source 8, Digital 4 — Source 8

PLANAR D — Dual Link In / Loop Out
Digital 1 — Source 7, Digital 2 — Source 8, Digital 3 — Source 8, Digital 4 — Source 8

Note: 4 x 4 Matrix with one large and one small sub wall.

Cabling

Cluster the displays into the groups where you want your small sub walls, and cable each sub wall to a single Quad controller module. Cable the Loop Out of each Quad controller module to the Dual Link In of the next module and loop the last Loop Out into the Dual Link In of the first module.

Source Routing

For the Quad controller modules that are displaying a small sub wall, set each switch to Loop, Use Internal Loop and set the Internal Loop to the display you want to view on that sub wall.

For each display that is part of the large sub wall, set each switch to Loop, and Use External Loop.

Set the External Loop of the Quad controller module that contains the source for the large sub wall to that source. Set the External Loop of all the other Quad controller modules to Dual Link In.

Wall Settings

Set the height and width for each display within a sub wall to the height and width of that sub wall and set the unit row and unit column as appropriate.

Dual Link Inputs Scenarios

Only one of the inputs on the Quad controller module is Dual Link capable. The Dual Link Input can either be used as a loop mechanism or as an input but not both. Because of this, systems that use scenarios 7 and 8 cannot also use any of the other scenarios.

Scenario 7: One Dual Link Input Per Quad Controller Module
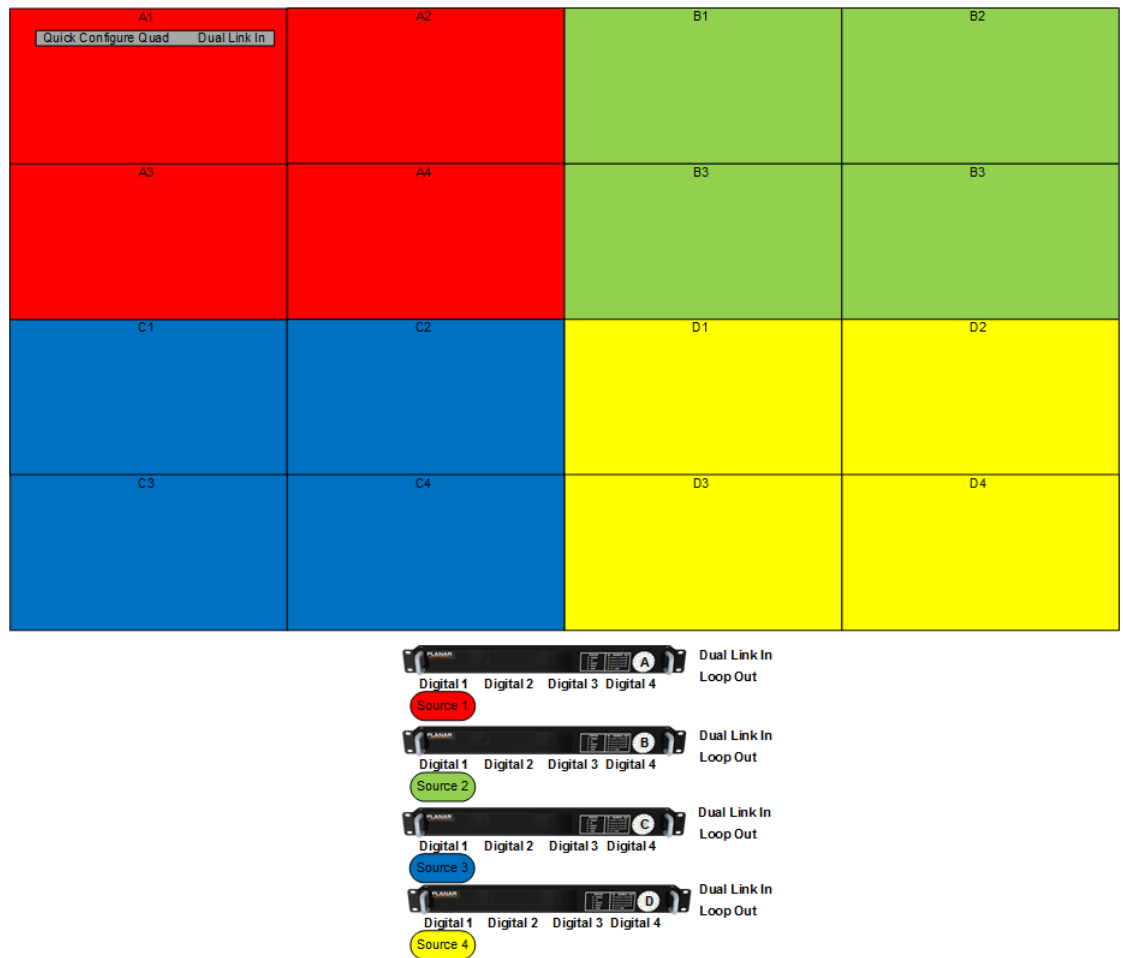
Note: 4 x 4 Matrix with one Dual Link source per Quad controller module.

Note: 2 x 2 Matrix with one dual link source per LCD.

Cabling

Cable the LCDs so each Quad controller module controls a 2 x 2 square of LCDs. The order within the square does not matter because the position sensors will be used. Cable each output of the video processor to the same numbered input in each Quad controller module. This could be Digital 1, Digital 2, Digital 3 or Digital 4, or, if the video processor output is Dual Link, Dual Link In. It is not necessary to cable the Loop Out connector of the Quad controller module.

Source Routing

The QUICK CONFIGURE QUAD setting in the WALL CONFIGURATION menu is used to configure this scenario. The system knows how many LCDs it has attached to each Quad Controller and will spread the Dual Link image across those LCDs.

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Wall Settings

By choosing the Quick Configure, the system will configure each display automatically. Because the settings are different for each display, the system must send many commands to each display. Quick Configure Quad takes a bit longer to respond than other Quick Configure settings. Note that the LCDs connected to each Quad controller module must be in a rectangle. If they are not, the wall settings will not be set, although the Source Routing will still take place. The rectangle does not have to be 2 x 2. For example, a wall may not have even multiples of four displays. Quick Configure Quad will set the wall parameters to the number and size of LCDs on that Quad controller module, be it 2 x 1, 1 x 2, 1 x 3 etc. The external video processor outputs must be configured accordingly.

Scenario 8: Dual Link Input Big Picture

Only one of the inputs on the Quad controller module is Dual Link capable. This means that there can be only one dual link source that is spread over the whole matrix.

Note: 3 x 3 Matrix with dual link source Big Picture.

Cabling

Cable the source into the first Quad controller module and then cable the Loop Out to the Dual Link In on the rest of the modules.

Source Routing

Every Switch in Every Quad controller module should be set to Loop. The External Loop should be set to Dual Link In.

Wall Settings

The Wall Height and Wall width parameters should be set to the size of the whole wall, and each Row and Column configured appropriately. This is the same settings used for any Big Picture, so an easy shortcut for this scenario is to use the Quick Configure to get things close and then make one final change. Assuming you have cabled the source to quad controller A, use these steps to save time.

Choose QUICK CONFIGURE BIG PICTURE A1. Then go to QUAD MODULE ROUTE A menu and change the External Loop to Dual Link In.

Complex Configurations

It is possible to design systems that don't fall into any of the above scenarios, but not all combinations of inputs on sub walls are possible. A system cabled for such a complex configuration may or may not be able to also have some of the simpler configurations.

Scenario 9: Multiple Large Sub Walls

The previous scenario was restricted such that only one sub wall in a Matrix could be larger than a single Quad controller module. If you want more than one sub wall that is larger than four displays, there are certain restrictions. You must cable the loop connections sequentially among the Quad controller modules that make up each sub wall. Since a sub wall that spans more than one Quad controller module uses the external loop, a sub wall is restricted to using inputs from only the first Quad controller module in the loop through chain.

Note: 4 x 4 Matrix with two 4 x 2 sub walls. One Big Picture is also available, but each sub wall is limited to four sources.

Quad Module Route A	
Switch 1	Loop
Switch 2	Loop
Switch 3	Loop
Switch 4	Loop
Internal Loop	Digital 1
X External Loop	Dual Link In
Use Loop	External

Quad Module Route B	
Switch 1	Loop
Switch 2	Loop
Switch 3	Loop
Switch 4	Loop
Internal Loop	Digital 3
X External Loop	Digital 3
Use Loop	External

Quad Module Route C	
Switch 1	Loop
Switch 2	Loop
Switch 3	Loop
Switch 4	Loop
Internal Loop	Digital 1
X External Loop	Digital 3
Use Loop	External

Quad Module Route D	
Switch 1	Loop
Switch 2	Loop
Switch 3	Loop
Switch 4	Loop
Internal Loop	Digital 1
X External Loop	Digital 2
Use Loop	External
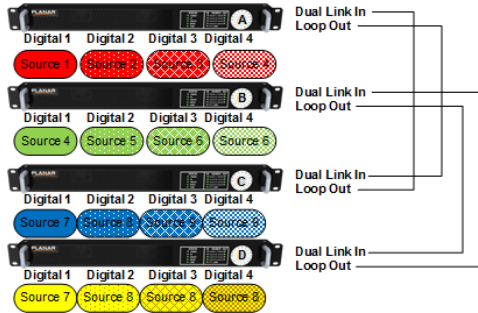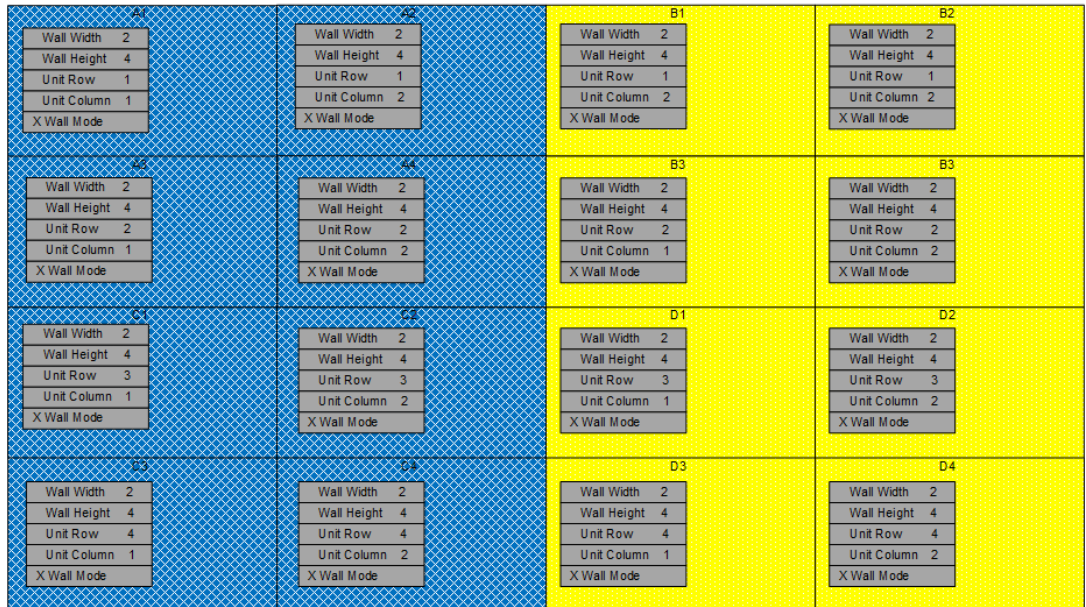
Note: Matrix with two 4 x 2 sub walls. One Big Picture is **not** available, but each sub wall can have eight different sources.

Cabling

Cluster the displays into the groups where you want your sub walls, and cable each sub wall to Quad controller module that are sequentially looped together. If you want to be able to also spread an input across the whole wall (Scenario 2), you must complete a single loop.

If you want to be able to spread more inputs across the sub wall than will fit on one Quad controller module, you can split the wall into separate loops.

Source Routing

For each display that is part of a large sub wall, set each switch to Loop, and Use External Loop.

Set the External Loop of the Quad controller module that contains the source for a large sub wall to that source. Set the External Loop of all the other Quad controller modules to Dual Link In. Note that the source for the sub wall must be in the first Quad controller module unless you have looped the sub wall back on itself.

Wall Settings

Set the height and width for each display within a sub wall to the height and width of that sub wall and set the unit row and unit column as appropriate.

Understanding the Quad Module Route Menu

Each Quad controller module has five digital video inputs: inputs 1-4 and a Dual Link loop input. Each module has four LCD connections and a Digital Loop Out DVI connector. Within each Quad controller module is a set of electronic switches that allow video to flow from one of the inputs to one of the LCDs and to the Digital Loop Out connector. The example below shows a pictorial representation of these switches. Each circle in the drawing represents one switch. For each switch, you can choose one of the input arrows to flow to the output of that switch, which in turn may flow to another switch or to one of the Quad controller module outputs.
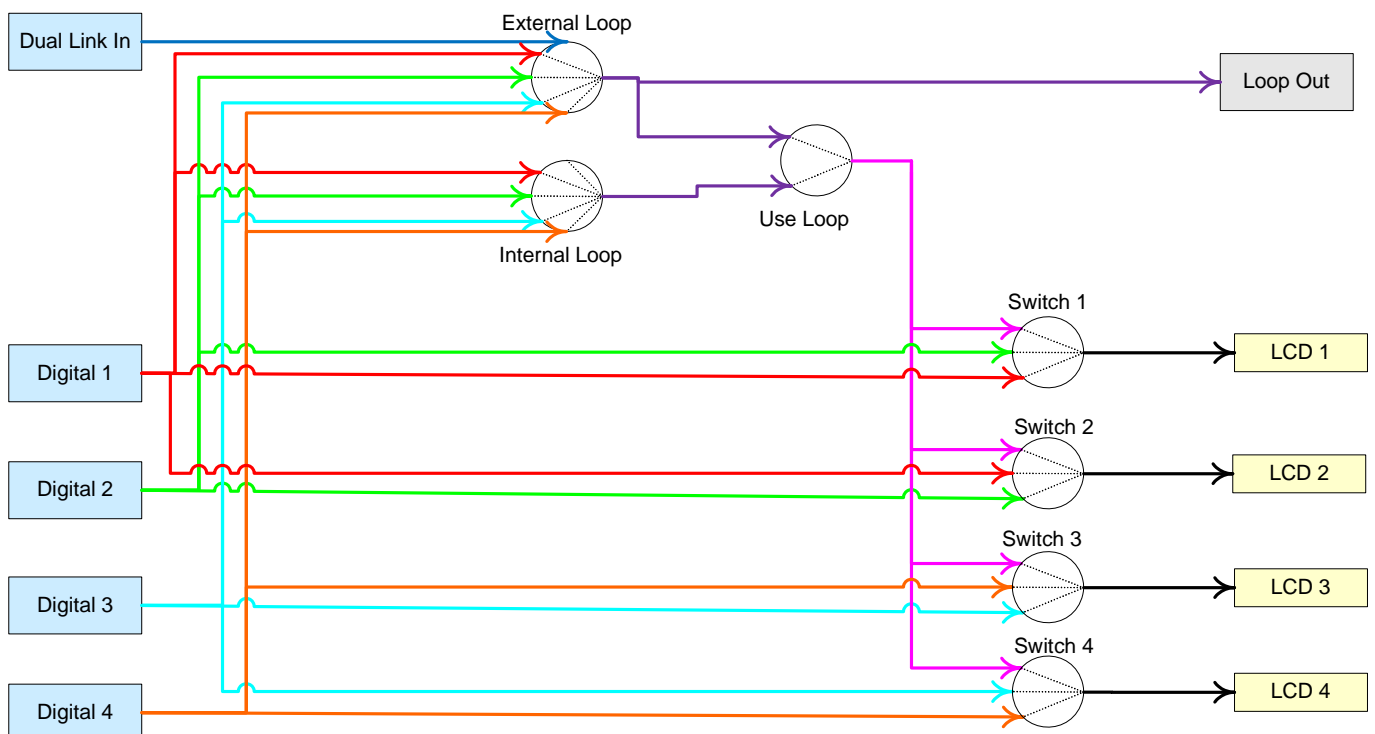
Note: Representation of the Quad controller module video switches.

Keep the following points in mind:

- An LCD can display its own digital input, its immediate neighbor or the "loop".
- The Loop Out connector can display any of the five inputs.
- The "loop" can be any of the four inputs. It can also be the Dual Link In connector. But in that case, the Loop Out connector must also be displaying the Dual Link In input.

The QUAD MODULE ROUTE menu allows you to set these switches. There is one QUAD MODULE ROUTE menu for each Quad controller module in your system. There are two parts to the menu. Each part gives the same information in a different way. The top part of the menu shows you what input (1,2,3,4 or Link In) will be shown on each output (LCD 1, LCD 2, LCD 3, LCD 4 and Loop Out).

The bottom part of the menu shows how each of the seven switches are set. You can change the switches using either part of the menu. The other part will automatically update. It may be frustrating to try to make changes in the switches using the top part of the menu, because not every combination of input to output is allowed. Changing one line on the top may cause changes in other lines. On the other hand, using the bottom part of the menu sets the switches directly so there are no disallowed states. As you set the switches on the bottom part of the menu, the top part of the menu will change to show the effect of your changes.

All of the scenarios in this section use only the bottom part of the menu to set up source routing.

Quad Module Route A					PLANAR
	1	2	3	4	Link In
LCD 1	☐	☐	☑	☐	☐
LCD 2	☐	☐	☑	☐	☐
LCD 3	☐	☐	☑	☐	☐
LCD 4	☐	☐	☑	☐	☐
Loop Out	☐	☐	☐	☑	☐
Switch 1					Loop
Switch 2					Loop
Switch 3					Loop
Switch 4					Loop
☑ Internal Loop					Digital 3
☐ External Loop					Digital 4
Use Loop					Internal

Note: Quad Module Route A menu.

Configuring High Resolution Inputs

High resolution inputs are any inputs to the HX60 video wall that have a pixel clock greater than 165MHz, have a horizontal resolution greater than 2045 pixels or a vertical resolution greater than 2047 pixels. Such inputs are supported in Clarity Matrix but have limitations and restrictions as described in this section.

Hardware Limitation

The Image Processing chip used in the HX60 design has an input limitation of 165Mhz pixel clock and 2047 pixel horizontal or vertical resolution. However, be aware that the Matrix is a system of multiple chips each supporting a separate LCD display, you can still display such resolutions by spreading that image over more than one display in the system. You just need to provide the with the correct portion of the image for display. This is accomplished through front-end FPGA (field programmable gate array) logic in the Quad controller module and communication amongst the processors via the RS485 link.

High Resolution Setup

In order to use high resolution inputs with the HX60, the capability must be turned on by checking the ENABLE HIGH RESOLUTION AND DUAL LINK INPUTS box in the WALL CONFIGURATION menu.

Check this box to enable processing for high resolution and Dual Link inputs.

Wall Configuration	PLANAR
Quick Configure Big Picture	Big Picture A3 ▶
Big Picture Setup	▷
Matrix Layout	▶
Quad Module A Route	▶
Quad Module B Route	▶
Quad Module C Route	▶
☑ Enable High Resolution and Dual Link Inputs	
Synchronize High Resolutions	

A high resolution input must use the Clarity Big Picture capability, either spreading the picture across the entire wall of displays or across some subset of displays, but it must be more than one. If a high resolution input is received and wall mode is not enabled, you will see only half of the image. In this case the message "Image truncated – Must use Big Picture" will appear on the BIG PICTURE SETUP menu and also on the UNIT STATUS menu.

The simplest way to set up the Big Picture is with the QUICK CONFIGURE BIG PICTURE menu (MAIN MENU > WALL CONFIGURATION menu). If your high resolution input is on the Dual Link input, spread it across the whole wall by choosing the DLINK button on the left edge of the menu. If you want to spread it to only the Quad controller module (e.g. when using a video processor), use the DLINK button on the bottom row of the menu.

Spread input C4 across the whole wall.

Spread the Dual Link input to the whole wall.

Quick Configure
Spread input over entire wall

PLANAR

| A1 | A2 | A3 | A4 | B1 | B2 | B3 | B4 |
| C1 | C2 | C3 | C4 | | | | |

DLink

| Quad 1 | Quad 2 | Quad 3 | Quad 4 | 1 & 3 | DLink | | No BP |

Spread each Digital 4 input over its Quad controller module.

Spread each Dual Link input over its Quad controller module.

Single link high resolution inputs must also be Big Pictured. Use the buttons on the QUICK CONFIGURE menu to choose the input you want to Big Picture. Auto layout discovery must be completed on the wall before quick configure setup can work properly. See "Matrix Layout Menu" on page 69 for more details about auto layout discovery.

Dual Link vs. Single Link

High resolution inputs can be used on any of the five inputs to the Quad controller module. However, when using the single link inputs (Digital 1 through Digital 4) the pixel clock may not exceed 165MHz. Almost by definition, any high resolution input running at 60 frames per second will exceed this limit. However, there are many high resolution inputs at lower frame rates that can be input to the single link input.

Many PC video cards will automatically switch to Dual Link output when the pixel clock exceeds 165Mhz. You can sometimes force them back to single link by choosing a lower vertical refresh rate.

Cabling for Dual Link

The Dual Link input of the Quad controller module is also the input used to loop signals through from one Quad controller module to the next. Therefore only one Dual Link input may be used when enabling the Clarity Big Picture. Connect the Dual Link signal to any of the Quad controller modules and cable the Dual Link out of that controller to the Dual Link In of the next controller and so on. The Dual Link Out connection of the last Quad controller module will remain unconnected.

Multiple Dual Link inputs may be used in the system if each one is connected to a different Quad controller module. A typical application for this would be a system with an external video processor. By using one high resolution output of the processor per Quad controller module, the overall number of processor outputs needed may be reduced. In this situation, no loop through cables are needed.

Configuring a New High Resolution Input

When a new signal is acquired or the Big Picture setup has changed, the processors must communicate various information to each other. Because of limitations in the RS485 link, this communication can take several seconds to occur. During this time, the image on the wall may not be scaled correctly. You will see each display pop into place as the RS485 communication completes. Once you have made a change, you can speed up this period of resynchronization by pressing ENTER on the SYNCHRONIZE HIGH RESOLUTIONS line in the WALL CONFIGURATION menu. Be aware that the same processing must happen when switching to a low resolution input after displaying a high resolution input, and this control may be used in that case as well.

When using the quick configure option, the system will synchronize automatically[1]. When a configuration is saved in a slot, the necessary information about high resolution inputs is saved as well. Once a configuration is set up, the easiest way to return to that configuration later is to recall it from a slot (see "Saving Configurations" on page 109). You must have the input in place at the connector before recalling the slot.[2]

---

[1] In Rev 02 firmware, the Quick Configure option does not always synchronize quickly. Sometimes it takes several seconds.

[2] In Rev 02 firmware, synchronization after a slot recall does not always work. The system will align correctly in several seconds.

Handling Vertical Resolutions Greater Than 2047 Pixels

The processing chip has a 2047 line limitation in detecting a video source. If it gets a source that is greater than 2047 lines, the reported line total is the actual total minus 2048. The firmware works around this limitation by making educated guesses about the true total. Since the majority of applications will want to display native resolution on the Clarity Matrix, the firmware specifically looks for input resolutions that are multiples of native resolution. So, if it sees a reported input resolution of 1366 x 256, it will assume that the actual input resolution is 1366 x 2304 (a 1x3 column of native resolution). Similarly, it will assume 1366 x 1024 is actually 1366 x 3072. Vertical resolutions greater than 2047 lines that are not multiples of 1360,1366 or 1368 horizontally are not supported.

Supported Resolution Summary

Up to 2045 pixels horizontal Up to 2047 pixels vertical Pixel clock less than 165MHz	Supported on all inputs
2046 to 4097 pixels horizontally Up to 2047 pixels vertically Pixel clock less than 165MHz	• Supported on all inputs. • Big Picture (Wall mode) must be selected to spread image over more than one display horizontally. • Must enable high resolution inputs in the WALL CONFIGURATION menu. • System will take several seconds to scale correctly.
1366x2304 1360x2304 1368x2304 1366x3072 1360x3072 1368x3072 1920x1080 Pixel clock less than 165MHz	• Supported on all inputs. • Big Picture (Wall mode) must be selected to spread image over more than one display vertically.
2720x2304 2732x2304 2736x2304 2720x3072 2732x3072 2736x3072 Pixel clock less than 165MHz	• Supported on all inputs. • Big Picture (Wall mode) must be selected to spread image over more than one display horizontally and vertically. • Must enable high resolution inputs in the WALL CONFIGURATION menu. • System will take several seconds to scale correctly.
Any resolution with Pixel clock greater than 165MHz	• Supported only on Dual Link Input. • Big Picture (Wall mode) must be selected to spread image over more than one display. • Must enable high resolution inputs in the WALL CONFIGURATION menu. • System will take several seconds to scale correctly.

On-Screen Menus

Main Menu and Submenus

Main Menu	**PLANAR**
Wall Configuration	▶
Picture	▶
Memory	▶
Diagnostics	▶
Advanced Options	▶
Program Information	>

Wall Configuration	**PLANAR**	
Quick Configure Big Picture	Big Picture A3	▶
Big Picture Setup		▷
Matrix Layout		▶
Quad Module A Route		▶
Quad Module B Route		▶
Quad Module C Route		▶
☑ Enable High Resolution and Dual Link Inputs		
Synchronize High Resolutions		

Picture Stretch/shrink the image	**PLANAR**
Picture Information	>
Picture Setup	▷
Aspect Ratio	▷

Memory	**PLANAR**
Recall	▶
Save	▶
Delete	▶

Diagnostics	**PLANAR**
Unit Status	>
Serial Port Status	>
Test Patterns	▷
Setup Summary	>
Hours	>

Advanced Options	**PLANAR**
Color Balance	▷
Size and Position	▶
Miscellaneous Options	▶
Backlight Settings	▶
Serial Port Settings	▶
Set Clock / Schedule Events	▶

Program Information	**PLANAR**
Planar Systems, Inc.	
1195 NW Compton Drive	
Beaverton, OR 97006-1992 USA	
+1.866.475.2627	
+503.748.1100	
www.planar.com	
Matrix 1366 x 768	
010-1168 Rev 06	
Code Generated Date: Aug 30 2012 at 15:43:45	
LCD Interface: 1375-00:May 18 2012 09:27:06	
FPGA Versions: 14/14	

Wall Configuration and Submenus

Wall Configuration	PLANAR
Quick Configure Big Picture Big Picture A3	▶
Big Picture Setup	▷
Matrix Layout	▶
Quad Module A Route	▶
Quad Module B Route	▶
Quad Module C Route	▶
☑ **Enable High Resolution and Dual Link Inputs**	
Synchronize High Resolutions	

Quick Configure   PLANAR
Spread input over entire wall

A1	A2	A3	A4	B1	B2	B3	B4
C1	C2	C3	C4				
DLink							
Quad 1	Quad 2	Quad 3	Quad 4	1 & 3	DLink		No BP

Big Picture Setup   PLANAR

Matrix Position	3x3	1:1
Wall Width		3
Wall Height		3
Unit Column		1
Unit Row		1
☐ Wall Mode		
☐ Frame Compensation		
Frame Height	10 pixels	
Frame Width	10 pixels	
☐ Frame Compensation		
* *** Copy Settings to All Displays		

Wall Configuration and Submenus Continued

Wall Configuration	PLANAR	
Quick Configure Big Picture	Big Picture A3	▶
Big Picture Setup		▷
Matrix Layout		▶
Quad Module A Route		▶
Quad Module B Route		▶
Quad Module C Route		▶
☑ Enable High Resolution and Dual Link Inputs		
Synchronize High Resolutions		

Matrix Layout
<Enter> to update matrix layout

Auto			Quick			Reset		**
A1	A2	A3						
B1	B2	B3						
C1	C2	C3						

Depending on how many Quad controller modules you have, the number of Quad Module "N" Route lines will be reflected on this menu. For this example, there are three Quad controller modules. This menu could show all the way from Quad Module A Route through Quad Module P Route.

Quad Module Route A PLANAR

	1	2	3	4	Link In
LCD 1	☐	☐	☑	☐	☐
LCD 2	☐	☐	☑	☐	☐
LCD 3	☐	☐	☑	☐	☐
LCD 4	☐	☐	☑	☐	☐
Loop Out	☐	☐	☐	☑	☐

Switch 1	Loop
Switch 2	Loop
Switch 3	Loop
Switch 4	Loop
☑ Internal Loop	Digital 3
☐ External Loop	Digital 4
Use Loop	Internal

Picture Menu and Submenus

Picture	**PLANAR**
Stretch/shrink the image	
Picture Information	>
Picture Setup	▷
Aspect Ratio	▷

Picture Information	**PLANAR**
Sync	(frame locked) Progressive
Vertical Frequency	60Hz
Horizontal Frequency	50.00kHz
Pixel Frequency	80.10MHz
⊢┤ Horizontal Resolution	1366
Ŧ Vertical Resolution	768

Input Levels			**PLANAR**
Colorspace		RGB	
Center Point	255	255	255
Black Level (offset) - All			
Red	− ( ) +		128
Green	− ( ) +		128
Blue	− ( ) +		128
White Level (gain) -All	− ( ) +		132
Red	− ( ) +		120
Green	− ( ) +		154
Blue	− ( ) +		122
Set to Nominal for RGB Levels (0-255)			
Set to Nominal for Video Levels (16-235)			
Copy Settings to All Displays			

Note: The COPY SETTINGS TO ALL DISPLAYS line will only appear if this menu is on the master display (A1).

Note: If the COLORSPACE is YCbCr, this menu shows BRIGHTNESS, CONTRAST, SATURATION and HUE instead of BLACK LEVEL and WHITE LEVEL and all of the their related settings.

Aspect Ratio	**PLANAR**
Scale Mode	16 x 9
Justify	Center
Overscan	0%
Sharpness	− ( ) + 4
Copy Settings to All Displays	

Memory Menu and Submenus

Memory	**PLANAR**
Recall	▶
Save	▶
Delete	▶

Recall   **PLANAR**

☑	1	☑	9	☑	**17**	☐	25	☐	33
☑	2	☑	10	☐	18	☐	26	☐	34
☐	3	☑	11	☐	19	☐	27	☐	35
☐	4	☐	12	☐	20	☐	28	☐	36
☐	5	☐	13	☐	21	☐	29	☐	37
☐	6	☐	14	☐	22	☐	30	☐	38
☐	7	☐	15	☐	23	☐	31	☐	39
☐	8	☐	16	☐	24	☐	32	☐	40

Save   **PLANAR**

☐	1	☐	9	☐	17	☐	25	☐	33
☐	2	☐	10	☐	18	☐	26	☐	34
☐	3	☐	11	☐	19	☐	27	☐	35
☐	4	☐	12	☐	20	☐	28	☐	36
☐	5	☐	13	☐	21	☐	29	☐	37
☐	6	☐	14	☐	22	☐	30	☐	38
☐	7	☐	15	☐	23	☐	31	☐	39
☐	8	☐	16	☐	24	☐	32	☐	40

Delete   **PLANAR**

☑	1	☑	9	☑	**17**	☐	25	☐	33
☑	2	☑	10	☐	18	☐	26	☐	34
☐	3	☑	11	☐	19	☐	27	☐	35
☐	4	☐	12	☐	20	☐	28	☐	36
☐	5	☐	13	☐	21	☐	29	☐	37
☐	6	☐	14	☐	22	☐	30	☐	38
☐	7	☐	15	☐	23	☐	31	☐	39
☐	8	☐	16	☐	24	☐	32	☐	40

Diagnostics Menu and Submenus

Diagnostics	**PLANAR**
Unit Status	**>**
Serial Port Status	**>**
Test Patterns	▷
Setup Summary	**>**
Hours	**>**

Unit Status A1			**PLANAR**
Matrix		**1366 x 768**	
010-1168	**Rev 06**		
LCD			
Temperature	**25 °C**	**Backlight**	**OK**
Voltage	**24**	**Fan**	**OK**
Quad Module			
Temperature	**31 °C**	**Fan**	**OK**
Power Supply			
PS1	**OK**	**Fan**	**OK**
PS2	**OK**		
PS3	**OK**		
PS4	**OK**		
Redundant	**OK**		

Serial Port Status **RS485** ▶	**PLANAR**
<ENTER> to clear; +/- to select different serial port	
Commands Received	**34**
Replies Sent	**34**
Last Packet Type	**Operation**
Last Packet Address	**Not Addressed**
Bytes Received	**921**
Bytes Sent	**773**
UART Framing Errors	**4**
UART Overflow Errors	**0**
Group A Unit: 1 19200 Baud	
Most Recent	
…115, 111, 108, 117, 105, 111, 110, 63, 13	
.st--1?.st--2?.st--3?.lcd.vertical-resolution?.	

Note: The QUAD MODULE and POWER SUPPLY lines only appear on processor number 1 of each Quad controller module.

Test Patterns			**PLANAR**
<ENTER> to select, None to show picture			
None	**Red**	**Red Scale**	**Logo**
White	**Green**	**Green Scale**	**Grid**
Black	**Blue**	**Blue Scale**	**4x4 Contrast**
Gray	**Cyan**	**Gray Scale**	**Uniformity**
Custom Color	**Yellow**	**Colors**	**Focus**
	Magenta	**Color Bars**	

Diagnostics Menu and Sub Menus (Continued)

Diagnostics	**PLANAR**
Unit Status	>
Serial Port Status	>
Test Patterns	▷
Setup Summary	>
Hours	>

Setup Summary			**PLANAR**
Current Setup Information			
Colorspace			RGB
Quad Module Route Code		682	2048
Wall	3 x 3	1:1	
Scale/Justify	Fill Screen/Center		
Position/Overscan	100,100		/ 0%
Zoom UL/ LR	+0,+0	/	+0,+0
Viewport UL/LR	+0,+0	/	+0,+0
Sharpness	4		
Black Level	109	109	109
White Level	149	149	149
Backlight Intensity			8
White Balance	100	100	100
Gray Balance	7	7	7
Backlight Adjustment			+0

Note: The WALL line will only appear on this menu if WALL MODE is checked in the BIG PICTURE SETUP menu.

Hours	**PLANAR**
System Time	00636:45
Backlight Time	00532:00
Average Hours Per Day	12
Number of Days > 20 Hours	0

Note: The last two lines will only appear on the master (A1) display.

Advanced Options and Submenus

Advanced Options	PLANAR
Color Balance	▷
Size and Position	▶
Miscellaneous Options	▶
Backlight Settings	▶
Serial Port Settings	▶
Set Clock / Schedule Events	▶

Color Balance	PLANAR
Color Temperature	Native
White Test Pattern	
White Balance - All	(Clipboard)
Red – ( ) +	100 (100)
Green – ( ) +	100 (100)
Blue – ( ) +	100 (100)
Gray Test Pattern	
Gray Balance - All	
Red – ( ) +	7 (7)
Green – ( ) +	7 (7)
Blue – ( ) +	7 (7)
Backlight Adjustment	+0
Copy to Clipboard	
Recall From Clipboard	
Reset to Defaults	
Remove Test Pattern	

Note: See page 150 for all of the submenus.

Size & Position	PLANAR
Picture Position	▷
Zoom Window Top & Left	▷
Zoom Window Bottom & Right	▷
Viewport Window Top & Left	▷
Viewport Window Bottom & Right	▷
Reset All Windows to Default	
Copy Settings to All Displays	

Note: The COPY SETTINGS TO ALL DISPLAYS line will only appear if this menu is on the master display (A1).

Advanced Options and Submenus (Continued)

Miscellaneous Options   PLANAR

Cable Equalization & EDID	▷
🕐 Menu Timeout	Never Time Out
Rotate Menu	None
☐ Hide Source Absent Message	
☑ Allow Frame Lock	

Note: See page 151 for all of the submenus.

Backlight Control   PLANAR

☑ Auto Backlight On		
☐ Turn Backlight Off When No Source (DPMS)		
DPMS Delay		1 hr
Backlight Control Mode		Manual
💡 Backlight Intensity	– ⬭ +	10
💡 AP/LED	– ⬭ +	0

Serial Port Settings   PLANAR

ASCII Response Type	Symbolic
ASCII Response Terminator	CR
Baud Rate	19200
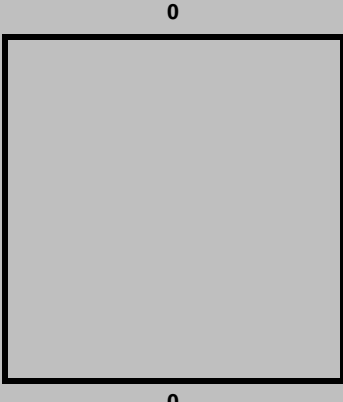
Set Clock / Schedule Events   PLANAR

```
  Press <ENTER> to set clock and schedule events

Current Date/Time:   Mon   Feb   28   2010   10:40

    01 07:30   Daily          Turn On

    02 21:30   Daily          Turn Off

    03 12:30   Mondays        Recall #04

    04 16:00   Wednesdays     Recall #23

    05 02:00   Apr 1     2010 Clk +1 Hr

    06 02:00   Oct 28    2010 Clk -1 Hr

    07

    08

    09

    10

    11

    12

    13

    14

    15

    16

    17

    18

    19

    20
```
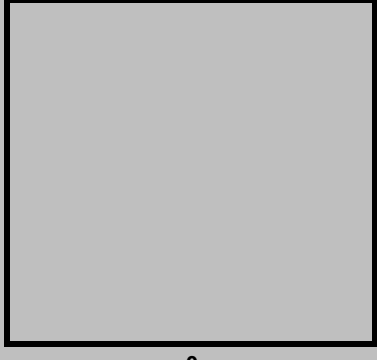
Note: See page 152 for all of the submenus.
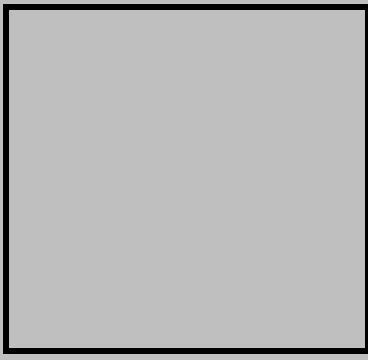
Size & Position Submenus
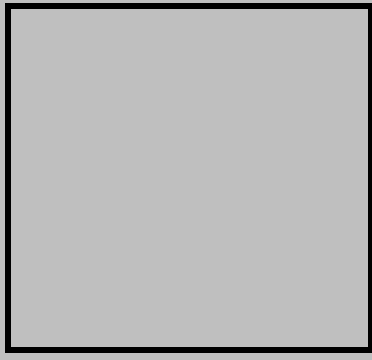
Size & Position	**PLANAR**
Picture Position	▷
Zoom Window Top & Left	▷
Zoom Window Bottom & Right	▷
Viewport Window Top & Left	▷
Viewport Window Bottom & Right	▷
Reset All Windows to Default	
* *** **Copy Settings to All Displays**	

Picture Position	**PLANAR**
Use arrow keys to move image	
✛	
Horizontal Position	168
Vertical Position	19

Zoom Top & Left   **PLANAR**

Arrows move top and left

0

0   0

0

Image Resolution	1366 x 768
This Unit	638 x 384

Zoom Bottom & Right   **PLANAR**

Arrows move bottom and right

0

0   0

0

Image Resolution	1366 x 768
This Unit	638 x 384

Viewport Top & Left   **PLANAR**

Arrows move top and left

0

0   0

0

Display Resolution	1366 x 768
Viewport	1366 x 768

Viewport Bottom & Right   **PLANAR**

Arrows move bottom and right

0

0   0

0

Display Resolution	1366 x 768
Viewport	1366 x 768

Miscellaneous Options Submenu

Miscellaneous Options	PLANAR
Cable Equalization & EDID	▷
Menu Timeout	Never Time Out
Rotate Menu	None
☐ Hide Source Absent Message	
☑ Allow Frame Lock	

Miscellaneous	PLANAR
Cable Equalization	1
☑ EDID (Plug and Play)	
EDID Detailed Timing 1	1366 x 768
EDID Detailed Timing 2	2732 x 1536 60Hz (2x2)
* *** Copy Settings to All Displays	

Note: The last line will only appear on the master (A1) display.

Set Clock/Schedule Events Submenu

```
Set Clock / Schedule Events                    PLANAR

  Press <ENTER> to set clock and schedule events
 Current  Date/Time:   Mon    Feb   28   2010   10:40
      01 07:30    Daily              Turn On

      02 21:30    Daily              Turn Off

      03 12:30    Mondays            Recall #04

      04 16:00    Wednesdays         Recall #23

      05 02:00    Apr 1      2010  Clk +1 Hr

      06 02:00    Oct 28     2010  Clk -1 Hr

      07

      08

      09

      10

      11

      12

      13

      14

      15

      16

      17

      18

      19

      20
```

Event # (0= set clock)	**0**
Frequency	Never
Action	No Action
Slot to Recall	1
Day of Week	Tuesday
Year	**2010**
Month	**03**
Date in Month	**02**
Hour	**21**
Minute	**30**

Program Information Menu

Program Information   **PLANAR**

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www.planar.com

Matrix 1366 x 768
010-1168 Rev 06

Code Generated Date: Aug 30 2012 at 15:43:45
LCD Interface: 1375-00:May 18 2012 09:27:06
FPGA Versions: 14/14

Note: The last line will only appear on processor number 1 of each Quad controller module.

Clarity Matrix HX60 Installation Guide

Troubleshooting

Below is a troubleshooting table of some common issues you might encounter when installing or running your Clarity Matrix LCD Video Wall.

What to look for	If you see it	If you don't see it
Solid Green LED next to Video connection on LCD interface board	Video connection is good.	Check power connections to the LCD and Quad controller module. Make sure Video and Comm connections are not swapped.
Blinking Green LED next to Comm connection on LCD interface board	Comm connection is good.	Check power connections to the LCD and Quad controller module. Make sure Video and Comm connections are not swapped.
Power LED on front panel is green. One address LED is lit	Front panel is connected and working properly. Power is good to the Quad controller module.	Check power to Quad controller module. If you see more than one address LED lit (the ones on the circle) the system is doing an automatic update. Wait up to 20 minutes for it to complete. Do not turn off power during this time.
Blinking RS485 light on all Quad controller modules except A	RS485 connections are good.	You must have one and only one 'A' Quad controller module.
Green LED in Out Column for the LCD	Video connection to LCD is good. Comm connection to LCD is good. 'A' Quad controller module is powered on and cabled to this one via RS485. All Quad controller modules have unique addresses.	If the LED is red, there is Comm connection but not video connection. It can take up to a minute for this LED to reflect the state of the system—you may need to wait if you have just turned on or changed connections.

All LCD backlights turn on with IR remote	IR sensor is connected.	IR sensor must be plugged in to 'A' Quad controller module.
	Quad controller module A is configured and cabled to the other Quad controller modules.	Quad controller modules must be cabled together via RS485. There must be one and only one 'A' Quad controller module.
	Comm connection to LCDs is good.	If a Quad controller module has been newly connected, you may have to turn off and then back on to synchronize those displays. If in doubt, A/C power cycle the system after all connections have been made.
"Info Pane" appears on all displays when menus are on. (The "info pane" is the gray square which shows the display address, position sensor information and information about the target menu)	Video connection is good. Equalization is set within reason.	If you see no video it all, the equalization could be bad. If some displays do not respond, you may have out of date firmware. All Quad controller modules must have the same revision level of firmware.
Unit Status Menu appears on all displays when the MONITOR button is pressed		If a different menu appears on some displays, you may have mismatched firmware. All Quad controller modules must have the same revision level of firmware, and that firmware must be "cloned" to all 4 of the processors.
Unit Status Menu - Temperature is within reason Backlight shows OK Voltage is < 22V	The LCD and its interface board are functioning properly.	These three items are reported to the Quad controller module by the LCD interface board over the Comm connection. If the voltage is 0 the voltage meter is not functioning on the LCD interface board (some early prototype systems did not have this meter). If the voltage is low, there may be too much drop in your power cables.
Unit Status Menu - Quad Module Temperature is within reason and Fan is OK	The Quad controller module cooling system is operating normally.	This portion of the menu only shows up on processor 1 of a Quad controller module. Check for proper fan function and proper cooling of the rack.

Unit Status Menu - Power Supplies show OK and power supply fan is OK	The power supply that is being monitored by this Quad controller module is operating normally.	This portion of the menu only shows up on processor 1 of a Quad controller module. If the message "PS Mon cable is not connected" shows in this menu, there is no power supply monitor cable connected. Connect the RJ45 on the back of the Quad controller module to that on the power supply module. Your power supply is one of four types: 2 supplies 4 supplies 2 supplies with redundant 4 supplies with redundant The status of each supply is a discrete signal in the PS Mon cable. The Quad controller module knows which type it has by internal configuration jumpers. If it is reporting failures for supplies that aren't there, these internal jumpers could be configured incorrectly.
Matrix Layout - Auto completes correctly	Position Sensors are aligned and working correctly.	Look at the info pane of each display. It shows you its position as reported by the LCD interface board. These numbers update about once a second. An LCD in service mode will not report the correct position. If a display on the top row shows a row other than 1 or a display on the left side shows a column other than 1, then light energy is causing a false reading. This can happen with some fluorescent lights. Cover the position sensor hole from receiving light. Each row should show columns in order from left to right. If the column number starts again at 1, there is a problem either with the receiver of that display or the transmitter of the display next to it. Check for proper alignment of the displays. Similarly, each column should show row numbers in order from top to bottom.

Matrix Layout shown in menu matches the true physical layout	Comm and Video connections are paired correctly.	If the layout shown in the menu looks correct, but the rows or columns are out of order when looking at the position sensor information in the info pane, then the COMM connections to one or more pairs of displays have been crossed. If the layout shown in the menu is different than that shown by looking at the addresses on the info panes, then the VIDEO connections to one or more pairs have been crossed.
< > buttons on the IR remote move a slave menu sequentially to each display in the Matrix	Auto Layout has been performed.	If Auto Layout has not been completed or had errors, the menu will appear on each display in address order (A1, A2, A3). If no display is connected for a particular address, the menu will "disappear". Press the arrow key again to move it to the next one until it comes back. You can see which display is being addressed by watching the info pane on any display. Once auto layout has completed, Quad controller modules that are not connected will be ignored. Even if the position sensors are not working, it will be helpful to attempt auto layout.
Solid Green PS Enabled LED on the front of the power supply module for each one installed	Power supply module is available to provide power.	DIP switch for that module has been turned off.
Solid Green DC POWER OK LED on the front of the power supply module for each one installed	Power module is supplying +24V VDC.	If LED is blank, that power supply module is turned off by the corresponding DIP switch. If LED is red, that power supply module is either faulty or not installed.

Common Symptoms and How to Troubleshoot Them

The following section gives you a step by step process to troubleshoot common issues, such as the screen is black. In the examples below, B2 is the display in question. References to this display are in red below. For specific troubleshooting, substitute the desired module and unit address for the display in question. All serial commands must be terminated with a carriage return or linefeed.

Symptom: Black Screen

Question	How to find the answer	Possible actions to take
1. Is the backlight on?	This takes a little practice to determine. Looking at the back of the array, you can see a bit of glow between the displays when the backlight is on. There is also a difference in the "blackness" of the black with the backlight on and off. Try turning the backlights off and back on to see if there is a difference.	• Check Power cable to the system. • Check power supply (question 10). • Turn backlight to system off and back on - the display may have become out of sync with the system. • The display may not be receiving commands. See question 5.
2. Is there a video extender in the system?		• Check cabling at video extender. • Swap cable to a known good extender output.
3. Is the equalization set correctly?	Bring up the CABLE EQUALIZATION & EDID menu by pressing the <MISC> key once. Use the right arrow to try each of the eight equalization settings to see if the image appears. Or use the command `op B2 CABLE.EQUALIZATION=0` and each number from 0 through 7 in turn.	
4. Is video reaching the display?	The LED next to the video RJ11 cable at the display should be lit. The response to the command `op B2 S?` should be odd (bit 0 is high).	• Check video connection. • Swap video connection with a known good Quad Controller output.
5. Is communication reaching the display?	The LED next to the comm. RJ11 cable at the display should be blinking. The response to the command `op B2 S?` should be negative (bit 15 is high).	• Check comm connection • Swap comm connection with a known good Quad Controller output.
6. Are menus available at the display?	Press MENU on the remote, or send `KY ** MENU`.	• Swap comm and video cables with a known good Quad controller output.
7. Is it in the Source Absent state?	Bring up a menu (question 6). The Source Absent message will appear above the display's address.	• Check the routing (question 8). • Check the input cabling. • Check the source device.

8. What are the routing settings?	Bring up the QUAD MODULE ROUTE B menu (MAIN MENU > WALL CONFIGURATION) and look for a check mark in the LCD 2 row under the desired input column.	• Select the correct switch settings in the menu until the desired source is routed to that output.
9. Can the source be routed to other displays in the system?	Bring up the QUAD MODULE ROUTE B menu (MAIN MENU > WALL CONFIGURATION) and change the switch settings to route the same source to a known working display.	• If the source cannot be shown on another display, check the source device.
10. What is the state of the power supply?	Bring up the UNIT STATUS menu (MAIN MENU > DIAGNOSTICS) by pressing the MONITOR button and view the Power Supply states on display B1. Or, send the command op B1 QUAD.PS.STATUS. Note that this command should be sent to unit 1 of whichever Quad controller module has the connect PS MON cable for the power supply in question.	• Be sure there are enough supplies in the module to drive the desired number of displays. • If a power supply shows "fault" replace the power supply module. • If a power supply shows "unknown" connect the PS Mon cable from the power supply to the Quad controller module.
11. What is the Big Picture Setup?	Bring up the BIG PICTURE SETUP menu (MAIN MENU > WALL CONFIGURATION) or the SETUP SUMMARY menu (MAIN MENU > DIAGNOSTICS) or read the settings with the following commands: op B2 WALL.MODE? op B2 WALL.WIDTH? op B2 WALL.HEIGHT? op B2 WALL.ROW? op B2 WALL.COLUMN? op B2 WALL.STATUS?	• The portion of the input video shown on this piece of a wall could be black. Turn wall mode off to view the entire image. • If WALL.STATUS is not 0, or the message "Can't display -- change Scale Mode-- appears on the menu, then the Big Picture scaler is not able to display the image at these settings.
12. What are the zoom/viewport settings?	Bring up the SETUP SUMMARY menu (MAIN MENU > DIAGNOSTICS) or read the settings with the following commands: op B2 VIEWPORT.WINDOW.BOTTOM? op B2 VIEWPORT.WINDOW.LEFT? op B2 VIEWPORT.WINDOW.RIGHT? op B2 VIEWPORT.WINDOW.TOP? op B2 ZOOM.WINDOW.BOTTOM? op B2 ZOOM.WINDOW.LEFT? op B2 ZOOM.WINDOW.RIGHT? op B2 ZOOM.WINDOW.TOP? op B2 OVERSCAN? op B2 POSITION.VERTICAL? op B2 POSITION.HORIZONTAL?	• Under normal circumstances, all zoom, viewport and overscan settings should be at 0. Position should be 100. Abnormal settings could prevent the picture from displaying properly.

13. What are the picture settings?	Bring up the SETUP SUMMARY menu (MAIN MENU > DIAGNOSTICS) and read the black level and white level settings or read the following settings with the following commands: op B2 OFFSET.RED? op B2 OFFSET.GREEN? op B2 OFFSET.BLUE? op B2 GAIN.RED? op B2 GAIN.GREEN? op B2 GAIN.BLUE?	• Under normal circumstances, the gains (white level) should be 128 or 149 and the offsets (black level) should be 128 or 109 Abnormal settings could prevent the image from displaying properly.
14. Is a test pattern being viewed?	Bring up the TEST PATTERNS menu (MAIN MENU > DIAGNOSTICS), or send the following command: op B2 PATTERN?	• Choose None on the menu or send the command op B2 PATTERN=NONE

Symptom: Picture Is Not Displaying Correctly

Question	How to find the answer	Possible actions to take
1. Is the colorspace correct?	Bring up the SETUP SUMMARY menu (MAIN MENU > DIAGNOSTICS) or read the setting with the following command: op B2 COLORSPACE?	• Computer sources are usually RGB colorspace. Some video sources are YPbPr, if you see the image but the colors are wrong, try changing this setting.
2. Are the gains and offsets correct for video vs. RGB levels?	See question 13 of the previous section.	• Some video sources use a code of 16 instead of 0 for black and 235 instead of 255 for white. If this is the case, the image may appear to be washed out. In the Input Levels menu, choose "Set to Nominal for Video Levels (16-235) to display the image correctly. Conversely, computer sources will need to be set to RGB levels in order to display correctly.
3. Is my source very high resolution or dual link?	If your source is more than 2047 pixels wide or tall or your source's input clock is higher than 165 MHz, it needs special treatment.	• See "Configuring High Resolution Inputs" on page 140.
4. Is the EDID correct for my source?	Bring up the MISCELLANEOUS menu (MAIN MENU > ADVANCED OPTIONS MISCELLANEOUS OPTIONS > CABLE & EQUALIZATION line).	• Your computer is most likely using Detailed Timing 1 or Detailed Timing 2 of the EDID to determine what resolution to output. If possible, set this menu to match the resolution you desire. If you are attempting to display a non-standard resolution which is not in this menu, a customized EDID solution may be required.

Servicing

When LCD modules need to be accessed or removed, this can be accomplished without removing other LCDs in the wall. Starting at the top of the wall, LCDs can be pulled up and out to place them in service mode, allowing the LCDs below to be accessed.

LCDs can also be completely removed and replaced very quickly. Because of their streamlined design, they weigh less than typical LCD displays and are more easily handled.

Caution: When is service mode, **do not unplug the power cable while the LCD is still on**. Use the remote control to turn off the LCD and **then** unplug the power cable. If you unplug the power cable when the LCD is still on, it could damage the LCD.

Clarity Matrix HX60 Installation Guide

Specifications

LCD Module Specifications

Specification	HX60		Shipping Dimensions
Dimensions	in/lbs	mm/kg	2 LCDs per box - 160lbs (72.6kg)
Width - Landscape	52.59"	1366mm	2 LCD mounts per box - 32lbs (14.5kg) Box and packaging - 60lbs (27.2kg)
Height - Landscape	29.69"	754mm	**Total weight of one box: 250lbs (113.4kg)** 60" x 22" x 40.5" (1524mm x 559mm x 1029mm)
Width - Portrait	29.69"	754mm	
Height - Portrait	52.59"	1366mm	
Diagonal overall	60"	1524mm	
Depth installed - Landscape	5.9"	150mm	
Depth installed - Portrait	6.5"	165mm	
Weight	80lbs	36.3kg	with protective optically bonded glass, add 11lbs (5kg)
LCD Mount			
Width - Landscape	51.2"	1300mm	
Height - Landscape	28.2"	716.5mm	
Width - Portrait	28.3"	718.3mm	
Height - Portrait	51.1"	1298.2mm	
Weight	16lbs	7.3kg	
Orientation	Landscape or Portrait		
Aspect ratio	1.77		
LED Backlight life	37,000 typical Note that the LED lifetime is defined when the brightness runs continuously at 70% strength.		
Power consumption	460W (max)		

Quad Controller Module Specifications

Specification	Quad Controller Module		Connector	Notes
Dimensions	in/lbs	mm/kg		
Width	19″	483mm		
Height	1.7″	43.2mm		
Depth	18.2″	462mm		
Weight	12lbs	5.4kg		
Power In			MiniFit	24V, 5A
RS232 In/Out			RJ45	
RS485 In/Out			RJ45	
Video Input			DVI-D	
Dual Link In			DVI-D	
Video Loop Out			DVI-D	
IR			3.5mm	
PS Mon			RJ45	
Video Out			RJ45	
Communication Out			RJ45	

Power Supply Module Specifications

Specification	Power Supply Module		Connector	Notes
Dimensions	in/lbs	mm/kg		
Width	19″	483mm		
Height	1.7″	44mm		
Depth	18.6	472mm		
Weight 2 modules 3 modules 4 modules	 15lbs 16.7lbs 18.5lbs	 6.8kg 7.6kg 8.4kg		
Power In			C14 AC Inlet	
Output to Quad controller			MiniFit	
Output to LCD module			MiniFit Sr. (Qty = 2)	

Power Supply Module Specifications (Continued)

Specification	Power Supply Module	Connector	Notes
PS Monitor Output		RJ45	
Input Ratings			
Input voltage		100-240 VAC	
Input frequency		60 Hz	
Input current 115 VAC 230 VAC		 15A 10A	Under normal usage, AC should not exceed 11A at 120 VAC.
Inrush current 230 VAC		 20A	
Output Ratings			
Output voltage		24 VDC	
Output current		21A per LCD module 5A per Quad controller module	

LCD Optical Specifications

Specification	Maximum	Minimum	Typical
Screen brightness	1900 nits		
Contrast ratio			5000:1
Uniformity		75%	
Viewing Angle, horizontal & vertical			±176°
Color gamut			72% NTSC 100% EBU
Color CIE - Native			
Red (x,y) Green (x,y) Blue (x,y) White (x, y)			0.620, 0.330 0.303, 0.630 0.150, 0.550 0.280, 0.290
Color Temperature Presets			3200K, 5500K, 6500K, 8500K
Native color temperature			10,000K
Number of colors			16.7M
Native resolution			1366 x 768 pixels

Environmental Specifications

Specification	Maximum	Minimum	Optimal	Notes
Temperature				All performance specifications are maintained within this temperature range.
operating, LCD module	35° C 95° F	5° C 41° F	20° C +/- 3° C	
operating, Quad controller module	45° C 113° F	10° C 50° F	20° C 68° F	
operating, Power supply module	45° C 113° F	10° C 50° F	20° C 68° F	
non-operating, LCD module	50° C 122° F	–20° C –4° F	20° C +/- 10° C	
non-operating, Quad controller module	85° C 122° F	–20° C –4° F		
non-operating, Power supply module	85° C 122° F	–20° C –4° F		
Fan Noise				
LCD module	N/A - no fan			
Quad controller module	37dB			
Power supply module	44dB			
Altitude (barometric pressure)	2000m			Above sea level, or equivalent barometric pressure. De-rate temperature 10° for every 1km above 1000m.
Humidity				
operating, LCD module	90% R.H.	20% R.H.		non-condensing
operating, Quad controller module	80% R.H.	20% R.H.		
operating, Power supply module	80% R.H.	20% R.H.		

Signal Compatibility

Video Mode		Vert. Rate (Hz)	Hor. Rate (KHz)	Pixel Freq. (MHz)	Pixels Per Line	Scan Type	Frame Lock	Digital Input Connector
VESA	VGA 640 x 480	60	31.469	25.175	800	Progressive	Yes	?
		72	37.861	31.500	830	Progressive	No	?
		75	37.500	31.500	840	Progressive	No	?
		85	43.269	36.000	832	Progressive	No	?
	SVGA 800 x 600	56	35.156	36.000	1024	Progressive	No	?
		60	37.879	40.000	1056	Progressive	Yes	?
		72	48.077	50.000	1040	Progressive	No	?
		75	46.875	49.500	1056	Progressive	No	?
		85	53.674	56.250	1048	Progressive	No	?
	XGA 1024 x 768	50	40.600	54.570	1344	Progressive	Yes	?
		60	48.363	65.000	1344	Progressive	Yes	?
		60	47.816	63.500	1328	Progressive	Yes	?
		70	56.476	75.000	1328	Progressive	No	?
		75	60.023	78.750	1312	Progressive	No	?
		85	68.677	94.500	1376	Progressive	No	?
	848 x 480	60	31.017	33.684	1086	Progressive	Yes	?
	852 x 480	60	31.726	34.010	1072	Progressive	Yes	?
	1024 x 1024	60	32.331	42.677	1320	Interlaced	Yes	?
VESA	1152 x 864	75	67.5000	108.000	1600	Progressive	No	?
	1280 x 720	50	37.490	74.250	1650	Progressive	Yes	?
		60	44.960	74.250	1650	Progressive	Yes	?
VESA	1280 x 768	60	47.776	79.500	1664	Progressive	Yes	?
		75	60.289	102.250	1696	Progressive	No	?
		85	68.633	117.500	1712	Progressive	No	?
	1280 x 960	60	60.000	108.000	1800	Progressive	Yes	?
		85	85.938	148.500	1728	Progressive	No	?
	SXGA 1280 x 1024	60	63.981	108.000	1688	Progressive	Yes	?
		75	79.976	135.000	1688	Progressive	No	?
		85	91.146	157.500	1728	Progressive	No	?
	1360 x 768	60	47.720	84.750	1776	Progressive	Yes	?
	1360 x 768	60	50.000	80.000	1600	Progressive	Yes	?
VESA	1400 x 1050	60	65.317	121.750	1864	Progressive	Yes	?
	1400 x 1050	59.94	65.200	122.480	1800	Progressive	Yes	?
	1400 x 1050	59.94	64.720	100.970	1560	Progressive	Yes	?
	UXGA 1600 x 1200	60	75.000	162.000	2160	Progressive	Yes	?
		60	74.537	161.200	2160	Progressive	Yes	?
	1680 x 1050	60	65.320	146.310	2240	Progressive	Yes	?
	1680 x 1050	60	64.720	119.090	1840	Progressive	Yes	?

Signal Compatibility

Video Mode		Vert. Rate (Hz)	Hor. Rate (KHz)	Pixel Freq. (MHz)	Pixels Per Line	Scan Type	Frame Lock	Digital Input Connector
	1920 x 1080	60	66.587	138.500	2080	Progressive	Yes	?
	1920 x 1080	50	67.521	148.550	2640	Progressive	Yes	?
	1920 x 1080	60	67.470	148.550	2200	Progressive	Yes	?
	1920 x 1200	50	61.800	158.220	2560	Progressive	Yes	?
	1920 x 1200	55	66.230	139.870	2112	Progressive	Yes	?
	1920 x 1200 RB*	60	74.020	148.040	2000	Progressive	Yes	?
SDTV	NTSC (720 x 480)	59.94	15.734	13.500	858	Interlaced	Yes	
	PAL (720 x 576)	50	15.625	13.500	864	Interlaced	Yes	
	480i (720 x 480)	59.94	15.730	13.500	858	Interlaced	Yes	?
	576i (720 x 576)	50	15.625	13.500	864	Interlaced	Yes	?
HDTV	480p (720 x 480)	59.94	31.466	27.000	858	Progressive	Yes	?
	576p (720 x 576)	50	31.250	27.000	864	Progressive	Yes	?
	720p	50	37.500	74.250	1980	Progressive	Yes	?
		59.94	44.964	74.250	1650	Progressive	Yes	?
	1080i	24	26.997	74.250	2750	Interlaced	No	?
		25	28.121	74.250	2640	Interlaced	Yes	?
		30	33.749	74.250	2200	Interlaced	Yes	?
	1920 x 1080	24	26.990	74.250	2500	Progressive	No	?
		25	28.200	74.250	2750	Progressive	No	?
		30	33.750	74.250	2750	Progressive	No	?

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

* RB = Reduced Blanking

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.

Clarity Matrix HX60 Installation Guide
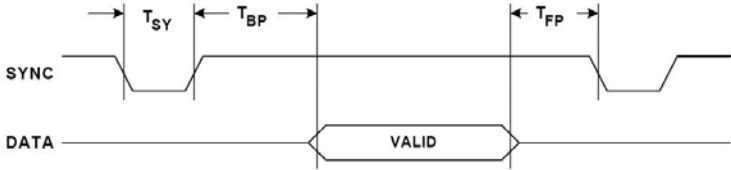
HX60 Dimensions

60" LCD Module Dimensions

60" LCD Front View - Landscape

STANDARD PANEL
DIMENSION
$\begin{bmatrix} 52.596 \end{bmatrix}$
1335.93

ERO PANEL
DIMENSION
[52.622]
1336.59

STANDARD PANEL
DIMENSION
$\begin{bmatrix} 29.694 \end{bmatrix}$
754.22

ERO PANEL
DIMENSION
[29.720]
754.88
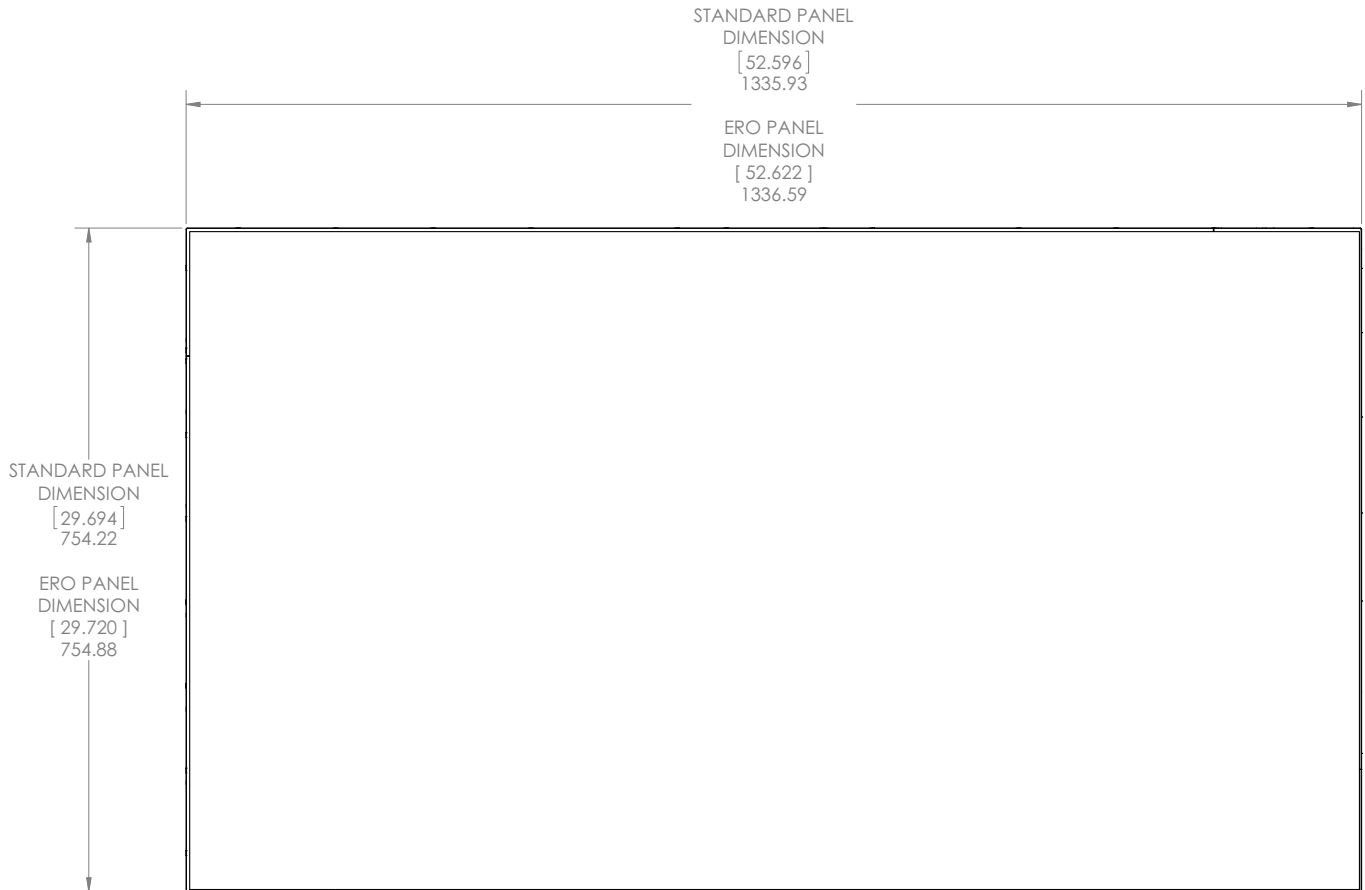
FRONT VIEW
STANDARD PANEL SHOWN

60" LCD Rear View - Landscape

HANDLES

ELECTRONICS
INTERFACE

POSITION SENSOR
RECEIVER

2X POSITION SENSOR
TRANSMITTER
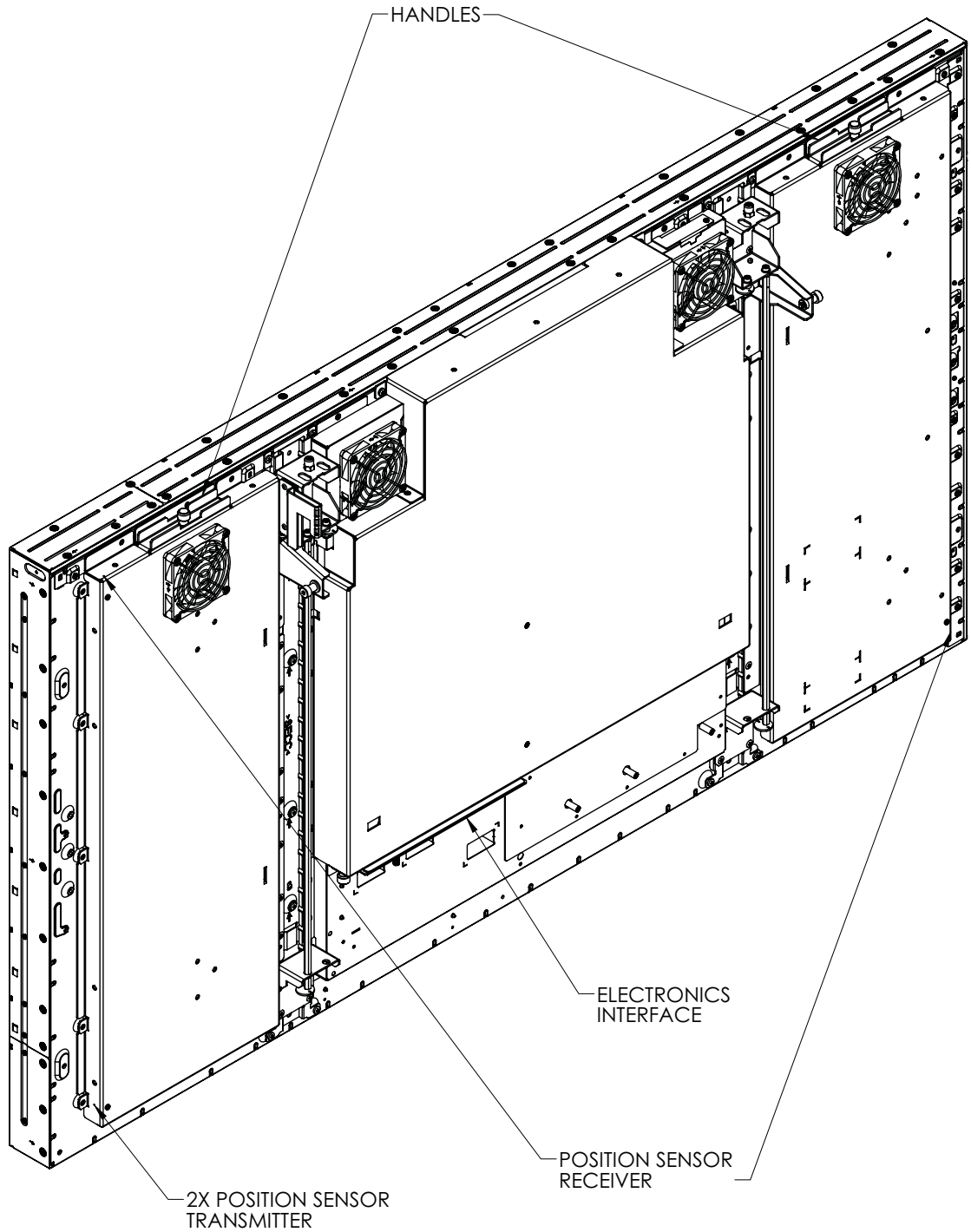
60″ LCD Side View - Landscape

WITHOUT MOUNT
STANDARD PANEL

WITH MOUNT
ERO PANEL

SERVICE MODE

[2.0]
51   MIN
[3.5]
89   RECOMMENDED

[2.94]
74.7

[5.77]
146.5

[5.9]
150
STANDARD
PANEL
NOMINAL

[6.0]
152
ERO PANEL
NOMINAL

[13.97]
354.9

17°
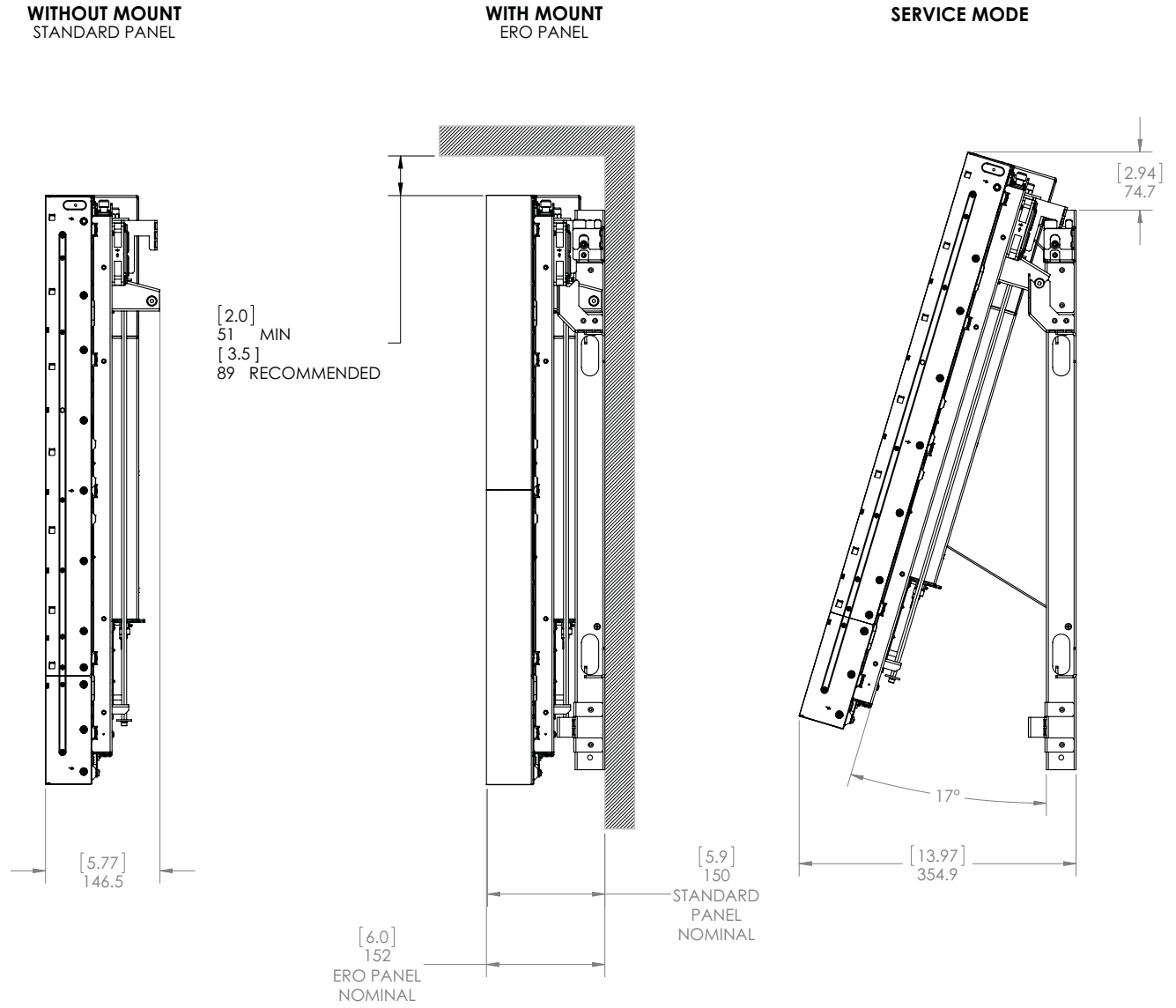
60″ LCD Bottom View - Landscape

BOTTOM VIEW

ELECTRONICS
INTERFACE
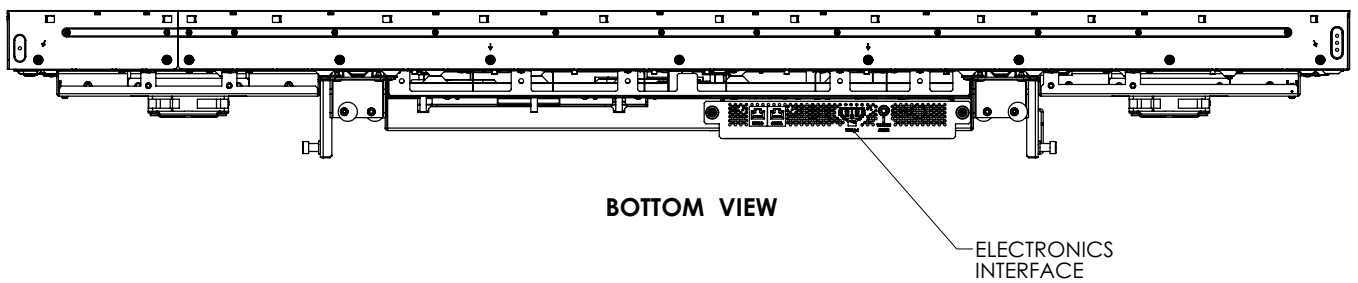
60" LCD Front View - Portrait

STANDARD PANEL
DIMENSION
$\left[29.694 \right]$
754.22

ERO PANEL
DIMENSION
[29.720]
754.88

STANDARD PANEL
DIMENSION
$\left[52.596 \right]$
1335.93

ERO PANEL
DIMENSION
[52.622]
1336.59
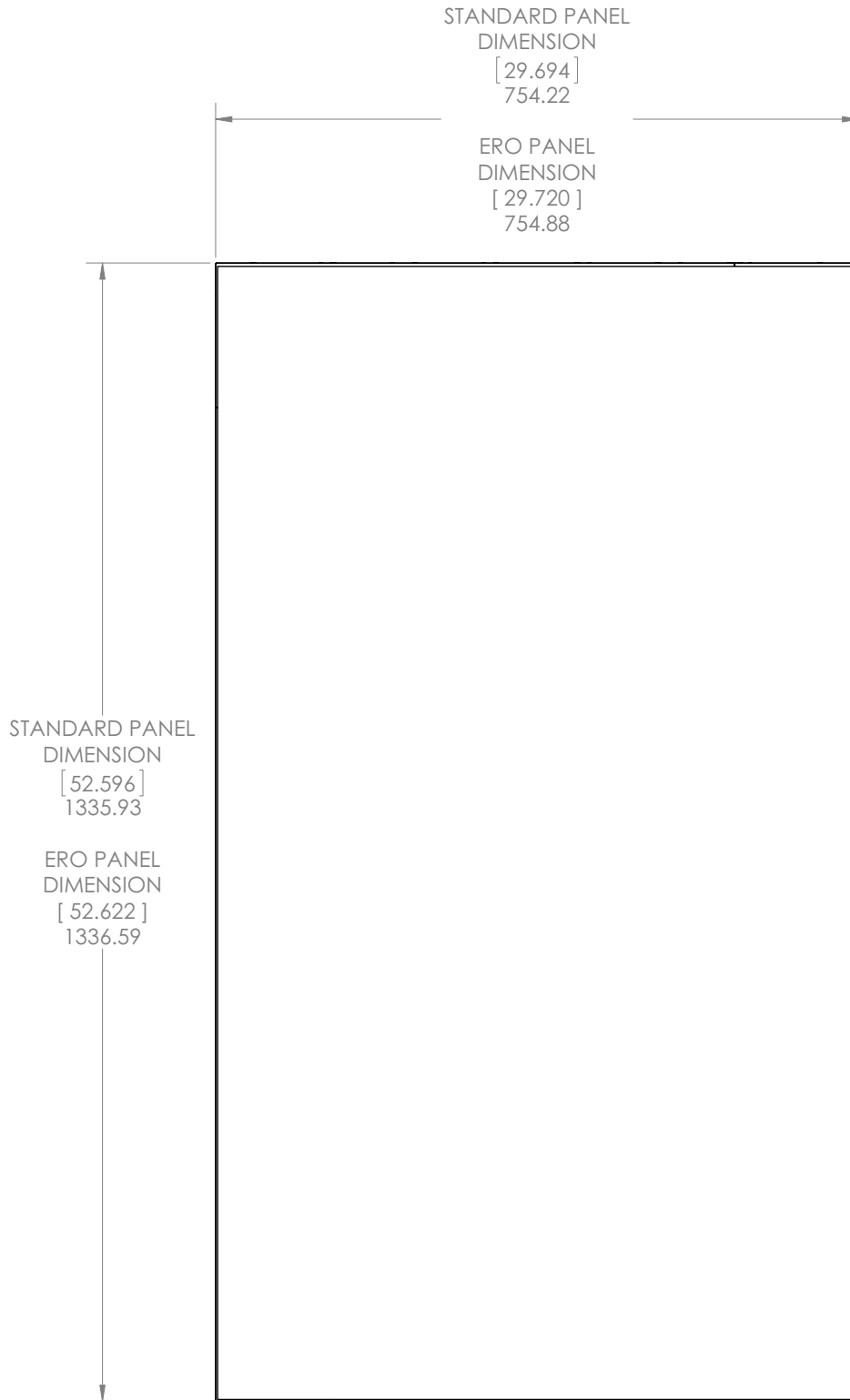
FRONT VIEW
STANDARD PANEL SHOWN

60" LCD Rear View - Portrait

HANDLES

POSITION SENSOR
RECEIVER

ELECTRONICS
INTERFACE

2X POSITION SENSOR
TRANSMITTER
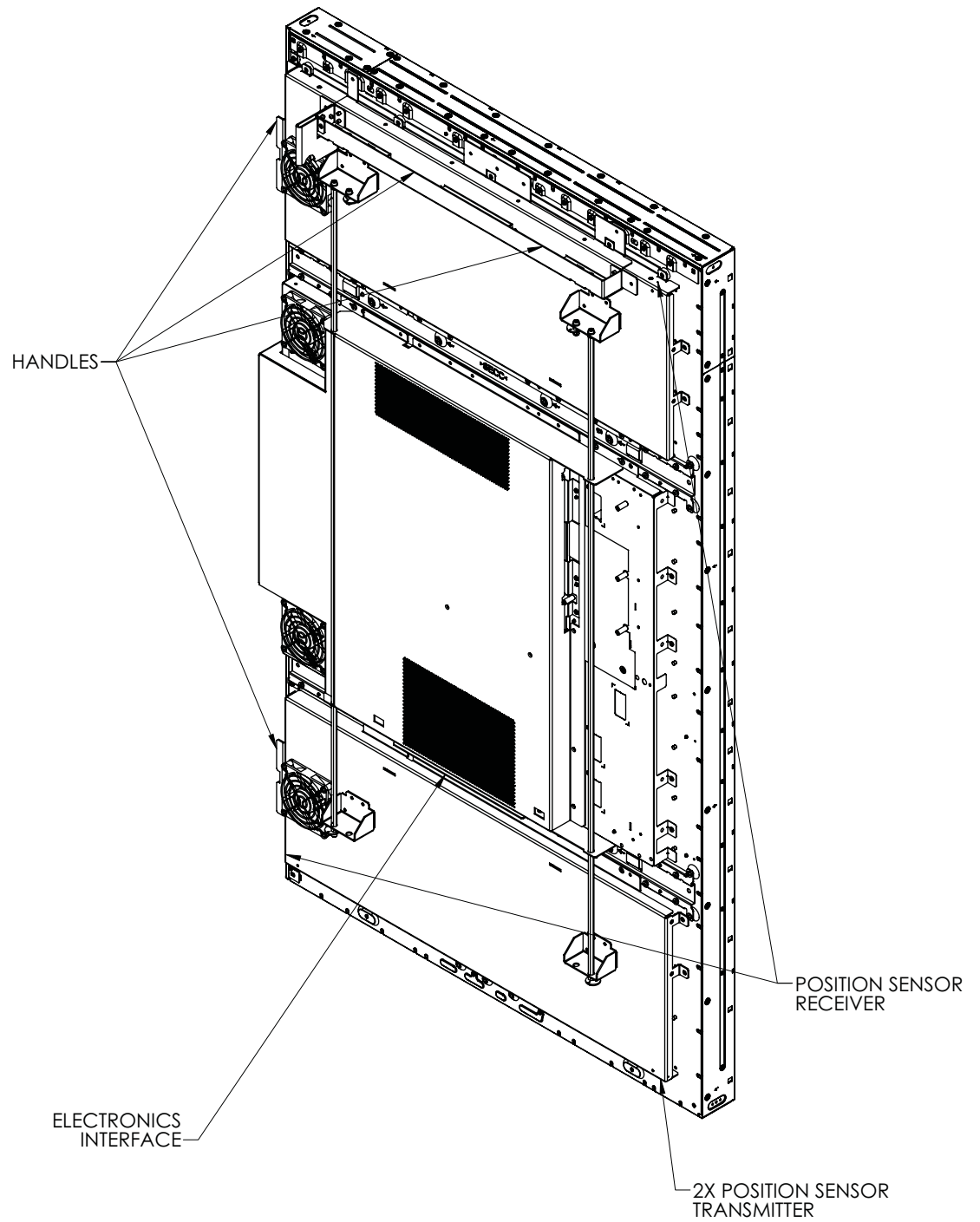
60" LCD Side View - Portrait

SIDE VIEWS

WITHOUT MOUNT
STANDARD PANEL

WITH MOUNT
ERO PANEL

SERVICE MODE

$\begin{bmatrix} 1.5 \end{bmatrix}$
38   MIN
$\begin{bmatrix} 3.0 \end{bmatrix}$
76   RECOMMENDED

$\begin{bmatrix} 1.89 \end{bmatrix}$
48.0

$\begin{bmatrix} 6.18 \end{bmatrix}$
156.9

$\begin{bmatrix} 6.5 \end{bmatrix}$
165
STANDARD
PANEL
NOMINAL

$\begin{bmatrix} 6.6 \end{bmatrix}$
166
ERO
PANEL
NOMINAL

10°

$\left(\begin{bmatrix} 15.55 \end{bmatrix} \right)$
394.9

1. SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

NOTES: UNLESS OTHERWISE SPECIFIED.
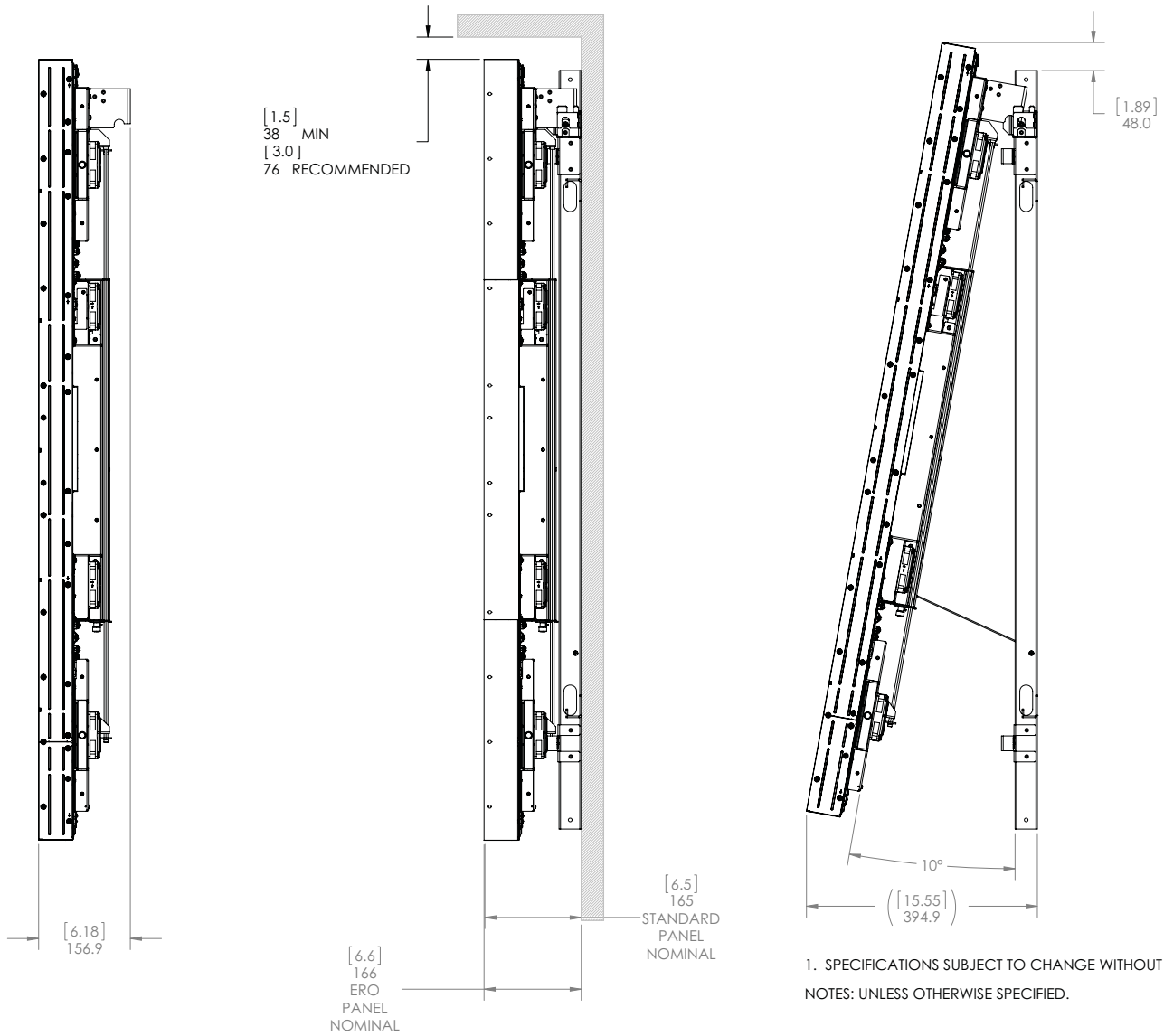
60" LCD Top and Bottom Views - Portrait
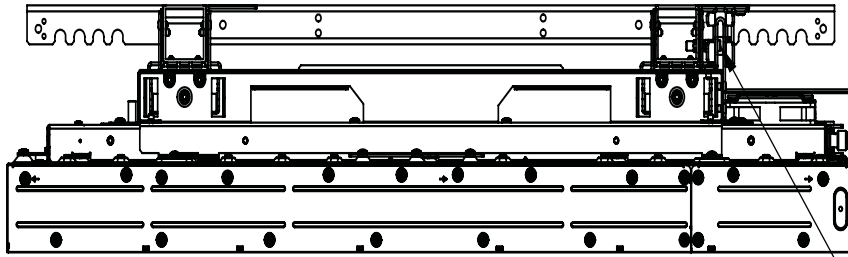
WITH MOUNT

X ADJUSTMENT ±3mm
3mm HEX KEY
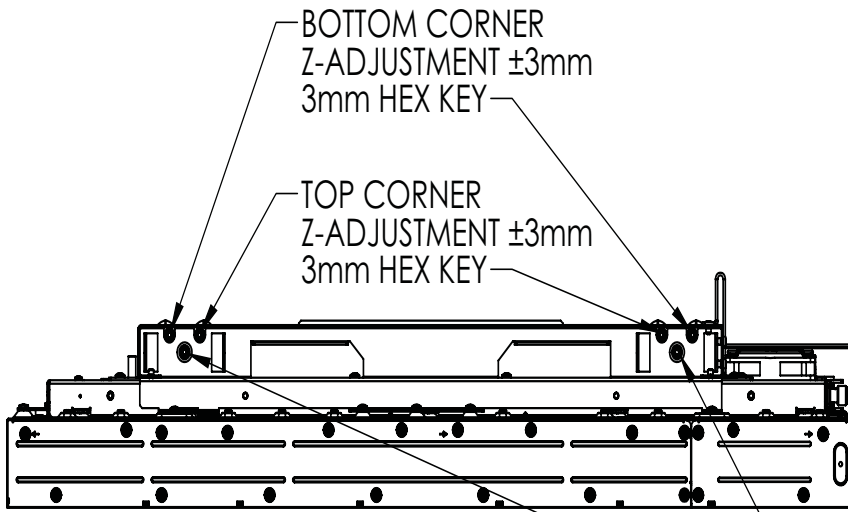
BOTTOM CORNER
Z-ADJUSTMENT ±3mm
3mm HEX KEY

TOP CORNER
Z-ADJUSTMENT ±3mm
3mm HEX KEY

TOP VIEW

Y/ROTATION ADJUSTMENT ±3mm
3mm HEX KEY
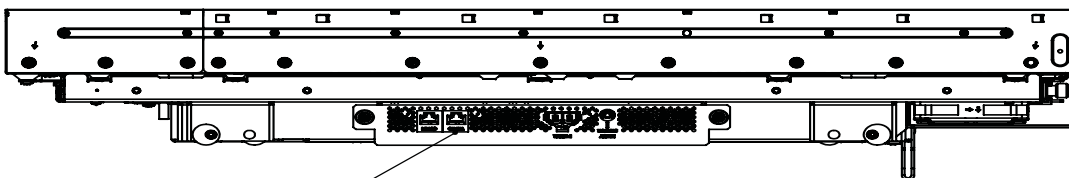
ELECTRONICS
INTERFACE

BOTTOM VIEW

60" LCD Mount Dimensions

60" Standard Landscape Mount Bracket Layout

Clarity Matrix HX60 Installation Guide
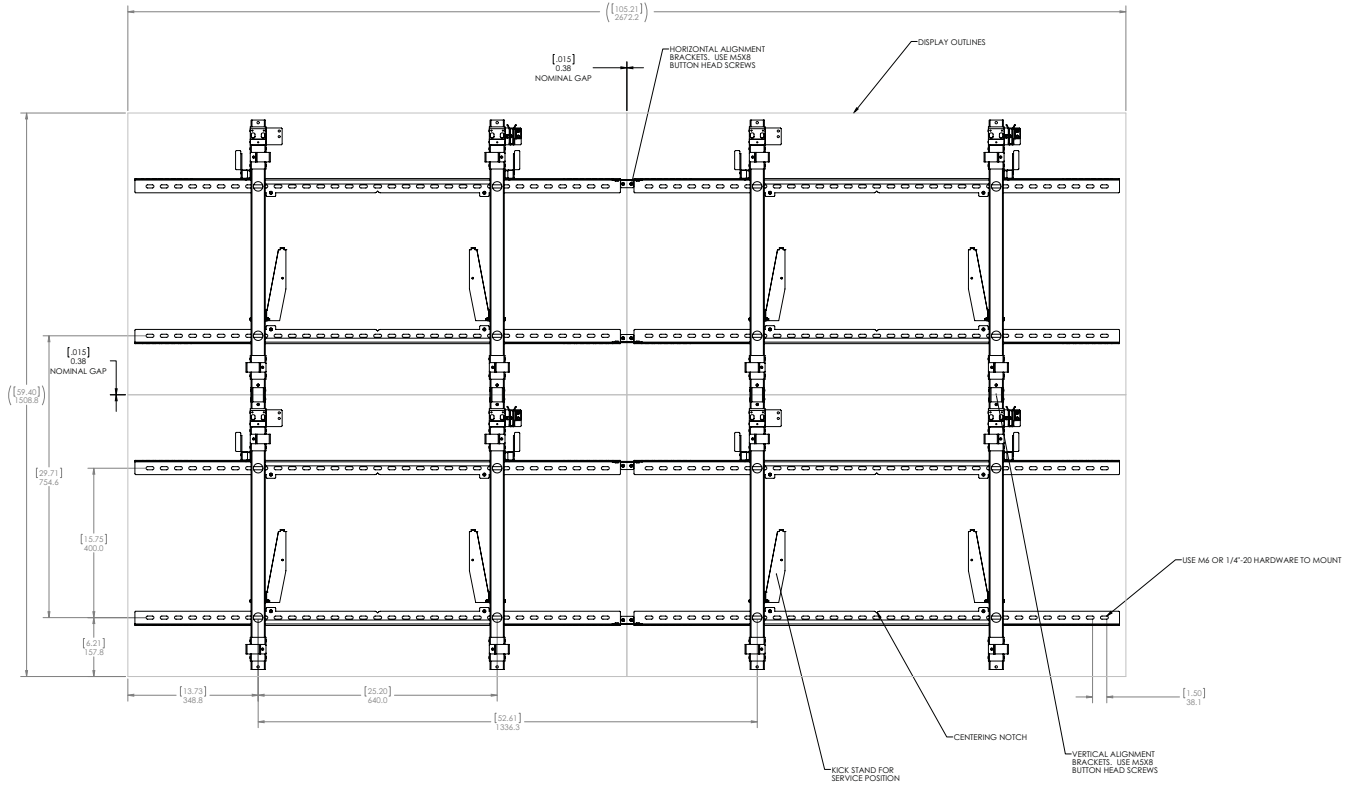
60" ER0 Landscape Mount Bracket Layout
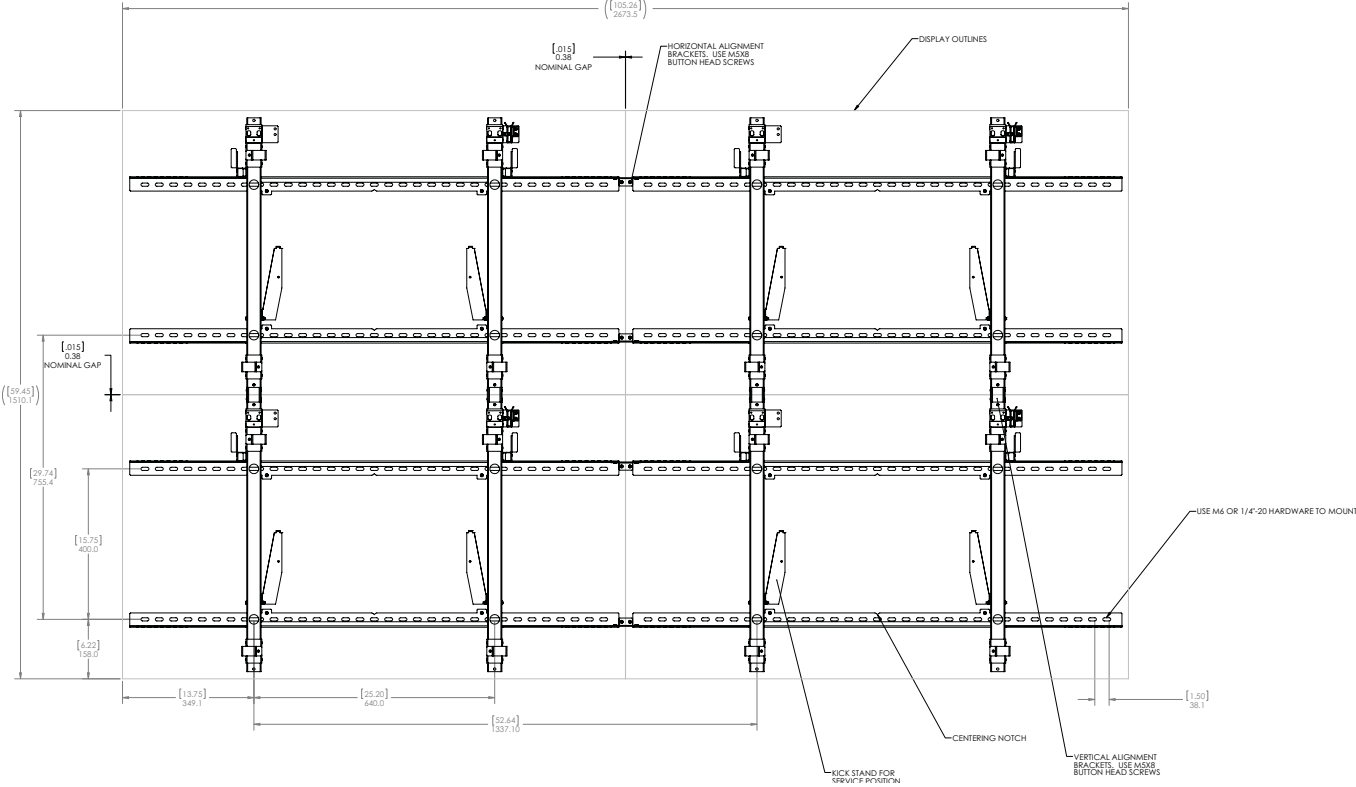
60" Standard Portrait Mount Bracket Layout

HORIZONTAL ALIGNMENT BRACKETS. USE M5X8 BUTTON HEAD SCREWS

DISPLAY OUTLINES

VERTICAL ALIGNMENT BRACKETS. USE M5X8 BUTTON HEAD SCREWS

USE M6 OR 1/4"-20 HARDWARE TO MOUNT

CENTERING NOTCH

KICK STAND FOR SERVICE POSITION

[59.40] 1508.8

[.015] 0.38 NOMINAL GAP

[105.21] 2672.2

[.015] 0.38 NOMINAL GAP

[52.61] 1336.3

[34.63] 879.6

[9.08] 230.7

[6.22] 158.1

[17.25] 438.1

[29.71] 754.6

[1.50] 38.1

60" ER0 Portrait Mount Bracket Layout

[59.45]
1510.1

[.015]
0.38
NOMINAL GAP

HORIZONTAL ALIGNMENT
BRACKETS. USE M5X8
BUTTON HEAD SCREWS

DISPLAY OUTLINES

[105.26]
2673.5

[.015]
0.38
NOMINAL GAP

VERTICAL ALIGNMENT
BRACKETS. USE M5X8
BUTTON HEAD SCREWS

[52.64]
1337.1

[34.63]
879.6

USE M6 OR 1/4"-20 HARDWARE TO MOUNT

[9.09]
230.8

[6.24]
158.4

[17.25]
438.1

[1.50]
38.1

[29.74]
755.4

CENTERING NOTCH

KICK STAND FOR
SERVICE POSITION

Power Supply Module Dimensions

Power Supply Module - Front and Rear Views

Clarity Matrix HX60 Installation Guide
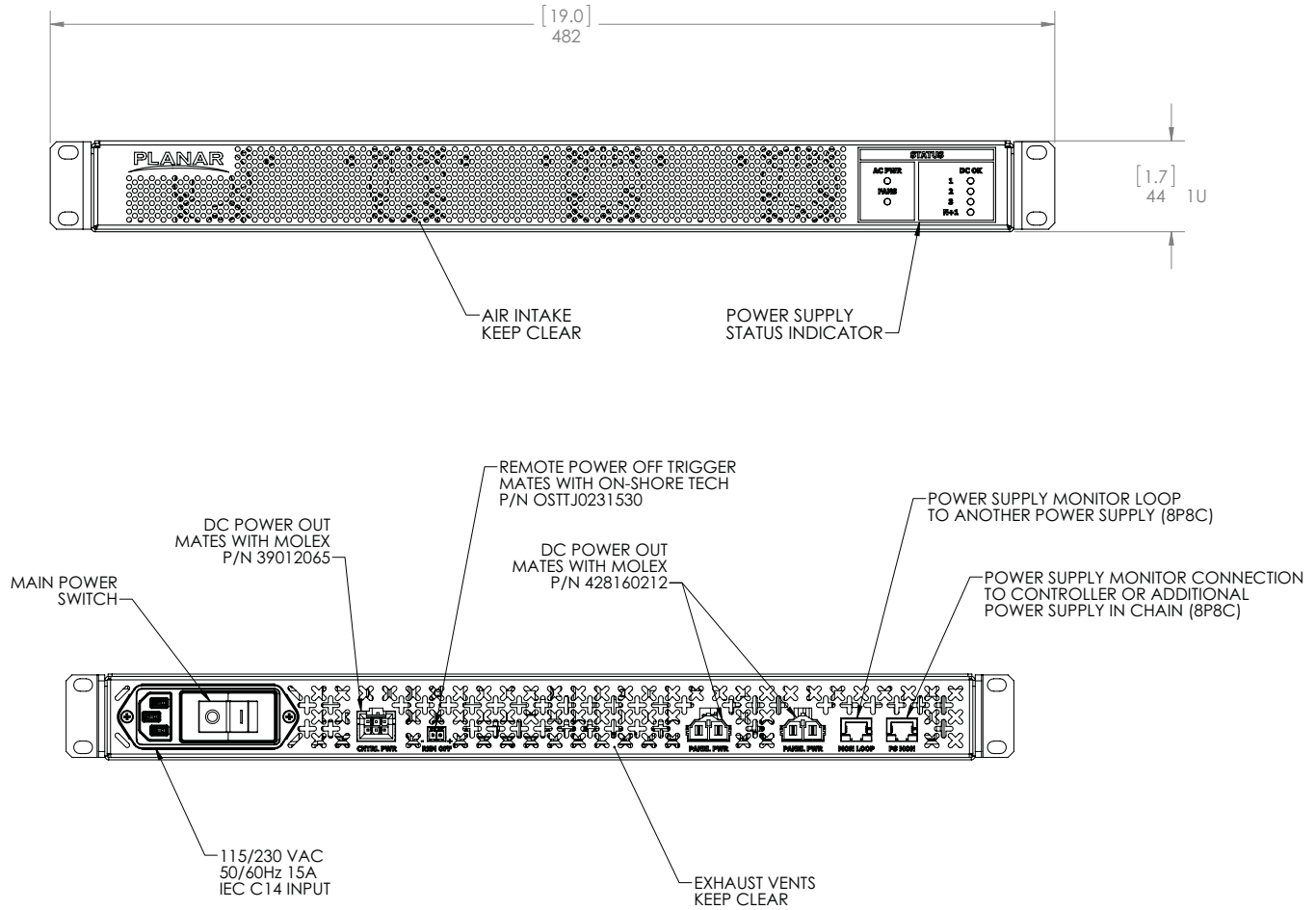
Power Supply Module - Top and Side Views

[12.99]
330.0

4X M4X0.8 FOR
FEET OR MOUNT
BRACKET
SCREW PENETRATION
4mm MAX

REMOVABLE
RACK MOUNT
BRACKETS

[13.39]
340.0

[18.27]
464.0

[17.44]
443.0
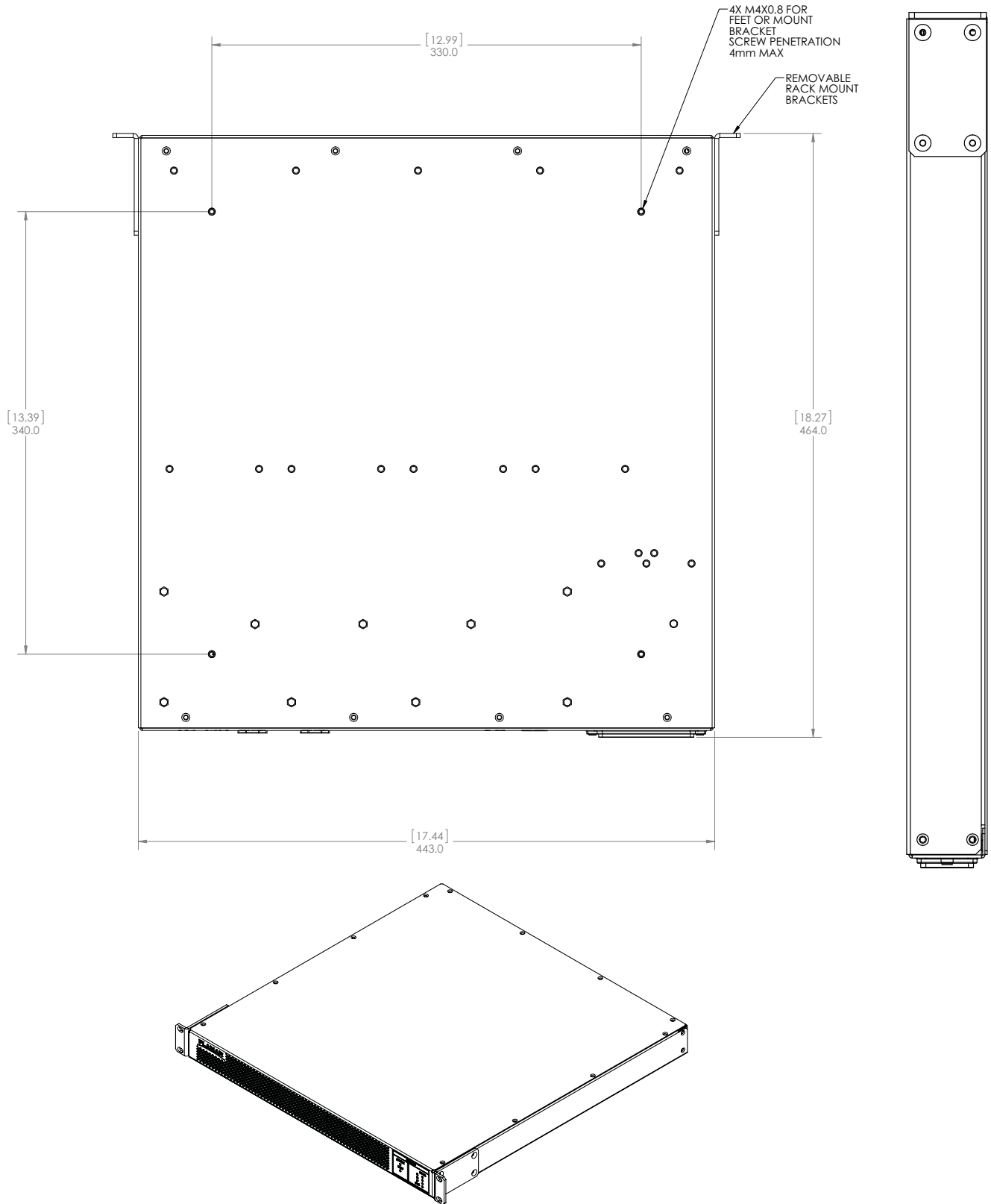
Quad Controller Module Dimensions

[19.0]
482

[1.7]
1U   44

REMOVABLE
RACK MOUNT
BRACKETS

[13.780]
350.00

[5.906]
150.00

6X M4X0.8 FOR
FEET OR MOUNT
BRACKET
SCREW PENETRATION
4mm MAX

[7.480]
190.00

[14.961]
380.00

[18.123]
460.32

[18.2]
464

[17.4]
443
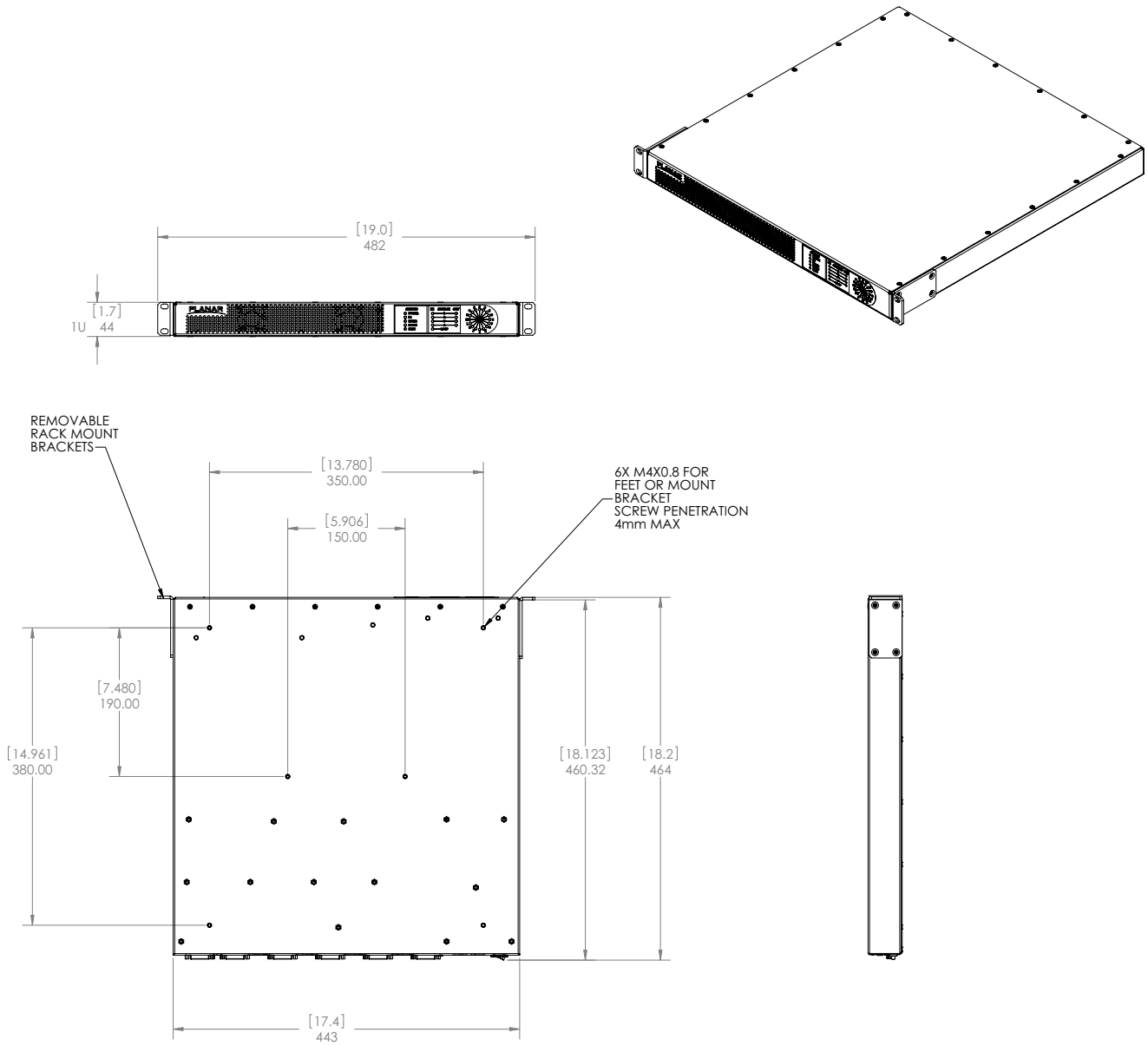
Optional Accessories

If you have purchased a wall adapter bracket kit or cosmetic trim, this section outlines how to set up and install each one.

Wall Adapter Bracket

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

- Two adapter brackets
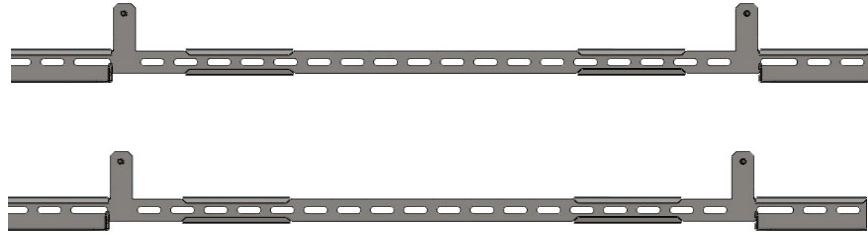
- Four M6 nuts/washers
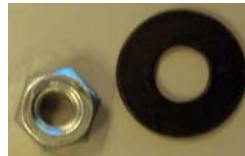
1   For each LCD module, mount two adapter brackets to the wall.

2   Install the LCD mount on the adapter brackets.
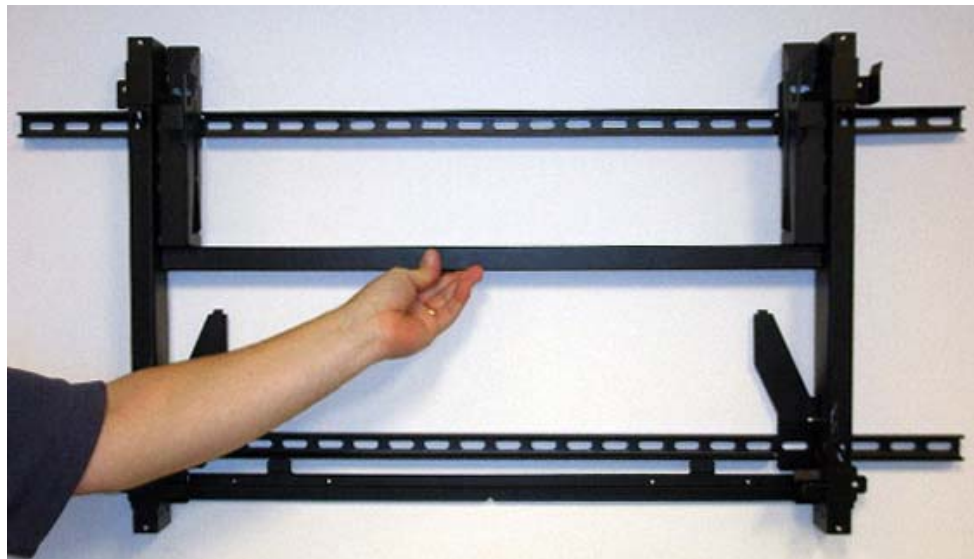
3   Install an M6 washer/nut in each mount point of the LCD mount.
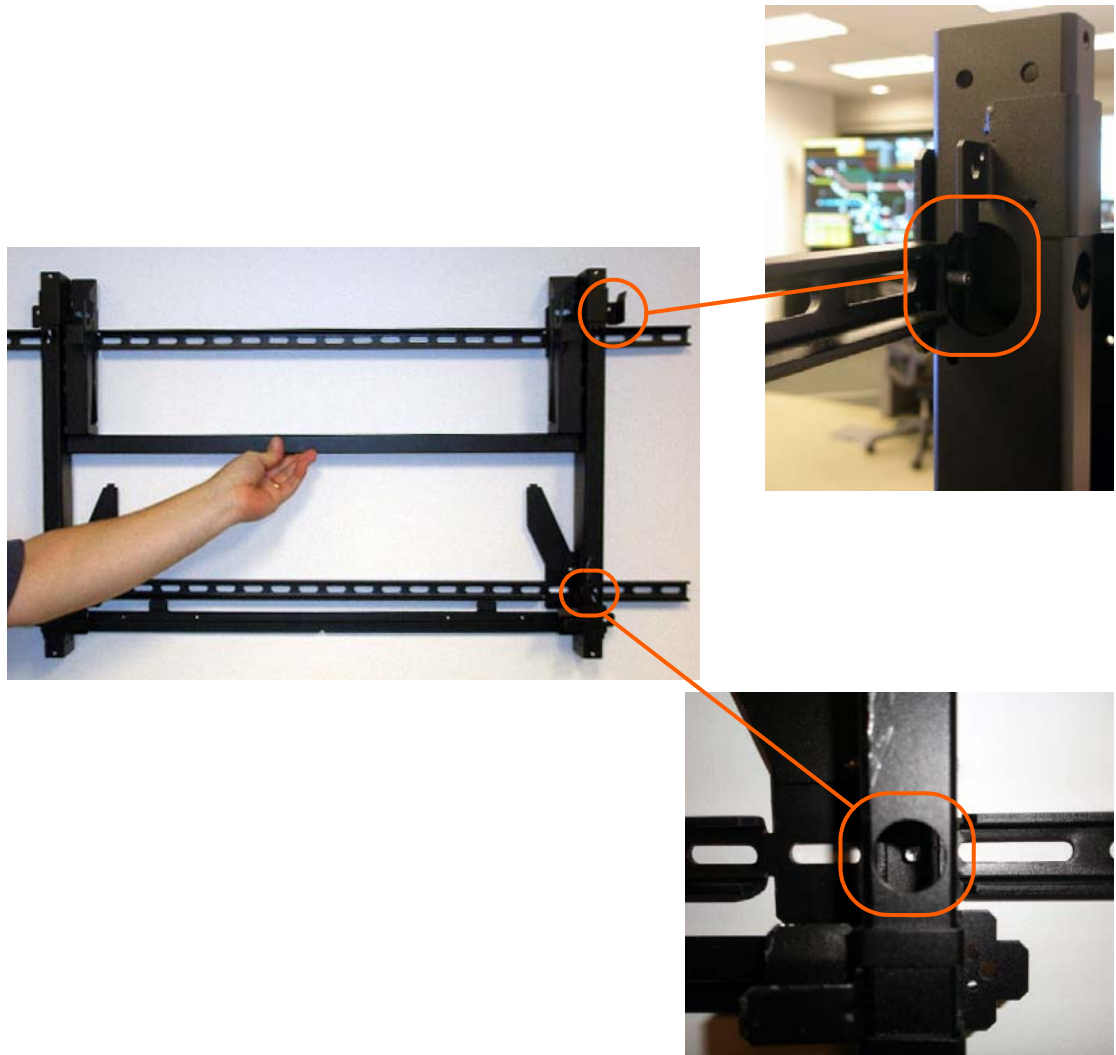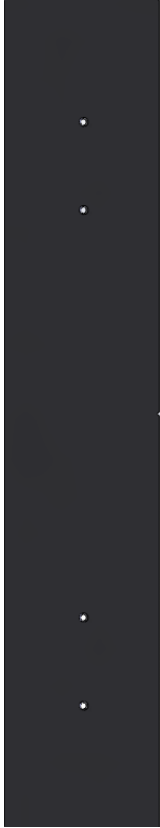
4   Repeat steps 1-3 for each LCD module that you want to mount to a wall.

Cosmetic Trim

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

Part	Number	Picture
Left/Right Trim Support Brackets (Landscape)	2 per each side of each LCD on the outside of the video wall	
Top/Bottom Trim Support Brackets (Portrait)	2 per each top and bottom of each LCD on the outside top and bottom of the video wall.	**Note:** There is a slight difference between the top and bottom brackets. The top brackets have one leg that is shorter.
Top Trim Support Brackets (Landscape)	2 per each LCD at the top of the video wall.	
Right Trim Support Brackets (Portrait)	2 per each LCD on the right outside of the video wall.	
Bottom Trim Support Bracket (Landscape)	1 per each LCD at the bottom of the video wall.	

Left Trim Support Bracket (Portrait)	1 per each LCD on the outer left of the video wall.	
Left/Right Trim (Landscape)	1 per each side of each LCD on the outside of the video wall.	

Left Trim (Portrait)	1 per left side of each LCD on the outside of the video wall.	
Right Trim (Portrait)	1 per right side of each LCD on the outside of the video wall.	

Top Trim (Landscape)	1 per each LCD at the top of the video wall.	
Top Trim (Portrait)	1 per each LCD at the top of the video wall.	
Bottom Trim (Landscape)	1 per each LCD at the bottom of the video wall.	
Bottom Trim (Portrait)	1 per each LCD at the bottom of the video wall.	
M3x 6 panhead screws	Landscape - 3 for bottom trim Portrait - 3 for left trim bracket	
M4 x 8 flathead screws	Used for all other trim hole locations	

Landscape Installation

The basic process of installing trim is to install the trim brackets first and then the trim. For ease of installation, it is **highly** recommended that you install brackets on the LCD module prior to installing the LCD on the wall!

TRIM INSTALLATION

TOP TRIM
SUPPORT BRACKETS

TOP TRIM

SIDE TRIM
SUPPORT BRACKETS

SIDE TRIM

SIDE TRIM
SUPPORT BRACKETS

BOTTOM TRIM
SUPPORT BRACKET

SIDE TRIM
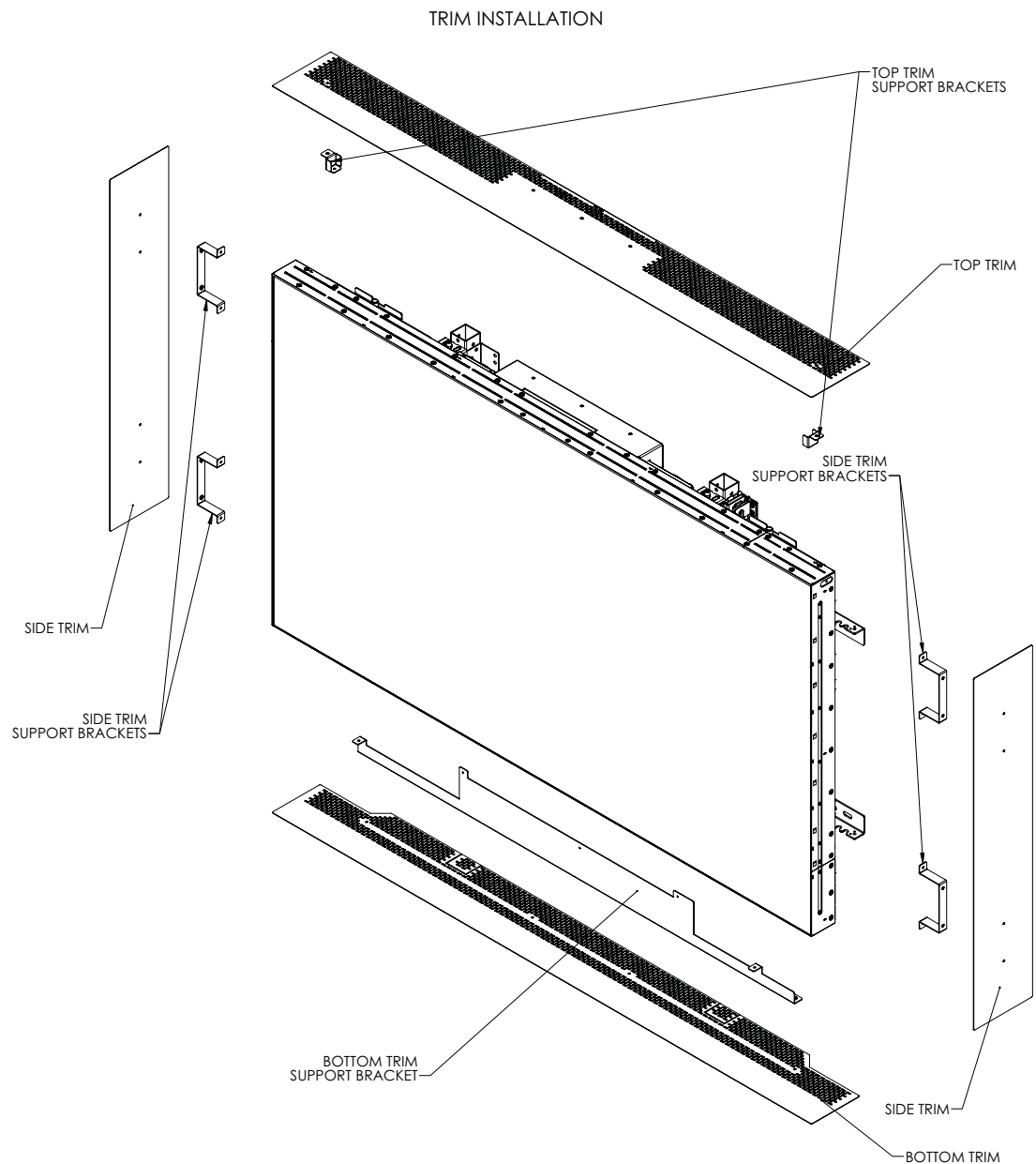
BOTTOM TRIM

1   Place the bottom trim support bracket against the back of the LCD module.

2   Install three M3 x 6 panhead screws on the top middle section of the bracket, as shown.

3   Install two M4 x 8 flathead screws on the bottom part of the bottom trim support bracket.
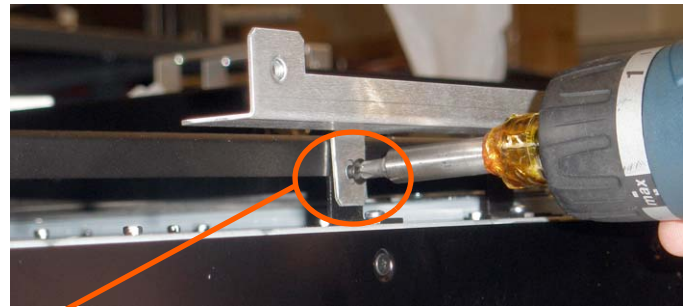
Note: As seen from the above before the bracket is placed on the LCD module.

4 Using two M4 x 8 flathead screws per bracket, install two side trim support brackets on each LCD in the left and right outside rows of the video wall.
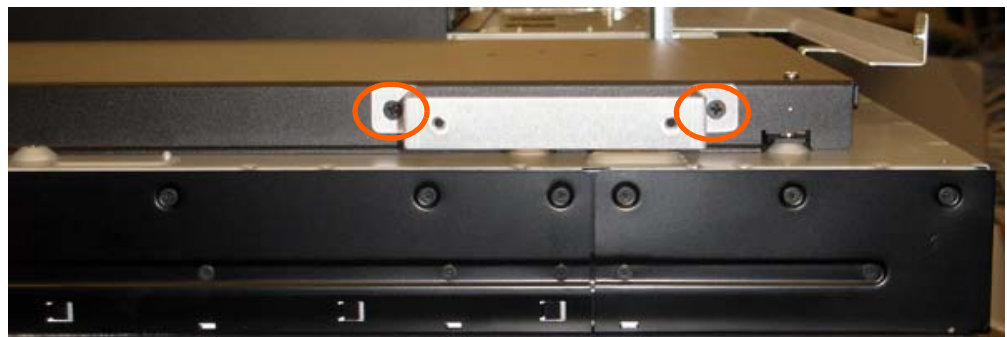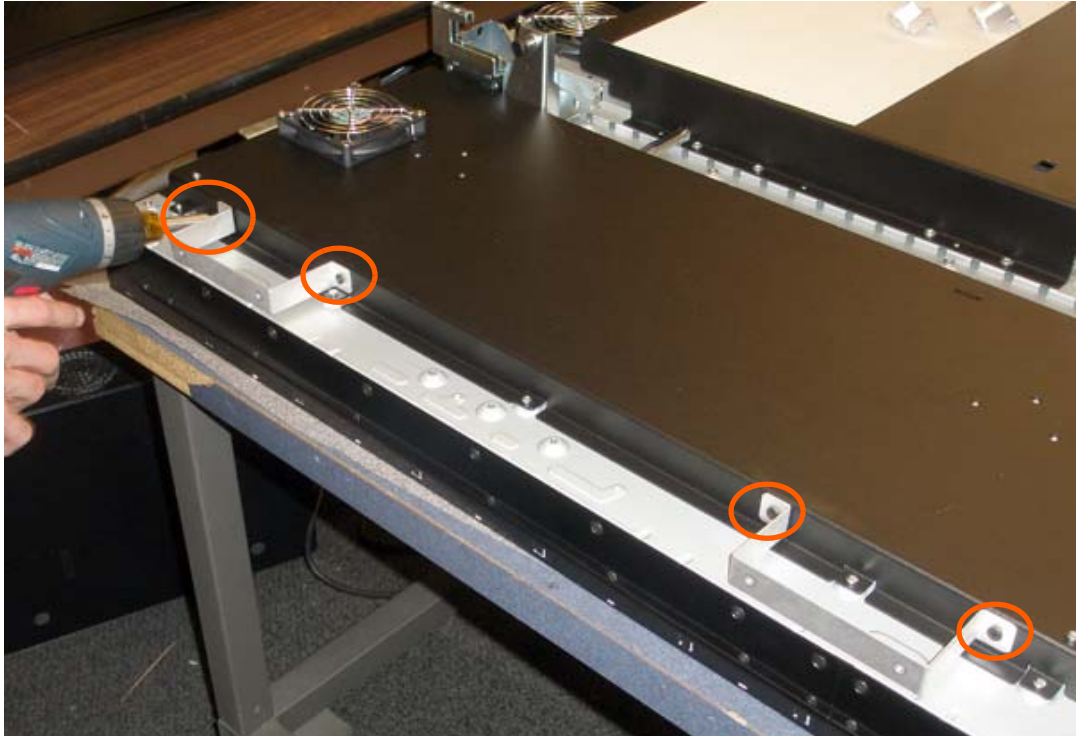
5 Using one M4 x 8 flathead screw per bracket, install the top trim support bracket on each LCD in the top row of the video wall.
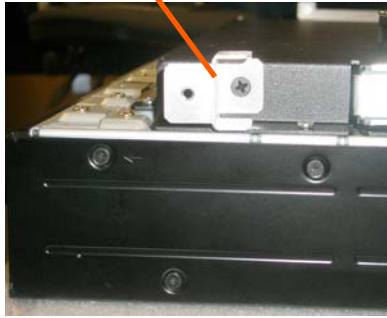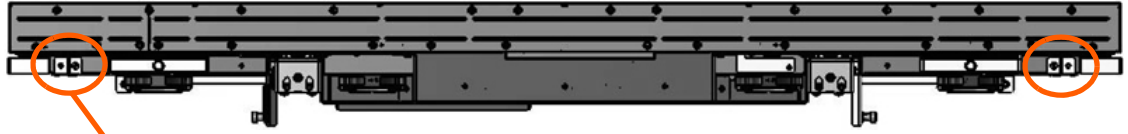
6 Once the trim support brackets are installed, it is recommended that you install the LCDs in the video wall and then install the trim. See "Wall Installation" on page 25.

7 Using five M4 x 8 flathead screws for each piece of cosmetic trim, install the top trim for each LCD module in the outer top row of the video wall.
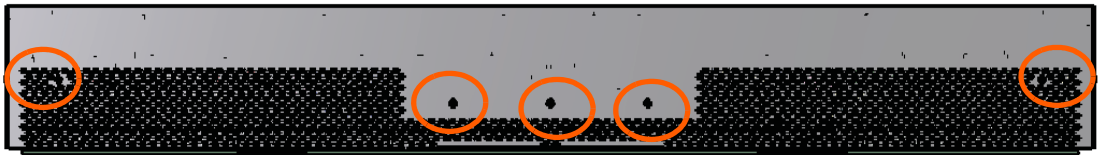
8 Using four M4 x 8 flathead screws for each piece of cosmetic trim, install the bottom trim for each LCD module in the bottom row of the video wall.

9 Using four M4 x 8 flathead screws for each of the left and right trim (same trim for both sides), install each side of the trim on the left and right sides of the video wall. Note that the notched side goes towards the mounting wall. This ensures that the trim will be installed facing the correct direction.

Portrait Installation

The basic process of installing trim is to install the trim brackets first and then the trim. For ease of installation, it is **highly** recommended that you install brackets on the LCD module prior to installing the LCD on the wall!

TRIM INSTALLATION

LEFT TRIM

TOP TRIM

TOP TRIM
SUPPORT BRACKETS

LEFT TRIM
SUPPORT BRACKET
(3X M3X8 SCREW
REQUIRED FOR
INSTALLATION IN
ADDITION TO M4
SCREWS)

BOTTOM TRIM
SUPPORT BRACKETS

BOTTOM TRIM

RIGHT TRIM

RIGHT TRIM
SUPPORT BRACKETS
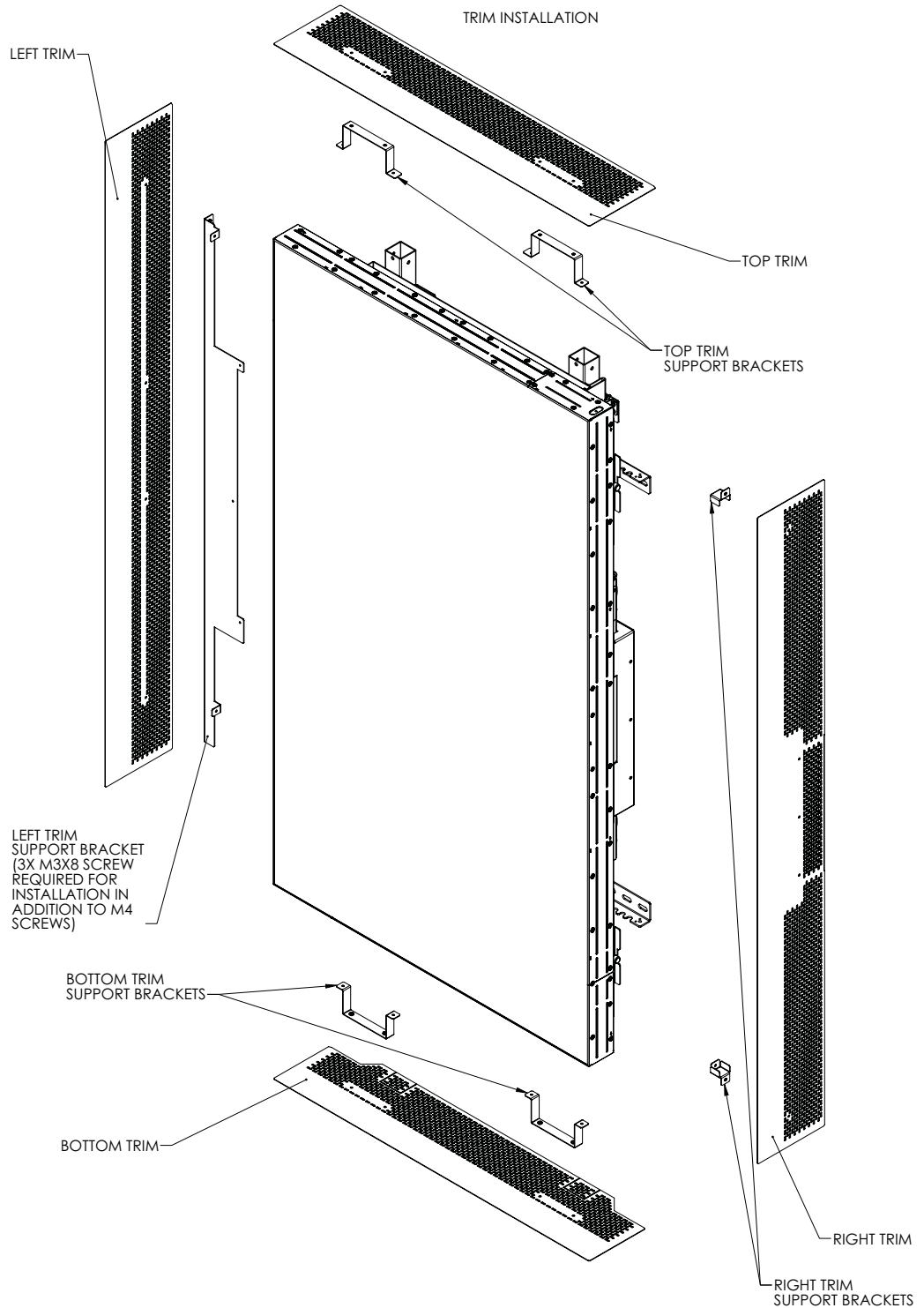
1   Place the left trim support bracket against the left side of the LCD module.

2   Install three M3 x 6 panhead screws on the top middle section of the bracket, as shown.

3   Install two M4 x 8 flathead screws on the top part of the left trim support bracket.

Note: As seen from the left side before the bracket is placed on the LCD module.

4   Using two M4 x 8 flathead screws per bracket, install two top trim support brackets on the top of each LCD on the outside row of the video wall.

5   Using two M4 x 8 flathead screws per bracket, install two bottom trim support brackets on the bottom of each LCD on the outside row of the video wall.

6 Using two M4 x 8 flathead screws per bracket, install two right trim support brackets on each LCD on the right side of the video wall.

7 Once the trim support brackets are installed, it is recommended that you install the LCDs in the video wall and then install the trim. See "Wall Installation" on page 25.

8 Using four M4 x 8 flathead screws for each piece of cosmetic trim, install the top trim for each LCD module in the outer top row of the video wall.
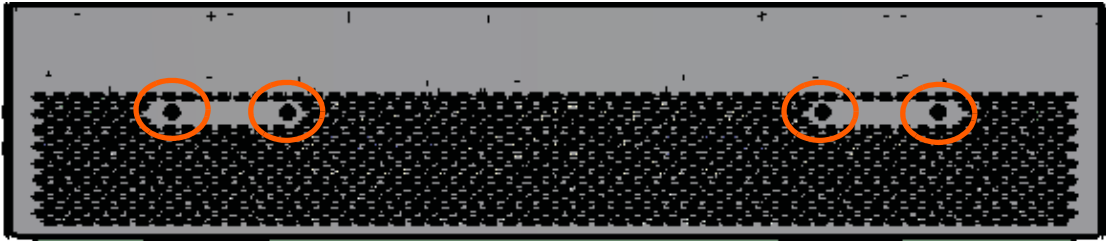
9 Using four M4 x 8 flathead screws for each piece of cosmetic trim, install the bottom trim for each LCD module in the bottom row of the video wall.
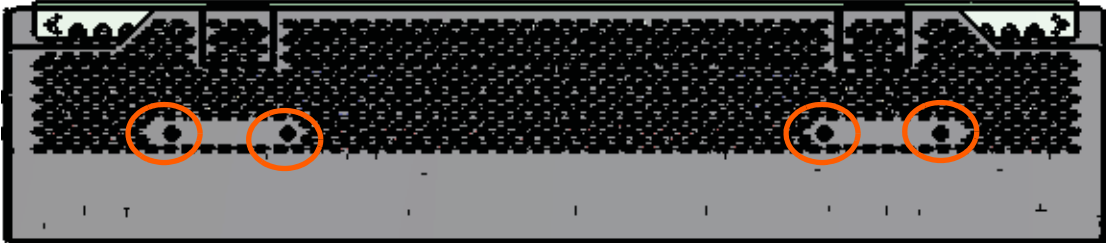
10 Using four M4 x 8 flathead screws for each piece of the left cosmetic trim, install the left trim on each LCD module on the left outer side of the video wall.
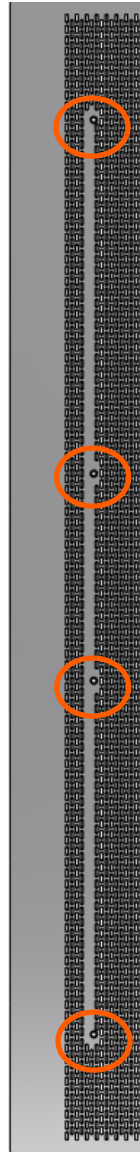
11 Using five M4 x 8 flathead screws for each piece of the right cosmetic trim, install the right trim on each LCD module on the right outer side of the video wall.

Accessing Planar's Technical Support Website

1 Go to http://partners.planarcontrolroom.com
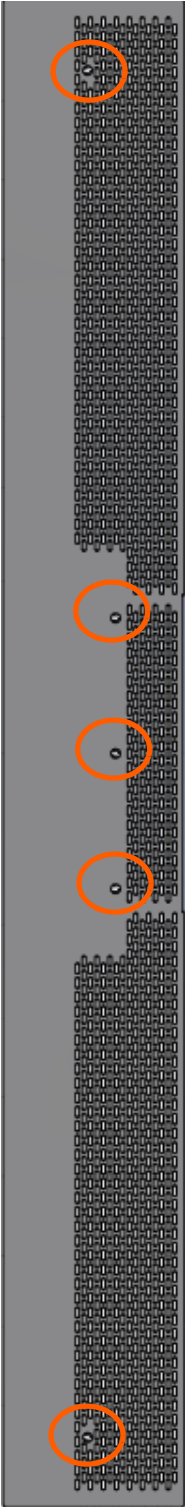
2 Once you enter your login and password, you can access downloadable utility software, new firmware, user manuals, and service manuals.

Downloading Additional Documentation and Firmware

Some of the other documents for the Clarity Matrix HX60, which are or will be available from the Technical Support Department website, are listed below.

Document Name	Contents
Installation Guide	Information for installers and technicians to install and configure displays.
RS232 Reference Manual	Technical information about the product, such as display mode information and how to use RS232 commands to control displays.

Downloading Utility Software

1   Go to http://partners.planarcontrolroom.com.

2   Enter your login and password information.

3   Navigate to the section that contains software updates and then look for Clarity Matrix LCD Video Wall.

4   From the list of available software, click on the tool you need.

Regulatory Information

Manufacturer's Name: Planar Systems, Inc.
Manufacturer's Address: 1195 NW Compton Drive

                            Beaverton, OR 97006

Declares that the products Model Numbers: HX60L, HX60P

Conforms with the provisions of:

Council Directive 2004/108/EC on Electromagnetic Compatibility;

EN55022:2006+A7 Radiated and Conducted Emissions from IT Equipment

EN55024:1998 Immunity of IT 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 2006/95/EC on Low Voltage Equipment Safety:

EN60950:2006+A11 Safety of IT Equipment

The Technical Construction File required by this Directive is maintained at the corporate headquarters of Planar Systems, Inc., 1195 NW Compton Drive, Beaverton, 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.

Other Certifications

CISPR 22

Clarity Matrix HX60 Installation Guide

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