How do you get one image from multiple projectors?

Using visual elements to enhance a service is a common tool for houses of worship. **Worship AVL Asia** explores how you can go bigger and bolder with the available technology.

Sometimes it seems that the only thing that limits the use of visuals in worship is the screen size they are projected on. If a screen is too large for the projection system, images can appear dim or lose resolution as they try to fill the whole space. Small screens, on the other hand, mean great graphics can often appear small or become lost.

However, this does not need to be the case. Technology is available to allow houses of worship to combine several projectors to make a much larger image or to create a brighter display on the screen.

There are several reasons why a house of worship would wish to use multiple projectors for one image. The HOW may need to create larger images than the aspect ratio of the projector offers, it might need to create brighter images than is possible with a single projector, have more pixels than possible with a single projector or it may need a large image when there isn’t enough projection distance available, even with the shortest lens.

‘While a multi-projector installation can be costly, simple and cost-effective options are now available for congregations looking to modernise their facilities and connect with their audiences in new ways,’ says Sarah Kelly, corporate marketing manager at Matrox Graphics Inc. ‘More and more HOW environments are adopting Matrox multi-projector technology and have seen first-hand how it’s kept their congregations actively involved – and enthralled – in services and performances.’

‘Having a wide panoramic projection image leaves an impression on the audience,’ agrees Tan Tiong Leng, technical executive for Panasonic’s professional systems division, professional audio video department. ‘The large image real estate can be used in exciting ways, by having an animated graphics background, live camera feeds and presentation slides in the foreground. It can also be used to convey special content like an ultra wide camera feed or for immersive simulation environments. Lastly, multi-projector blending images are also used for projection mapping instances onto a building or inanimate objects.’

‘If the pastor is speaking to a large congregation and moves around a lot, they may need the largest possible image,’ adds Mark Wadsworth, international marketing manager for Digital Projection International. ‘Often when this is incorporated with an IMAG system, a wide screen can display static and real-time content at the same time, allowing the congregation to better engage with the service.’

‘Multi-projector setups are usually deployed as complementary enhancements to any number of HOW services or productions, from simple readings to live concerts and performances,’ further Ms Kelly. ‘Congregation leaders have dreamed up many ways of using multi-projection, including: adding architectural interest to new buildings that are missing stained glass and other traditional decorative elements, projecting inspirational panoramic video content as part of...’

**TripleHead2Go in action, courtesy of Camron Ware**

**Multiple projectors can be used for architectural purposes**
a service, or increasing audience participation by displaying community announcements, hymn lyrics and prayer text.’

**Edge blending**

Having established why a house of worship would want to use multiple projectors, the next step is to explore how it can do this.

‘To get one image from a multi-projector set-up, a user would need to use a feature called edge-blending,’ says Mr Wadsworth. ‘This is where multiple projectors can be used to produce one seamless image, often spanning over a wide, irregular shaped screen.’

While this creates a large image, there is one major issue that the technology needs to solve. ‘The fact that the projectors are overlapped also means that you will have a common part of the image between two adjacent projectors,’ notes Barco’s Vickie Yueh. ‘Then the image from one projector is feathered out versus the other projector that is increasing in

![Without edge blending, overlapping areas can appear brighter](image1)

![Achieving a single image with edge blending](image2)

**Edge blending and image brightening are reasons to use multiple projectors**

brightness in the overlap. This makes a nice uniform brightness image all over the screen.’

There are two types of edge blending available to houses of worship. ‘Hard edge blending is where the edges of the projectors do not overlap and are neatly aligned, while soft edge blending is where a percentage of the image from each projector is made to overlap and brightness corrected,’ explains Mr Tiong Leng.

‘The playback system being selected would be different for each type,’ he continues. ‘For hard edge blending, the videowall playback system does not need a pixel correction function, whereas for soft edge blending, the playback system would need to be able to reproduce the content of the overlapping pixels on the overlapping projectors to be soft blended.’

**Adding brightness**

The second reason for using multiple projectors for one image is to add brightness to the projection. ‘In

![Piano miking simplified](image3)

**Piano miking simplified**

- Pristine sound quality
- Quick and simple setup
- Incredible gain before feedback
- Superb sound with the piano lid up or down
- Low profile design
- No hot spots
- Cannot be seen from outside the piano

Earthworks® PM40

earthworksaudio.com/pianomic

(609) 654-2433 • info@earthworksaudio.com

MADE IN USA • 15 YEAR WARRANTY

a house of worship with a lot of ambient light and a large screen, it may be necessary to use two or more projectors to get the required brightness,’ states Mr Wadsworth. ‘This however doesn’t use edge blending, but relies on less shift to align both images with exact pixel accuracy on top of each other.’

‘When you require a higher brightness of the image you can dual or triple stack the projectors and project onto the same image,’ adds Mr Tiong Leng. ‘This can be done relatively easily using video distribution amplifiers to split the original video source into the required number of projectors.

‘Using one projector to cover a very large image size will drastically reduce the effective brightness of the image,’ continues Panasonic’s Mr Tiong Leng. ‘This means that the environmental lighting has to be heavily controlled or the image will appear washed out. By using multiple projectors and
each of them covering a fraction of the intended image will therefore achieve an image with overall higher brightness.1

Choosing technology

Armed with the knowledge of why and how many houses of worship are opting to use multiple projector setups, the next stage is examining the available technology to decide which is the most appropriate for your HOW.

‘There are two ways to perform a blend screen, with hardware or without,’ says Ms Yueh. ‘Most Barco allow for a seamless image to be shown on the screen. This built-in functionality is necessary as the blend zone (where the two images overlap) has an elevated brightness level. To make this one seamless image, the brightness in these regions needs to be reduced to match the image either side of it.’

Mr Tong Leng agrees that the most important piece of hardware for this area is the projectors themselves, suggesting houses of worship should opt for multiple projectors with edge blending and colour matching functions. ‘The edge blending feature external multi-monitor adapters like Matrox DualHead2Go and TripleHead2Go to connect the single video output of a compatible notebook or desktop computer to two or three projectors, respectively,’ she explains. ‘These small devices are especially popular within the worship community given their cost-effectiveness, ease of setup, and ability to work with Mac or PC laptop or desktop computers. They come bundled with the Matrox PowerDesk software that features a number of desktop management options including clone mode to show the same content on all projector outputs.

‘Additionally, for similarly or larger sized multi-projector installations, Matrox M-Series add-in graphics cards can connect up to eight projectors, all from a single board, in a single PC,’ continues Ms Kelly. ‘The M-Series boards also come bundled with an enhanced version of the Matrox PowerDesk software, which includes the Edge Overlay feature. Installers looking to create a truly seamless image across all projectors can use this feature to duplicate the GPU’s output edges, allowing the projected images to be physically overlapped and then easily aligned from the ground up via software to create a seamless image. When combined with rack-mounted, edge blending projectors, the brighter sections where the projected images overlap can be adjusted to match the rest of the projected content.’

Simple setup

With volunteer-run technical teams, sometimes the most technologically advanced equipment is not appropriate. The steep learning curve required often means equipment is under-used, so multi-projector systems need to be simple to install and use. ‘With edge blending technology now mainstream, it is a relatively straightforward task to set this up,’ notes Mr Wadsworth. ‘Manual blending simply involves “nudging” the projected image to line up, usually done by loading an alignment grid. There are also auto calibration systems on the market that will do this at the push of a button, but this involves extra equipment such as cameras and computers.’

‘It requires some skills to get a good result,’ agrees Ms Yueh. ‘Most of the time is going to be getting the perfect mechanical adjustment – the projector needs to be perpendicular to the screen – then it is just a case of following the software. All tools to bring it to a perfect image are in the projector. It is just a matter of knowing what to adjust at what moment. Barco offers training for that in order to help customers to build nice looking blended screens.’

Cost factor

While every house of worship wants to have high quality equipment to create the best possible experience for its congregation, each purchase must be made out of a tight budget. However, it is possible for a house of worship to afford this technology.

‘Using external blending equipment
can be costly, so to utilise this set-up on a budget, it is best to select a projector with blending built in,’ suggests Mr Wadsworth. ‘Many smaller, single chip projectors such as our E-Vision allow blending as standard.’

‘There is a way to make a multi-projection videowall without using external videowall processors using Panasonic projectors,’ states Mr Tiong Leng. ‘The projectors come with a digital zoom function which allows the user to zoom the input source up 10 times the original size. By combining this function with the in-built pixel shift function, we are able to create a videowall by only using a video distribution amplifier and one video source.

‘The caveat, of course, is that since the input resolution is from a single source, the pixel density that is translated to a larger videowall becomes very sparse,’ he continues. ‘For example, going from a 1920 output to a 5760 display means that each pixel becomes three times larger and hence, we can expect that the larger the digital zoom being introduced, the more blurred and pixelated the final output image will be. In order for such a videowall to be effective, the viewing distance will need to be increased to the point that the image blur cannot be visibly discerned.’

Ms Kelly agrees that using multiple images can be achieved on a budget. ‘Worship environments have recognised this by turning to solutions like Matrox TripleHead2Go and M-Series. TripleHead2Go’s wide-ranging compatibility, whether it’s for PC and Mac, laptops and desktops, and monitors and projectors, makes it easy to use existing hardware to affordably install any triple-projector configuration. The M-Series graphics cards meanwhile, include the Edge Overlay feature at no additional cost, allowing users to employ edge blending projectors to create a simple, reliable, and cost-effective multi-projector solution.’

The use of edge blending technology is now commonplace. There are a raft of options to suit all budgets and levels of technical knowhow. The only limiting factor is the ambition of the house of worship.

www.barco.com
www.digitalprojection.co.uk
www.matrox.com
www.panasonic.com/sg

A triple-projector configuration using TripleHead2Go

Using multiple Panasonic ultra-short throw projectors for one image