



**Planar® LookThru™ Transparent OLED Display**

**Fabricator's Guide**

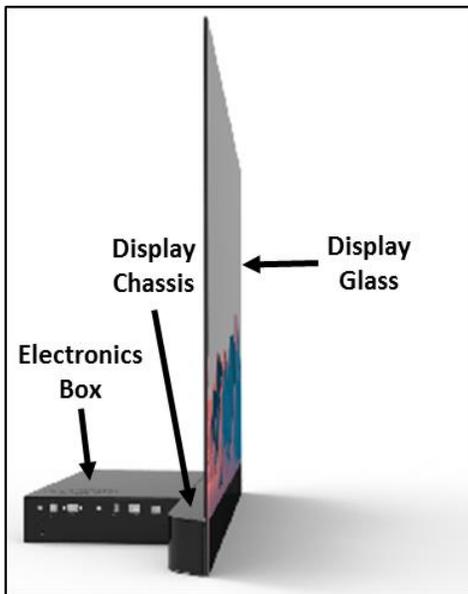
# Table of Contents

Table of Contents.....	2
What's in the Box.....	3
Display.....	3
Counterweight Plate.....	3
Cable Cover.....	3
HDMI and Power Cables.....	3
External Connections.....	4
Remote and Sensor.....	4
Quick Start Guide.....	4
Optional Accessories.....	4
Platform Cover: 955-0595-xx.....	4
Tiling Kit.....	4
Base Plate Kit: 935-0425-xx.....	7
Introduction to the Planar LookThru Display.....	7
Short Description of OLED Technology and Planar LookThru Design.....	7
Safe Handling.....	8
Cleaning.....	9
Environmental Considerations.....	10
How To Use Planar LookThru Display.....	10
General Instructions.....	11
Mechanical Considerations.....	11
Electrical.....	11
Thermal.....	11
Tabletop Installation.....	12
Mounting.....	12
Optical Considerations.....	14
Luminance.....	14
Transparency.....	14
Sunlight.....	15
User-Provided Touch.....	15
Content.....	15
Safety Considerations.....	15
Structural.....	15
Glass.....	16
Thermal.....	16
Specifications.....	17
Line Drawings.....	17
Regulatory Information.....	17

The purpose of this document is to provide guidelines and help for installers and fabricators working with the Planar® LookThru™ Transparent OLED Display. This document does not replace the User Manual or the Content Developer's Guide. It does not provide specifics on how to work in each environment where a Planar LookThru display may be installed. This document is intended to provide expert fabricators and installers with the information and understanding necessary to make the most of the Planar LookThru display.

Detailed specification and instructions on operating the Planar LookThru display are found in the User Manual located at [www.planar.com/LookThru](http://www.planar.com/LookThru).

## What's in the Box



*Standard Model*

### Display

Planar LookThru displays come in two models (described in detail in the next section) and both models have three main components: Display Glass, Display Chassis and Electronics Box. The Display Chassis is the main support for the entire display and should be used when removing the display from the box, moving it or mounting it during installation.

### Counterweight Plate

The Counterweight Plate serves as a stabilizer and ships attached to the Electronics Box on Standard Models (more information on models later). The Counterweight Plate should be removed if the Planar LookThru display will be mounted to a fixture or surface.

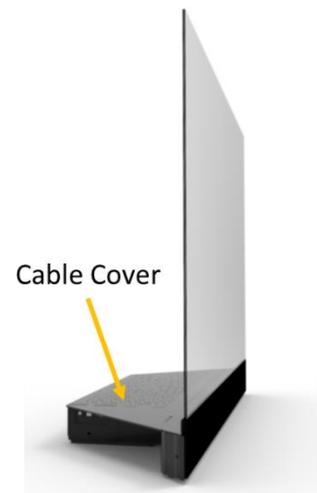
## Cable Cover

Due to the orientation of the circuit boards in the Electronics Box, it is asymmetrical when compared to the Display Chassis. The Cable Cover makes the Electronics Box symmetrical without restricting access to the I/O ports.

Note: Never use the Cable Cover to lift or move the display

## HDMI and Power Cables

The Planar LookThru display ships with a 110VAC power cable with C14 connector and one HDMI cable. The display has four HDMI ports (2x 2.0 and 2x 1.4), one DisplayPort input (1.2), one DisplayPort output, as well as connections for RS-232 controllers, LAN, USB and the infrared sensor.



## External Connections

The Planar LookThru display has four HDMI ports (2x 2.0 and 2x 1.4), one DisplayPort input (1.2), one DisplayPort output, as well as connections for RS-232 controllers, LAN, USB and the infrared sensor.

## Remote and Sensor

The Planar LookThru display is controlled by the included Remote Control through an On-Screen Display (OSD). To increase the range of the Remote Control, a 112-inch (2850mm) Remote IR sensor is also included.



*Remote Control and IR Sensor*

## Quick Start Guide

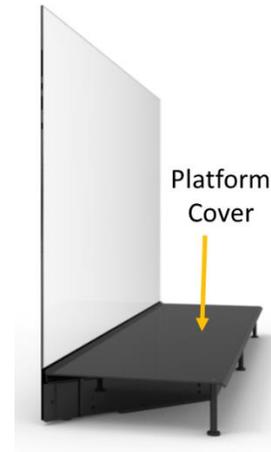
A printed guide with the basic information necessary to start and operate the Planar LookThru display is included, but the more detailed User Manual, Content Developer's Guide and this Fabrication Guide are available at [www.planar.com/LookThru](http://www.planar.com/LookThru).

## Optional Accessories

Depending on your installation needs, the optional accessories may help to facilitate proper use of a Planar LookThru display.

### Platform Cover: 955-0595-xx

The Electronics Box has perforations that allow for proper airflow and cooling. If the installation requires items to be placed close to the Display Glass, the platform cover protects the Electronics Box and supports any display items. The Platform Cover can accommodate display items up to a total of 20 lbs. (9kg). Do not exceed 20 lbs. in total weight on the Platform Cover.



## Tiling Kit

If multiple Planar LookThru displays will be tiled, optional tiling hardware can be used to help connect the free corners of the Display Glass (i.e. not the corners connected to the Display Chassis).

Note that the Display Glass is not designed to bear any load. The tiling hardware only connects the corners of the Display Glass and does not provide any structural support for the displays or any fabricated installation.

Here are the four tiling components:

- Plus sign shape for flat (2x2): 935-0421-XX



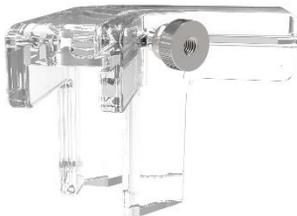
- T-shape for flat (2x1): 935-0422-XX



- Plus sign shape for angle (2x2) : 935-0423-XX

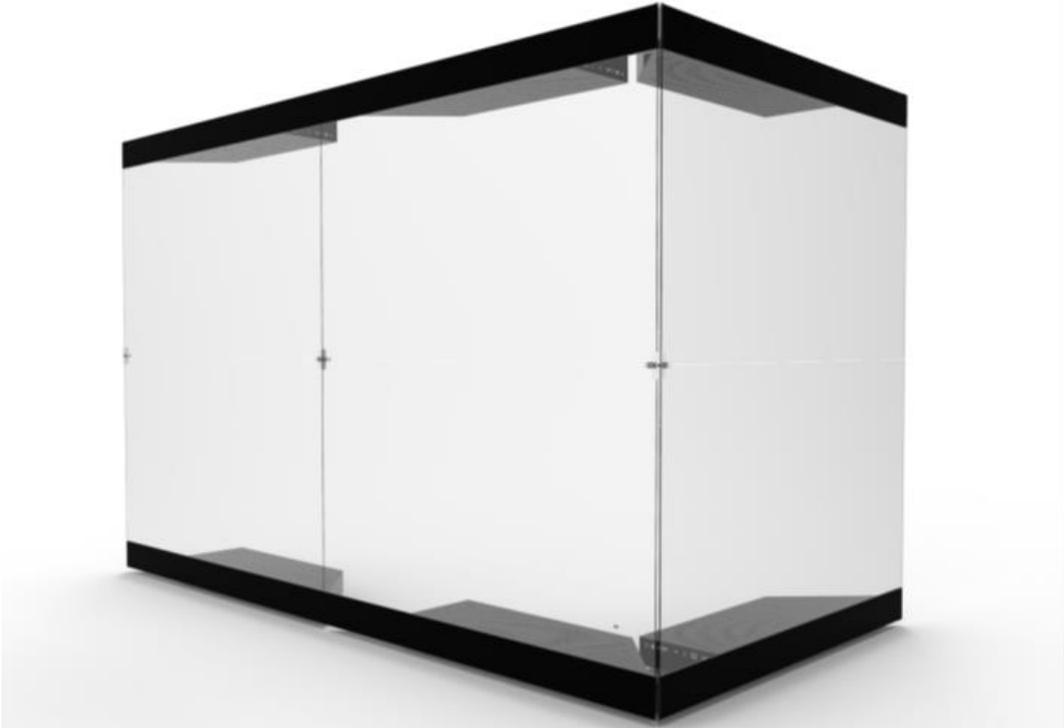


- T-shape for right angle (2x1): 935-0424-XX



*Plus sign shape for angle 2x2 (left) and T-shape for angle 2x1 (right)*

Below are examples of how to use the tiling hardware to connect the Planar LookThru displays.

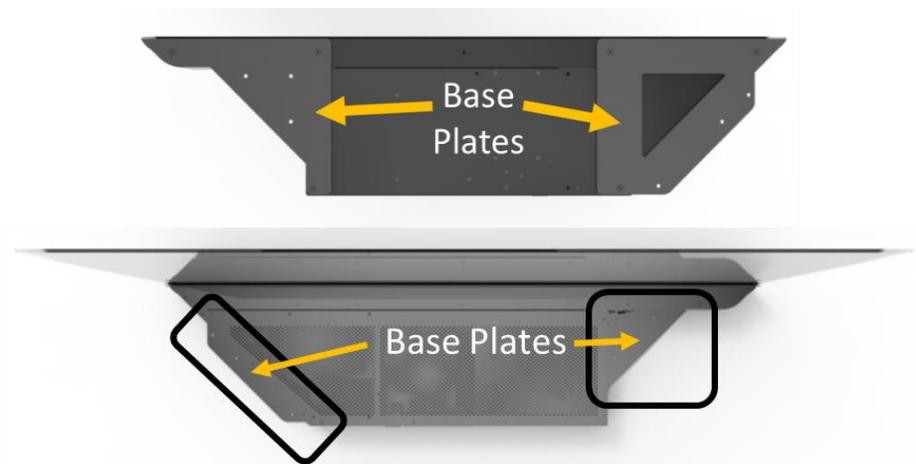


*Sample installation using the tiling hardware.*

## Base Plate Kit: 935-0425-xx

If the display will be mounted to a ceiling, wall or table top, the Base Plate Kit provides a mounting platform. The Base Plate aligns with the mounting holes on

the standard version of the Planar LookThru display (more about the version in the next section) and allows the mounting into the support structure to be independent of the mounting points on the Display Chassis and Electronics Box. The Base Plate can be used for either landscape or portrait orientation and is designed to accommodate standard wall studs that are 16 inches on center. The Base Plates provide adequate airflow for the Planar LookThru display and allow multiple displays to be connected and mounted together.



## Introduction to the Planar LookThru Display

The Planar LookThru display represents a new type of display technology. With that newness comes some considerations that must be addressed.

## Short Description of OLED Technology and Planar LookThru Design

The Planar LookThru display uses active-matrix organic light-emitting diodes to create an emissive display that is also transparent (technically translucent with 38% of light passing through it). Because each pixel is made up of light-emitting diodes, there is no backlight as on a traditional LCD display; rather, each pixel generates its own light and heat.

The Planar LookThru display comes in two models:

- LO552: Standard Model
- LO552-S: Straight Mount Model
- 

The Standard Model has the Electronics Box set at a 90-degree angle to the Display Glass. The Straight Mount Model has the Electronics Box set parallel to and below the Display Glass for installations.

### Front vs Rear Viewing

Because each pixel is emitting its own light, the display can be viewed from the back as well as the front (the back side being where the



*Straight Mount Model (LO552-S)*

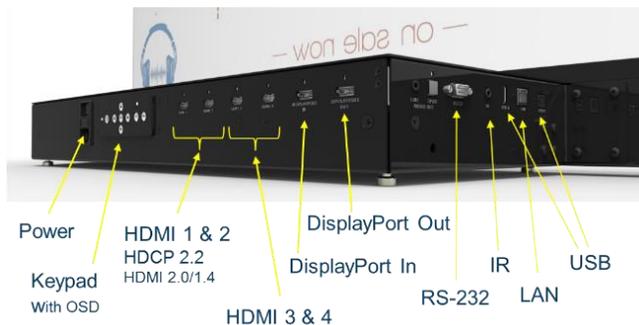
Electronics Box is located). However, the light emitted toward the rear is significantly less – approximately 90% - than that on the front, and any image viewed from behind will be reversed.

## Cooling Features

The Planar LookThru display generates significant heat that must be dissipated. The Electronics Box is perforated to allow for proper airflow but installations must keep at least 0.25 inches (5mm) between the Electronics Box and the mounting surface and 0.5 inches (12mm) above the Electronics Box to allow for that airflow. Additionally, dust build-up can prevent adequate cooling so regular vacuuming must be facilitated in the installation to allow for the cooling features to work.

## Glass Treatment

The front surface of the Display Glass is made of Corning® Gorilla® Glass, and is coated with an anti-reflective coating that is optically bonded to the OLED display. The Corning Gorilla Glass provides scratch resistance on the front of the display only. The back side of the display is susceptible to damage from sharp and/or hard objects and should be protected accordingly.



## Input/Output

A single display installation can be driven from any HDMI or DisplayPort capable source. If multiple displays will be tiled together, the RS-232 connection will allow custom display hardware to drive the displays.

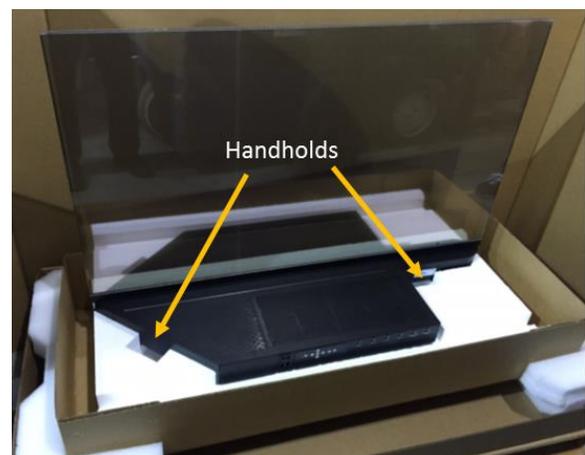
Installations should take into account the location of the inputs on the Electronics Box, as well as provide access to either the keypad on the back or the Remote Control (with an included 112inch extension cord and sensor).

## Safe Handling

When removing the display from its box or moving it around, hold it by the indicated handholds on the Display Chassis and Electronics Box. Do not lift, move or shift the display by the Display Glass.

It is recommended to have at least two people when moving or installing the display.

The display ships with a protective film over both the front and rear sides of the Display Glass. When removing the film there is a possibility of electrostatic discharge (ESD). Wear an appropriate ESD safety device and/or connect the Planar LookThru display's power cord to a





grounded outlet before removing the protective film to prevent ESD damage to the electronic components.

Do not bend or flex the Display Glass away from the Display Chassis. The glass is not designed to bear any weight or to be flexed at all. Doing so can weaken the connections between the Display Glass and the Display Chassis and result in damage to the display.

It is recommended that the shipping box be used whenever transporting a Planar LookThru display. Retain the shipping box if you think the display may be transported after initial installation.

The Electronics Box needs at least 0.25 inches (5mm) below and 0.5 inches (12mm) above of clearance for adequate airflow. Carpet or other soft materials that can flex by at least 0.25 inches are not suitable installation bases for the display.

If the feet need to be removed from the Display Chassis and Electronics Box for a mounted installation, at least two people should lay the Display Glass flat on a protected surface so that the Electronics Box is in the air (ideally before the protective film is removed). Remove the feet and then, lifting by the Electronics Box and Display Chassis, return the Planar LookThru display to a vertical position.

## **Cleaning**

Appropriate cleaning will be necessary both after installation and throughout the life of the display.

### **Metal Surfaces**

Wipe the metal surfaces of the Display Chassis and the Electronics Box with a dry, lint-free towel. If any cleaning product is necessary, it should be applied sparingly to the towel and never directly to the display. No liquid should be allowed to get into the Electronics Box or into the gap between the Display Glass and chassis.

Use a vacuum cleaner to clean any accumulated dust or lint on the Display Chassis and Electronics Box. Do not use compressed air as dust can be pushed into the Electronics Box and impede the normal airflow.

### **Glass**

The anti-reflective coating on the front of the Display Glass can be difficult to clean. Use a soft cloth, such as premium cheesecloth, that does not produce lint. Use a glass cleaner that is designed for LCD displays. If there are stubborn smudges or sticky substances on the glass, use high quality isopropyl alcohol to remove the substance before using standard glass cleaner.

As with the Electronics Box and Display Chassis, always apply cleaning solution to the cloth in moderate amounts, then wipe the cloth on the Display Glass. Never apply cleaning solution or isopropyl alcohol directly to the Display Glass.

Avoid touching or wiping the exposed edge of Planar LookThru LO552 and LO552-S models (standard and straight mount) as the silicon bead that seals the edge of the glass may allow some silicon onto the Display Glass surface and mar the anti-reflective coating.

## **Environmental Considerations**

Planar LookThru displays are designed for indoor installations that are not subjected to direct sunlight or extreme temperatures.

Normal use for the display is considered to be 18 hours per day at 25°C (77°F), moving images and 75 nits average luminance on the display.

The ambient temperature should not be below 0°C (32°F) nor exceed 40°C (104°F) as measured within 24 inches (610mm) of the Electronics Box.

Keep the relative humidity between 20 and 95% where the Planar LookThru display is installed.

Planar LookThru displays should not be installed or operated outdoors or in direct sunlight (even through a window). The display will not be readable in direct sunlight and the ultra-violet radiation will reduce the lifespan of the display.

The Planar LookThru display does not have a UV protective coating to ensure the best possible image quality so the installation location must protect the display from UV radiation via direct sunlight (i.e. not through a window) or other UV sources (e.g. full-spectrum lighting) that may shine on the display.

Adequate lighting behind the Display Glass will affect the appearance of transparency (similar to window glass) so lights may need to shine near the Display Glass for your installation to work; however, ensure that heat-producing lights do not shine directly onto the Display Glass or introduce heat to the Display Glass.

If it is not possible to keep light sources away from the Display Glass, use low-heat light sources such as LED or CFL bulbs. Avoid incandescent and/or halogen-type bulbs near the Display Glass.

## **How To Use Planar LookThru Display**

Planar LookThru is ideal for many types of installations including hospitality, exhibit displays, retail displays, wayfinding and entertainment. The specifics of how the display will be installed will determine the environmental and mechanical needs.

## General Instructions

Planar LookThru displays can be installed vertically or horizontally (in portrait or landscape orientation) with the Electronics Box facing up, down, left or right.

When installing a Planar LookThru display, it must be supported by the mounting points in the Display Chassis (primary) and mounting points on the Electronics Box (secondary) and NOT by the Display Glass. There are five primary mount points on the Display Chassis that receive M6 threaded screws. 20mm max thread penetration for primary and secondary mounting points. At least three of the five primary mounting points must be used when installing the Planar LookThru display.

To align the Display Glass, adjust the angle of the mount points rather than attempting to move the Display Glass. For example, shift the optional base so the display is level rather than attempting to adjust the angle of the Display Glass to align it properly.

The glass should not be bent, torqued or subjected to any weight-load.

*Disclaimer: Proper installation Planar LookThru displays is the responsibility of the customer. Failure to follow safety and installation guidelines from this manual, or installation of the display in a manner not covered in this document, is the responsibility of the installer and/or end customer.*

## Mechanical Considerations

### Electrical

Each Planar LookThru display has an average power consumption of approximately 100W with a peak consumption of approximately 300W when the display is completely white (more pixels lit equals more power used). The standby power for the display is less than 1W.

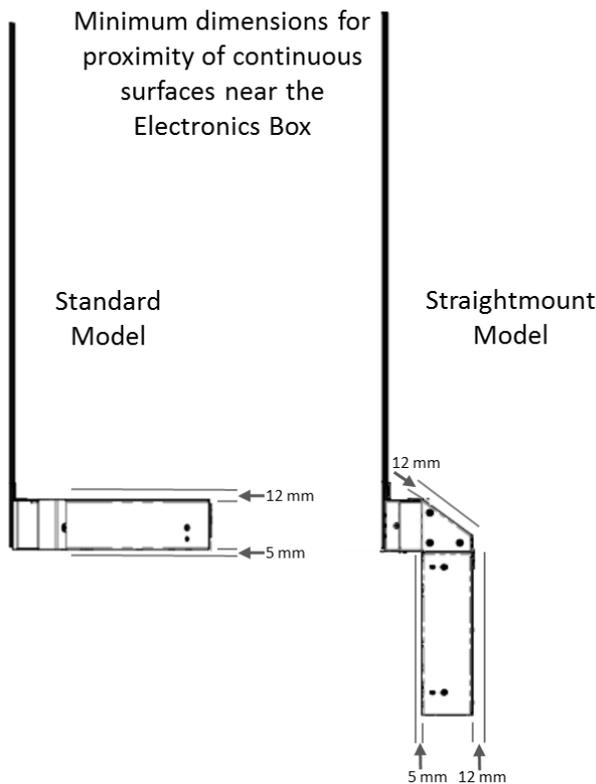
The power supply can accept inputs between 100 and 240V at 50 to 60Hz.

Ensure that the power circuit on which you install a Planar LookThru display can handle not only the average current, but also the peak current, to avoid tripping circuit breakers or creating a fire hazard.

### Thermal

The Planar LookThru Display Glass produces negligible heat but should be protected from direct heat sources such as incandescent or halogen lights. The Electronics Box and Display Chassis produce the majority of the heat from the display's electronics and must be allowed adequate air circulation.

To prevent ambient noise, the Electronics Box is designed to keep cool without the need for a fan so long as normal airflow is permitted. A sealed, enclosed box would restrict the airflow and increase the ambient temperature outside the Planar LookThru display's operating range (0° to 40°C). If the display's Electronics Box will be enclosed, adequate airflow must be provided and



at least 0.25 inches of clearance below and 0.5 inches above the perforated sides of the Electronics Box must be present.

Do not cover the perforations on the Electronics Box with cloth or display items that might reduce airflow. If display items need to be placed directly behind the Display Glass over top of the Electronics Box, consider using the optional Platform Cover or build a platform that meets the same specifications.

If installing multiple Planar LookThru displays in a tiled arrangement so that two or more Electronics Boxes will have their perforations adjacent to each other, double the required gap from 0.25 inches to 0.5 inches (12mm), or otherwise provide additional airflow to the Electronics Boxes.

## Tabletop Installation

The Planar LookThru display can be set on a tabletop that is of sufficient strength. The

Planar LookThru LO552 includes a Counterweight Plate to increase stability in tabletop installations. The Counterweight Plate is attached to the bottom of the Electronics Box with quantity 3 M6 screws. Remove the Counterweight Plate if the Planar LookThru display will be mounted to any fixture or surface.

The Planar LookThru LO552 model with the Counterweight Plate attached weighs 73.5 lbs. (33.4kg). The Counterweight Plate for the Planar LookThru LO552 model weighs 13.6 lbs. (6.2kg).

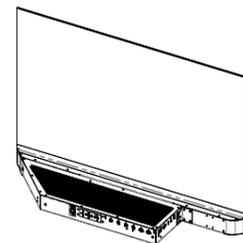
The Straight Mount model does not have a Counterweight Plate and must be mounted to a sufficiently strong fixture or surface.

## Mounting

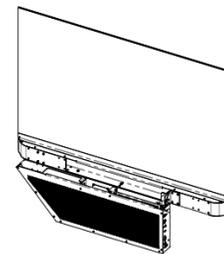
When mounting a Planar LookThru display, the entire weight of the display must be supported by the Display Chassis and Electronics Box. The Counterweight Plate (if present) must be removed prior to mounting.

*No load should be placed on the Display Glass.*

Without the Counterweight Plate the Planar LookThru LO552 weighs 59.9 lbs. (27.2kg). The Straight Mount Planar LookThru LO552-S weighs 63.5 lbs. (28.9kg).

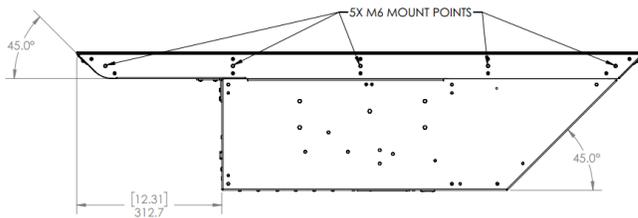


*LO552 Standard Design*

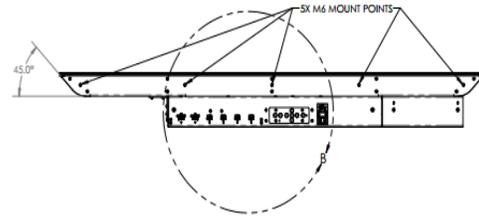


*LO552-S Straight Mount Design*

The primary mounting points are on the Display Chassis and at least three of five primary mounting points must be used when mounting the Planar LookThru display. Ideally, all five should be used, but when there is no suitable mounting substrate it is permissible to augment the primary mounting points with the secondary mounting points located on the Electronics Box.



*Standard Design Mounting Points (LO552)*



*Straight Mount Design Mounting Points (LO552-S)*

*Never use only secondary mounting points. Every installation must use a minimum of three primary mounting points.*

Both the primary and secondary mounting points receive M6 threaded mounting screws. 20mm max thread penetration for primary and secondary mounting points.

If there is insufficient support on the mounting surface (e.g. the wall studs do not align with the mounting points) the optional base plate can be used to aid in mounting the Planar LookThru display. The base plate can be secured to the mounting surface and then the display secured to the mounting points on the Base Plate that are aligned with the mounting points on the display.

Any leveling that needs to be done to align the Display Glass with the rest of the installation should be done via the mounting points and/or the base plate. No pressure should be placed on the glass to move it into position, rather the Display Chassis and Electronics Box should be moved to affect the desired movement in the Display Glass.

Multiple Planar LookThru displays can be arranged in a tiled installation using the optional tiling components.

The optional tiling components are connectors that clip the corners of the Display Glass together to prevent movement.



*Portrait corner tile set-up (LO552's)*



*Straight Mount Display (LO552-S)*

- Plus sign shape for flat (2x2): 935-0421-XX
- T-shape for flat (2x1): 935-0422-XX
- Plus sign shape for angle (2x2): 935-0423-XX
- T-shape for right angle (2x1): 935-0424-XX

The clips do not provide any structural or load-bearing support. Each Planar LookThru display must be individually mounted and supported. The clips should not transfer a load from one display to another nor require the Display Glass to be moved or torqued to install. The purpose of the tiling clips is only to ensure that the glass remains in its installed position.

The free edges of the Display Glass on the Planar LookThru LO552 and LO552-S models are treated with a silicon sealant to protect the AMOLED electronics inside. Avoid installations where the exposed edge can be handled by the public or will be subjected to wear to prevent degradation of the seal.

## Optical Considerations

The strength and position of ambient lighting will greatly affect the visibility of what is displayed on the Planar LookThru display and what is seen through it.

## Luminance

The average luminance of the Planar LookThru display is about 75 nits. While the actual lighting output of the display is not very much (a 100W incandescent bulb produces around 18,000 nits), the contrast between lit pixels and unlit (i.e. transparent) pixels provides a high effective contrast ratio.

When installing a Planar LookThru display it is important to illuminate anything behind the Display Glass that should be seen through the glass, but to keep that illumination low enough to not overpower the light output of the display itself. Unfortunately it is not possible to give specific numbers since distance from the Display Glass, ambient light and display content are all factors that affect the appearance of transparency and the readability of the display.

## Transparency

It is suggested that, before an installation is made final, test the lighting behind the Display Glass with the content running on the display to ensure the best possible transparency and visibility on the display. Dimmable lights for behind the Display Glass will provide flexibility and should be considered on all installations.

For installations where the Planar LookThru display is not enclosed behind (e.g. using a Straight Mount LO552-S model), the display will be visible from both the front and the rear, but with greatly reduced luminance from the rear and with all images reversed.

Without any content on the Display Glass, the Planar LookThru display transmits 38% of the ambient light through it (38% transmissivity) meaning that looking through the Display Glass will appear like looking through a slightly tinted window.

## **Sunlight**

The Planar LookThru display cannot be read in direct sunlight and will be damaged by exposure to UV radiation from either the sun or ambient light sources. Adding a UV coating to protect the display would also alter the color output, especially in the blue and purple spectrum.

Most building windows provide UV screening (with the UV radiation turned into heat). If the display must be installed where sunlight can hit it through a window, ensure that the window provides the necessary UV protection and that the added heat generated by the sunlight does not bring the ambient temperature of the display installation above 40° C (104°F).

## **User-Provided Touch**

Control of the touch interface is up to the user.

## **Content**

Since the Planar LookThru display is a new type of platform, the content showcased on the display requires new types of consideration. A comprehensive Content Developer's Guide is available on [www.planar.com/LookThru](http://www.planar.com/LookThru).

As a fabricator, it is important to align the installation with the content to deliver the best possible experience. For example, a content developer wanted to highlight different objects behind the Display Glass in an exhibit-style installation, the installation would benefit from a low-light interior (i.e. behind the Display Glass) with adjustable spotlights.

When fabricating for Planar LookThru displays, it should be considered as a part of the overall environment rather than a separate piece that provides a display in the environment. Content then becomes not simply an addition, like a poster on a wall, but something to be integrated like a window in a wall.

## **Safety Considerations**

### **Structural**

The Planar LookThru display is not a structural piece and cannot be used to support any portion of the installation. Support the full weight of the display by using the primary and secondary mounting points on the Display Chassis and Electronics Box.

## Glass

The glass on a Planar LookThru display is 2mm thick Corning Gorilla Glass covered (on the front side only) with an anti-reflective coating. As such the glass can withstand normal impacts and scratches as from being used as a touch interface, but it is not designed nor capable of bearing any loads.

Do not stress the glass or move it out of a 90-degree alignment with the Display Chassis. If the glass is accidentally moved out of alignment, relieve the pressure on it and allow it to move back into its neutral position as soon as possible.

The rear side of the screen does not have an anti-reflective coating nor protective Corning Gorilla Glass. It should be protected from touches, scratches or impacts.

## Thermal

The Planar LookThru display is designed to operate only between 0°C (32°F) nor exceed 40°C (104°F) ambient temperature. If lighting, heating, or the Electronics Box of the display will increase the ambient temperature above 40°, install additional cooling measures to prevent damage to the display.

*Be sure to account for the added heat of a computer when calculating the ambient heat in an enclosed Planar LookThru display installation.*

When operating within the appropriate temperature range, the Electronics Box requires 0.25 inches (5mm) of clearance below and 0.5 inches (12mm) above the perforated holes to allow for airflow. Dust and lint accumulation can restrict the airflow and should be addressed through either cleaning access (using a vacuum) or air filtration on the installation if vacuuming is not feasible.

## **Specifications**

Specifications are available at <http://www.planar.com/LookThru>

## **Line Drawings**

2D and 3D models are available at <http://www.planar.com/LookThru>

## **Regulatory Information**

Refer to the Regulatory Information in the Planar LookThru Transparent OLED Display User Guide available at <http://www.planar.com/LookThru>