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## LIVE OAKS Community Church

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Audio Directors Work  
to Grow Under Vastly  
Different Landscape

Making the Move to IP:  
Laying the Professional  
Groundwork for Future  
Expansion

2020:

What Have We Learned

### REVIEWS:

YAMAHA YC61 STAGE KEYBOARD/ORGAN

PANASONIC AW-UE150 4K PTZ CAMERAS

MARS T100 FULL DUPLEX INTERCOM SYSTEM  
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## EDITORIAL NOTE

**D**id you know that Technologies for Worship magazine has been providing AVL education to houses of worship for 29 years this year? When we first started, the magazine was called RELIGION, and the articles we wrote were a lot different than the ones we share today: stories about clip art software and analog audio mixers have given way to LED walls and digital AoIP, but our goal has never wavered: to provide as much information about



MICHELLE MAKARIAK

the different technologies available that can help houses of worship grow their ministries to better serve their communities.

Heading into 2021, we want to continue moving forward.

We want to provide even more opportunities for our readers and social media followers to connect with us and to share their stories. What gear are you using? What are you most interested in learning about? How can our magazine serve you better?

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On a different note, NEXT MONTH exciting new changes are coming to the magazine. I'd love to tell you more, but my lips are sealed...and my keyboard is locked.

Catch you next month! **T**

*Michelle Makariak*

## TECHNOLOGIES FOR WORSHIP

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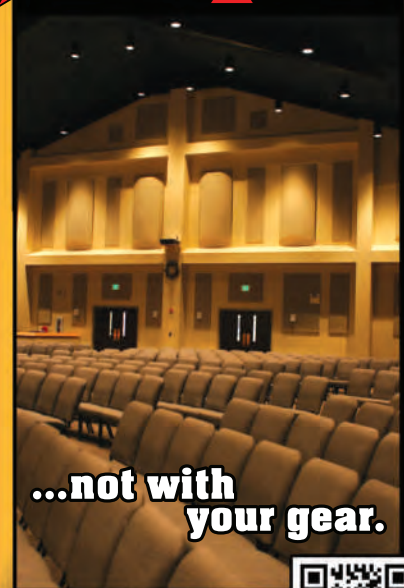


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## Hitachi Kokusai Moves U.S. Headquarters to Larger Facility

**H**itachi Kokusai Electric America, Ltd. (Hitachi Kokusai) has relocated its U.S. headquarters to a larger facility in picturesque Western Massachusetts. The move brings the innovative manufacturer of advanced broadcast, production, surveillance, and industrial vision cameras together with its subsidiary Hitachi Kokusai Electric Comark LLC (Comark) under one roof with over 53,000 square feet of usable space.

“The expiry of the long-term lease on our Long Island facility opened the door for us to collaborate more closely by working side-by-side with the esteemed team at Comark,” said Sean Moran, Chief Operating Officer, Hitachi Kokusai. “Each group has proven strengths at opposite ends of the content chain -- from our award-winning cameras for high-quality acquisition to Comark’s robust distribution and broadcast transmission solutions. Sharing a facility will allow us to explore future collaboration opportunities in between

those ends of the spectrum. The location itself is also very appealing as it gives us more engineering space and resources, in an area ripe with talent from nearby higher education institutions.”

Hitachi Kokusai is beginning the transition to its new building this month, with the changeover officially effective by January 1, 2021. While the new location near Springfield is roughly a three-hour drive from its previous home, the company is retaining all its staff. Employees choosing not to relocate to the Massachusetts facility will work remotely – a model already proven successful when lockdowns forced office closures during the COVID-19 pandemic.

Hitachi Kokusai’s new address will be:  
Hitachi Kokusai Electric America, Ltd.  
104 Feeding Hills Road  
Southwick, MA 01077

The company’s toll-free phone number remains the same, at (855) 891-5179. All employee phone numbers and extensions also remain intact.

## Industry Veteran Joins EAW®

**E**astern Acoustic Works (EAW®) announces the appointment of pro audio veteran Michael Palmer



as its Director of U.S. Sales. The loudspeaker manufacturer’s North American sales figures have recently shown a positive growth pattern and with Palmer at the helm, EAW is anticipating sizable market share gains. The release of new cutting-edge products, including its ADAPTive, MKD and Radius Series in addition to its KF810P installation line array, will continue to help drive this progress.

**I**n his new role at EAW, Palmer is overseeing all aspects of sales throughout the U.S. working closely with manufacturer’s sales reps and regional sales managers. He will liaison with EAW’s installation and touring applications teams as well as consultants, contractors and concert/event production companies.

“We reached a point where it was crucial to strengthen our sales leadership to guide our talented sales team to the next level,” says Marco Breda, chief executive officer of EAW. “Palmer’s stellar reputation, knowledge and relationships with key decision makers in our industry make him the ideal candidate to catapult us to the next level.”

With over 30 years of experience in the audio industry, Palmer comes to EAW from Allen & Heath and L-Acoustics where he steered the manufacturers through intense growth periods as U.S. National Sales Manager and Head of Sales U.S. and Canada, respectively.

“EAW is an iconic industry-leading loudspeaker manufacturer and I’m excited to be part of their amazing team,” said Palmer. “EAW’s commitment to bringing innovative technologies to market has long been the brand’s hallmark. I look forward to working with the team at EAW and being a driving force in their growth.”



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HEMDEN, VIRGINIA

## Open Door Church Completes Major System Upgrade with Allen & Heath

Over the last 30 years, the Open Door Presbyterian Church has continued to steadily grow their congregation and upgrade their AV capabilities. As expanded audio requirements had been increasingly difficult to fill with their aging 2005-era digital console, they knew it was time for a change. Turning to the local audio experts at Genesis Technology for guidance as to the best choice to modernize the system, the answer was unanimous—Allen & Heath dLive.

“The Open Door project was a great example of the power of having a connected audio ecosystem,” notes Genesis Technology Senior Systems Engineer Michael Yoo. “Obviously we aim for stellar audio quality for the congregation and ease of operation for the church AV technicians, that’s always a key goal. In this case it was also important to bump up the overall worship experience for the praise band. We have FOH quite a distance from the musicians, high ceilings and stage volume concerns that brought forth to the need for a top notch personal monitor solution as well.”

“That’s one of many areas where Allen & Heath has things really figured out,” adds SK Macdonald (SKMac) Sales Support Associate Jack D’Angelo. “Jumping up to dLive and adding in the ME Personal Monitoring System was the answer to all of those needs. It was also helpful to know that with so many network and interconnect options for dLive, the swap over wasn’t going to require stripping out all of the

existing infrastructure. Dante, no problem. AES, sure. Not only was it largely ‘plug and play’ for the install of the new desk and peripherals, but the church can rest easy knowing that future expansion is also a breeze if they should need it.”

The upgrade includes a Dante-enabled Allen & Heath dLive S7000 at FOH, paired with a DM48 MixRack and AES output card. A 96kHz DX168 AudioRack provides additional I/O flexibility and scalability. The dLive feeds five ME-1 40-source personal mixers distributed across the stage, powered and managed by a ME-U 10-port PoE Monitor Hub.

“The previous audio console was designed in a pre-iPhone world and just wasn’t cutting it as far as usability and workflow,” notes Yoo. “dLive is unique in its ability to offer up over 200 assignable fader strips and dozens of SoftKeys while not completely overwhelming the engineer or requiring operators to bend their usual way of looking at workflow to conform to the desk. It really is as easy as dragging and dropping inputs and outputs around to configure the desk like you would popping around on an iPad. The musicians love the sound quality and customized mixes on their ME units and the entire system took a sonic leap.” **T**

PAIRED WITH A QUINTET OF ME-1 PERSONAL MONITOR MIXERS, DLIVE OFFERS PERSONALIZED CUSTOMIZABLE MONITOR MIXES—MANAGED BY THE MUSICIANS ON STAGE.  
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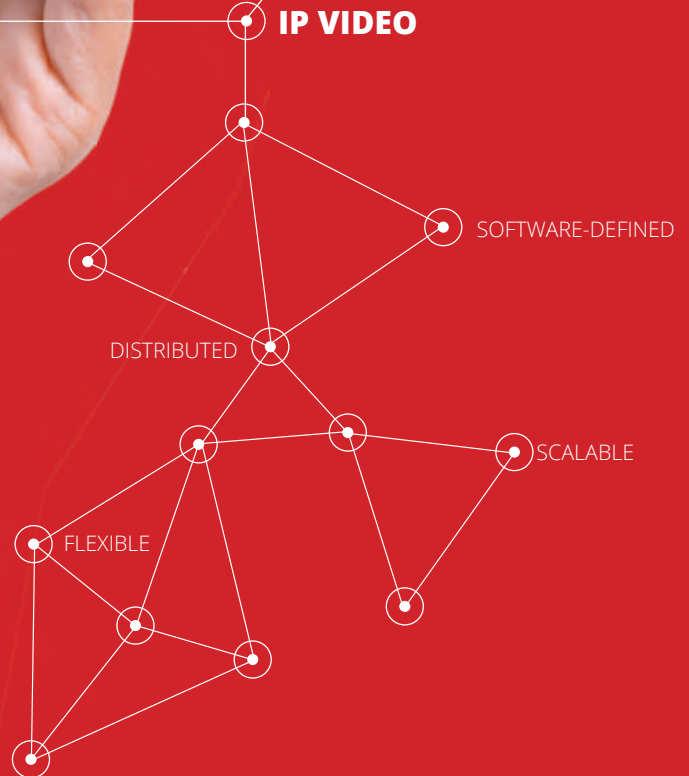
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BIRMINGHAM, AL



## EAW® System Ensures the Message is Heard at Shades Mountain Baptist Church

**B**lackhawk Audio Installs EAW ADAPTive System Loudspeakers and Subwoofers Along With VFR89i Stage Monitors for a Discrete Yet Powerful Sound

When the leaders at Shades Mountain Baptist

Church in Birmingham, Alabama green lighted a full renovation of the mega church's 2,700-seat main worship center, the job of designing and building a state of the art, upgraded audio system was awarded to Blackhawk Audio. In addition to world-class

sound and coverage, Shades Mountain also wanted to ensure that the new system was discrete in that it was contained within a very compact grill cloth area. Blackhawk found the solution with EAW and its ADAPTive line, including its Anya™ and Anna™

Loudspeakers and Otto™ Subwoofers, as well as its VFR89i Stage Monitors.

“One of the biggest selling points of the EAW ADAPTive speaker system was that in addition to its audio quality and excellent coverage, it also was low profile and would not visually overwhelm the sanctuary,” says Blackhawk Audio President Rick Shimer. “The previous look of the sanctuary had a very large ‘speaker cluster’ with grill cloth. Ensuring that the PA system was less obtrusive while also offering pristine sound was a main factor for this project; they wanted a particular look and we are able to achieve this using EAW’s Anya, Anna and Otto.”

The upgrade, which consisted of over 30 EAW speakers, included two Anya’s each for far house left and far house right, six Anna’s each for house left and right, two Anna’s for down fills, six Otto subwoofers for center and eight VFR89i passive two-way stage monitors for the choir.

“The EAW ADAPTive platform has proven to be the best choice for sonic clarity and acoustical control across our worship center,” says Ryan Maynard, production manager, Shades Mountain Baptist Church. “Blackhawk’s design and deployment of the system has given equal attention to all seats in the room, so that everyone has an engaging experience, no matter their preference of seating location. For a system this powerful and configurable to fit within the confines of the new ceiling structure is quite an accomplishment.” **T**

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# NEXO P15 Point-Source Loudspeaker



**N**EXO is expanding its P+ Series of point-source loudspeakers with the new P15, a 15" coaxial loudspeaker ideal for front-of-house (FOH) and monitoring applications. The new model from NEXO, a Yamaha company, joins the P8, P10 and P12 speakers to complete a full range of powerful compact speakers combining scalability and versatility for sound reinforcement applications in multiple markets.

The new speaker arrives 25 years after the launch of the NEXO PS15, arguably the most ubiquitous 15" point-source cabinet of all time. The P15 features all the performance and design hallmarks of its P+ Series counterparts. Its curvilinear enclosures of custom birch and poplar plywood are unique to the P+ Series, with the bent wood significantly enhancing the lightweight cabinet's robustness.

The powerful 2-way passive/active speaker delivers 139 dB (Passive) to 141 dB (Active) SPL from its purpose-built 15" Neodymium magnet coaxial driver with a 3.5" voice coil. The new speaker's frequency response is 57Hz-20kHz. The P15 weighs 23 kg (approx. 2.2 pounds) and measures 600 x 483 x 352 mm (approx. 24 x 19 x 14 inches).

"The versatility of the P+ Series is especially relevant at this time," said Gareth Collyer, NEXO's sales and marketing director. "As houses of worship redefine indoor and outdoor audience areas to accommodate social distancing, the portable power and interchangeability

of the P+ Series cabinets are useful, and helps extend the facilities ability to handle different repertoires of performance and events."

The P15 is so versatile that it can transform inventory.

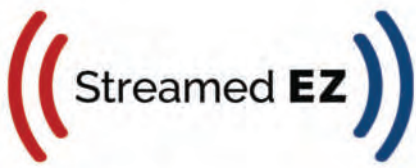
Unusual for the 15" category, a switch on the back of the cabinet enables the P15 to be reconfigured from passive to active mode, taking SPL output from 139 dB to 141 dB (peak). Horn flanges, with their variable directivities, can be interchanged from the 60° x 60° provided as standard to a 90° x 40° or an asymmetrical 50°- 100° x 40°. (The interchangeable flanges are marketed as accessories.) Switching between different directivities is achieved by removing the steel grille and replacing the flare, which uses a magnetic fixing.

The ergonomic design of the P15 includes large comfortable handles on each side with a 35mm pole-mount fitting with a Speakon connector and threaded inserts to connect mounting accessories. The backplate holds two more Speakon connectors and the recessed switch to change the cabinet from passive to active mode. The Installation version of the P15 is passive only, with a cable gland for a two-core cable for audio input, ensuring IP54 protection.

The new P15 speaker can be used independently or with its companion subwoofer, the new L18 Compact Sub, a horn-loaded sub-bass model with a high-excursion 18" woofer. It matches the efficiencies of the P15, offering an extremely high output level (140dB Peak) and an impressive power-to-weight ratio. The P15 can be used either on a pole-mount with the L18 cabinet, wall-mounted, or flown in landscape mode beneath an L18 enclosure, using a specially designed yoke bracket.

Built around a custom-made 15mm bent plywood shell, the L18 is robust yet weighs only 50kg (approx. 110 pounds). **T**

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# PreSonus Eris Sub8 Compact Studio Subwoofer



**P**reSonus' new Eris Sub8 subwoofer is an excellent choice to add sub-lows to any set of small monitor speakers, but it was especially designed to complement the voicing and frequency response of Eris-series media reference

monitors. If you want to add serious bass to Eris E3.5, E3.5 BT, E4.5, or E4.5 BT media reference monitors, the Eris Sub8 is the perfect mate.

Driven by an onboard 100 watt (peak) Class A/B amplifier, the Eris Sub8 delivers powerful, accurate

low end all the way down to 30 Hz—a full 50Hz below the Eris E3.5s. It naturally extends the reach of Eris E3.5 or E4.5 monitors in a manner appropriate to smaller rooms, where these monitors excel. This allows you to produce better mixes, as you'll be hearing an

accurate representation of your work.

Eris Sub8 flexibly configures to your mixing and listening needs, connecting to your full-range monitors via balanced ¼-inch TRS or unbalanced RCA inputs, with a continuously variable input level control (-30 dB to +6 dB) and a polarity-invert switch. You also get balanced ¼-inch TRS and unbalanced RCA pass-through outputs for connecting satellite speakers.

A defeatable high-pass filter removes frequency content below 80 Hz from the full-range signal sent from the Eris Sub8 to the full range speakers. Along with the variable (50 to 130 Hz) low-pass filter/crossover control, this ensures the subwoofer starts working at the precise low-frequency point where your full-range monitors drop off. The result is tight, smooth, clear low end, with none of the mud that occurs without a crossover.

The Eris Sub8 also offers protection against RF interference, output-current limiting, over-temperature, and turn-on/off transients, as well as a subsonic filter, and an external mains fuse.

The PreSonus Eris Sub8 subwoofer is available now for a U.S. street price of \$199.95. For more information, visit [www.presonus.com/products/Eris-Sub8](http://www.presonus.com/products/Eris-Sub8). **T**



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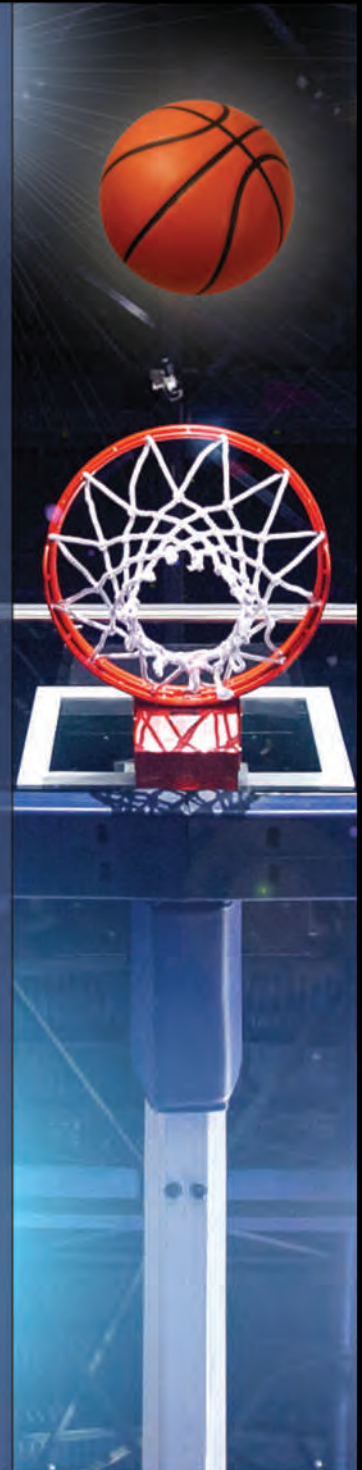


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## STREAMER FROM GLP

Responding to the current trend for streaming and videoconferencing, necessitated by the coronavirus pandemic and social lockdown, GLP has designed [Streamer](#). This is a small, versatile LED light source whose sole purpose is to present hosts, interviewees and collaborators in professional, studio type lighting with the ability to be fully remote controlled by a lighting designer, if required.

UL-listed, the spec includes flicker free high intensity output, with a color temperature range of 1,900 to 5,600 Kelvin, provided by three different color sets of LED's.

GLP Inc president, Mark Ravenhill, commented that their new solution is both easy to use and transport thanks to the robust yet compact case, that at just 6 inches long easily fits into a laptop bag. "Streamer plugs directly into a standard USB-C socket on any computer, no batteries or bulky power

adapters are required," he explains.

The control app provides full management over the output level and color, allowing the user to create their perfect balance.

GLP's Streamer has been designed to be small, lightweight and completely portable and so can easily be thrown in your backpack and taken from location to location. One handy feature of the unit is the onboard buttons that will recall up to 8 presets, along with independent intensity control. In this mode you can just plug it into a standard power outlet using a wall wart. So whichever location a staff member finds themselves in, they can be sure that they will always be able to look their best on camera with this handy portable solution.

The Streamer's variable color temperature control allows it to work with all environments and the system that drives it - that uses a combination

of three different LED colors – can be fine tuned to match all skin tones when connected to the control app, that is available for both Mac and PC platforms.

The very clever part of Streamer though is its ability to be controlled remotely, so now your presenter can focus on what they do best and with any standard internet connection, the lighting controller can securely connect to the Streamer and adjust intensity and color temperature from wherever they are. A really handy function when so many services and messages are being sent out by video these days.

GLP's Streamer Deluxe Control Kit comes complete with mounting accessories including an extendable tripod, a 12-inch gooseneck extension for hard to reach places, a suction cup and USB-C to USB-C cable, contained in a purpose-designed case with molded foam interior. **T**

[Available now.](#)



# Lawo's mc<sup>2</sup>36 mkII Mixing Console

The new mc<sup>2</sup>36 audio console is amazingly compact and as powerful as its larger siblings. With 256 DSP channels, Waves® plug-in integration, local I/O, and Lawo's unrivaled microphone pre-amps. Plus, native IP connectivity with IP Easy™ plug & play management. Say hello to an all-rounder with a stellar feature set. Meet the new mc<sup>2</sup>36.



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## 3 Remote to the Max

Seamless integration of external PCs running third-party DAWs, effects engines, etc., into the user interface for sweet-spot control using the mc<sup>2</sup>36's keyboard, touchpad and touchscreen. Remote mixing/control using generic fader surfaces is supported.

## 4 Built-in AoIP Connectivity

Three redundant pairs of network I/O ports support all relevant IP audio standards (ST2110-30/-31, AES67, RAVENNA, DANTE®). Network redundancy with ST2022-7 Class C "Seamless Protection Switching" (SPS) is also available.

## 5 IP EASY

Make IP setups as simple as analog, thanks to automatic device detection with one-step assignments, complete with security features: access control, quarantining of unknown devices, etc. WAN (multi-site) and LAN (on-site) transport are supported out of the box. Leverage point-to-point connections of stageboxes without additional network infrastructure.

[PRODUCT SPECIFICATIONS HERE](#)

# Absen's Acclaim Pro Series

Absen's Acclaim Pro Series is a member of the Acclaim Series, joining Acclaim and Acclaim Plus. This permanent indoor solution has a pixel pitch range of 1.2mm - 1.5mm, a brightness of 600 nits, and is suited for a variety of solutions for houses of worship.



[PRODUCT SPECIFICATIONS HERE](#)

# FIVE KEY FEATURES FOR HOUSES OF WORSHIP



## 1 4 in 1 IMD package

Acclaim Pro uses 4 in 1 IMD LED packages which is 2.5 times stronger than general SMD packages, which reduces the possibility of pixel damage or drop during the installation and operation.

## 2 Easy Installation and Maintenance

Acclaim Pro allows for easy installation of the panels as they can either be wall mounted or flown to fit the churches display needs. Modules can be serviced easily from the front with the vacuum tools.

## 3 Higher Color Accuracy

Acclaim Pro uses a premium chip with PWM that can maintain complete detail and high contrast ratio and achieve high greyscale even at low brightness levels. This allows a natural and smooth color gradient and superior image accuracy at almost any brightness setting and room condition.

## 4 Low latency solution

With specific sending box, Acclaim 1.2 Pro can enable the low latency solution which reduces the latency between the source end and the content on display.

## 5 Standard 27.5' design

With its lightweight design, the panels can be stacked for easy installation and 4 panels combined together can make a 55' screen. It also brings the screen to true 16:9 resolution along with the ability to have 4K and Full HD resolution.





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# Design Science's Portable, Battery-Powered Display Totems

**T**ypical Houses of Worship, across denominations and faiths, have a lot going on every day, and an insatiable demand for varied and changeable messaging to get in front of congregation members, volunteers and staff.

Posters, notice boards and pop-up banners can deliver the basics, but to effectively communicate all the needed messaging, at the right times, many Houses of Worship use digital signage technology to run scheduled, full-motion messaging on screens.

Screen-based messaging boosts communications capabilities and turnaround times, and usually saves the House of Worship money in the long run through reduced resource requirements and the end of ongoing design/print/ship costs for paper-based messaging.

But there's one problem that's been hard to overcome – ensuring the screens are in the places where they'll be seen and have an impact.

Displays have power cords, and they need wall plugs. So they're almost always positioned and plugged in where power is available and the cords don't create tripping hazards.

In most Houses of Worship, the best locations for messaging are in the center of



common areas and at entryways, where people gather or pass through. Those positions rarely have power plugs in the floor.

Canadian technology company, [Design Science Corp.](#), has released a new kind of floor display that runs messaging for full days on nothing but a battery charge. The totem-style, free-standing 43-inch LCD information display can be placed in the most optimal position (or positions) for full worship and activity days, operating for as much as 14 hours on a single charge.

Overnight, the displays can be easily wheeled over to wall outlets to plug in and recharge. Think of it being like a giant smartphone.

The steel and aluminum display totems have the sleek design of digital advertising and information posters seen in venues like shopping malls and airports but are ruggedized and specifically engineered to be easily moved around, and are extremely secure and stable when “set in place” and brakes locked.

The units have ball-bearing casters – making it possible for a single staff member or volunteer to reposition them through a day. A locking system removes any risk of movement.

The screens are capable of playing out smooth full HD

video and animated graphics, and have small but powerful media players built into the enclosures, as well as WiFi. They are managed and updated by user friendly digital signage content management software, and Design Science includes training with its displays.

Design Science bundles the screen, media player and management software in an enclosure, with personalized support services to ensure customer success. Units can be purchased or leased. There are no recurring software subscription costs.

Signs, posters and banners often flank entryways at Houses of Worship, because they are optimal positions to greet, communicate and connect.

Using printed material – in paper, vinyl or fabric – means communications have to be both generic and evergreen. They lack specifics and need to serve multiple needs. A requirement for more and different messaging means more and different printed material, and all the design, printing and shipping costs, coordination and time to get that right. These costs can significantly help to offset the cost of this must-have technology.

With digital displays, one screen can rotate through multiple scheduled messages, and even be dynamically updated from other systems, like websites or building management systems. That messaging can be scheduled to come on and off screens down to the hour, minute and second, and changes can be made on demand or determined months ahead of time based on known schedules.

Leaders and staff can determine where screens are best placed around a facility, and in the case of portable, battery-powered versions, where those units are



DESIGN SCIENCE BATTERY CASSETTES

**Screen-based messaging boosts communications capabilities and turnaround times, and usually saves the House of Worship money in the long run through reduced resource requirements and the end of ongoing design/print/ship costs for paper-based messaging**

needed through a day.

That might involve having moveable screens:

- In the lobby or entry hall surrounding services and events;
- At the library supporting the material for a special event;
- In a main hallway locating regular or special classes;
- At an overflow or secondary entry, welcoming and guiding for things like weddings, voting or food banks.

In all, screens can be used to manage, schedule and run messaging for everything from scheduled study groups, classes and committee meetings to wedding and birthday recognition and health and safety messaging.

Conventional wisdom has been validated by years of real-world experience in locations as varied as fast-food chains and airports – screens positioned where people are, showing timely, relevant information, make a positive difference. Digital signs capture 400% more views than static versions.

The benefits of more people seeing and remembering messaging can be evident in everything from higher contributions and attendance levels to more efficient operations on busy days.

Design Science has versions of the battery-powered display that run on conventional AC power, for set-ups where screens positioned along walls, near entrances or by support columns makes sense. The content can be mixed and managed over the same network, using the same software, as the battery versions.

But to maximize communications, battery powered displays create the opportunity to be disruptive, in a positive way – placed directly in view and hard to ignore. **T**

# HDTV and 4K Camera Solutions from Hitachi

Churchgoers attending worship services have increasingly high expectations for video production quality, whether participating in person with IMAG or watching online via live streaming. Similarly, churches that distribute live video of their lead pastor to linked satellite campuses are finding it important to maximize the quality of that video, since it is effectively standing in for a live person with all attendees focusing on it.

Broadcast-class cameras enable superior visual quality and operational advantages for HOW productions. Visual characteristics including exceptional low-light sensitivity and faithful color reproduction are particularly well-suited to church environments, while features ranging from fiber connectivity to large viewfinders simplify cabling and usage. Here, we look at three different options from Hitachi Kokusai.

## SMALL CHURCH (UP TO 500 SEATS)

### Z-HD5000

Hitachi Kokusai's best-selling and most economical HDTV production camera, the Z-HD5000, is the perfect entry point for Houses of Worship looking to step up to a broadcast-class camera. Its three 2/3-inch CCD image sensors combine with advanced digital signal processing to deliver stellar picture quality with a 58dB signal-to-noise ratio and accurate color representation. Its outstanding sensitivity allows low-light environments to be captured in exceptional detail with minimal or no gain adjustments even when moving quickly between well-lit and shadowed areas. The Z-HD5000's ability to represent detail in dark areas of the picture is further accentuated by its support for High Dynamic Range (HDR).

As a broadcast-class camera system, the Z-HD5000 connects to a camera control unit (CCU) in the production control room. Compatible CCUs are available with 1080i, 720p, or selectable output. Functions such as iris and shading can be remotely adjusted, increasing consistency between multiple cameras while freeing volunteer camera operators



to concentrate on the actual shots. Large viewfinder options make it easy to frame and focus scenes, while compatibility with industry-standard lenses lets customers choose the perfect ones for their needs.

The Z-HD5000 offers valuable communication paths between the control room and camera operator including integrated intercom connectivity, return video, and tally lights. By leveraging SMPTE Fiber connectivity between the camera and CCU, all of these functions plus program video, audio, and power can be carried on a single cable – eliminating cumbersome multi-cable bundles while supporting longer cable runs than SDI or HDMI.

## MID-SIZED CHURCHES (501 – 1000 SEATS)

### SK-HD1800

For Houses of Worship that want native 1080p60 progressive video acquisition or global shutter CMOS sensors, the award-winning SK-HD1800 combines those capabilities with the same rich features and benefits as the Z-HD5000, all at a fraction of the cost of competing solutions in its class.

When capturing scenes with large LED displays in the frame, artifacts such as flickering and horizontal banding can appear in the video with cameras that use rolling-shutter MOS or CMOS image sensors instead of CCDs. The SK-HD1800's global shutter CMOS sensors minimize these artifacts, enabling flawless, high-performance video capture in churches where LED lights or large LED displays are used.

The SK-HD1800 builds further on the remote operation capabilities of Hitachi's Kokusai's Z-series cameras with the addition of a motorized, four-position filter wheel. Tight integration with the Dashboard control system from Ross Video is also popular with churches that use Ross production switchers.

For Houses of Worship taking advantage of HDR displays, the SK-HD1800 supports HDR specifications including HLG (Hybrid Log-Gamma) and HPQ, which is compatible with the HDR10 open standard. Pairing the SK-HD1800 with a



CCU from Hitachi Kokusai's CU-HD1300 series forms an exceptionally flexible camera system, with options including up-conversion to 4K with 12G-SDI or quad-link 3G-SDI output; SMPTE ST 2110 support for IP-based production workflows; and parallel HDR and SDR output with separate shading adjustments.

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## LARGER CHURCHES (1001 + SEATS)

### SK-UHD4000

For Houses of Worship looking to maximize the quality of their IMAG and video archives or simply for future-proofing, Hitachi Kokusai's SK-UHD4000 Ultra HD camera makes broadcast-class 4K acquisition practical and more affordable.

The SK-UHD4000 performs exceptionally well in low lighting conditions, particularly for a 4K camera. On most cameras, when pixel count and picture resolution increase, low-light sensitivity will decrease. The SK-UHD4000's unique four-imager configuration delivers outstanding sensitivity even at full Ultra HD (3840 × 2160) resolution.

Further enhancing the SK-UHD4000's cost-effectiveness, direct support for standard B4-mount 2/3" bayonet lenses enables churches to start by using their existing HD lenses until they're ready to invest in true 4K optics. Multiple viewfinder options are available, including nine-inch studio viewfinders with focus-assist – particularly valuable since



focus becomes even more critical in 4K productions.

The corresponding CU-HD4000 camera control unit supports options including 12Gbps SDI 4K output to complement a standard quad-link 3G-SDI interface. Users can select from multiple HDR profiles alongside SDR with separate video shading adjustments, enabling simultaneous HDR and SDR outputs for optimal viewing across a wide variety of displays. **T**

# Intercom Solutions from Studio Technologies

Studio Technologies designs and manufactures dependable, high-performance audio and video solutions for live-production environments, and are known for offering products that fit real-world needs and meet the highest standards for reliability, signal integrity, and creative demand.

## Small Church (up to 500 seats)

Based on the Studio Technologies' Model 5421 Dante Intercom Audio Engine, cost-effective, flexible party-line (PL) intercom solutions can be created using an existing Audio-over-IP (AoIP) Ethernet network. Using the range of Studio Technologies' Dante-enabled beltpacks and standard off-the-shelf Ethernet hardware, HOW venues have access to high-performance, multi-group systems that are simple to operate and easy to maintain. Power-over-Ethernet (PoE) technology means that only a single standard Ethernet connection is required to provide both data and power to each user beltpack. The Model 5421's programmable-logic (FPGA) signal processing ensures every user receives a reliable group mix that does not include their own audio contribution (an integral sidetone function allows users to hear their own audio). A sophisticated Auto Mix algorithm allows the automatic adjustment of the level of every user's contribution to a party-line channel, creating perfectly balanced group mixes without including extraneous signals from open, unused mics. Intelligibility is significantly improved, helping to ensure that vital cues won't be missed. Configuration and status monitoring of the system is



managed by Studio Technologies' STcontroller PC application – a single universal piece of software that can manage most Dante-enabled Studio Technologies' products. Audio routing is performed using the standard Dante Controller software application. All Dante-compatible audio devices and intercom beltpacks, such as the Studio Technologies' Model 372A or Model 373A, are compatible with the Model 5421 "Engine" and can be utilized to create an application-specific intercom system.

## Medium Church (501 – 1000 seats)

Using the Studio Technologies' Model 45DC and Model 45DR Dante Intercom Interfaces, along with the Model 5421 Dante Intercom Audio Engine, will allow creation of a PL intercom system that includes system integration and compatibility with existing single- and dual-channel party-line (PL) intercom systems. Dante-based intercom user devices, such as Studio Technologies' Model 373A Intercom Beltpack, can be directly added to the PL system by simply plugging into a Power-over-Ethernet (PoE)-enabled Ethernet network. The Models 45DC and 45DR interfaces can also prove useful when linking Dante-based matrix intercom systems with legacy PL intercoms systems and devices. This enables existing party-line hardware to become part of a contemporary Dante-based intercom environment. Both the Model 45DC and Model 45DR interfaces are often used in matrix intercom applications, such as in conjunction with an RTS ADAM® with OMNEO® and Clear-Com Eclipse® systems. The two interface units can directly create industry-



standard PL intercom circuits by providing both the required power and intercom terminating impedance. The two single-channel interfaces on the Model 45DC are optimized for and directly compatible with single-channel Clear-Com® PL circuits. Its “sister” product, the Model 45DR, is designed for use with 2-channel RTS® TW party-line intercom circuits. Each interface includes a party-line-active detect function to ensure that its circuitry will remain stable, minimizing the chance of unstable audio signals being presented to users. Both the Model 45DC and the Model 45DR can be directly powered by either PoE or 12 volts DC.

## Large Church (1001 + seats)

The Model 5422 Dante Intercom Audio Engine is a flexible, high-performance solution for creating multiple party-line (PL) intercoms circuits. When combined with the Studio Technologies' Model 348 Intercom Station and Model 370-Series 1-, 2-, and 4-channel user beltpacks, HOWs can easily configure a complete, simple to operate, great-sounding PL intercom system. By using a standard Ethernet network as the transport “backbone,” no additional wiring for intercom functionality will normally be required. A typical Model 5422 application could support eight to 24 intercom users. The exact number will depend on the needs of the application and how the specific system is configured. Unlike general-purpose Dante digital matrix devices, the Model 5422 is optimized to allow direct support for PL intercom functionality and includes the ability to enable Auto Mix processing for enhanced voice intelligibility. The Model 5422 also includes other specialized audio capabilities, including the ability to create talent-cuing (IFB) functionality, with both voice and tone interrupt detection. Two Model



5422 versions are available to support either one or two 32-channel “engine” groups; the Model 5422-01 provides one 32-channel groups, while the Model 5422-02 provides two 32-channel group. These groups can be independently configured to create PL circuits that range in size from four to 32 channels. Also, while the primary application for a Model 5422 group is to create a party-line (PL) intercom circuit, each group can be independently configured to support party-line, talent-cueing (IFB), summing bus, audio switching, or pass-thru applications. **T**

# Microphone Solutions from Audix

As we look to the new year and hopefully a vaccination to the dreaded COVID pandemic that has made it difficult, if not impossible, to attend church, many congregations are looking to update and upgrade their audio equipment as they prepare to cautiously open their doors to worship. When it comes to delivering the church's message, the most important tool a church needs is a reliable, high quality microphone.

## Small Church (up to 500 seats)

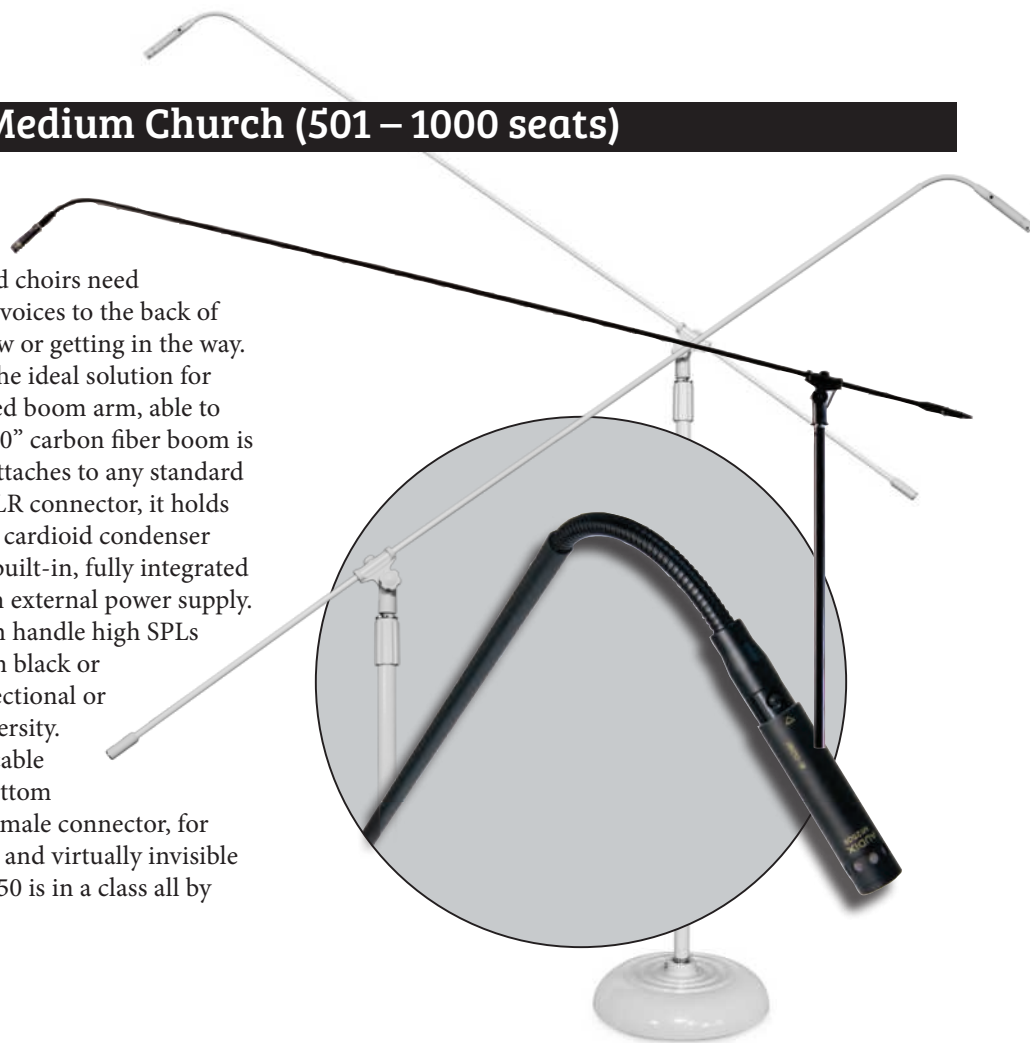
Since many smaller churches seldom have room for a large choir or praise band, the primary focus for the congregation is on the minister. For smaller church budgets looking to stretch their dollar, a combination wireless system would be a solid investment. The Audix Performance Wireless Series is a great choice, due to the ease of setup combined with feature-rich options of Audix's meticulously engineered wireless systems. The Audix Performance Wireless Series is available in two performance levels: the 40 Series and 60 Series. Both are available in single and dual rack models. The 40 Series is a diversity system with 32 MHz of spectrum, featuring 33% more frequencies than typical 24 MHz systems in the same price/performance range. Using the Audix 40 series is as simple as "scan-sync-play" and features one-touch auto scan searches, one-touch sync, which links the transmitter to the receiver in seconds. One of the most efficient and cost-effective models in the series is the AP42 C210, which comes with a H60 OM2 handheld microphone, a B60 L10 bodypack with an ADX10 lavalier microphone and the dual-channel R42 Diversity Receiver, which has 106 pre-coordinated frequencies for quick, easy and reliable set up. The combination system allows for the flexibility of using either the OM2 dynamic handheld mic or the bodypack system with the ADX10 cardioid lavalier microphone, or both at the same time.





## Medium Church (501 – 1000 seats)

Medium size churches generally have the added space for a choir, and choirs need great mics to bring clarity and their voices to the back of the church without blocking the view or getting in the way. The Audix Microboom MB5050 is the ideal solution for the task, with its low-profile extended boom arm, able to cover up to a 20-person choir. The 50" carbon fiber boom is light weight (only 2.5 ounces) and attaches to any standard microphone stand. With its mini-XLR connector, it holds the high-quality Audix M1250 mini cardioid condenser securely in place. The M1250 has a built-in, fully integrated low-noise preamp, so no need for an external power supply. The size of a pen cap, the M1250 can handle high SPLs without distortion and is available in black or white, with hypercardioid, omnidirectional or shotgun capsules, for maximum diversity. The included high-quality internal cable delivers exceptional sound to the bottom of the boom, ending in a mini-XLR male connector, for discreet connections. For an elegant and virtually invisible solution for miking choir the MB5050 is in a class all by itself.



## Large Churches (1001 + seats)

When it comes to large churches, one of the notable additions comes from the music side, often in the form of a complete praise band, which means the addition of amped up instruments and a drum kit. For these additional instruments, there is no finer tool in the sound engineer's kit than the Audix DP Elite 8 microphone pack. The DP Elite 8 is the ultimate combination of 8 professional microphones needed to mike up a 5-piece drum kit. The pack includes the D6, Audix's flagship dynamic kick drum microphone, two D2s for rack toms, one D4 dynamic microphone for floor tom, the i5 for snare, a pair of SCX1Cs for overhead miking, and the SCX1HC for hi-hats. Also included are four DVICE rim mount clips for the snare and tom microphones and three heavy-duty tension fit mic clips for the SCX1 mics. They are all housed in a foam-lined aluminum case for safekeeping for when service is over. And if there are other instruments needing to be miked, and there's room in the budget, a second DP Elite 8 microphone pack can be employed to cover the rest of the band. The D6 or D4 is a great microphone for a bass cabinet, the i5 is notorious for guitar cab miking and the SCX1Cs can be used for ambient miking of pianos or string instruments.



# Five Things Every Church Should be Doing

BY HOLLAND DAVIS

**W**e are in the middle of a communications revolution. World events have forced churches to rethink how they communicate the timeless truths of the gospel in today's world. It's more than just an option, it's now a need and I believe there are five things every church should be doing to stay relevant and connected to their congregations. Each of these could be a complete standalone article but use this as a punch list of things to do.

## Broadcast Every Service

You might say, we only broadcast our main services or the services that feature our senior pastor. I would challenge you to broadcast everything you can. Each service you broadcast is going to connect to a different audience at a different

time. The egalitarian nature of the internet removes the stigmas associated with making sure the right people are in the audience to hear the right speaker. On the internet, anyone who is interested will be able to watch and each person who watches has a group of people they influence and potentially invite to watch as well. It's an unprecedented time for growth. It may not be a time of growth that you can visibly see, but it is a time of growth in terms of influence and reach beyond the four walls of your church.

## Have a YouTube Channel

Whether you think YouTube is the mark of the beast or not, it is the second most visited site in the United States. You need to be on it. Here are some of the benefits: YouTube offers free live streaming for non-profits. You can use OBS as a free streaming platform to stream to YouTube. If you want to stream to more than one



platform, I suggest using Box Cast. What I use YouTube for is to catalog my messages. Each Book of the Bible is its own playlist. Each Sermon series is its own playlist, and using a sermon plugin on my website I link back to the sermons on YouTube and provide PDF's of all my notes. It is a must have and will serve your congregation. If you don't like YouTube use Vimeo.

changes to our services and so much more. My local church page is a private group that allows me to share information specific to those who attend the church. My public church page is open for anyone to join and it's primarily used to promote what we are doing. Both are essential. You might say, our church is elderly and we're not technical. That may be true, but their grandkids

not as difficult to use as it seems. We have made things very easy for our older congregants to join Zoom meetings. All they have to do is click a link on our website. Now I've heard all the rumors about people crashing meetings and doing inappropriate things. Honestly, it probably won't happen to you and if it does it's easy to block that individual from future meetings. Don't let fear

need to tell them, and social media is a great way to do it. We now design all our graphics for Instagram which is an image that is 1080 x 1080 pixels at 300 dpi. This image works everywhere in all social media platforms. The only other size we use regularly is 1600 x 900 at 300 dpi for video. When we are creating playlists, it helps us brand a group of videos together so people know they are part of the same series.

Don't let technology become the new generation gap. If you are not hip to technology, then get your grandkids or your kids to help. Regardless of how we feel, this is the new normal for communication. The world is focused on social media as a way to be informed. Let's step up to the challenge of using existing technologies to provide good, life changing content that offers hope and life to people who are searching. **T**

## DON'T LET TECHNOLOGY BECOME THE NEW GENERATION GAP. REGARDLESS OF HOW WE FEEL, THIS IS THE NEW NORMAL FOR COMMUNICATION

Vimeo Plus, which gives you 5 GB a week of upload capacity, is around \$60.00 a year. If you don't like either and want a private company, use Boxcast. Boxcast charges around \$ 150.00 a month and \$0.50 per broadcast hour for storage.

### Have a Facebook Page

A lot of people are bailing on Facebook. I'm not. Facebook is the sixth most visited site in the United States, and it allows you to broadcast your services for FREE on Facebook LIVE and provide a way to inform your community. We use Facebook to list our events, post pictures of what we are doing, inform of

are. The next generation of attendees definitely is and whether you know it or not, your congregants are probably moonlighting on other church sites who do use Facebook live. It's not a necessary evil... it should be part of an overall strategy to meet people where they actually live. By the way, Instagram can also stream live for FREE.

### Have a Zoom Account

Zoom is fifth on the list of websites most visited in the United States. We use Zoom for leadership meetings, prayer groups, small groups. This is where community happens for us. It is essential to have a Zoom account and it's

of what could happen keep you from providing a needed service to your congregation.

### Promote Through Social Media

Facebook, Instagram and Twitter are all in the Top 40 of all sites visited. It's a great way to communicate events, services, messages and resources. There are many who think all forms of marketing are evil. If the Spirit is moving people will simply know to go listen to your last sermon. That is amazing when it happens, but most of us need to communicate. The Bible says how will they know unless they hear and how will they hear unless someone tells them. You

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**Holland Davis** is a teaching pastor, veteran worship leader, composer of the award-winning song *Let It Rise*, and the author of a book entitled *Let It Rise: A Manual For Worship.* He is the Senior Pastor of Calvary Chapel San Clemente and CEO of [worshipsong.com](http://worshipsong.com). You can follow him on twitter or Instagram @ [hollanddavis](https://twitter.com/hollanddavis)



# Wise Equipment Investments:

BY TIM ADAMS

**M**any of you are looking at making equipment or system upgrades in 2021 and if we have learned anything in 2020, it's that we must make dollars stretch further, which means any investments into equipment must stand the test of time and that means understanding what you get for your money, what the expected lifespan will be, duty cycles (maintenance) and how will every piece of equipment not only integrate together but also fit into your current systems.

Of course, the old adage that “you get what you pay for” does continue to ring true, but how do you balance wanting quality with having a small budget? Churches are hurting financially right now – and have been since before COVID hit with giving down across the board. While it's true that denominational churches have born the brunt of this issue, it's not limited to their ranks. While the causes of this can be discussed at length, let's focus on the reality of needing new and/or better equipment with more functionality while balancing the need to keep the overall cost down.

What options exist for this situation being faced by so many of you?

## Phased Upgrades

Rather than making one large equipment purchase, see if you (or your integrator) can break up the package into smaller chunks that still get you the most critical functionality up front while spreading the financial burden over different phases. This can help the cashflow for the church as they don't have to see a huge dip in the bank account, which can often overflow into the reserves, which is NEVER a situation you want to see. Of course, going into

# Getting the **BIGGEST BANG** for Your Buck



debt is also a choice I would not recommend specifically because by the time you pay off the loan, it will likely be time to upgrade the equipment again.

If a church has to go into debt in order to effect upgrades, I would argue that leadership is either not doing a good job of casting vision to the congregation (i.e. this is our mission and this is how we are going to get there) or that the membership is not mission-focused or being very Christian (i.e. we have church for ourselves and no one else). Either way, there are more fundamental issues that need to be addressed.

## Grants

While Federal grants are likely not available for churches, there are private grants available to help them with building repairs, expansion and other projects. A simple online search generated several available options but pay attention to the conditions of each grant as many do have eligibility requirements that need to be met. If

and the average is that 20% of members do 80% of the work (or 20% of members pay for 80% of costs), but there's no need to let that deter you from trying to change those percentages so the load is shared by more of your members. If you're a small church, this may have a fairly small impact, but it could be the difference between getting an upgrade done or not.

from scratch, but this time try to simplify the budget into larger categories and try to wrap all the needs into those categories. This provides a "larger pool" for ministries to pull from, but it also allows the church board to allocate funds from those pools towards special projects. I know one church that has three funds in their budget: General, Youth, and Mission – all ministries

value. Focusing on value ensures you're taking into account brand reputation, long-term customer support, durability, functionality, etc. If you focus on lowest price, you often sacrifice some, if not all, of these important considerations simply because you want to keep the cost down. Don't let price keep you from getting what you need; after all, we follow the God of miracles

**While it's important to be able to pay for the upgrade, you must also ensure that you are investing that money into quality equipment. This means you're not looking for lowest cost, but best value. Focusing on value ensures you're taking into account brand reputation, long-term customer support, durability, functionality, etc.**

you are a denominational church, you may be able to obtain a loan or grant from your parent organization. It never hurts to ask and you may be surprised to learn about what is available.

## Members

I know that those church members who are financially well off are often approached to help financially close the gap for projects and that they tire of being the ones that contribute the most, but I'm talking about a different concept here. Your members represent a rich and diverse set of skills and talents. One way to free up money is to utilize your current members to handle maintenance, landscaping, janitorial, etc., which can make dollars that are given stretch further. I know many churches do this already,

## Save

Ok, ok, I know, this one isn't exciting or new, but in today's "get it now" mindset, the idea of saving money towards a goal is often forgotten about. Of course, this doesn't help you in a situation of "we need to replace our audio mixer that just died." If that is your situation, then you'll likely need to use a credit card and pay it off over time; but use this as a lesson that you need to adjust your budgeting to set aside funds every month/quarter/year for equipment maintenance and/or upgrade.

## Budgeting

I alluded to this in the section above, but if you really want to make an ongoing difference, have a brainstorming session where you re-create your budget

fall into one of these three categories. I know another church that chooses a "special project" every year and this allows members to give towards that project throughout the year – this has had great success as it exercises patience, provides a goal by casting the vision (i.e. this is why we need it) and helps to ensure that monies are available to fund the goal. And the goal doesn't go away until it's funded, even if the goal takes multiple years.

In the end, there are many more paths towards being able to achieve an upgrade without going into debt, but while it's important to be able to pay for the upgrade, you must also ensure that you are investing that money into quality equipment. This means you're not looking for lowest cost, but best

and who are we to say what is and what isn't possible? Have faith, ask for God's guidance and follow where He leads.

Oh, and please work with an integrator! We know what works and what doesn't and can save you many headaches and can guide you to equipment that has a proven track record, which can help you rest easy in spending money wisely! **T**

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**Tim Adams** spent over 20 years volunteering in church technical ministry and now focuses on helping small churches achieve technical excellence through equipment upgrades, training, sharing best practices and teaching leadership how to cast God-sized vision.

# 2020

## WHAT HAVE WE LEARNED?



BY TIM ADAMS

**2**020 as a whole pretty much sucked and we would choose to forget about it and move forward, or rather backward to how things used to be. However, while a new year brings new promise, hope and dreams, we would be foolish to not take a look back at the amazing things that happened, and reap what we can from everything that occurred.

As a system integrator, I can tell you that my perspective is likely very different than those of you who had to deal with massive changes, stress, and the unknown working week in and week out. As such, I saw a massive, positive response to lockdowns, social distancing and the idea of no in-person church services from churches across the country and around the world.

In what I call Phase One (churches shuttered) I saw pastors and tech teams turning to existing technology to get around this huge obstacle by jumping into the world of live streaming to YouTube and Facebook, primarily. Others turned to Zoom, as the business world did, to handle their weekly services.

We all learned about the hazards of live streaming and the ever-present complexities of ensuring everyone has a smooth experience. Some of us learned the hard way about the seriousness of copyright infringement as streams were cut off mid-stream on YouTube and/or Facebook, while others skated by with no issues.

One question I have for you is whether or not your church has taken a poll of your members to see if they like the virtual church format, or do they miss being able to see everyone? I've heard reports of both and I think one thing that we can take from 2020 is that live streaming is here to stay. Whether your church didn't have plans to start live streaming, were planning for it in the future, or had been live streaming for a while, the need for live streaming from at least some of your membership is not going to disappear any time soon.

### Adjust, Adapt, Be Flexible

We proved our ability to adjust, adapt and be flexible as the situation continued to be fluid and we found creative solutions to having church. Solutions ranged from a simple smartphone/tablet streaming directly to consumer cameras which in turn streamed through software, such as OBS and even drive-in church services. The sheer creativity that was on display in 2020 during the midst of hard conditions was amazing!

We learned about things we never anticipated – sanitizing and more intense cleaning, face masks, social distancing, herd immunity (and much more) but through the grace and power of God, we overcame these difficulties to make sure that we continued to spread the Good News.

In Phase Two, when churches were allowed to re-open and have limited in-person attendance, we saw a huge surge in churches wanting/needing to upgrade their live streaming solutions to something installed that could be operated from the church itself. This led to additional difficulties as the supply chain for cameras, switchers, live streaming encoders and USB interfaces was severely over-stretched. The lead times skyrocketed as demand far exceeded available supply, especially since manufacturing had also been compromised due to the pandemic.

Even in this situation, churches were eventually able to get the equipment they needed. Smaller manufacturers were able to pick up some of the slack and manufacturers and their distribution network were able to get revenue to help keep their doors open, while integrators were able to (for the most part) install the new equipment which also helped them stay afloat.


I saw the church tech community band together like never before using social media to support each other with ideas, advice, lessons learned and asking questions. And while some groups were less helpful than others, as a community

As we look ahead into what 2021 will hold, it's important to remember that, while 2020 had many challenges and situations we would like to forget about, it also saw churches overcoming some significant obstacles to continue their mission of spreading the Good News to a world that needs to hear it like never before.

we largely supported each other. I remember some very long comment threads I was a part of where people came up with very creative solutions to some unique issues and that's a spirit I love to support – helping each other out when in need, much as I imagine the early church was like.

Because of the huge rise in live streaming, we learned the importance of good lighting and great audio. I think it's also safe to say that video teams are pretty tired of hearing complaints about audio from the live streaming audience. It's a tricky area because it can be difficult to monitor your live stream due to bandwidth issues with either the local network or the Internet connection at the church. And how many of us have had a crash course in networking, compression/encoding and Internet connections?

As we look ahead into what 2021 will hold, it's important to remember that, while 2020 had many challenges and situations we would like to forget about, it also saw churches overcoming some significant obstacles to continue their mission of spreading the Good News to a world that needs to hear it like never before. I would encourage all of us, regardless of what

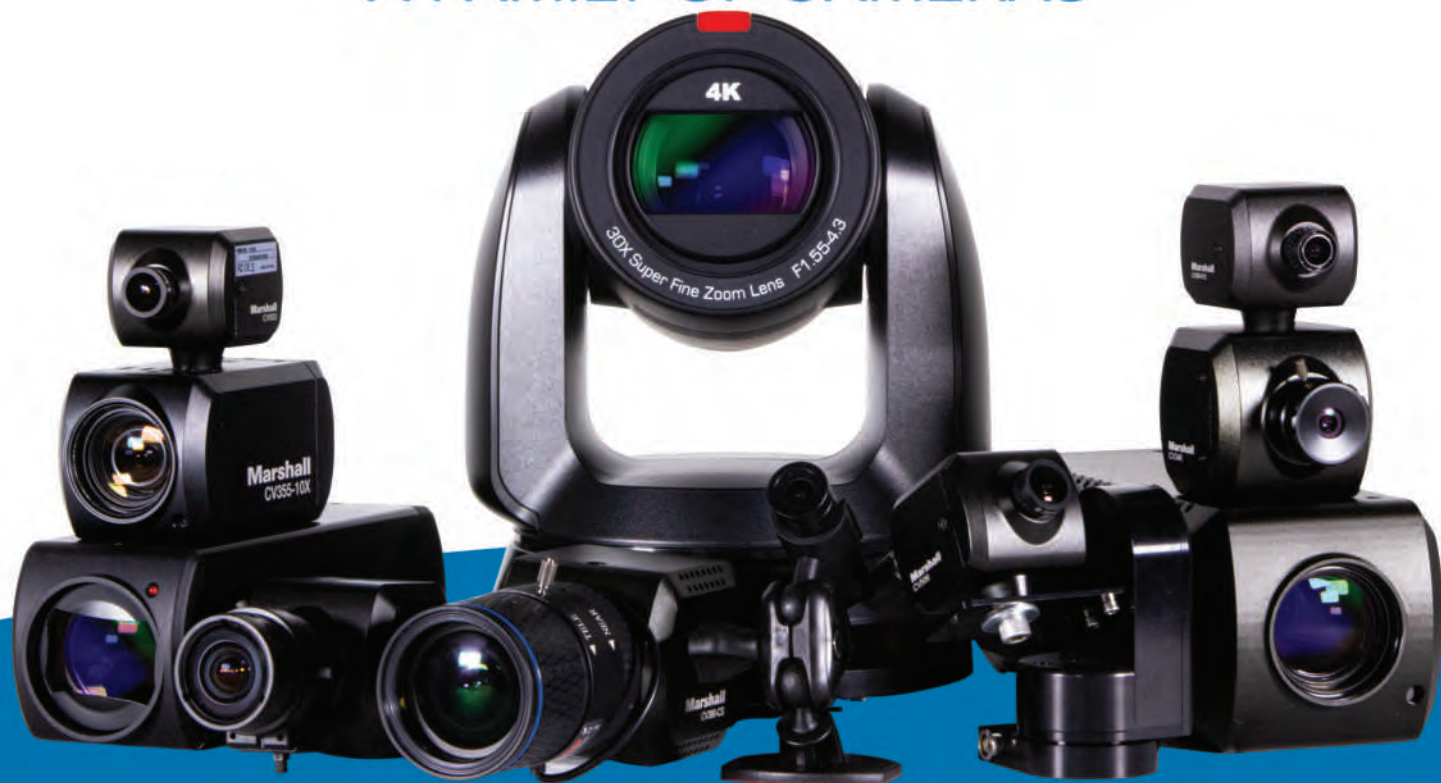
place we find ourselves in, to tap into the love and compassion of God and continue serving and supporting each other. This will only become more and more important as we continue to close in on the time when this world will end, and we go to be with God. So let's love one another, exercise patience, empathy, compassion and kindness, and remember that, above all, we are God's children first and we should treat each other as such. One lesson I have personally learned from the ugliness of 2020 is that anything that seeds division is not from God and that we are called to actively guard and fight against our enemy, the devil. So, let's "be alert and of sober mind. Your enemy the devil prowls around like a roaring lion looking for someone to devour." 1 Peter 5:8, NIV 

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**Tim Adams** spent over 20 years volunteering in church technical ministry and now focuses on helping small churches achieve technical excellence through equipment upgrades, training, sharing best practices and teaching leadership how to cast God-sized vision.

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# LOOKING FORWARD TO A BRIGHTER YEAR:

BY JEFF MUTO

## Delivering Meaningful Content Starts with Choosing the Right Projector

In recent months, churches have been struggling to find ways to deliver meaningful content to their congregations. One area they can consider is the quality, brightness and reach of their projection systems.

Projection systems have long been important technology tools for Houses of Worship venues from small portable classrooms, to overflow rooms to large churches and auditoriums for Sunday services. As churches continue to grapple with having to redistribute congregants in smaller groups, or transition between indoor and outdoor services and activities, there is a more compelling argument than ever to be made for investing in portable projection systems.

Portable projection system technology has advanced by



leaps and bounds. Many of the newer systems pack a powerful punch when it comes to functionality, durability, performance – and perhaps most importantly, ease of use. They also feature a broad range of technology options, from ultra-small portability for small room settings, to larger format devices that can project larger than life-size images at any location.

When assessing a portable projection system, there are a number of key technology elements to consider to determine if the choice is right for your specific needs, starting with the size and darkness of the space(s), and type of presentations (e.g. streaming, static images, etc.).

## Here's a checklist of what to consider.

**1.** Brightness and resolution. Determining the brightness needed is based on the size of a room and the number of people it can accommodate. A general guide is a 5000 to 6000 ANSI lumens output projector for spaces large enough to accommodate 200 people or more; minimum 4000 ANSI lumens output for a 100 to 200 people size space; and 2000 to 3000 ANSI lumens output for anything smaller.

**2.** Standard throw, short throw or ultra-short throw (UST). Throw distance refers to the measured expanse that the light must travel from the projector's lens to the projection screen's surface. A standard throw projector typically creates a 100" (16.9) image footprint from about 10 feet of throw distance, making it better suited for larger areas that may require movement or action. For smaller spaces, short throw projectors can create the same sized image from about 4 ft., while ultra-short throw projectors will put up the same size image within 3 to 20 inches of the throw distance.

While there is a wide spectrum of choices, specifications of a good middle-of-the-road portable solution that can accommodate most medium/smaller size spaces would feature 1280 X 800 resolution, 3,000 ANSI lumens output, and a 1.37 to 1.64 throw ratio – such as the ViewSonic LS600W lamp-free LED projector.

**3.** Light source. Traditional projectors have lamps that need to be replaced on a regular basis. How often depends on the level of usage, the amount of dust in the system, and the efficiency of the fan. A hassle-free and more efficient alternative is lamp-less systems (LED or laser) that can deliver high quality images without the ongoing costs of replacing lamps. An additional benefit of a lamp free projector is that it's more environmentally friendly because it doesn't contain mercury like traditional lamps. What you choose depends on the brightness needed from the projector and the number of people in the environment where you are using the system.

The top-of-the-line choice (should you need it) would be a 4k laser, because it offers the highest brightness. LED is more affordable, and delivers similar benefits in medium or small group applications.

**4.** Smart features. Smart features are integral to making the entire running of the projector simple and seamless. These include plug-and-play USB capability and Wi-Fi enabled. If the projector is Wi-Fi enabled for example, you can easily cast content from a smartphone or other device making it simple for even inexperienced users to learn and manage.

**5.** Other basics to consider. Consider a battery powered projector if it is often moved to different locations within the facility, particularly if you are hosting small group presentations with ultra portable projectors.

Also test the sound quality of the embedded speakers. The differences in quality between systems might surprise you. Automatic on/off features are also a great perk for saving power.

Lastly, check if the system has a sealed optical engine, an important feature for preventing dust and moisture from entering and preserving the image quality.

As churches face the new normal in all aspects of their operations, they are becoming increasingly versatile in how they populate their spaces and deliver presentations. Multifunctional, lightweight, and intelligent portable projection systems can play an important role in helping them service their congregations during these challenging times.

Whether churches have single spaces or multiple overflow rooms for Sunday School classes, serve community meals, or hold gatherings, there is a wealth of portable projection system choices that can be tailored to suit and scale to any venue's needs. The key is assessing the exact fit and features that would best suit your environment and budget today and in the year ahead. **T**

**Jeff Muto** is the business line director for ViewSonic, a leading global provider of interactive and collaborative display solutions for enterprise, education, and commercial markets.





# Making Multi-Zone Wireless Mic Systems Work

BY CHRIS REGAN

**T**his spring, the Archdiocese of Boston unveiled a \$26M restoration of the 150 year old Cathedral of the Holy Cross. An architectural marvel, the 2000 seat cathedral is the largest in New England and surpasses St. Patrick's in New York City in size. This poses a challenge in configuring a “works everywhere” wireless mic system. Landry Audio, a division of CommLink Integration, took on the project.

Multi-zone wireless microphone projects, sometimes referred to as DAS (short for Distributed Antenna System)

are unique in the world of wireless audio. Often times these projects don't have a very high channel count, since a musical act with 8 wireless microphones and 8 channels of IEMs typically perform in one fixed stage area.

And this was the case in the cathedral project, where CommLink only needed eight channels of wireless microphones. Easy, right?

Not exactly.

Those eight mics need to work reliably across a massive floor plan, well out of range and line of sight for

any single set of receive antennas. And naturally the 150-year-old architecture and strict aesthetic limitations added even more to the challenge.

While determining coverage areas and antenna type may require a bit of trial and error, the actual wiring for a multi-zone system at the rack-end is pretty straight forward. The 4 Zone serves as the “head end” of the system, combining each A and B diversity channel down to a single A and a single B. This output pair then connects to a DISTRO4 or other multi-channel antenna distribution system, which



then feeds the inputs on the wireless mic receivers.

Based on the location of the AV rack (inside a closed office area) - an estimation was then made over practical multi-zone coverage for the wireless system, taking into account antenna type, placement, and optimal line of sight conditions that would meet the strict aesthetic requirements of the project. Coaxial cable run length vs. RF over fiber distribution was also considered.

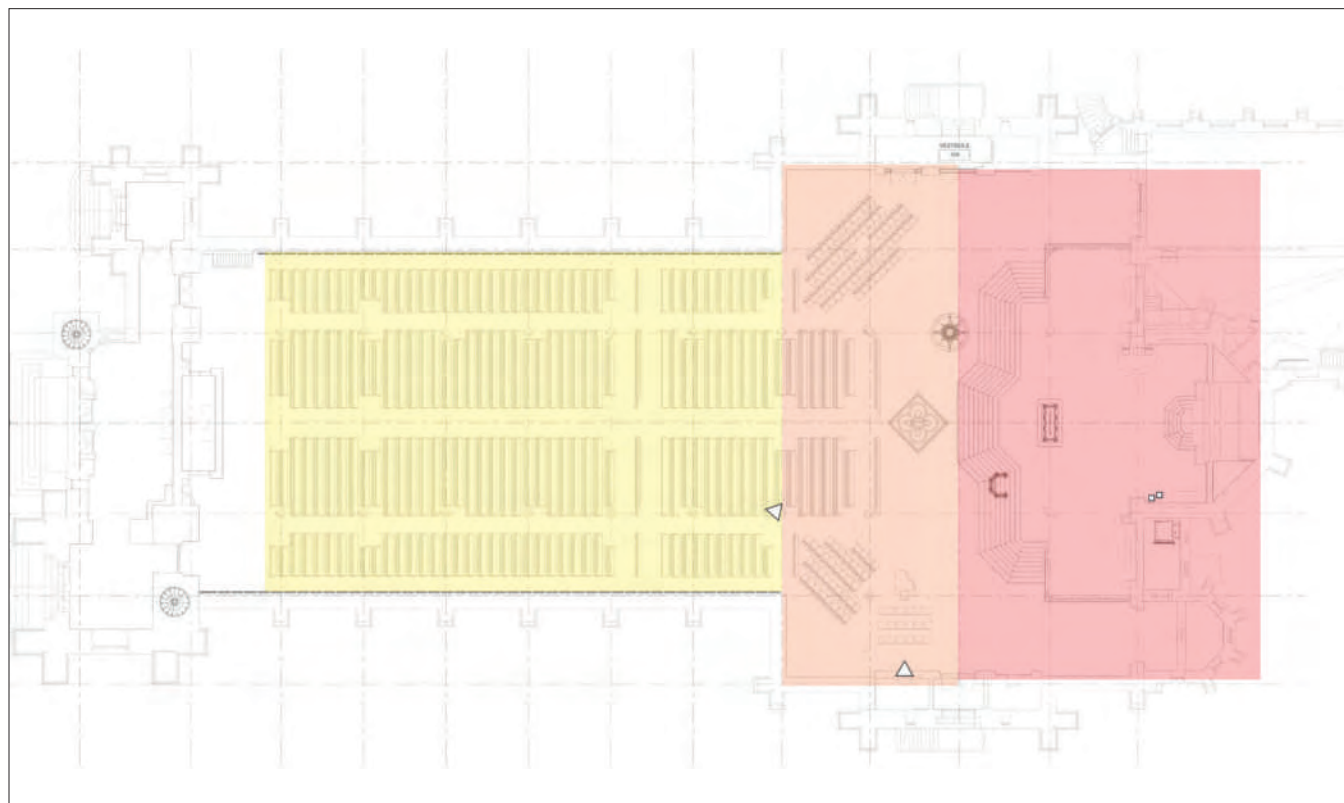
A pair of low profile Shure UA864 antennas were mounted on the wall of the altar area, out of sight from

the congregation, this section of the cathedral comprised Zone 1, and had an effective range just to the edge of the altar, which is where Zone 2 picks up coverage.

Zone 2 begins in the transept area and utilizes the installation white Diversity Fin Antenna. From a single point of installation high up on the wall of the cathedral and cleverly camouflaged, the polarization diversity antenna system is nearly impossible to find, even if you're looking for it. Over larger areas, particularly indoors with a variety of reflective surfaces, like the marble floor of the cathedral, signal

fades due to angle and orientation of the signal are even more pronounced. This is where the Diversity Fin excels in maintaining adequate signal level due to cross linear polarization fading.

The largest area in the cathedral, the main congregation, is where Zone 3 picks up the roving mic transmitters. Here another Diversity Fin in white was installed high up on a column. For certain church services, the microphone transmitters will move down the long walls of the cathedral, and the system would need to reach areas well out of reach of the first two zones. There was a chance this area may require





a 4th Zone, so Commlink budgeted a backup plan to further extend the system with another Diversity Fin antenna if needed, which would then likely require an RF over Fiber solution like Optix due to the 2000 ft potential cable run to the rear of the cathedral. Having thoroughly tested the three zone coverage areas after installation, the 3 Zone configuration was deemed adequate. The Zone 3 Diversity Fin also

employed in-line amplifiers to boost the signal and makeup the signal loss over a run of several hundred feet of RF Venue RG-8X cable. These in-line amplifiers are powered by DC on the coaxial lines provided by the 4 Zone.

Tapping into each zone with a spectrum analyzer, while walk testing the transmitters set to various power levels (low to high) is an effective way to measure coverage. (This particular

setup seems to work with with the ULX-Ds set to 10 mW, but may benefit to moving up to 20 mw given the large size of the facility. Luckily the spectrum conditions at the site provide for a low noise floor, and lower transmit power levels work (and save battery life!).

The final handoff of the system was completed, along with documentation for the frequency settings, backup frequencies and other system details. ■

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# Audio Directors Work to Grow Under Vastly Different Landscape

BY ANDRES CAAMANO

*For an audio director, plenty was on their respective daily plates up until a few months ago. Then March rolled around. Since then, many of their worlds have changed dramatically. For these audio directors, their roles have morphed into jobs that have become anything but simpler.*

## Focus Toward Streaming

Among one of the most significant aspects of change that audio directors have had to circumnavigate is a shift away from live services, and more toward streaming or broadcasting.

Churches have largely begun offering in-person services again, from the early days of lockdowns in certain parts of the country. Even so, with the uncertainty and concern over the virus, many are still opting to watch services from home.

Regarding that recent growth in streaming, Mike Anderson, a former tech director at Blue Ridge Community Church in Lynchburg, Virginia said, “So much has shifted from the live side. Churches have worked to up the quality, to deliver the church service in a better environment.”

Aiming to improve the overall streaming experience, particularly on the audio side, is no small feat.

“As we work to give them the best church experience at home, we have to recognize many of them have small speakers, and challenges like that,” explained Carl Everett, a former campus production director at Fellowship Church in Grapevine, Texas. To achieve a quality experience, he noted, provide “broadcast level audio, while having it be consistent. You want to avoid having the band screaming in their face, only to have talking be significantly lower.”

The audio element within a streamed service is integral to it being watched in full. “The biggest side of video is audio. If the audio is garbage, it doesn’t matter how good your video is,” noted Brandon Salyer, director of technical arts at Shadow Hills Baptist Church in Las Vegas. “We have to meet the challenges and demands of each platform people are using. With instruments like bass guitar, or other lower-end instruments ... with 5.1 surround sound (in the viewer’s home, Shadow Hills’ streamed service) sounds incredible.”

## Service Issues

Aside from working through issues tied to streaming, in-person service challenges have hardly gone away.

“As churches start to meet in person again, the number one thing is finding volunteers willing to do so, over fears (relating to COVID-19),” explained David Leuschner, executive director of Digital Great Commission Ministries, and the former executive director of technical arts at Gateway Church in Dallas-Fort Worth, Texas.

In an effort to successfully overcome those concerns, Leuschner touted other businesses’ COVID-19 messaging. “We have asked people to wear masks. The airline industry, though, is saying, ‘We are safe, and this is what we are doing,’” he said. “[Houses of worship] should be making sure our volunteers know, ‘These are six things we are doing, to make you feel safe.’”

As churches have begun offering in-person services again, it has forced



many to navigate an uneasy landscape. Churches have had to be nimble, especially when faced with COVID-19 limitations.

For example, as outlined by Golden Preciado, former tech director at Refuge Calvary Chapel in Newport Beach, California, she detailed how the church, “At the beginning (in March), we were all live streaming, with one staff person there.” The situation soon morphed, by offering outdoor services to members “in the parking lot, when people could meet outside.”

It wasn’t long before the church began hosting services, where it “could do some indoor capacity, up to 25 percent.” Only for the church to once again return solely to outdoor services.

Through all these changes, Preciado noted, “It’s been difficult. Our governor has been going back and forth (relating to COVID-19 directives). Through it all, the church has been spending money on taking the necessary precautions.”

Even as so many new concerns come to the attention of audio directors, many long-standing issues remain.

## Budgeting Toward Improvement

With 2021 having begun, budgeting for the year is fresh on the mind. For an audio director, seeking to avoid having the tech team become understaffed and underbudgeted is often an annual exercise. To avoid being caught in that position, communication is key, noted

Leuschner.

As Everett suggested, “Build a healthy relationship. Have your leader trust you. And you trust them. And be willing to overeducate (in discussing a proposed added expense).” The value of such a relationship, Anderson added, “Is that it is a lot better to explain why you need things, if you’ve already formed a relationship.”

When you ask about an additional expense is also crucial. Approaching the administration, right after a budget has been approved, likely won’t get you the answer you are looking for. “You can ask for a new audio console in February, but if the budget is renewed in January, you probably won’t get it until next January. Planning ahead is key to securing budget funds,” Leuschner said.

Recognizing that most churches typically don’t have large budgets, when presenting needs to administration, seek to offer options. “Come with a heart of humility,” noted Preciado. “When you present a scenario of needs, discuss the one with the highest amount of need. Then one with a little less need, and then the least.”

As tempting as it is to prioritize one’s needs around equipment, don’t ignore how a church can grow by expanding one’s staff.

“For the longest time, I was the only one (in the department). Eventually, I talked to the administration about hiring an assistant,” noted Salyer. With that addition, he noted how it has



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**Depending on the church's size, some may be looking to add to their tech team staff come budget time. Smaller churches, though, might just be deciding on whether to bring on an audio director on full-time or part-time.**

helped, with his being able to spend time with family or take time off when needed. If one is forced to work excessive hours, “they won’t last long. Even God rested on the seventh day.”

#### Avoid Being Stretched Thin

By having enough staff on hand, it also provides an opportunity to train those around you. “If you are the only person that can ‘do it right,’ where you feel you have to do it all, that’s an issue,” he added.

Depending on the church’s size, some may be looking to add to their tech team staff come budget time. Smaller churches, though, might just be deciding on whether to bring on an audio director on full-time or part-time.

Faced with such a decision, Anderson cautioned that a church should understand how, bringing on a part-timer, would need to come with fewer expectations. “When (the audio director) is stuck in part-time, you can only work on the service. The spiritual and relationship side suffers, and the long-term vision will also be impacted.”

By having a full-time audio director, Everett explained, the added time commitment will lead to weekend

services being of “increased quality, well put together and not rushed.”

Speaking from experience, Salyer said that the role could be limiting. “When I first started, I was part-time,” he said. “I never had enough time to get things done before Sunday morning rolled around.”

### Worthwhile Technical Tools for Audio Directors


Beyond the people segment of the budget, one should not ignore the software tools that can be essential to an audio director’s success.

When it came to the logistics side of the role, Anderson, Everett and Leuschner agreed on Planning Center’s value. Everett noted, “Your crew is your most important asset.”

Among the software tools used by audio directors to help improve sound, Anderson touted Waves. “I hate really mixing without it, whether on the broadcast side, or a live in-person mix,” he said.

From the digital audio workstation side of things, Everett highlighted Adobe Audition, to help with mastering and recordings. The software can “easily be interfaced with Creative

Cloud that many (house of worship) creative teams use.” For Preciado, she pointed to ProTools as her digital audio workstation tool of choice, for recording, editing and mixing audio.

Among the tools discussed for the often-frustrated audio director - who often will hear from members of the congregation about how it’s “too loud” - Leuschner suggested the SPL reporting software, Trend. The software, which can be found at [howloudisit.com](http://howloudisit.com), can track the decibel level from a prior week. From there, it can compare it to the current week, to see if it is louder, or a misperception. “The number one complaint that I hear is that ‘it is too loud, and can the audio director fix that?’” said Leuschner. With software tools like Trend or Smaart, they are key to helping an audio director “set standards, and help you mix to those standards.” 

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**Andres Caamano** is a writer and editor with nearly 20 years’ experience, including over four years bringing attention to the latest news in audio, video and lighting technology for houses of worship.



# Choosing Audio Consoles with Growth in Mind

BY JAMES CARELESS

**T**he audio console is the heart of a church's AV/sound reinforcement system. Yet finding the right console – one with room to grow but at a price the church can afford – can be incredibly challenging.

Lacking expertise, church leaders can end up buying “whatever console they were recommended from a Facebook group or one that was just released and is getting press coverage,” said Jordan Hill, Deploy team member at Mankin Media Systems. “It’s easy to get lost in the latest and greatest, and not evaluate the needs of the organization first.”

To prevent this from happening, TFWM spoke with Hill and other audio professionals to learn how to choose the right audio consoles for churches of all sizes. Here’s what they told us.

## Taking the Right Steps

Selecting the right church audio console requires a methodical step-by-step process.

“The first steps are to determine budget and timing,” said Kevin Kimmel, Yamaha’s Systems Application Engineer.

“Next, consider your long-term production needs. Is there a long-term plan that is supported and what are those requirements?” (If not, now is the time to draft such a plan.)

The next step is to answer specific questions such as:

How many outputs will be required to drive the PA and other zones on the property? “Whatever the channel count you think you need, add at least 15% as stuff always come up,” said Kimmel.

Will there be a system processor that’s doing the distribution, or will each zone be driven from the console itself?

Are outputs needed to build stems either for in-ear monitors or other mix positions?

What are the requirements for monitors looking down the road, namely in-ear mixes and/or wedge mixes?

With this done, it is time to consider the range of church events to be produced (and their complexity) and the experience of operators (both paid and volunteer) who will be running the board. “For example, a system may

need to be flexible and simple enough to be used by volunteers operating a handful of mics during the week, and then be reconfigured to deliver a 100+ channel festive service manned by a professional production crew,” said Tom Wise, Product Manager for Live Consoles at Solid

church environments,” he said. “Being able to program the console’s entire configuration including channel count, bussing structure, I/O routing and fader layout into a showfile makes the jump between those extremes as simple as loading a file.”

“This brings me onto

analog inputs through either additional input cards or Dante-enabled devices.”

Have Enough Headroom for Growth, But Not Too Much

There’s one last question to be answered: How can a church ensure that its new audio console has room to grow, but not more than it

he said. For instance, “the advancement of Audio over IP (AoIP) technologies such as Dante has significantly reduced the technological and cost barriers to implementing flexible and scalable infrastructures, and offers a good value solution to this problem.”

The Last Word

## To simplify the decision process, the smart course is to look at these features and decide which are ‘must-haves’ (crucial) as opposed to ‘nice-to-haves’ (optional).

State Logic). “While the initial learning curve might be a little steeper, I believe the recallability of digital consoles makes them a clear winner in these diverse scenarios when compared to analog consoles.”

### Must-Have Features

Today’s audio consoles are packed full of amazing features, all of whom demand a church’s attention at purchasing time. To simplify the decision process, the smart course is to look at these features and decide which are ‘must-haves’ (crucial) as opposed to ‘nice-to-haves’ (optional).

“For me, the ‘must-have’ features are sound quality, flexibility and ease of use,” said Wise. Starting with sound quality, “what the audience and performers hear is ultimately what matters! This means optimising the quality of the preamps and the digital signal processing (DSP) algorithms inside the console.”

As for flexibility? “The challenge of scaling from small weekday services to complex events rivalling Broadway shows is somewhat unique to

my third ‘must-have’, Wise continued. “Ease of use is important irrespective of the operator’s technical competence. Being able to drag-and-drop fader strips onto the surface or manipulate an EQ graph with a pinch of your fingers feels intuitive to almost everyone in today’s touch-screen-centric world.”

Having enough audio channels (with room to grow) is obviously a must-have. But “channel count is only one factor in ‘being enough mixer,” said Kimmel. “Having the right amount of DSP (built-in plug-ins, and EQs/EQ types) are equally as important as having those things available to the users, as they will assist in making the job easier and the results better.

One last feature that could qualify as a must-have: “The newest digital audio consoles all give you the ability to software or hardware upgrade, which allows you to add key features in the future,” said Mankin’s Hill. “You should also ensure that you have a Dante-capable system, and the ability to expand your system by adding

needs to pay for? After all, “most digital mixers have much more functionality than any one facility/mix engineer uses,” said Kevin Kimmel. “Overkill occurs when the facility just cannot afford it as the cost was way over budget, or when the console purchased is way over the heads of the users.”

So how can a church determine how much audio console it actually needs? According to Jordan Hill, the answer lies in determining what the church’s biggest annual event is, in terms of required channels and other audio production features. “Then add 10% to 15% to everything,” said Hill.

Kimmel suggests “getting a console that has more than enough channel count with the ability to add stage racks/modules for stage racks as needed, as well as a DSP that is much more than you need right away or is expandable within itself.”

Tom Wise agrees with Kimmel, but only up to a point. “While having enough console channels is obviously essential, it’s important to think about the overall system and not just the console in isolation,”

If the task of choosing the right audio console still seems daunting despite the advice offered above, then it is time to call a trusted audio integrator for their guidance (and possible selection/installation assistance). After all, the goal is to make the right audio production choice for your church -- whatever it takes to get to that decision! **T**



**James Careless** is an experienced freelance writer with credits at *The Toronto Star*, *National Post*, and *Globe and Mail* newspapers. He is also a broadcaster/podcaster and has produced the ecumenical radio show “Daybreak” at CHEX-AM radio in Peterborough, Ontario.



## MAKING THE MOVE TO IP

# Laying the Professional Groundwork for Future Expansion

BY TONY STAIRES

**A**n IP infrastructure for live and broadcast applications in a house-of-worship context offers a number of benefits. One of them is easy resource sharing, i.e. the geographical separation of a live event and the places where it can be attended and complemented through live input. Data streams (rather than signals) can be sent from the main church to campuses in different cities, states or countries on a so-called wide-area network (WAN). Also, with the right network connection, multiple data streams can be sent over the internet to be mixed at home, providing an effective solution where the content and the engineers do not have to be in the same physical location.

Of course, IP-based audio, video and control signals can also be distributed on-campus, i.e. on a local-area

network (LAN). If there are plans to share entire events and, more importantly, invite all venues, campuses or homes to contribute to weekend services, Bible studies, church meetings, weddings and funerals, Audio-over-IP is a fundamental first step on the way towards inclusive events. Why? Because IP is flexible, scalable and can be based on the same open-standard technology (ST2110) that subsequently added video gear uses.

Imagine being able to control not just the mixing console for the FOH and monitoring systems at venue A but also what people in venues B, C, D, etc., hear and see, while at the same time streaming audio and video content to the church's streaming service for live or on-demand access by those who are, or were, unable to attend in-person.

## Growing with You

In its basic form, “Audio over IP” (AoIP) means that audio streams are transported over a network. There are several Audio-over-IP protocols out there, some proprietary (CobraNet, SoundGrid), i.e. developed by a given manufacturer and usually unable to talk to other brands, others slightly more generic but lacking crucial options for future expansion (no WAN support), and finally, what the broadcast world calls “real” Audio-over-IP: vendor-agnostic, interoperable solutions that do away with the most limiting restrictions of Ethernet-based approaches.

**You can start small, with a mixing console and a stagebox, for instance, and then add components as your needs evolve**

This reputation is largely due to a forward-thinking roadmap based on the idea that future audio and video systems would consist of a number of bricks that can be assembled to build solutions of just the right size to cover all aspects of the intended purpose.

Lawo is one of the contributors to the RAVENNA protocol, which paved the way for the AES67 standard, which has today become part of the ST2110 suite, the generic standard for interoperability of (physical and virtual) devices by a variety of manufacturers.

This does not have to be expensive either. Natively ST2110-compliant devices cost about the same as solutions based on proprietary or limited-scope generic AoIP protocols. But they have modularity in their DNA and offer the guarantee that ST2110-compliant devices talk to one another, irrespective of who builds and commercializes them. This means that you can start small, with a mixing console and a stagebox, for instance,

and then add components as your needs evolve. Simply connect more distributed stageboxes, gateways, and native IP equipment to the same network switches as you go—without ever outgrowing your existing infrastructure.

## Setting A Standard

Until not so long ago, there were almost as many formats as there were manufacturers. Everybody thought they had found the best solution. True to the outcome of previous “format wars”, open standards eventually prevailed. In the case of IP, they were initiated by the Alliance for IP Media Solutions (AIMS), which fosters the adoption of one set of common, ubiquitous, standards-based protocols for interoperability over IP.

Far-sighted manufacturers actively contributed to the development of standards like RAVENNA, AES67 and Ember+ for interoperability; SMPTE 2110 for the accurate transmission of audio, video, control and timing data; and SMPTE 2022-7 for redundant operation. Today’s professional users expect vendors to follow the standards of the AIMS Roadmap.

Users inclined to stick to legacy solutions—called “baseband devices”—still believe that all existing equipment needs to be replaced in one go. This apprehension is put to rest by the availability of IP-native devices that offer a variety of “baseband” inputs (and outputs) and convert SDI, analog, AES3, MAD1 and other formats to IP, and back. The migration towards IP can be a gradual process.

## Benefits of ST2110-based IP

As stated above, ST2110 data streams can be transported over thousands of miles. Thanks to IP, distributed setups involving venues and control rooms in two or even more cities have become all but the norm. Standardized control formats like Ember+, which are also transported over IP fabrics, allow a user on the East Coast, say, to remotely control video cameras, mixing consoles and a variety of other devices on the West Coast—or anywhere else on the planet.

Some users have started to leverage the WAN capability of their equipment

to a point where the processing equipment is centralized in one location, which users can access from many different locations simultaneously. Users and engineers no longer need to be in the same location: the audio engineer can mix from home, the video director can switch cameras from a campus control room, and the content comes from yet another place; all while the resources for video and audio processing are located in a centralized equipment room and accessed over fiber.

The underlying technology works equally well on a local, regional or country-wide scale. Depending on the scope of your application, top-notch professional results can be achieved with a small number of devices.

## Hit the Ground Running

Are there any challenges to going ST2110-compliant IP? Not as such if you accept that IP requires a paradigm shift: people need to think in terms of data packets and network requirements. This is something that can be learned. And while only a year ago the biggest challenge posed by an IP network was that nobody really knew the routes taken by data packets or how to troubleshoot issues, this has since been overcome by system monitoring and telemetry software, that makes the entire network transparent and easy to maintain.

Although network monitoring makes most sense in larger systems, this option exists from the moment you set up your first IP-native device. **T**

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**Tony Staires** currently works as the House of Worship Sales Manager and Sales Engineer for Lawo North America. Previously, he was the Production Director at Granger Community Church in Indiana. Over the past 20 years, he has also worked in production and AVL integration, with several national broadcast organizations, and as FOH and monitor engineer for Grammy and Dove Award winning artists.





# Q&A

## Faith United Methodist Church

**F**aith United Methodist Church in Tulsa, Oklahoma is one of many churches that has worked to ensure its services remain accessible to all during the 2020 global pandemic. When churches had to shut their doors, the Faith United Methodist team shifted to video streaming. When social distancing practices became more clearly defined, they developed a hybrid model – allowing a few in-person worshipers to join them at the church while they continued the stream. However, when the on-site sound system was running, the audio on the stream became increasingly unintelligible – presenting obvious problems.

**Mark Eldridge, Director of Tech Ministries at Faith United, shares their solution...**

**TFWM: What was the challenge you had with your audio system before the coronavirus pandemic?**

**Mark:** Our previous sound system was designed and installed in 2005, using components and technology available at the time, and staying within our budget, and it served us very well for many years. The system was based on three main point-and-shoot speakers built into the



architecture up very high above the chancel, each covering part of the front of the sanctuary. Then there were ten smaller speakers underneath the front edge of the balcony to cover the seating in the back underneath it. The system provided sound everywhere, but it was not consistent, and reflections and reverberation were not well controlled in the room. For live music, it was acceptable, but for spoken voice, intelligibility was very seat dependent.

For the past several years, we had been making preparations to upgrade the system with better technology, knowing we were going to add online streaming to our services, and that the equipment we had could not provide what we needed. But we didn't have a detailed plan. Then the very first service of 2020 during rehearsal, I found that the center main speaker had stopped working, and we knew we were going to, as a minimum, make some system repairs and updates.

### What changed once you had to adapt to shutdowns and social distancing requirements?

**Mark:** When COVID-19 forced us to close to in-person worship, we were streaming online services within a week. The learning curve was like a vertical wall, and in that first week, we knew our current sound system, even with some repairs, would not allow us to hold both live





**The learning curve was like a vertical wall, and in that first week, we knew our current sound system, even with some repairs, would not allow us to hold both live in-person services and also to have high-quality online streamed service audio.**

in-person services and also to have high-quality online streamed service audio. The reason was that sound was not only directed to the people in the sanctuary seating, but was reflecting off of all of the hard surfaces; walls, balcony face, etc. Those reflections caused a lot of uncontrolled reverberation and cancellations, and it was muddying up the audio mix on the video stream. We immediately began looking at what we needed to do streaming right.

**What were the potential solutions you saw to fix both in-person and live streaming audio?**

**Mark:** I had been researching the Renkus-Heinz ICLive speakers for several years before this, as I had been studying the beam-steering technology. I also work with very high-end car audio sound quality systems, and I have used beam steering in cars successfully on a much smaller scale. The benefit of beam steering is that it allows you to direct the dispersion pattern of the speakers where you really want the sound to be. For the church, that meant

placing it on the congregation and keeping it off of the walls and other surfaces, and providing the highest quality sound for both.

I knew the Renkus-Heinz technology could be very promising for our needs for both live streaming and in-person services.

**Did you work with an integrator or designer on the project?**

**Mark:** Our go-to person for this project was Curt Taipale with Taipale Media Systems. Even before Covid altered our services, I had been in touch with Curt about helping us with the new system design and integration. Right up front, I asked if he would work with the Renkus-Heinz steerable speakers in the design, and away we went!

Curt was our point-person for so much. He did 3-D acoustical modelling of the sanctuary, and determined everything related to speaker placement, acoustical treatments, initial system settings, and more. He coordinated vendors and suppliers, and he always provided the guidance



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we needed throughout the process, answering every question I threw at him. Curt is at the top of my list for church sound system design!

## What ultimately was installed, and how difficult or easy was it to get up and running?

**Mark:** The specific layout for our Renkus-Heinz IC Live X speakers is, using their naming configuration, is X-X-LX four units tall in an array, which has eight of the 8-inch midrange drivers from top to bottom, and 16 of the high frequency drivers at the lower 2/3 of the system.

Curt Taipale and Brandon Heinz from Renkus-Heinz set the ICLive X speaker placement 10 feet above the sanctuary floor at the left and right sides of the chancel area. Mounting them lower allows them to steer the beam underneath the balcony, providing excellent intelligibility coverage for every seat in the sanctuary without supplementary speakers under the balcony.

We had Renkus-Heinz custom paint the speakers to match the wall color, and they blend in very nicely with the décor in the sanctuary.

We did the hands-on system wiring and speaker installation work ourselves within the church, as we had the expertise needed to handle these areas. We did have Perdue Acoustics handle the acoustical treatment installation work.

For system tuning after the installation was completed, Thomas Tyson working with Taipale Media Systems, and Graham Hendry from Renkus-Heinz, came in for a full day of commissioning and system configuration. Graham started with the speakers' positioning and digital steering for coverage of the sanctuary seating and avoiding the walls and other hard surfaces. Tom dialed in the crossovers, equalization, delay settings, monitors, and everything else to optimize the sound for the entire sanctuary. Between the two of them, it really came together nicely. They are some super-smart guys, and lots of fun to hang with too.

## What are the results of the upgrade?

**Mark:** Sensational! We've had a few months of services now with the new system, and the results are just overwhelmingly good! We receive comments from staff to worshipers in our socially distanced in-person services that say they can hear everything like they never have before, clean and clear.

And, those depending on worship via live stream have universally sent us positive responses to the improvement in audio. We're right where we want to be now, with the ability to offer a high quality worship experience for everyone – no matter where they are.

It's challenging to even find the correct superlative for how much this has improved our services. As our senior pastor Charla Gwartney said to me: "It sounds so good everywhere in the sanctuary. I have no words." **T**

# Metrics for Evaluating LEDs – Part 1

BY STEPHEN ELLISON

**P**erformance Metrics are the data for a fixture defined by organizations outside of the manufacturer. A good example is the metric Measurement; the dimensions of a fixture are fixed values backed up by the National Institute of Standards and Technology. No matter whether you measure in inches or millimeters, anyone can use a tape measure and get the same information that is published by the manufacturer. In this article we are going to look at some of the basic metrics you can use to compare fixtures.

## DIMENSIONAL

### ELECTRICAL

- *Power*
- *In Rush Current*
- *Vampire or Stand By Power*
- *Cooling - i.e. Noise*
- *Data Protocol / Dimming*
- *Warranty*
- *L70*

## Dimensional

Dimensional is so basic a metric there are only two points I would make. First, the size of a fixture can become important in some situations, so having this data readily available is important in deciding if the fixture will fit. The second point goes to weight; LED fixtures can weigh a significant amount more than their incandescent counterparts. You need to keep this in mind when you design your rigging or mounting location.

## Power

One good thing about LEDs is the power consumption. Fixtures are available now that use only 100 watts of power and outperform the best 575-watt fixture. An example of how much you can save is the amount of power required to light a cyclorama using a traditional cyc light, vs LEDs. At one theater I worked in we had a 40' wide by 20' tall muslin cyc, and we used ten three-cell cycs to light the backdrop. Each cell of the fixture used a 1500 wall lamp, that is a total of 45,000 watts

with all on at full. Typically, you would only use Red at full and Blue at half for a nice magenta, (22,500 watts). Those ten fixtures can now be replaced with ten LED fixtures at 133 watts each, for a total of 1,330 watts, a power savings of over 21,000 watts. Another benefit is that you don't have to replace the gels.

## In Rush Current

This metric is more important than the last in designing your lighting rig. When you first apply power to a fixture, the electronics go through a startup phase. During this initial power up phase, the amount of current that is being consumed can be significantly higher than the operating current. While this initial phase is very short in duration, typically less than a second, the current draw can be enough to trip a breaker if too many fixtures are connected to the circuit. You may read that the fixture is 100 watts and think the power draw, based on simple use of ohm's law, is .83

**When you first apply power to a fixture, the electronics go through a startup phase. During this initial power up phase, the amount of current that is being consumed can be significantly higher than the operating current.**

amps. You would allow for some extra current for the fan and electronics, so you err cautiously and use 1.5 amps. You are connecting to a 20-amp breaker which, when reduced to 80%, is 16 amps, so you figure you are good for at least ten to eleven fixtures, since the 100 watts is with all colors at full.

However, you would be wrong and would suffer nuisance breaker tripping. When you look at the specifications you will probably not find a listing for In Rush, but you can find a listing for how many fixtures you can put on one circuit, or daisy chain. If you don't find it on the specifications sheet try looking at the installation manual – the information should be there. If you can't find it then a call to the manufacturer is in order, as this information is critical to laying out your power layout.

## Vampire or Stand by Power

This term refers to the power being consumed by a fixture when it is turned on and not putting out any light. This information is not very relevant to stage lighting fixtures, unless you plan to always leave them powered on. You will always want to turn off power to any fixtures that are using a fan to keep them cool, unless they have a mode that shuts the fan completely off when the fixture is not producing light. Your house lights, which should be convection cooled to keep down on ambient noise, are typically left on for

very long periods of time. This means that they are always consuming some power.

A good example of a device you use every day that is always on is your TV. How many of you actually turn off your TV every night? Don't think that when you push the power button on the remote means you are turning off the TV, you are only putting it into sleep mode, there is normally an indicator LED that tells you the state of the TV. I did have one person tell me when asked that they turn off the power strip each night. So, there is always some power being consumed. The better the electronics the lower this number will be; the lower the number, the less cost on your electric bill. This could also influence how long you have these fixtures powered on. I would recommend that if you have the fixtures on an architectural control system, power them on before you need light in the space so that you don't have to wait for them to go through their power on sequence, which can be seconds.

## Cooling

This is an easy one, since there are only two answers: convection or fan. The method of cooling directly affects the ambient noise floor in the space. If the fixtures are fan cooled, the next question relates to whether the fan is always on at one speed or can it be adjusted based on heat or noise.

## Data Protocol

DMX512 is best for use in a church sanctuary. While there are other options, DMX provides the best flexibility and dimming.

## Warranty

My only thought about a warranty, other than you want one, is that you should choose a longer warranty based on it can be difficult get to the fixture if you must fix it or send it back

## L70

This Metric is probably new to you, as it only applies to newer fixtures. L70 refers to the life expectancy of the fixture. LED lamps are different than an incandescent lamp in how they fail. When an incandescent lamp fails it is permanent and can be quite dramatic when they blow. An LED will either fail completely or just fade away. When they fade out it is slowly and over a long time, so a metric is needed to help understand when the light output is less than desirable. L70 is given in hours of use, the 70 refers to the point when the light output has reached 70% of the new output. Most people do not use the term L70, they just list the fixture at X number of hours.

There are still some more metrics you should know, and they will be covered in part two of this article. **■**

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**Stephen Ellison** became interested in lighting early on looking at the colors in the sky. On his way to following his father's profession he made a serious detour into getting a BFA in lighting design. Today he works for The Light Source helping customers understand how to use the products.



## Streaming Media in Houses of Worship: *WHAT'S NEXT?*

BY MIKE MORIN

**I**n these times of unpredictable circumstances, many have turned to the community within their congregations to find support and comfort in knowing they are not alone. For some, this community of worshipers, friends and family has been disrupted due to new health protocols and occupancy limitations; however, many house of worship facilities have worked to use this time to strengthen the community within their church and grow their congregations beyond their typical geographical boundaries. Though house of worship facilities have been closed or at low capacity since March 2020, streaming media has made it possible to connect with a larger audience and has created new opportunities to expand communities.

When it comes down to it, recording, live streaming and uploading a worship service is the most direct way to reach your congregation at home and renew a sense of normalcy within the community. Some house of worship facilities have already begun to do this using social media platforms that allow for simple live-streams while

others have adopted more advanced technology to capture a full service and immediately upload to an online resource or website.

But what about when churches return to in-person services? Now that house of worship facilities have worked to create a strong community and congregation beyond their typical geographical region, many will look to implement a more permanent hybrid solution.

### WHAT TO CONSIDER? SHOP BEFORE YOU BUY

Before starting the buying process, every house of worship facility must understand their facility's unique needs, the total budget and how its audience plans to stream the content to ensure the technology and software purchased will be the best fit.

When it comes to capabilities of streaming media systems, recording, streaming, and uploading are the basic capabilities required for streaming worship services for facilities of any size. These three elements should come together to ensure a user-friendly

experience that anybody from the IT department to the pastor themselves can operate.

Streaming and uploading your service is just as important as recording— in a time where many feel safest at home, live-streamed events and services can bring back a sense of normalcy and community. Streaming platforms range from free services on websites such as YouTube to platforms for purchase such as Ustream and Kaltura. I cannot emphasize enough the importance of doing research on each of the platforms before choosing, as each have their own pros and cons for the near and long term. Many of the free platforms, such as YouTube or other social media channels, typically have restrictions on what content can be shared on their platform – specifically music. These platforms are reliable to making sure that live streams and uploaded videos do not use any copyrighted content and will take down the video or stream if they find a user in violation. At the same time, the pricing models for the premium platforms can be complicated

and sometimes house of worship facilities find themselves with an invoice that is much higher than they budgeted for. Streaming platforms are vital to providing online services and can make streaming extremely easy for any facility as long as they do their research beforehand.

Content capture systems can provide immersive experiences for viewers if done correctly. A full package system with multiple simultaneous inputs, such as HDMI, SDI, TCP/IP as well as compatible third-party equipment including smartphones, computers, and cameras, ensures that the congregation at home can feel engaged in the service. They allow the congregation to watch the pastor, view images, read passages and other experience-enhancing visuals all at once as if they were at an in-person service. Some house of worship facilities already have the equipment needed to successfully use a content capture system, which

## Now that house of worship facilities have worked to create a strong community and congregation beyond their typical geographical region, many will look to implement a more permanent hybrid solution.

can greatly cut down on cost as facilities make long-term investments in online and hybrid worship services. Cameras and microphones may already be sitting in storage and when combined with streaming systems, can easily produce a successful live stream for the congregation watching at home.

Like any technology, the quality, features and lifespan of your content capture system will depend on the investment you are willing or are able to make. As a significant piece of equipment, and one that will not only aid in the current challenging times but can also help to grow a congregation far beyond geographical barriers, the price should be considered over the course of years, not the immediate pandemic.

### NEAR TERM BENEFITS

During this time when the world is itching to get back to a place of normalcy, the comfort level among many is still quite low when thinking about going back to potentially crowded indoor spaces. However, the desire to feel a part of their communities is stronger than ever, especially when facing challenging times. Now more than ever, many are turning to religion and community for support so it's extremely important that house of worship facilities provide safe ways for its congregation to meet and grow together.

Through streaming media, worshippers at home, down the block or clear across the country can join and participate in a service as it is happening in real time. With content capture, house of worship facilities have the option to let their congregations join them live or come back and watch them on demand. There is also a great opportunity to create smaller meeting groups for the community to come together like they would in the fellowship hall after service or on a weeknight for a Women's Group or Men's group meeting.

### LONG TERM BENEFITS

While the social distancing guidelines will eventually fade and the world will return to a sense of normalcy, the desire to have worship on demand won't go away. Streaming media has already created new opportunity for growth and community, and the technology is only going to continue to advance the house of worship experience. House of worship facilities have long been restricted by their physical location while those who have moved, who are traveling or who are physically home-bound, have been unable to continue to attend services or become a part of the community in their neighborhood. Crossing city and state borders, a live-streamed service can bring any religious community together no matter where the congregation may be. Additionally, with video-on-demand services house of worship facilities are no longer confined by its physical size

or time constraints. Worshipers won't have to worry about crowding into smaller spaces and pastors can reduce the number of services they perform on a weekly or daily basis.

Establishing a hybrid model of in-person and live-streamed worship services allows for congregations to return to church on their own time. With a content capture system, you no longer need to be in-person to have the full religious experience — while some may not prefer to attend from their homes, it gives more time and flexibility to those who need it.

Going beyond live streaming weekly worship services, a content capture system can filter down to any level of worship from Sunday School to ministries, taking tours of the facility and more personal time with the staff. The possibilities of what content to record, stream and upload are endless.

As the world may be continually changing, our religious communities are here to stay. The way in which we attend worship services will continue to evolve and at-home worship may become the norm. Through content capture systems and online streaming houses of worship now have increased flexibility to connect with their congregations in immersive and thoughtful ways. **T**

**Mike Morin** is the Business Development Sales Manager, Maxell Pro AV, and has been in the electronics industry for over 45 years and involved in the projector industry for over 25. He works directly with end user, dealers, engineers and

consultants, and has been involved with the design and development of many high-end projectors. During his time in the industry, Mike has seen a variety of installation types from simple front projection to complicated rear projection with multiple mirrors.



# A Very Covid-Friendly Christmas at Live Oaks Community Church

BY RICKY PERINCHIEF  
PHOTOS COURTESY OF INFINITY PHOTOS 19



**2**020 was a year like no other: Coronavirus altered nearly every aspect of life as we knew it. Plans went out the window, toilet paper became a precious commodity, handshakes were no longer socially acceptable, large gatherings were frowned upon; and as 2020 drew to a close, holiday traditions seemed like a distant memory... Yet Pastor Chris Holck and the congregation of Live Oaks Community Church in Oxford, Florida, dreamed up a way to bring some much-needed Christmas spirit, while practicing social distancing. Especially since Live Oaks serves The Villages, Florida, the largest retirement community in the world, which also meant it is home to some of the most vulnerable age group for Covid-19.

While most churches were forced to abandon in-person services, Live Oaks was already steps ahead, having an outdoor venue with stage, speaker system, basic lighting setup, an FM modulator, and a giant LED wall where golf carts and cars could line the parking lot for a non-traditional



Sing choirs of angels  
Sing in exultation



worship experience. No other church was better prepared to worship in this type of setting. This enabled Live Oaks to grow rapidly, even during a worldwide pandemic.

It was late summer during another spike of Covid-19 where reality started to set in for most of us. This was not a sprint – it was a marathon. Life would not get back to normal as fast as we all had hoped. About that time, Live Oaks tech director, Isaac Rojas, called our company, Proton Global Media Group, for help. Pastor Chris Holck presented his vision for “Come to the Light”, a Christmas light and sound experience that would encircle the outdoor venue they refer to as “The Grove”, and where golf carts and cars could watch a 30-minute presentation on the LED wall, complete with narration of the Christmas story and mixed with sing-a-long Christmas carols...all-synchronized to an epic light show! There would be two showtimes nightly from December 1st to 23rd, with three shows on Christmas Eve.

We immediately began mapping out all of their existing tree and shrub locations and ways to maximize their stage; finding the right fixtures while keeping the budget as lean as possible; plus finding safe and inconspicuous ways to hide the electrical and data runs. With Live Oaks outgrowing their current facility in just two years, construction on their brand new 800-seat auditorium was well underway; so it seemed like a challenge to be juggling two major projects at once.

We presented our plan to the committee in October, got their feedback, settled on a budget, and my team and I were off to the races! Our friends at Chauvet were such a big help, getting us demo gear so we could see first-hand what fit the design best.

The right side of the parking lot was lined with massive grandfather oak trees, which we up-lit with eight Chauvet Pro COLORado 3 Solo fixtures – providing a wide RGBW wash to the branches facing the audience. Our engineers created custom pole mounts set in concrete to help shoot over the line of shrubs. The 200’ row of shrubs was lit using commercial-grade pure white LED Christmas net lights. Because this line of DMX would have required running wire across the parking lot, we turned to City Theatrical’s SHoW DMX Vero Transceivers to provide wireless DMX data.

Eleven tall palm trees flanked the stage, which we wrapped in separate strands of red, green and blue LED string lights, and white twinkle lights were hung from the palm fronds. We used Chauvet DJ DMX-4 dimmer packs at the base of each palm, giving us individual control of the 4 colors. Because the DMX-4 is not outdoor-rated, we got creative and put them in large clear airtight storage containers, cut holes on the bottom to run power and DMX through and let them breathe. We then elevated the boxes on concrete blocks, covered with a breathable camouflage netting so it would blend in with the landscaping during the day and not get direct sunlight, then zip tied to the block.

We found a great residential-based product to line the entire soffit and roof line, called Trimlight. Their CEO, Ryan Whitaker, was a huge help getting us all the custom aluminum channel for the permanent LED holiday light install. Though Trimlight’s iOS app is amazing for home use, we needed to



bypass during the shows and integrate with DMX so we could control and customize every pixel in the over 500 linear-foot run. The pros at Environmental Lights in California helped us locate the right DMX decoders for the job.

For the main stage, we selected a brand-new product from Chauvet Professional that way-outperformed our expectations. The Rogue Outcast 1 Hybrid fixture is an outdoor-ready, IP65 spot/beam/wash moving head, powered by an intense 400W lamp. We put three of these upstage on the floor for maximum impact. When it hit the sky in spotlight mode, you could see for miles! The rear stage wall we washed with three Chauvet Pro COLORado Batten 72X's. For more thematic moments, we brought out some Chauvet Pro Vesuvio II's which illuminates bursts of fog with advanced RGBA+UV LED color mixing. The impact of these fixtures lessened during windy nights, but calmer performances they were a highlight! Same with our two Chauvet Pro AMhaze Stadium Haze Machines, as it performed well during light winds, but got away from us during windier nights.

The star of the show had to be the two custom twenty-foot tall

## Come to the Light Gear List

8x Chauvet Pro COLORado 3 Solo

3x Chauvet Pro Rogue 1 Outcast Hybrid

24x Chauvet Pro Épix Flex 20

6x Chauvet Pro Épix Flex Drive

3x Chauvet Pro COLORado Batten 72X

16x Chauvet DJ DMX-4

2x Chauvet Pro AMhaze Stadium Haze Machine

2x Chauvet Pro Vesuvio II

Antari S500 Snow Machine

525 linear feet of Trimlight Permanent Holiday Lights

3x Environmental Lights DMX decoder

Vista 3 Software by Chroma-Q with 2048 DMX Channel Dongle


Luminex Luminode 12 DMX Interface

Apple iMac i7 and Mac mini i3

Q-Lab 4 Automation Software

2x City Theatrical SHOW DMX Vero Transceiver





Christmas trees engineered by one of the church members. We hung 12 vertical strands of Chauvet Pro ÉPIX Flex 20, outdoor-rated LED flexible strips that extend five meters with 240 individually controllable RGB LED's for some amazing effects. Those are powered from a rack unit called the ÉPIX Flex Drive. Two giant white LED stars completed the trees, controlled once again by a DMX-4 dimmer pack.

Last but not least, there was a 100% chance of snow following each performance, YES even in sunny Florida... thanks to Antari's \$500 snow machine. As golf carts and cars were exiting, the snow was falling from the custom LED-lit Christmas arch-finishing the night with a festive atmosphere.

Our programmers and engineers outdid themselves, completely automating the show using Mac computers from Apple that ran Q-Lab 4 software, where time-of-day triggers sent commands to Pro Presenter 7 software, audio console, and lighting console; we used Vista 3 Software by Chroma-Q with 4 universes of DMX into Luminex's Luminode 12 DMX interface. It was amazing to sit back and watch it run close to perfect each and every show!

To say this free event was a big success is the understatement of 2020. Their online reservation system ended up selling out nearly every show. Hundreds of golf carts and cars waited in long lines, and more than 10,000 people had the chance to experience, "Come to the Light" this year alone. The entire community was buzzing! In a Christmas season where many didn't get to travel or see their families, Live Oaks Community Church and their dedicated teams of volunteers helped bring some much-needed holiday cheer, even in the midst of a worldwide pandemic; taking this non-traditional idea and making it a new Christmas tradition. Proton Global was honored to play a part in something that had so much meaning and purpose. Can't wait to make it bigger and better next year! **T**

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**Ricky Perinchief** is the Owner of Proton Global Media.



Chris Holck



Isaac Rojas

## With Chris Holck, Lead Pastor and Technical Director, Isaac Rojas, Live Oaks Community Church, Oxford, Florida

### TFWM: What was the inspiration for "Come to the Light?"

**Pastor Chris:** It was capitalizing off of the idea that people love to look at Christmas lights, and are more drawn to churches or civic events during the holidays; but with Covid, those things wouldn't be possible. Our goal was to create a safe, socially-distanced, and free event for the community and host it at our outdoor venue with a large LED wall, lights encircling, and great music that allowed us to tell the age-old story of Christ's birth in such a captivating and creative way.

### How important was it bringing in an integrator like Proton Global to help bring your idea to life?

**Pastor Chris:** We could not have done it without them! They took our initial concept and brought ideas that went way beyond our imagination; technology that we didn't even know existed! Sure we could have attempted to do it ourselves, but turning to Ricky and his team who had the experience, automating so it ran efficient, and had a whatever-it-takes mentality to get the job done in a short time. It was an audacious goal.

**Isaac:** It was essential. I admit we were in a bit over our heads. To bring in a company that not only had the right connections, but more-importantly someone who knows the importance of the gospel and the true purpose behind an event like this.

### Describe the impact this presentation had on your church and community.

**Pastor Chris:** We had over 600 volunteer slots to fill. Our congregation stepped-up to serve our community and welcome them on our campus. From online reservations to parking team, smile team who handed out gift bags, security team and police who kept us safe, first response team who provided medical support, and our prayer and hospitality teams that served; it was a total church effort each and every night... 51 shows in 26-straight nights!

### With your new building under construction, what kind of role will technology play and what are you most excited about?

**Pastor Chris:** Most excited for our LED wall, and of course rock-solid sound and great lighting. Plus, we'll have The Lighthouse, our new 100' tower where we would love to project onto for Come to the Light 2021!

**Isaac:** Incorporating the latest technology, yet making sure it's done tastefully and fits our demographics. Not just copying everyone else. We'll be utilizing more automation and streamlined systems to not overwhelm our volunteer-base.

# Yamaha YC61 Stage Keyboard/Organ

BY JOHN CHEVALIER

**F**or the last two months I've had the opportunity to play the new Yamaha YC61 Stage Keyboard/Organ. The YC61 is an "Organ Focused" stage keyboard, but don't let that description fool you because there is a lot this keyboard can do. From authentic Hammond organ sounds to classic digital pianos and more, the YC61 has it all.

To be honest, I had read up a little on this unit before receiving it, however, that didn't take away the "Wow Factor" when unboxing. This keyboard looks amazing! At first glance you can't deny the organ characteristics with 9 draw bars on the upper left located right next to the speaker/amp section with full rotary speaker controls. Looking past the organ features there is a full keyboard section as well with effects, choruses, vibrato, speakers' amps and reverbs.

When powering up the first thing that caught my attention was the drawbars have LED lights which is a logical combination, but still a really cool feature considering the changing in stage lighting in many of today's worship services. The YC61 also sports a high contrast LCD screen that clearly shows you what patch you are on along with any additional modifications to that patch.

For full disclosure as to how I did this review, I want our readers to know that under normal conditions I would not only test out all the features of a product, but also would be using it in the live worship environment for a few weeks. Unfortunately, at this time, due to the worldwide pandemic, everything here is currently shut down and this was not an option. With that said, I was able to use various tracks in my home studio to duplicate live worship as much as possible. In a very short time, I was able to access a number of different sounds that fit the bill for each song I was playing. Here is what I see as the most important features of the YC61:

## Intuitive User Interface

The controls on the keyboard are set up in an easy-to-use logical fashion. On the far left is your master control section with volume and rotary speaker/bend controls which are all assignable and very easy to access while playing. Followed left to right by the Organ section, the Live Set section where you can pre-program and recall stored sounds for live performance, the Keys section that gives you the ability to customize, select voices, and layer sounds, followed by Effects, Speaker/Amp, Reverb, and Master EQ. Each section has its own ON/OFF switch which makes it very easy to see what section is controlling the keyboard



at any point. The whole layout just makes sense, and the various controls are super easy to access while playing.

## Drawbars with LED Lighting

The organ sections tone generator allows you to choose from several organ styles where you can then, using the drawbars, change the organ sound in real time, as well as letting you add vibrato, chorus, split the keyboard and add a percussive sound when you press the keys. You can also customize the drawbar lighting to differentiate between upper and lower sound by splitting the keyboard.

## Real Authentic Sound and Feel

With 61 semi-weighted waterfall keys, the YC 61 plays very much like a traditional vintage organ, allowing the player to easily use slide techniques, etc. However, it still plays enough

like a keyboard to not be distracting at all when using digital piano sounds. This is the first keyboard to use Yamaha's Virtual Circuitry Modeling (VCM), although not stated appears to be borrowed from the Helix line. This together with the rotary speaker simulator nails the vintage organ sound, but also has some other amazing high-quality sounds.

### Live Set / Keys Section

This area of the keyboard has very more jazz/rock organ sounds, but also gives you quite a few high-quality Acoustic and Digital Pianos, Pads and Strings, as well as synth sounds. You can see exactly what you are doing and how you have modified the sounds on the LCD display that allows you to see the setting that you are on along with modifications and other system information that you may need to access. Operation of this sections is very intuitive if you are familiar with any production

to really start out looking for the downside and then putting it through the paces to see how it overcomes what I had deemed to be the negatives. This didn't happen on this keyboard. As a worship leader and a professional musician for over 40 years I can tell you that the star rating below of solid 5's is an honest look at the YC61. The only negative I see is that I have to send it back. 📧

*John has been involved in multimedia communication for over 20 years. He is an Apple Certified Trainer and a full time Digital Video Instructor in Sonoma County, California. He also travels extensively presenting at workshops and seminars, focusing on Team Building and Leadership Development to improve organizational performance. [www.johnchevalier.com](http://www.johnchevalier.com)*



model keyboard, however what is really impressive is the quality of the sounds. Again, with using the VCM technology, you not only have a very unique organ, but also a fully versatile keyboard.

With features such as 61 waterfall keys, the ability to split the keyboard for different drawbar settings, two different rotary speaker simulators, the additional sounds that include vintage 70's digital keyboard to grand pianos, synths and pads, all with various effects and the ability to layer sounds and add effects makes this, what is perhaps the best value in a keyboard out on the market right now.

Although Yamaha shows and MSRP of \$2499.00 (USD), you can find it from most music retailers for \$1999.99 (USD). You will have to look a long time before you find a keyboard this versatile.

In closing, when I review any piece of gear, it's my philosophy

## JOHN'S REPORT

<b>FLEXIBILITY:</b>	★★★★★
<b>STABILITY:</b>	★★★★★
<b>EASE OF USE:</b>	★★★★★
<b>COST:</b>	★★★★★
<b>OVERALL VALUE:</b>	★★★★★

# Panasonic AW-UE150 4K PTZ Cameras

BY PRESTON FUQUA

**H**eaded into 2020, Denton Bible Church made the decision to replace our old, SD cameras and broadcast workflow with something more current and dynamic. With an average 4,000 congregants over three services every Sunday, we recognized that the quality of our content needed a serious upgrade in order to create the high-impact worship environment that would meet our needs and help us take our live streaming to the next level.

We knew what we wanted: cameras that would be easy for our volunteers to use, that would provide quality HD imaging and have a wide field of view, while having as little a footprint within our sanctuary as possible.

The system we were looking to replace was old. Really old. Our cameras ranged from 15 years to 25 years old. We had to run composite video out of the older cameras, up convert it to SD-SDI and then to HD-SDI to be able to feed it through our switcher. We had also replaced our two SD projectors about five years prior with 16K DLP projectors and had planned to change the cameras eventually, but it was exciting to be given the go ahead to make that switch.

We chose to purchase five Panasonic AW-UE150 4K PTZ cameras and two AW-RP150 touchscreen remote camera controllers after testing a variety of options. The AW-UE150s were the best choice for us – the image quality they provided was stellar, and the cameras can output simultaneous HD and 4K capture, which meant they would grow with us as we make future improvements. They have a large 1” MOS sensor and 20X optical zoom, which means our volunteers can get good, close-up shots, and allows our congregants to fully immerse themselves in our live-streamed services. Combined with the two AW-RP150 touchscreen remote camera controllers, our volunteers are



able to use the cameras in a variety of ways and manipulate multiple cameras at once, capturing great shots with very little training – they are that intuitive.

Our old setup consisted of three fixed camera positions in the middle of our sanctuary, each on its own 8’ x 8’ platform. Once the tripod and camera operator were added, the line of sight for anyone behind the cameras was clearly obstructed. While the new cameras are in the same spot, they are mounted on static pedestals 8-feet off the ground and permanently mounted, keeping lines of sight nice and clean,

with a fourth movable camera on stage. These cameras are used for both IMAG and streaming of our morning services. The fifth is being used in our student auditorium, where our evening service and student ministry events are held, along with other ministries during the week. This solo camera is primarily used for streaming and program feeds to other parts of the building.

Panasonic's camera systems have been a very versatile tool for us. Our camera operators have caught on quickly and really enjoy the ability to customize the user experience, as well as the ability to quickly jump between pre-programmed shots and moves.

HD Crop is a feature on the cameras that we are excited to use. It allows a 4K UHD image to be sent out along with three separate FHD 1080/720 cropped signals.

This is super useful for panel events that we host. We can use the one camera to produce three different video shots and still be able to manipulate the three 1080/720 signals within the 4K frame. Images shot in 4K can be output in their entirety while simultaneously cropping parts of those images. The cropping position can be specified from a maximum of three locations to enable simple operation from the AW-RP150 remote camera controller, a web browser or other operations screen.

Historically, Denton Bible Church had needed three camera operators to pull off the Church's three Sunday services, along with our midweek events. With the new camera system in place, our volunteer operators are able to show up prior to service, review the notes for the day and check the configurations on their control surface. Additionally, Panasonic's RP150s remote touchscreen camera controllers allow the volunteers to output multiple resolutions, control them via a webpage and capture multiple shots from one camera, which they utilize with the different speakers and panel events they host.

The timing of our purchase couldn't have been better.

Shortly after we added the cameras and controllers, the pandemic hit. Instead of being caught with an old, sub-par SD broadcast system in place for our socially distanced live-streamed worship, we instead had our new HD setup running. We could never have imagined when we first started the process that this upgrade would become so important to our church worship so quickly. We quickly added a broadcast suite with separate audio mixing and video switching capabilities, and the new streaming capabilities allowed us to add a new weekday series as well, allowing us to reach approximately 6,000 viewers weekly, more than we were seeing with our in-person live services. 📺

**Preston Fuqua** is the Technical Director at Denton Bible Church in Denton, TX. He oversees the AVL staff and volunteers for weekly services and events, along with the maintenance and upkeep of all technical systems.



Back



Lens close-up



Base close-up

## PRESTON'S REPORT

**FLEXIBILITY:** ★★★★★

**PICTURE QUALITY:** ★★★★★

**EASE OF USE:** ★★★★★

**COST:** ★★★★★

**OVERALL VALUE:** ★★★★★

# MARS T1000

## Full Duplex Intercom System from Hollyland

BY HOLLAND DAVIS



I am not a fan of manuals. I believe a product should be intuitive and easy to implement without a ton of research. I was not disappointed by Hollyland's MARS T 1000 Full-Duplex Intercom System.

### The Test Environment

I decided to use one of the highest pressure environments I could think of to put a new product through its paces – a live outdoor event. We held an outdoor event called 'Light at The Lighthouse' with multiple bands, LED screens, fully integrated video backgrounds with audio loops and video cameras for live remote internet streaming. I needed a product that we could open up, set up and work instantly, that would also be easy enough for an untrained group of volunteers to use. The MARS T 1000 performed flawlessly and the audio quality was crystal clear.

### THE EQUIPMENT

The Basic set up we received came with a base station, four belt packs and five standard side-ear headsets with built-in microphones (like a gamer's headset). The headset attaches via a standard 3.5mm jack. The base station automatically pairs with the belt packs when they are turned on. This allows for a four-camera shoot with a producer station, which is more than enough for most small to midsized churches. You can expand your production to up to ten team members by linking two MARS T 1000 base stations using a standard ethernet cable. Each base station also has a headset input. No additional equipment needed. One of my pet peeves is when tech companies use brand specific connectors that lock you into only using their products. Not so with the MARS T1000. If you prefer your own in-ear buds, you can use them.

The base station and belt packs are built to last. The belt packs are a light-weight industrial grade metal and small enough to mount to a camera. The antennae are short stubs that will withstand being caught on something and torn off.



The belt packs also support tally lights (to identify which camera is active) via the Tally Universal Signal Converter provided by Hollyland. We didn't take advantage of this in our particular situation, but it's an amazing feature to have. Our event lasted four hours, but the belt packs are designed to last eight hours powered by lithium batteries. The base station can be powered by two NPF-970 batteries or an A/C adapter which is provided. Two batteries will power the base station for up to 40 hours, which is ideal for a remote event. The headsets were very well constructed. A little uncomfortable, but not unbearable and not unlike most headsets on the market. Comfort becomes an issue when you have a four-hour event and I discovered some of the team needed to take a break from wearing the headsets. But again, you can also use your own ear buds if preferred.



full-duplex wireless communication and carrier-grade voice quality. However, we had people on comm behind tents and other barriers within 100 ft and did not have an issue communicating in a non-line of site environment. We used the product in a live concert event, but I can see this product being used on a film shoot, stage production, multi-camera live event or anything that requires a discreet level of communication during a live event.

In reviewing available full-duplex wireless intercom systems with five single ear headsets, the Hollyland MARS T 1000 offers better performance, better features and better construction at \$1799.99 (list price) than anything else I found on the market. There are some that are cheaper, but not as rugged in terms of construction. There are some that are more expensive, yet more proprietary and less flexible. Bottom line; I highly recommend the MARS T 1000 System. It's priced right and backed by a company with nine years of experience in leading technology. 📺

**Holland Davis** is a teaching pastor, veteran worship leader, composer of the award-winning song *Let It Rise*, and the author of a book entitled *Let It Rise: A Manual For Worship*. He is the Senior Pastor of Calvary Chapel San Clemente and CEO of [worshipsong.com](http://worshipsong.com). You can follow him on twitter or Instagram @hollanddavis

### THE PERFORMANCE

One of the functions I loved about the MARS T 1000 is the open mic feature. The camera operator doesn't have to press down a button to speak. It stays open and allows for creative collaboration. However, if the chatter become distracting, the producer or director can mute the mics from the base station. Our team does not talk over each other or talk at the same time, so we didn't experience the ducking function on the mic which operates like a "gate" and pulls the volume down of other voices when you're speaking. I could see how that would be a problem, but then talking over each other is always a problem no matter what system you use.

The manual says the transmission range of the MARS T 1000 reaches up to 1000 ft in a clean line of sight with

### HOLLAND'S REPORT

**FLEXIBILITY**



**RELIABILITY**



**EASE OF USE**



**COST**

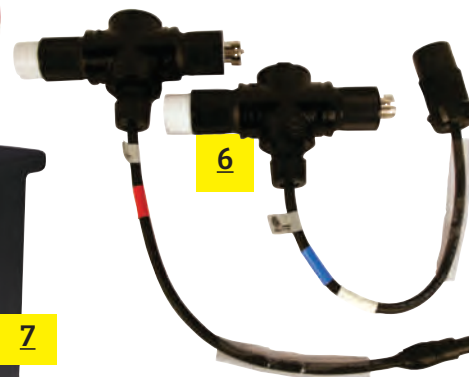


**OVERALL VALUE**





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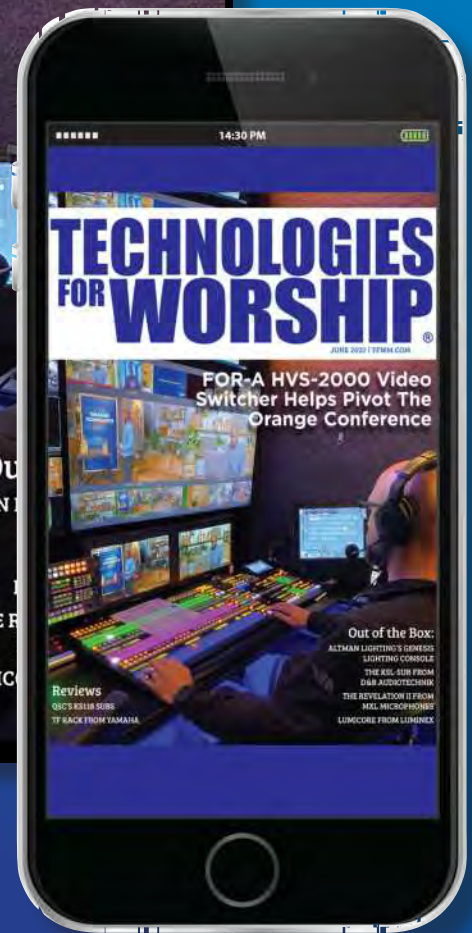
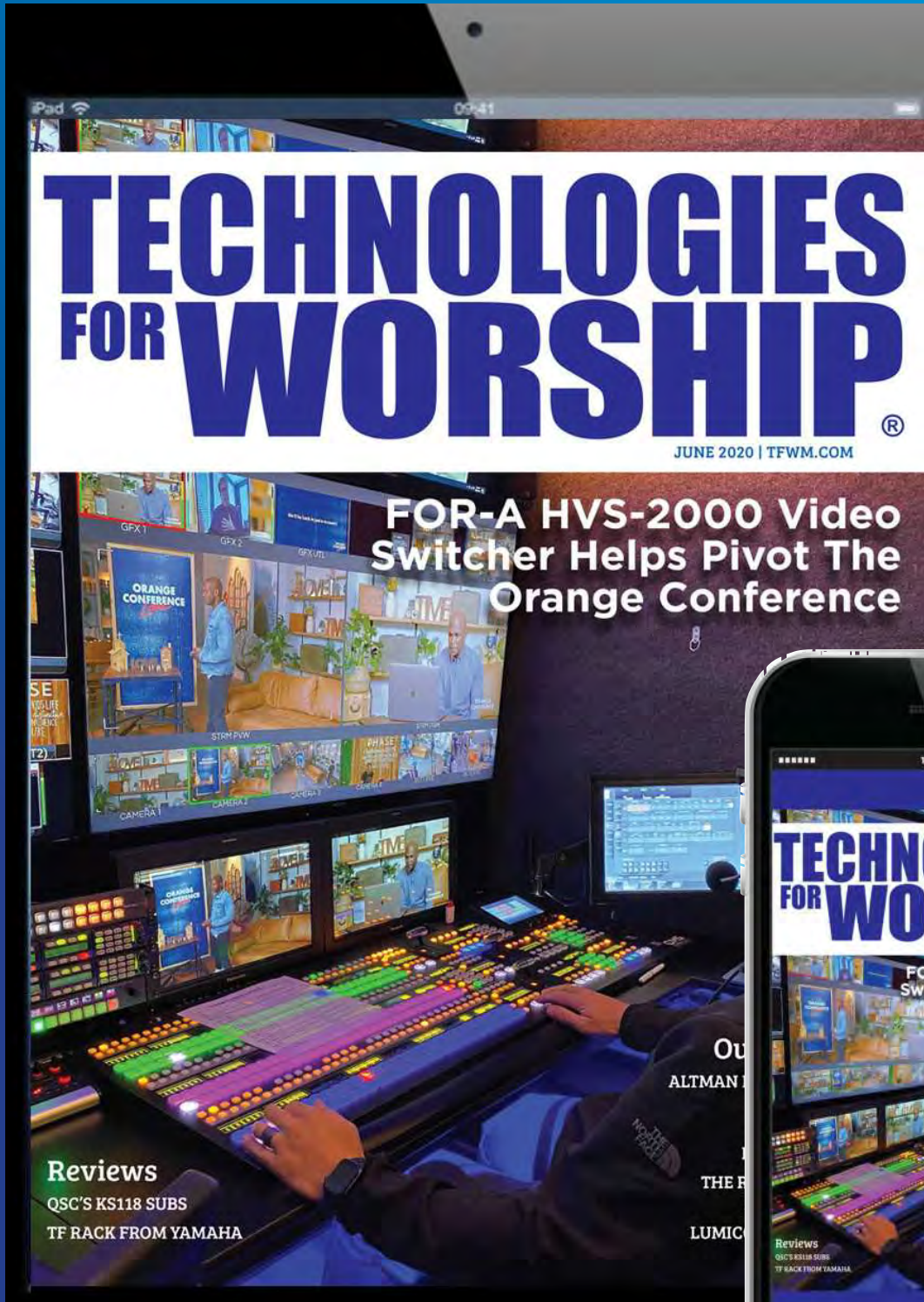


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