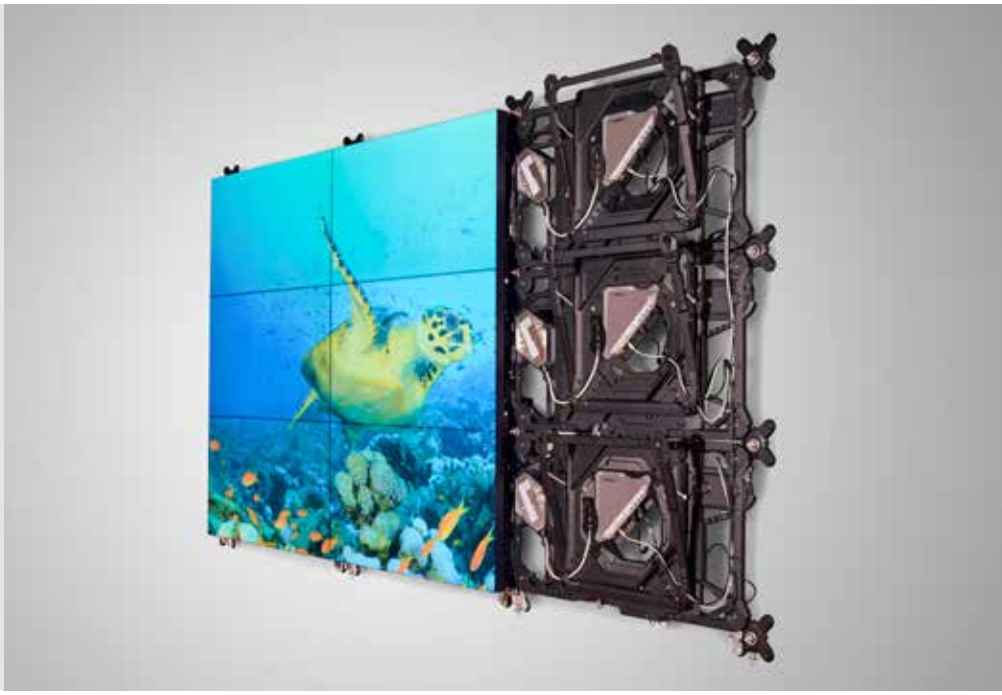
Technical article

Inside UniSee Mount



Explaining the journey towards –and the great innovation inside! – Barco UniSee®'s revolutionary patented mounting structure, guaranteeing the precise installation of every Barco UniSee wall, regardless of its size.

Introduction: the pains with current LCD Mounts

When Barco started designing the Barco UniSee LCD video wall platform, it soon became obvious that a new mounting structure would also be needed. The standard availablemounts simply did not accommodate the bezel-less and modular platform's needs and could not guarantee a perfectly aligned video wall keeping tolerances and screen gaps under control during its entire lifetime.

The reason for this is quite simple: the standard VESA mounts were originally designed simply to hang single LCD panels on a wall. These common mounts are essentially nothing more than fixation brackets. Moreover, as demonstrated throughout the years, these standard mountsare well suitedto supportsmaller LCD video walls, but the moment you want to create larger video walls (for example a 6x4 configuration) you run into trouble because ensuring a perfect alignment of all panels of the video wall becomes harder and time-consuming. Additionally, as the bezel size reduces, the risk of panel damages when using standard mounts increases.

In simple words: no installer, how talented he or she may be, can drill holes with a precision that exceeds 1 mm/0.04". There's always a tiny margin. And this is acceptable because the mounts have been designed to compensate these faults by allowing further fine-tuningat the end of the installation with a simple screwdriver when accessing it from the side. This fine-tuning is not difficult when installing a smaller LCD video wall, butfrom a 3x3 video wall configuration onwards, there are panels that are completely locked in by other panels, making the job harder and harder.Locked in panels cannot be reached from the side, making them very difficult to align. Yes, you can slide the video wall forward (like you do when servicing the panel) and access the alignment screws, but you have no reference for how much you need to turn. It's a blind operation that can become very time-consuming.

The larger your video wall (so the more panels are locked in), the more difficult becomes its alignment and this complexity rises exponentially (Fig. 1). This islogical, because changing the alignment of one panel will change its position relative to each of its neighbors. This is the reason why there are typically larger gaps between the panels in a larger video wall than in a smaller one.

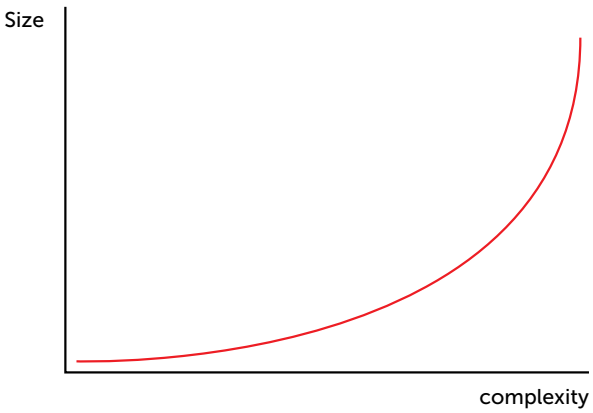


Figure1: Size vs complexity when installing an LCD video wall with traditional mounts

Having control over these gaps and keeping this control in larger video walls to ensure the best possible viewing experience, was one of the pre-requisites when Barco UniSee was designed. Next to these important installation issues, there were other challenges we wanted to tackle. First of all, when working with bezel-less LCD video walls, a main point of concern is the panels'edges. A thinner bezel (or equally alike, the absence of it in the case of Barco UniSee) makes the panels more vulnerable to installation damages. Thus, you cannot put any pressure on them: not at first installation, not when differences in temperature and humidity affect the structures, and not when servicing the video wall in the future. On top of that, you also need to make sure that the gaps are kept to the absolute minimum. If there is a bezel, the gap between panels is only slightly visible. But for bezel-less video walls, the inter-screen gap suddenly becomes more important and far more noticeable, as it takes a bigger portion of the total pixel-to-pixel distance. Hence, when designing a video wall with Barco UniSee panels, it is crucial to minimize and control theseinter-panel gaps.

Since the release of Barco UniSee, a number ofnew solutions with a bezel width of less than 1 mm have been introduced. However, these products still use the traditional VESA mounting systems. In other words, they still suffer the same old alignment issues at time of installation and mechanical alignment drifts over time. These issues are successfully tackled by Barco's UniSee Mount solution, which not only eases perfect installation, but also eliminates alignment drifts.

The UniSee Mount general meta-structure

The requirements

The ambitions for the UniSee Mount were really challenging. Barco would not have beensatisfied with a result that merely solved one aspect of the challenge.

- Guarantee a precise installation of the video wall, regardless of its size andindependent of the installers' skills;
- Ensure the smallest gap between all LCD panels at time of installation, but also keep these tolerances under control over time;
- Allow easy expansion of the video wall for future needs;
- Ensure ease of maintenance, for every panel, with the lowest possible risk of panel damage;
- Offer asolid mounting structure, that isstill easy to maintain;
- Create the basis to support Barco UniSee's modular platform philosophy and offer a structure to host critical components like power supply and input board.

Since the design team started from scratch, they had the freedom to experiment in multidisciplinary teams. The result was a revolutionary mounting structure emerging from sheer mechanical innovation that brought everything together. Watch the video for more insights.

> Traditionally, you install the mount and the panels, and then you do the adjustment of your entire video wall.
>
> With the UniSee Mount, we changed this paradigm by creating a solid base which we call the meta-structure. Installing this grid requires some precision at the start, but it saves you a whole lot of time when you start to install the panels. This is just a matter of hanging the panels into the frame. Once installed, your perfect gap is guaranteed.
>
> **Tom Dewaele,**
> Design Manager at Barco

The UniSee Mount in more details

The wall mount: a solid basis for the meta-structure

The design team created two parts in the UniSee Mount (Fig. 2a): a fixed part (dark grey) that is used to connect the structure to the wall, and a floating part (blue) that has a bit more freedom of movement and that carries the panels. In this way, the basic part to support the video wall, and the part that ensures the alignment of the entire wall are separated, making both operations manageable.

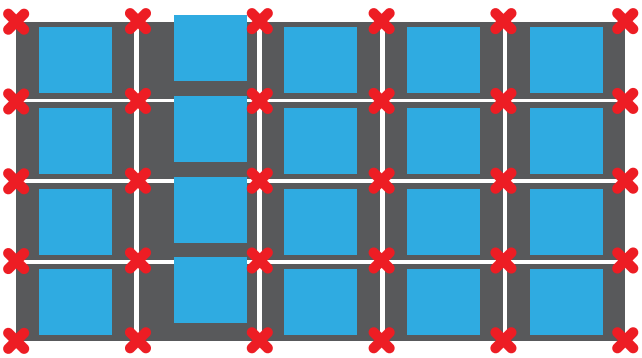


Figure 2a: The UniSee Mount consists of two parts: a fixed (dark grey) and a 'floating' (blue) part

Figure 2b: Real photo of one UniSee Mount unit.

The wall cross: the UniSee Mount's secret carriers

One of the most important elements to help meeting the requirements and guaranteeing a precise installation is the specifically designed 'wall cross' used for mounting (Fig. 3).

This essential and patented element of the structure literally carries the design, as it is the only connection to the wall. There is a wall cross on every corner of eachMount, unless for touching panels, that only need one wall cross (as seen in Fig. 2a). Because one bolt is enough to hang the wallcross, the number of drill holes needed is dramatically reduced resulting in installation time savings. What's more, the tolerance against drilling errors of the wall cross is higher than with current generation LCD mounts – sosmall drilling errors are compensated (Fig. 4).

Fixing the individual mounting structures together with these wall crosses creates a solid meta-structurefor the video wall.

Figure 3: The UniSee Mount's wall crosses combine multiple functions in the design.

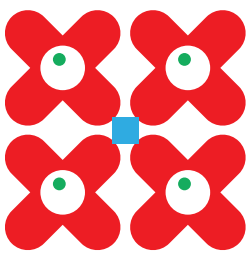


Figure 4: The UniSee Mount's wall crosses can compensate for drilling errors

Compensating for the physical wall's imperfections

Walls are rarely 100% straight (schematic representation in Fig. 5). Although often hardly visible by the naked eye, these imperfections have a big impact on the installation outcomes of video walls, because mismatches on the Z-axis always have a negative impact on the LCD video wall.

However, these imperfections are compensated by the innovative wall crosses. Because the large bolts can be easily moved along the Z-axis (Fig. 6) for up to25 mm/1", installers have the freedom to compensate for the wall's imperfections in an easy way – if they are within reasonable limits, that is.

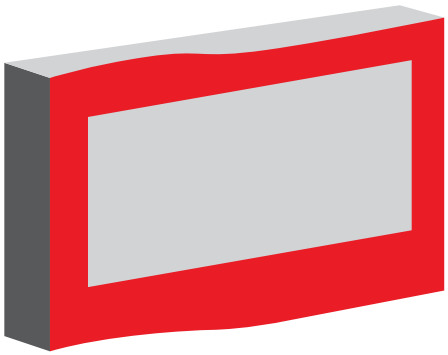


Figure 5: Walls are rarely perfectly straight, causing issues when mounting an LCD video wall

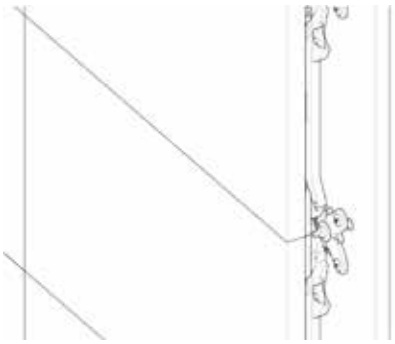


Figure 6: The wall crosses have up to 25 mm/1" of space to move along the Z-axis (the depth)

The UniSee Mount alignment principles

Using gravity for perfect alignment

Even when designing a mounting structure from scratch for larger video walls, alignment remains a tough nut to crack. This is because – unless you have one large structure to hang the complete wall from, which would be impossible to handle – there are always some drilling errors and difficulties in accessing the inner panels. Plus, just like everything that is not resting on a solid surface, gravity is an issue.

That's why, after some failing prototype iterations, the Barco designers decided to actually use gravity as a driving force in their design instead of fighting it. Once thatdecision was taken, everything fell perfectly into place. Quite literally, that is!

The basic idea behind the UniSee Mount is to have the bottom row and the left panel column of the video wall fixed (Fig. 7), while the other panels still have some space to move. Driven by the fixation points on the bottom and the left (blue arrows), these outer (red) rows create a force that points to the top right (see white arrows).

All other (dark grey) panels were designed to direct the force to the bottom left. This creates a tension that allows the panels to tighten together. A spring-loaded systemensures that the forces on the edges of the LCD panels are limited, effectively preventing damage to the edges.

The result of this system? An LCD video wall that automatically aligns perfectly, without the need to fine-tune with a screwdriver (as mentioned on page 2). Alignment is guaranteed at any time thanks to the power of gravity!

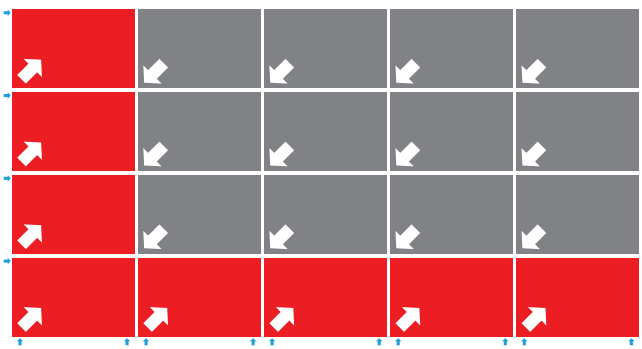


Figure 7: The red panels are fixed, providing the power to keep the other panels perfectly aligned

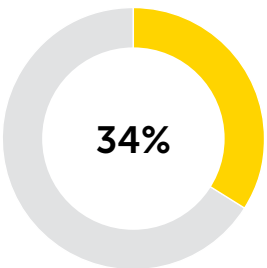
UniSee Mount's impact on installation time

UniSee Mount is a revolutionary new structure, which still requires a high level of precision when creating the foundation of the entire meta-structure - as this impacts the alignment which is being secured upfront, and not at the end like with traditional video walls - but which simplifies the installation of sub-1mm video walls overall. Thanks to the UniSee Mount, fine-tuning time after installation is reduced drastically resulting into real time and cost savings.

Barco offers a special training program for installers to become accustomed to this innovative way of working. These trainings can be followed online, onsite and even a guided installation service is being offered to partners, in which an experienced Barco specialist guides installers through the process.

The time saving feedback received from the field is quite impressive. Below table shows the difference in effort of installing and fine-tuning a 10x4 video wall using UniSee Mount compared to competing structures.

	UniSee Mount	Competing structures
Physical LCD video wall installation	3 days	3.5 days
Fine-tuning time	1 day	2.5 days



Overall, the installation time is reduced by 34% compared to other LCD video walls. And, equally important, the installation is done even more precisely using the UniSee Mount!

Channel partners told us that the first generations of e/exnb products were incredibly fragile with many breakages and damages seen by integrators during installations. This issue has been remedied to a degree, as installers have become more used to handling these displays, but it is still an issue. However, this is not a problem for the Barco UniSee product due to the innovative mounting system that has been developed by Barco.

FutureSource2019 Global Videowall Display Solutions Report

The importance of UniSee Mount for the modular platform

Fitting the external components

Barco UniSee was conceived as a modular platform. This has a lot of advantages when servicing and upgrading the system. Several key elements, including the input board and power supplies, are separated from and located independent of the panel (UniSee View), so they can easily be accessed and replaced when necessary.

The UniSee Mount fits this philosophy perfectly by providing the place to host theseexternal components. Both the connection board, and the power supply (optionally, the redundant power supply as well) find their perfect place on the board (Fig. 8). What's more, space is foreseen for the cabling, making sure everything is neatly in place and never hinders an operation.

The analogy of removing and replacing a panel for servicing is similar to docking and undocking a laptop from a docking station. When the LCM (Liquid Crystal Module, which is the 'front end' display part of the panel) needs servicing, it can simply be undocked from the UniSee Mount behind, without having to disconnect any cables. Afterwards, it can be docked back to resume normal operations.

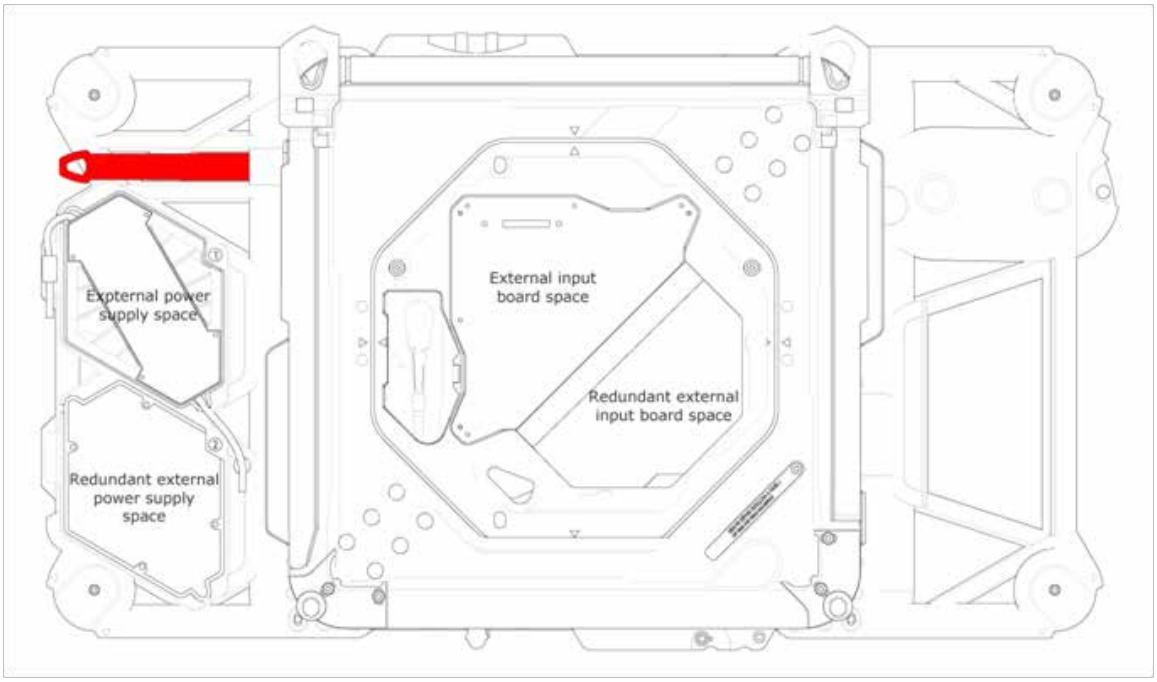


Figure 8: The UniSee Mount provides the needed space for the external components

Maintenance using UniSee Mount

The traditional issues when servicing the inner panels

Even the most durable and reliable video walls need maintenance from time to time. With Barco UniSee, we have limited these maintenance needs by removing certain parts that are susceptible to wear – for example, by making a passive cooled system without fans – but,nevertheless, a time for service will arise.

Traditionally, maintenance is quite a difficult operation with ultra-narrow or bezel-less LCD video walls. Removing the panels from their place not only requires quite some effort, especially for larger video walls, but you also risk losing the panel's alignment – requiring you to start the complicated aligning processall over again, with the addedrisk of damaging the panels. Avoiding this was one of the key objectives when designing the UniSee Mount.

Maintenance: it can be easy

Because the UniSee Mount consists of two separate parts (a fixedpart for wall fixation and a floating part for panel mounting), you can move the panels separately from the structure. We illustrate, for example, how to service the red panel in the video wall below (Fig. 9).

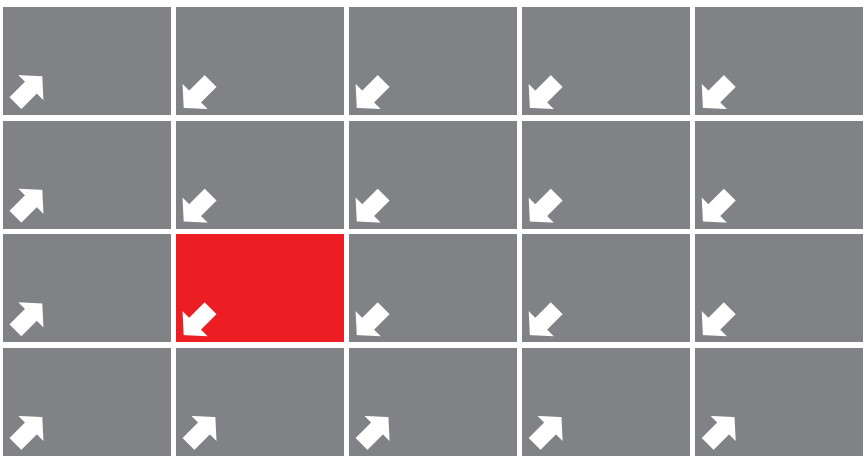


Figure 9: Imagine your objective is to service the red panel

Using a simple wrench, you can easily move a complete column a few inches/ centimeters towards the upper right. Start with the rightmost column, and work your way one column at the time until your reach the column that contains the panel that needs service. In our example, this will look like this (Fig. 10):

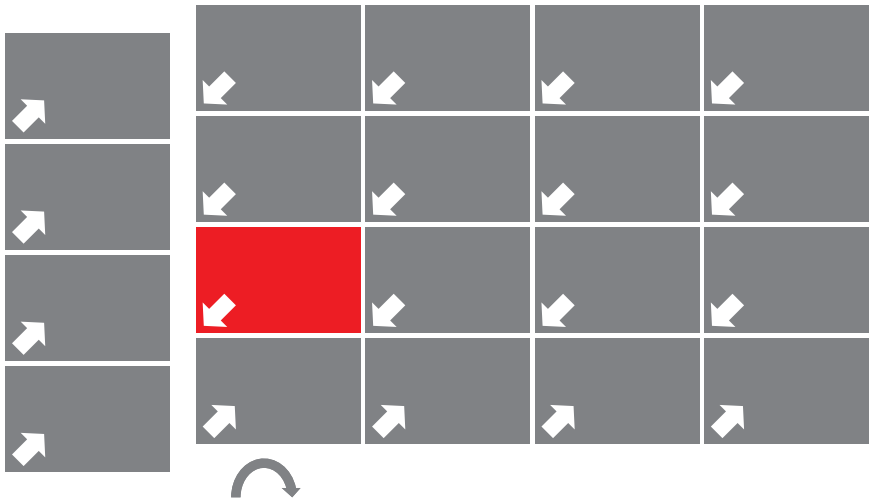


Figure 10: The UniSee video wall with columns shifted to the upper right

Then, the true magic happens. First, fix theservice lever (this is the left red bar in Fig. 8), and then release the column that contains the panel you want to service by using the same wrench. This will keep all panels to the right and the top of the panel-to-service in their place. The panels underneath the red one will gently slide into their original position, while the panel-to-service will follow halfway. This will look like Fig. 11. The red panel is now isolated and can be easily accessed and removed. Because the panels are simply connected to the UniSee Mount with only two brackets, the panel can be easily removed to maintain the power supplies or connection unit – or to replace the panel entirely. All these operations can occur without the risk of damaging the panels.

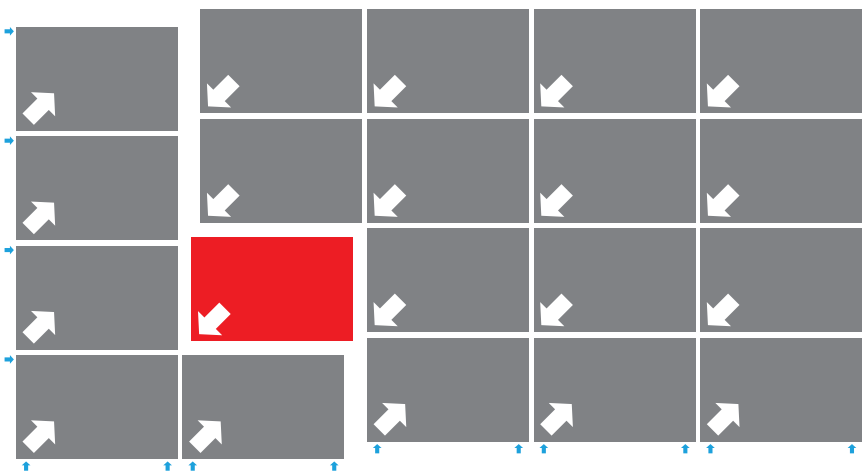


Figure11: The red panel is now isolated and ready to be serviced

When maintenance is complete, drive up the service column again and release all columns using the wrench.This will make all of the panels slide back into their original position. Because the backbone has not moved, there is no risk of losing alignment.

Think this description is quite abstract and you want to see what happens yourself? Then check out this video, where the end-to-end maintenance concept is shown.

A curved installation with all the UniSee Mount benefits

Issues when curving an LCD video wall

Curved video walls create a spectacular sense of immersion. Especially for larger installations, straight setups are not easy to watch in full – resulting in suboptimal ergonomics. When using traditional VESA mounts, it is extremely challenging to create a curved LCD video wall because by curving the wall, the risk of bad alignment in all directions, especially along the Z-axis (the depth) is very high. Also the gaps between the panels will become significantly larger. This is already true for the 3.5 mm and 1.8 mm bezel generations, so even more challenging for the bezel-less Barco UniSee.

And things get even worse when trying to service a traditional curved LCD video wall. Replacing a single, locked-in panel is often impossible, forcing you to remove all the screens. This causes a very long service time – which can take up to several days.

Preserving UniSee Mount's benefits for curved video walls

In order to offer the same UniSee Mount benefits for curved video walls, Barco and strategic alliance partner Vogel's jointly developed an innovative curved mounting structure. This new structure allows a concave curved setup from 0-10 degrees, in steps of 1 degree.

The rationale of the curved structure is the same as for the straight setup: using a fixed and a floating part, the panels can be installed with ensured precision along all axes whilst keeping the gaps under control. Gravity makes sure they fall perfectly into place, guaranteeing the smallest possible seam in any case. Also servicing has the same benefits as with the straight setup: every column to the right of the panel to be serviced is shifted upward and to the right.

However, the mechanics of the curved mount are slightly different. New wall crosses and special corner pieces were developed to accommodate the curved nature of the structure. These are available in the UniSee Curved accessory kit. Thesolid back structure created by Vogel's ensures a comfortable and safe mounting, for both the installers, service staff and users. Note that there are separate kits for landscape and for portrait set-ups.

Conclusion

The UniSee Mount was conceived to answer all theneeds of bezel-less LCD video walls. Using the power of gravity and a lot of design innovation, the structure succeeds in offering the right platform for now and into the future.

Key takeaways

- We have **simplified the complexity** of creating a perfectly aligned video wall.
- With the UniSee Mount, we are able to **keep tolerances and screen gaps under control**.
- UniSee Mount is helping to **ensure a sub-1mm precise installation over a multiple-m² wall** which is impossible to achieve with normal VESA structures.
- A **high level of precision** is needed when creating the **foundation** of the entire meta-structure as the **alignment** is being **secured upfront** and not at the end like with traditional video walls.
- **Fine-tuning time** after installation is **reduced drastically** resulting into real **time and cost savings**.
- Also a **curved mounting option** is available, to ensure all the benefits of the UniSee Mount for curved installations.

Looking for more information about the UniSee Mount? Then, watch the video, or contact us!

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