TECHNOLOGIES FOR WORSHIP ®

FOR-A HVS-2000 Video Switcher Helps Pivot The Orange Conference

Out of the Box:
ALTMAN LIGHTING'S GENESIS LIGHTING CONSOLE

THE KSL-SUB FROM D&B AUDIOTECHNIK

THE REVELATION II FROM MXL MICROPHONES

LUMICORE FROM LUMINEX

Reviews
QSC'S KS118 SUBS

TF RACK FROM YAMAHA

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EDITORIAL NOTE

Over the last few issues, you may have noticed that our magazine has grown, and we hope you are as excited about these changes as we are. We have always been committed to providing quality educational articles for all house of worship tech teams and leaders, regardless the size of your facility. With the emergence of COVID-19, the educational aspect of what we do has taken on an even greater role. So many of you have shared with us that, with your church shut down or running at limited capacity, you have more time available to read and pursue a deeper understanding of the role you play within you worship community.

To help facilitate this learning, Technologies for Worship has added several new departments to our magazine:

• Best In Show, which features specific manufacturer or reseller specific solutions for a variety of needs (this month, we feature Full Compass streaming bundles and projection solutions from Maxell)

• In Depth, which provides a deep dive into a product we feel could be particularly useful to the tech team at your church (like Shure's MV88+ Video Kit)

• an increased focus on streaming (Options for Your Church, Regardless of Size, Streaming Solutions, and The Evolution fo Digital Congregations) and

• COVID-19, which looks at different ways your church can prepare for the new normal

• We will continue adding new departments in upcoming issues, so keep your eyes peeled – and if you have any suggestions for article topics, please call or text me at 705-500-4978 or email me at mm@tfwm.com. We are here for you, so don't be afraid to share your stories with us and let us know what you need!

Along with the above-mentioned articles, our June issue also features a Technology Spotlight on Mount Paran Church and their all-new L-Acoustics sound system, a look at Step In Time Sequential Power Control, How Acoustical Design Affects Church Audio, and reviews for QSC's KS118 Subs and the TF Rack from Yamaha. We also look at Altman Lighting's Genesis Lighting Console, The KSL-SUB from d&b audiotechnik, MXL Microphones REVELATION II Mic and LumiCore from Luminex in our Out of the Box segment, plus so much more it might actually boggle your mind.

CFX has made the difficult decision to postpone the physical tradeshow until fall 2020, but has some very exciting options for mini-virtual events throughout the year – make sure to check out their website (https://churchfacilitiesexpo.com/) for the most current information, sign-up for their newsletter and listen to their podcasts.

We'd also like to take this opportunity to remind you that 'this, too, shall pass." Things will, eventually, get back to some version of normal and we will all come out the other side with stronger worship communities than ever before.

Most importantly of all, take care of yourselves, stay safe and God bless!

Michelle Makariak

MICHELLE MAKARIAK

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CONTENTS 06/2020 — VOL 29 - ISSUE 6

LEA Professional Launches Free Online User's Guide to Support Customers

LEA Professional, an industry leader in amplifier and systems design, today announced its free online user's guide complete with videos, blog posts and tutorials. The new user's guide is designed to support customers and audio enthusiasts alike with educational content on new LEA products including amplifier set up and functionality guides.

"At LEA Professional we know how important it is to stay connected with our customers, especially during these challenging times. We want to make sure that, even though we cannot see them face to face, we can still provide support where it's needed," said Brian Pickowitz, VP of Marketing, LEA Professional. "Online content is more important than ever, and with our free user guide customers have direct from the source answers on some of the most frequently asked questions."

The user guide can be accessed directly through the LEA Professional website and takes the customers on a journey through their LEA Professional products, from unboxing to set up and maintenance allowing users to get the most from their product in a timely and interactive way.

Recent Guides Include:
- Amplifier DSP Overview: Connect Series
- DSP Settings: Connect Series Channel Settings Overview
- Speaker Tunings & Amp Settings: Saving & Loading **T**

For more information and to check out the user's guide visit https:// leaprofessional.com/online-users-guide

ARRI strengthens lighting division with Ivo Ivanovski as General Manager

ARRI is pleased to welcome Ivo Ivanovski as General Manager Business Unit Lighting, effective August 1, 2020. Together with General Manager Markus Lampier, Ivo Ivanovski will manage ARRI's Lighting Business Unit out of the facility in Stephanskirchen, Germany. In this position, Ivo Ivanovski will be responsible for demand creation including the areas of product management, application engineering, service, sales, and marketing. He will support long-term ARRI colleague Markus Lampier who will continue to focus on operations at ARRI Lighting. Mr. Ivanovski will report directly to Markus Zeiler, Executive Board Member of ARRI. **T**

d&b audiotechnik Announce Product Warranty Extension Program to Support Customers

German audio technology and solution company d&b audiotechnik today announced a Product Warranty Extension Program to support customers into the future. The product warranty Extension Program is only one part of d&b's overall Covid -19 response to alleviate customer anxieties and reemphasis d&b's long-term commitment to the market.

"While the entire live entertainment market is dealing with the effects of lockdowns and is facing uncertainty, our aim is to alleviate one of the concerns of our partners and customers who are suffering the effects of the pandemic," said Amnon Harman, CEO, d&b audiotechnik. "This is one example of the measures d&b has introduced to support customers during this time including hosting an extensive program of daily educational webinars. d&b customers and users can be assured that our products are of the greatest possible quality, and we stand behind that promise."

The six month warranty extension applies to all d&b products in the mobile and installation product portfolio currently covered by the standard d&b Product Warranty – which already has a reassuring long term of five years, purchased and delivered in the period from 1 March 2015 to 31 August 2020. The warranty covers failure at the component level — meaning any component or manufacturing issue will be covered. This extension applies worldwide and covers systems overall extended life span.

"We felt that extending the warranties for only those customers whose expire during Covid-19 was not enough," said Harman. "We are striving to help our customers maintain their d&b systems in the best possible condition and we look forward to the day when they can all enjoy delivering beautiful sounding concerts and events again." **T**

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HIGH END SYSTEMS

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Altman Lighting's Genesis Lighting Control Console

Building upon their reputation as one of the industry's most trusted entertainment and architectural lighting manufacturers, Altman Lighting introduces the simplicity of control with Genesis. Combining the ease-of-use of a fader-based controller with the power of an intuitive touch screen interface, the Genesis lighting console provides the programmer with a unique familiarity for the creative control of today's complex automated and LED luminaires.

The Genesis lighting console also provides advanced programming functionality with features such as Shape FX, Chases, Fan, and Individual Cue Timing. Additionally, the powerful graphical user interface allows control of luminaire parameters via familiar icons, color picker, movement targets or touch sliders. For moving light control, pan and tilt are also controlled via the touch pad adding a fine movement control for those critical focus points. The unique animate feature provides a simple and intuitive way to quickly create chases, sequencing, and patterned attribute control within a single cue.

Genesis control consoles can control up to twenty-four (24) discretely addressed luminaires, each with a physical intensity fader and bump button, and each console is capable of controlling up to one (1) DMX 512 Universe. Additional universes and luminaire counts may be achieved through the connection of an optional Genesis wing, and two (2) Genesis wings may be added to each control console.

"As churches look to upgrade their lighting designs with the latest technology, Genesis is a user-friendly and affordable solution for the control of intelligent luminaires," stated Jason Osterman, Altman Global Specifications Manager. "Wanting to give users a simple experience in creating the most dynamic looks possible, Genesis is complete with a built-in animation effects engine, and an innovative software design which guides the lighting technician through each step of programming."

"Focused on giving programmers of all skill levels the operation simplicity of an instinctive console which boasts high-end features, we are very excited to be releasing Genesis," added Pete Borchetta, Altman Vice President Product Innovation. "This product line takes us into a new direction that allows us to broaden the innovative and affordable technology solutions that people in the industry have come to expect from Altman Lighting." **T**

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JUST THE FACTS

- Control of up to 24 individual fixture group over 512 control channels
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- Ten (10) playback pages
- Two (2) master faders
- One (1) playback master
- One (1) fixture master
- One Hundred (100) Cue Lists with up to 1,000 Cues or effects.
- On-Board context sensitive help with multi-language support
- "Animate" feature – create complex effects between two or more fixtures – simply.
- Fixture template wizard
- 7" color capacitive touch screen
- Icon driven graphical user interface system
- Additional playback and DMX outputs available with Genesis Wing (Accessory)
- One (1) RJ45 Ethernet port for support of:
- sACN
- ARTNET
- Low Voltage Power Jack with external power supply

CAPTURE THE EXCITEMENT, NOT THE ARTIFACTS

The application of LED technology has dramatically increased the use of large screens to add excitement and information to TV productions. But when images of LED screens are captured by modern CMOS cameras, motion and synchronization artifacts can be captured as well. Camera systems with global shutters all but eliminate this problem. Are you planning to add on-camera screens to a TV news set, house of worship stage, or live event? Give us a call. We pride ourselves on answering customer service calls personally. These days we take them from our homes. (516) 682-4431.

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The KSL-SUB
from d&b audiotechnik

German audio technology and solution company d&b audiotechnik has introduced a formidable new addition to the company's exceptional SL-Series line array family.

Driven by a dedication to designing solutions for specific needs, the new KSL-SUB provides a small, lightweight format that extends the frequency response of a KSL System down to 36Hz with exceptional dispersion control, impressive low frequency headroom and unmatched performance for its size. This powerful, directivity-controlled, smaller format sub enclosure allows venues of all size to experience very accurate, smooth and punchy bass response.

The KSL-SUB and KSL-GSUB subwoofers operate with two forward-facing 15-inch drivers and a single, rear-facing 15-inch driver which, driven with 2-way active amplification, provide uncompromised cardioid directivity control.

Measuring just 100 x 90 x 45 cm (39.4 x 35.4 x 17.7 inches) in size, and with a sheer weight of 82 kg (181 lbs), the KSL-SUB delivers an output of 139dB driven by d&b D80 amplifiers.

The KSL-GSUB has a streamlined form: minus the KSL-SUB standard rigging hardware. It stands at a diminutive height of just about 45cm, easily allowing for under stage deployment. Using a new KSL-SUB adapter frame the KSL-SUB can be deployed above KSL-Tops as part of a flown array.

Completing the comprehensive System package—and designed to fit within standard sized shipping container and trucks—the KSL-SUB is available in touring carts with protective covers. The "hybrid" KSL-SUB touring cart allows users to leave the KSL flying frame on top of the KSL-SUB adapter frame below the subwoofers during transportation if they choose.

"The KSL subwoofers are the next step in d&b's continuing obsession with innovation, efficiency, performance and directivity control," said Werner 'Vier' Bayer, product manager, d&b audiotechnik. The KSL-system also includes a complete installation package featuring KSLi8 and KSLi12 loudspeakers, combined with (KSLi-SUB/KSLi-GSUB), subwoofers and the new 40D high performance installation amplifier, plus a complete catalogue of accessories and customization options. The ability of the Series to control the full frequency spectrum minimizes low-mid frequency masking in the reverberant field allowing system engineers to reduce the overall sound pressure level in the venue, greatly improving the system's program intelligibility while dramatically cleaning up the stage as well as backstage environment from annoying noise.

The KSL-SUB is available in both flown and ground stack (G) versions. ∎

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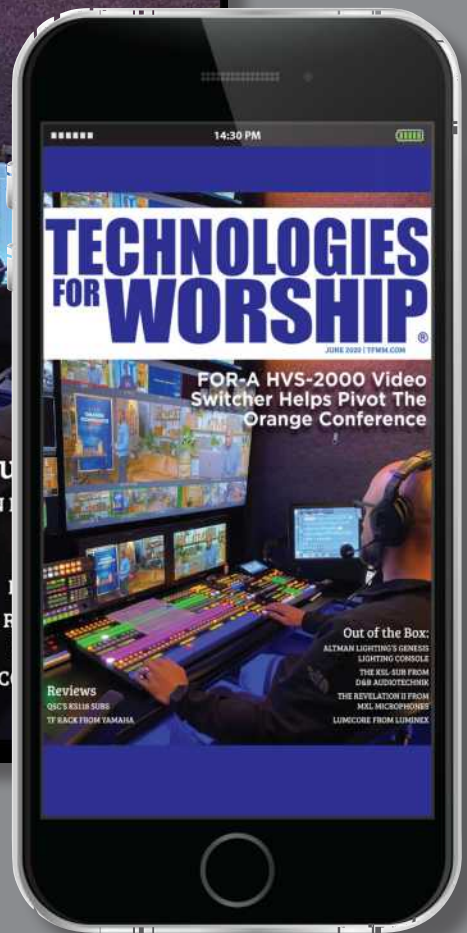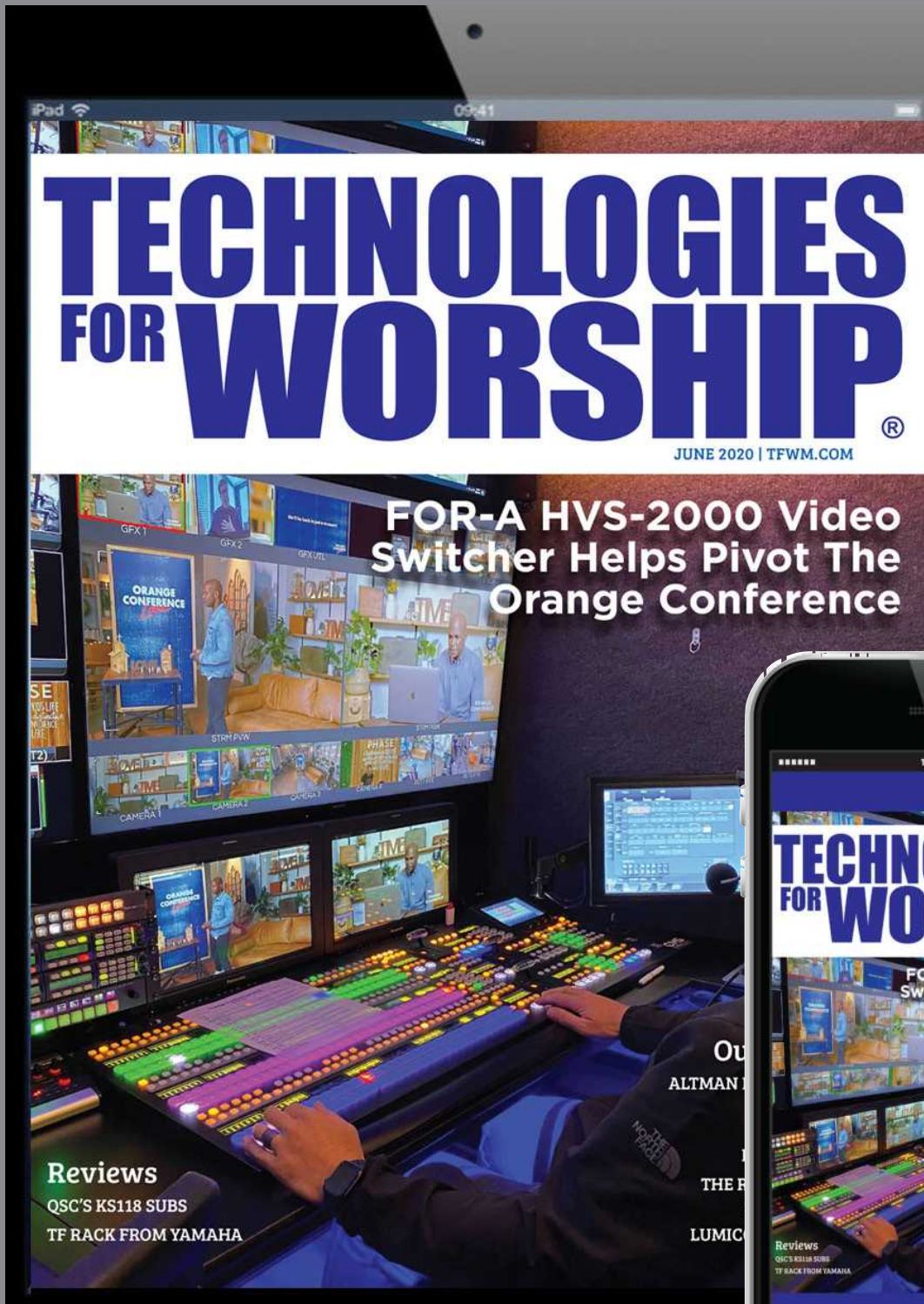
The REVELATION II
from MXL Microphones

MXL's reinvented REVELATION II microphone offers the warmth and intimacy of a premium tube microphone, with the versatility of variable pattern tube technology. As the successor to the MXL REVELATION, which is often regarded as the greatest microphone ever produced by MXL, the REVELATION II utilizes the latest design and manufacturing technologies to offer the remarkable clarity and versatility of the classic MXL REVELATION, but at a fraction of the price. Providing rich and transparent sound, the REVELATION II is an ideal solution for capturing pristine vocals and instrumentals in house of worship applications.

The microphone voicing lends itself to a natural and organic frequency response, which attributes to the classic "tube mic sound" that audio engineers desire. Its variable polar pattern adds to its versatility, and the mic's circuitry and sound quality allow users to obtain high-quality recordings without breaking the bank. Today, with many church services being produced at home, it is more crucial than ever that they have access to budget-friendly solutions that will not compromise on audio quality.

According to Trevor Fedele, Director of Sales at MXL Microphones, "Our entire team truly knocked it out of the park with the REVELATION II. The MXL REVELATION is widely regarded as the most popular microphone that MXL has ever made. The new REVELATION II captures the performance and versatility of the original REVELATION but is more accessible to house of worship facilities at a lower price point. A lush mid-range provides a unique color and sound and with the REVELATION II, our customers are falling in love with the classic REVELATION sound all over again."

Additionally, its Mogami cable and wiring offers exceptional audio fidelity and its dark violet and black chrome metal finishing provides a sleek aesthetic. A dual gold-sputtered, 6-micron diaphragm and hand-selected EF86 pentode tube offer warmth and character giving the REVELATION II an iconic sound. The microphone's variable selection knob allows for limitless transitions between cardioid, omnidirectional, and figure-8 polar patterns.

"Today, with many services being produced remotely, the last thing we would want is the musical element to be lost," adds Fedele. "By bringing high-quality solutions to musicians and service leaders, we aim to contribute to a seamless experience for both in-person and virtual church services."

For more information, go to: www.mxlmics.com. ∎

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Helping Your Church
LIVE STREAM

by Richards

LumiCore from Luminex

With 64 built-in engines, LumiCore allows you to merge and route up to 64 x 4 input sources toward 64 newly defined universes. This way, LumiCore becomes the ideal solution to isolate your control setup in a house of worship, on a festival, or in a theatre or TV studio.

As technology is evolving towards full networked solutions (ArtNet or sACN directly to the fixtures), LumiCore provides all the flexibility of the LumiNode but directly on the network, with up to 256 input universes merged and routed towards max 128 output universes. All of this with extremely low latency.

Same great features from the LumiNode - Merge in HTP, LTP, Backup, Switch, Crossfade or Custom Mode

The engine technology allows you to merge in HTP, LTP, Backup, Switch, Crossfade, or custom mode, with different triggers that can be assigned even on a per-channel basis.

In large pixel mapping applications, LumiCore is the ideal bridge to merge different control sources into new network streams.

In a House of Worship, LumiCore will allow for isolation and control of any defined universe.

Use your LumiCore to record cues and shows right onto your device, then playback by using the show as an input or select a control source. Need to bring an emergency lighting scene into your installation? Record your desired cues to your device and use the integrated contact closure as the trigger.

You can also use LumiCore as plugin device for an automated follow spot system, like Follow-Me, by inserting merged results as a higher priority on the network with the same sACN universe numbers.

Sarah Lima, Luminex Brand Manager for A.C. Lighting Inc. and A.C. ProMedia, says "Using LumiCore to separate, merge and custom route your universes has never been easier. Looking to replace your DMX cables, DMX splitters and update house lighting? LumiCore could be the solution you've been looking for."

Houses of Worship can add processing power and advanced network communication to their control system with the LumiCore from Luminex. LumiCore allows for up to 256 input universes merged and routed towards max 128 output universes for greater data communication in your lighting and more. LumiCore is also easy to adapt to future protocols, meaning less cost and more options as your system grows into the next generation of lighting and network control.

LumiCore also allows you to have control desks in the IT environment by bridging the local lighting rig and isolating it from their show critical control part. If your house of worship runs worship festivals or hosts tours, Lumicore can also facilitate all of your lighting setups and host the most advanced and flexible data system to your guest acts and upcoming headliners. **T**

Shipping June 15, 2020.

KEY FEATURES:

- **64 Process Engines**
- **Up to 256 input universes**
- **Contact Closure**
- **Color display and control jog for fast configuration**
- **PoE powered (IEEE 802.3af)**
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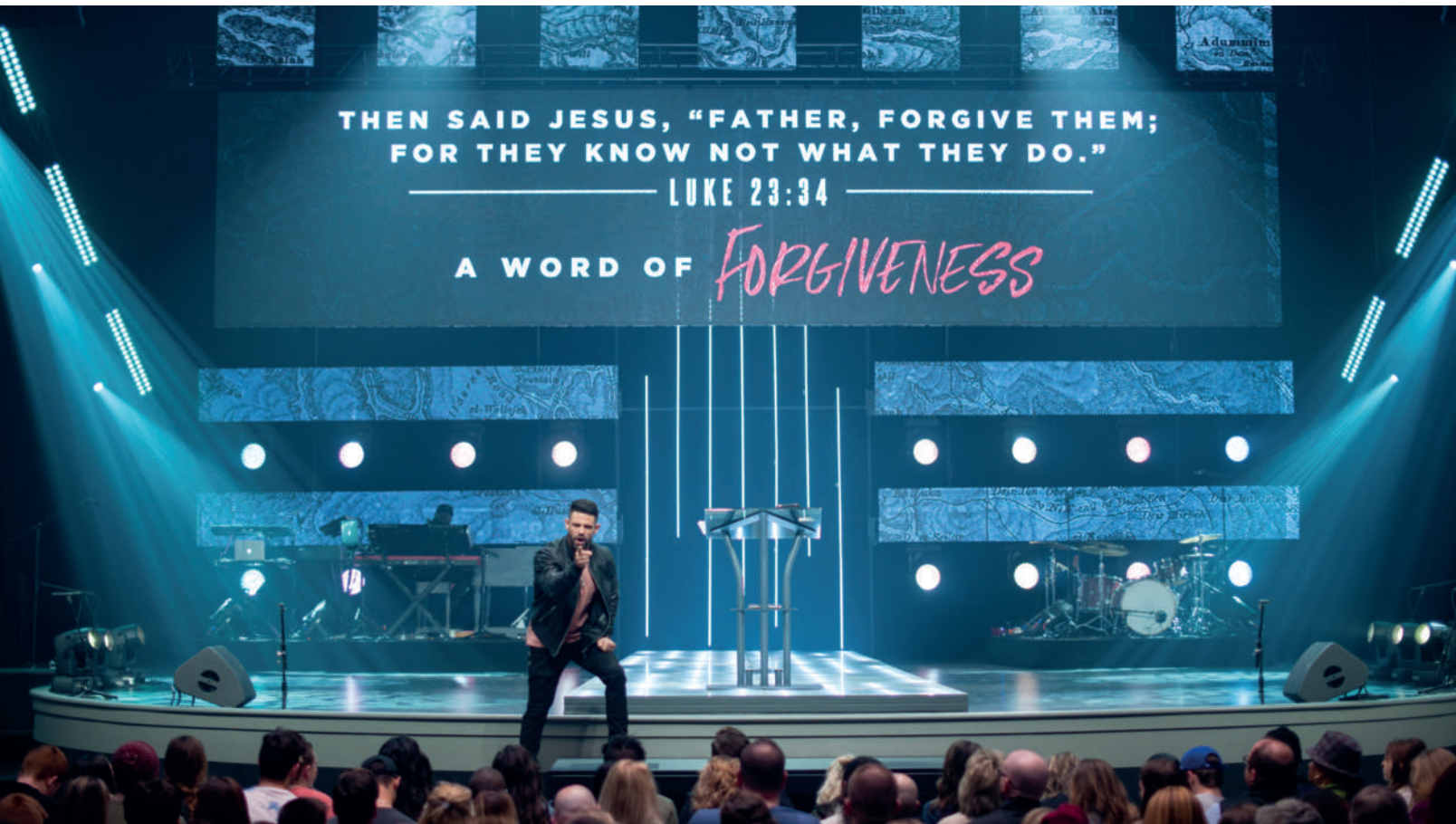
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Elevation Church - Charlotte, NC, USA

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An in-depth look at Shure's MV88+ Video Kit

As more and more Houses of Worship turn to technology to stay with the times, many leaders are looking to enhance their video and audio production capabilities as a way to maximize worshipers' experiences in- and outside of their facility.

Shure understands that HOW tech teams shouldn't have to buy half a dozen products to film a high-quality piece of video content one day and capture live music performances the next. Enter the MV88+ Video Kit, an all-in-one mobile solution for capturing professional-quality recordings on-the-go.

The MV88+ digital stereo condenser microphone kit includes a Manfrotto® PIXI tripod, phone clamp, and mount providing next-level recording flexibility and compatibility with Lightning and USB-C cables. The latest addition to the Company's MOTIV™ line of digital microphones, the MV88+ delivers Shure signature audio quality for extraordinary content creation.

A Professional Quality Condenser Microphone

The MV88+ microphone plugs directly into iPhone and select Android devices using a Lightning or USB-C connector. The condenser microphone features two capsules: a cardioid pattern that picks up sound directly in front of the microphone and a bidirectional which captures sound from the left and right sides. HOW tech teams can use the classic mid-side stereo recording technique that provides an adjustable stereo image and is suitable for capturing a variety of sources, including choir performances or sermons.

Knowing users value real-time audio assessment, the microphone was designed to include a 3.5mm headphone jack that lets HOW techs record and monitor recordings with the utmost confidence. The compact and durable all-metal construction is small enough to carry anywhere and for capturing professional-quality recordings on-the-go.

Flexible Recording Control with the ShurePlus™ MOTIV App

When paired with the free ShurePlus MOTIV app, HOW tech teams have on-screen metering, integrated controls and the ability to customize the MV88+ exactly how they need it. Microphone settings such as gain, adjustable stereo width and user-friendly digital signal processing (DSP) preset modes—speech, singing, flat, acoustic, loud—enable accessible pro editing in the moment. Custom presets can be saved to quickly access for future uses. This feature comes in handy when doing live streams on social channels. With a few easy taps, creators can trim and share recorded studio-quality audio in multiple formats.

HOW tech users can easily select a polar pattern—stereo, mono cardioid, mono bidirectional, raw mid-side— best suited for their application and further tailor the width of the stereo image for foolproof capture of live musical performances or sermon delivery. The intuitive interface allows teams the ability to adjust the microphone gain and set the volume of the sound source they are recording. To determine how much of each input needs to be heard, use the monitor mix slide. For best results, start monitoring at the midpoint and adjust.

Tailor Recordings with Advanced Mic Settings

For HOW techs who want more control and fine-tune the microphone further can do so with the limiter, compressor, and equalizer settings. These are retained in the microphone when using other audio and video recording applications.

Limiter – Toggle the limiter on or off to prevent distortion from volume peaks in the recording.

Compressor – Choose no compression, or select light or heavy compression to control volume when the sound source is dynamic. Quiet signals are boosted and loud signals are lowered.

High Pass Filter – Choose no HPF for the most natural sound or select 75 Hz or 150 Hz to reduce wind noise, room noise, or proximity effect.

• 75 Hz Low frequency cutoff provides a 6 dB-per-octave cutoff at 75 Hz. Helps eliminate floor rumble and low-frequency room noise from heating and air conditioning systems. This setting may also be used to compensate for proximity effect or to reduce low frequencies that make an instrument sound dull or muddy.

• 150 Hz Low frequency rolloff adds a 6 dB-per-octave roll off filter at 150 Hz. Use this to compensate for proximity effect or to reduce low frequencies that could make an instrument sound dull or muddy.

Left-Right Channel Swap – For stereo recordings, use Left - Right Swap to flip the left and right audio channels to match the stereo image to the video.

Equalizer – Change the preset modes to hear the DSP changes, and use the equalizer to boost or cut bands of frequencies to improve sound clarity.

Bit Depth and Sample Rate – Select a lower sample rate when it is useful to have a smaller file, for example, when recording speech or a podcast for download. Select a higher sample rate for music and dynamic recordings. If no alternate is selected, MOTIV will record audio at 24/48 kHz.

Recording Tips

Turn On Airplane Mode and Do Not Disturb to avoid recording interference from phone calls, messages, and various notifications.

• Record in Mono to increase your available record time or when recording a single source, like vocals, that would benefit from less ambient noise. Select the Mono Cardioid or Mono Bidirectional polar pattern and audio from all capsules are summed to a single channel.

• Record in Stereo to accommodate portrait or landscape recording. The stereo image is accurate if the Shure logo is facing upward.

• Monitor your Recordings by plugging headphones directly into the headphone output on your MOTIV device to ensure recordings sound great.

• As Houses of Worship find new ways to stay connected during this time, audio performance is the one element that must be consistent. Whether it's passage readings, live musical performances or sermon delivery, all demand pristine audio. There should be no "ifs," "ands," or "buts." Now, with the MV88+ Video Kit, tech staffs can record more easily as traditional worship settings change and streaming video/recordings are becoming more prevalent in services. **T**
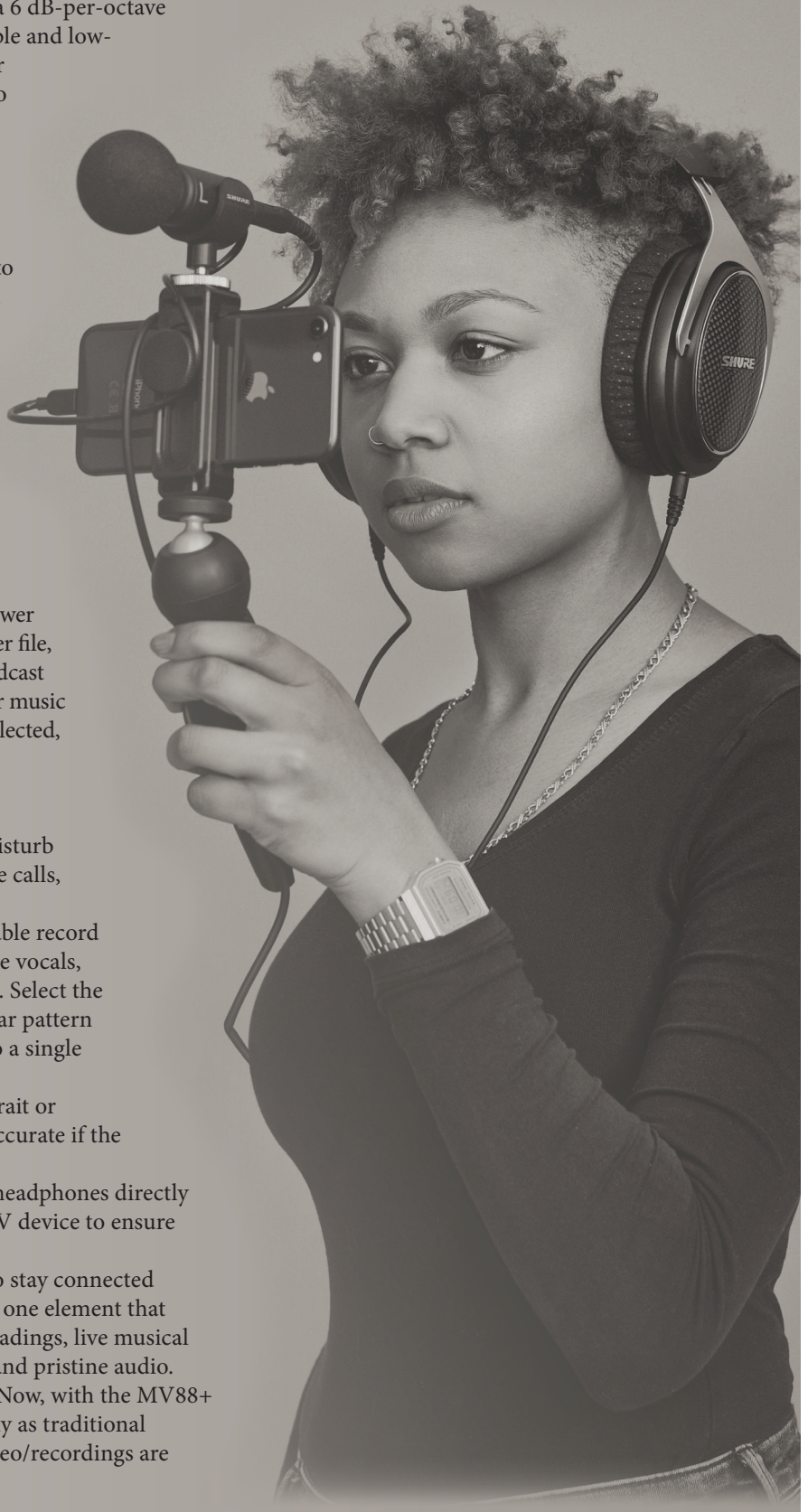
Sanitizing Your Camcorders

BY CRAIG YANAGI

Though large churches have been providing remote services for years, we've found a significant up-tick in virtual worship from small parishes in response to coronavirus lockdowns. This means that broadcast-quality camcorders have become more commonly implemented. With churches relying on the kindness of volunteers to produce services – virtual or otherwise – it's common for cameras to be operated by different people from week-to-week.

Now, as COVID-19 stay-at-home orders are lifting around the world, governments are issuing protocols to follow for reopening of businesses, schools and churches, alike. Among the most prevalent requirements are instructions for cleaning and sanitizing commonly used surfaces. In churches, this not only means things like pews, door handles and common spaces, but also equipment, such as cameras.

Below are our top six camcorder sanitization recommendations to consider for increased safety among users, while also not affecting the operation of your camera inventory. The most important tip to remember is to always shut down the camera prior to cleaning.

Focus attention on commonly touched surfaces: remember that handles, straps, lens rings, viewfinder eyecups, batteries and operation buttons are frequently used. As such, they should be wiped down between each use.

We also recommend more thorough weekly cleanings, which go beyond the surface areas of the camera. This involves powering down the camcorder and cleaning the tripod or support handles, lens controllers and lights.

Make sure to use non-chemical cleaning agents: since cameras are electronic devices, it is important to use non-abrasive cleaning solutions, such as liquid soap and water or Isopropyl alcohol wipes and sprays (at least 70-percent alcohol). The use of bleach-based products should be avoided as repeated use could cause discoloration.

Do not use alcohol on the viewfinder and LCD screen: these should only be cleaned with a cloth dampened with diluted liquid soap and water. Benzene- and alcohol-based wipes can be harmful to coated surfaces.

Opt for soft cleaning materials: using cotton and microfiber cloths are essential to protecting camera equipment. Also, remember to use a new cloth to dry off the surfaces following the disinfecting process.

Do not overuse cleaning solutions: though it is important to clean consistently after each use, an overabundance of liquid could cause it to get inside the camera, which could lead to operational damage.

As we move forward into this new post-COVID world, it's important to remain vigilant of everyone's health and safety. Following the CDC's guidelines, along with congregation and social distancing protocols, while also keeping your equipment clean will provide long-term benefits to parishes as a whole. **T**

Craig Yanagi *is the National Marketing Manager of JVC Professional, a Division of JVCKENWOOD USA Corporation*

Developing Sanitation Protocols for Lav Work

Four Tips For Keeping It Clean and Two Tips For Getting Back To Business And Staying Distanced

BY BRIDGET HARRINGTON

Keeping things clean has been a hot topic lately, and social distancing also looks like it will be here to stay for a while. Most of us use lavalier mics, which require touching the talent. As we start to get back to work, how can we adapt what is a very hands-on job to be more hands-off and give our clients the safety and peace of mind that they deserve?

The AQTIS and IATSE in Canada are in the process of writing sanitary guidelines for productions undertaken there. Written by Daniel Fontaine-Bégin, Tony Fortin, Simon Poudrette and Stephan Roy, the guidelines recommend:

1. Frequent handwashing, along with the wearing of masks and protective glasses, within 6 feet of talent. Surgical gloves should be used to pass things to others.
2. The placement, adjustment and removal of lavaliers should be done at the Sound Station, using fresh adhesive.
3. As a general rule, a solution of 70% isoprophyl alcohol - either in a liquid or as pre-packaged lint-free wipes - is preferred for gear disinfection. That specific percentage is recommended because it takes more time for the liquid to evaporate from the disinfected surface, making it a more efficient cleaner than 91% or 99% alcohol. Mix the solution in a spray bottle, which produces a fine mist and disperses the liquid without soaking what it is sprayed on. Depending on the surface to be cleaned and the shape and size of the items to be disinfected, it may be possible to spray lightly, wipe or dab with cotton swabs. Bleaching solutions, such as Lysol or disinfectant wipes, are not recommended for any gear, since they can be corrosive.
4. Assign a disinfected transmitter and lavalier microphone for each person and store it in a Ziploc-type bag, or appropriately identified container. After the workday, disinfect and place in a new, clean labeled container for the next day's use. If you can, appoint a volunteer "disinfection team" (one or however many people you deem necessary) whose sole responsibility will be to ensure clean gear and make safe adjustments on talent as needed.

Distance-Friendly Ideas

The nature of lavalier mics involves touch and adjustment. You might consider these two workarounds to make it easier to maintain distance:

A Word About UV Disinfection

Many of you have asked us about UV light for disinfection, and we haven't tested any UV methods thoroughly enough to recommend them at this time. Our Service Department is presently testing options, and we will share our findings when they are available.

As always, consult the CDC Guidelines, which are updated as they evolve. ⊞

Bridget Harrington is a Marketing Specialist and Content Creator at Lectrosonics, Inc.

How To Do a Virtual Studio Production Using a Switcher

Want to create virtual studio productions without using a complicated virtual studio system? In this Tech Tip Tuesdays video, we show you how you can easily do a virtual studio production using a video switcher.

> Check out more great "Tech-Tip Tuesday" videos from DataVideo at
> https://www.youtube.com/playlist?list=PLgV3CN8Dy_GPBW34rsvEmS57FqwQWT80R

ONE SIZE DOES NOT FIT ALL

Streaming Options for Your Church, *Regardless of Size*

Whether you are a small church, a large one, or somewhere right in between, streaming has never been more affordable or necessary. Regardless of budget and what you were (or weren't) doing before COVID-19 turned everything topsy-turvy, your church can easily adapt and grow your streaming and video-on-demand to keep your worship community engaged.

Here we offer a brief overview of three different sized churches, providing a peek at the broadcast gear they are using for streaming, and also what services they are offering
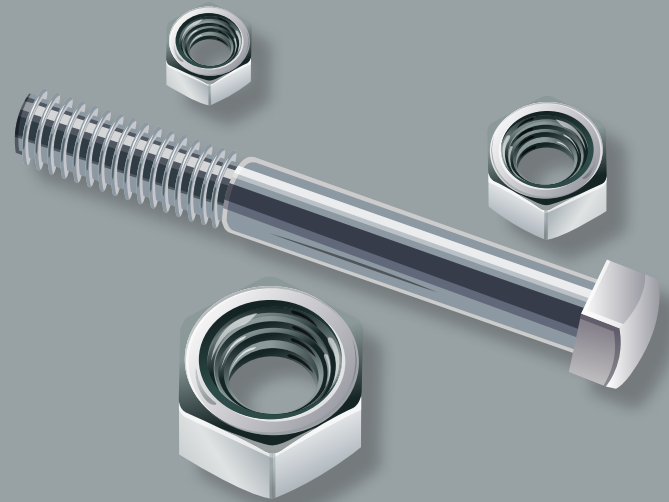
Small Church

Calvary Chapel San Clemente, San Clemente, CA

https://calvarysanclemente.org

Seats: 160 • Streaming Schedule: Sun at 8:00am and 10:00am • Bible Study: Thurs at 7:00pm

Platforms:

Calvary Chapel Online Church: *https://calvarysanclemente.online.church/*

YouTube Live: *www.youtube.com/user/sanclementecalvary*

Facebook Live: *www.facebook.com/SanClementeCC/*

Calvary Kids at Home: *https://calvarykids.calvarysanclemente.org*

Previous Teachings: *https://sermons.calvarysanclemente.org*

LYRICS FLOW

Neumann U-87

XLR

iPad Pro
using Worshipstorm Projector App

Lightning to HDMI Adapter

VIDEO FLOW

HDMI

HDMI

Sony Handycam HDR CX-150

Roland V02-HD Switcher

AUDIO FLOW

Shure BLX 88
Wireless System with lapel mic

Focusrite Scarlett 2i4

USB

HDMI

Magewell USB Capture

MacBook Pro 15" Quad Core i7
*using Streamyard Software

LYRICS FLOW

Sunnyside Adventist Church, Portland, OR

https://sunnysideadventist.com

Seats: 600 • Streaming: Sun @ 8:45am and 11:15am, Wed @ 10:00am (Bible Study) • Other videos loaded throughout the week for encouragement, including Pastoral messages

Platforms:

YouTube Live:
https://www.youtube.com/channel/UCRmMVw3RhiyGB4I4DBABSQA

Bible Study:
https://www.youtube.com/watch?v=i3ndm9HvrL0&list=PLZ3xWf5F6JDUgJ3GWCDTBOnoN7sp9ynIMChildren's

Pastoral Messages:
https://www.youtube.com/watch?v=UZ1cm1Uq0vc&list=PLZ3xWf5F6JDWNTcrk_ZIv3HnqYaZebdNP

Children's Sabbath School:
https://www.youtube.com/watch?v=psXU3gn21rY&list=PLZ3xWf5F6JDUmgThAcQy9_qk574GqWUWw

Other recent uploads:
https://www.youtube.com/channel/UCRmMVw3RhiyGB4I4DBABSQA/feed?activity_view=1

ProPresenter via Matrox DoubleHead2Go

AUDIO FLOW

Roland M300 32-Channel Live Digital Mixing Console

FOH Roland M480 mixer (this includes various mics)

4 X **Canon XH-A1S HD cameras**

Blackmagic Design ATEM 1M/E

ATEM 1 M/E Production Studio 4K

Blackmagic Design DriveDock recorder

Teradek Vidiu streaming encoder

Lincoln Berean Church, Lincoln, NE

www.lincolnberean.org

Seats: 3000+ • Streaming: Sat @ 7:00pm & Sun @ 9:00am and 10:45am

Platforms

Livestream: *https://live.lincolnberean.org/*

Facebook Live: *https://www.facebook.com/lincolnberean*

YouTube Live: *https://www.youtube.com/user/LincolnBereanChurch*

Past Sermons: *https://www.lincolnberean.org/sermons*

Vimeo: *https://vimeo.com/lincolnberean*

LYRICS FLOW

Canon EOS 5D Mark IV DSLR Cameras, EOS C200 Cinema Camera and EOS R Mirrorless Digital Camera provides pre-made video content for the live stream.

iMac with Pro Presenter 6

VIDEO FLOW

Ross Carbonite Switcher

Panasonic AG-HPX370 cameras
AG-HPX370 has been replaced with the AG-PX380

Blackmagic Design Audio to SDI Embedder

AUDIO FLOW

MICROPHONES

Shure SM7B vocal

Sennheiser MKE2 Gold lavalier

RADIAL DIRECT BOXES

ALLEN & HEATH DLIVE S7000 WITH DM64 MIXRACK AT MONITOR POSITION
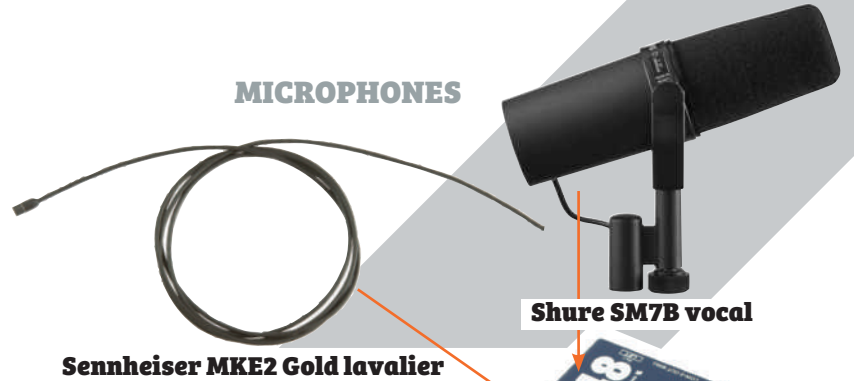
ALLEN & HEATH DLIVE S7000 AT FOH

Living As One Ray Encoder

Living as One streaming service via Ethernet cable which feeds the church website, Facebook and YouTube

Video Streaming Bundles from Full Compass

Single USB Camera With Controller

PTZOptics PT20X, PT-JOY-G3-IP

Let's start things off with an easy setup that will get the job done. This bundle is ideal for smaller churches or those that have been using minimal streaming equipment already, like a smartphone, and are looking to upgrade. This two-piece kit includes the PT20X 1080p High Definition, (HD) camera from PTZOptics, and their PT-JOY-G3 joystick controller. PTZ cameras (Pan, Tilt, Zoom) have become one of the most popular types of cameras for houses of worship due to their flexibility, high-quality imagery, and ease-of-use. And the best way to take advantage of their PTZ functionality is with a joystick controller. With it, you can make smooth pans with the camera, tight zooms onto the pastor while speaking, and can quickly pull out for wide shots to capture the entire stage. This particular model has been completely redesigned from the ground up, based almost entirely on customer feedback, so it's been constructed specifically for

streaming. It has advanced features that experienced professionals will benefit from, but it's easy enough for volunteers to learn quickly and use effectively. This switcher is PoE (Power over Ethernet) capable, as well, so you just need one cord to power it and connect it to your IP network. Let's circle back to that camera for a moment. It utilizes a 20x zoom for those tight shots and is truly plug-n-play with USB 3.0, HDMI, and ethernet outputs. It offers true HD at 1920x1080p at up to 60 frames per second, so the motion in your videos will be smoother than cameras that run at just 30 fps. Plus, it comes equipped with Wide Dynamic Range for high performance even in low-light settings.

Single Camera Video Streaming Bundle With Encoder

Sony SRG300H/W, Sony RM-IP10 Controller, Datavideo NVS-33 Encoder

Perhaps you've been using a dedicated computer for your streams that you'd rather be using for other things. This bundle includes the Datavideo NVS-33 encoder, which will get your stream up onto your online platform of choice. And while you will need a computer or tablet for the initial set up, once that's completed, you just press one button on the front of the encoder to start your stream. And it offers the additional functionality of remote control through a Windows PC, Mac, or mobile device. It also records while it streams, so you can edit the production later or have a copy to put on your website for Video-On-Demand. The SRG300H/W from Sony is a desktop or ceiling mountable PTZ camera that operates in full 1920x1080p HD at 60fps. The powerful 30x zoom makes it ideal for small to medium-sized venues giving you a large range of close and wide shot options. And it features exceptional low-light sensitivity (as low as 0.35 lx in High Sensitivity mode), which allows it to pick up images in near-darkness. Proprietary Sony View-DR technology expands the dynamic range for clear video even with harsh backlighting where there are extremes of light and dark in the same shot. What's more, XDNR® functionality reduces image noise for a crisp reproduction of both still and moving subjects. The Sony RM-IP10 Controller remotely operates this camera over your IP network. The three-axis joystick provides for comfortable, accurate control of pans, tilts, and zooms. Presets save up to 16 camera settings, so if you find a shot you like, it's easy to return to. And this controller is made to scale up, with the capability to support and control many more cameras, if you decide to expand your streaming rig in the future.

Dual Camera PTZ Bundle With Blackmagic Design ATEM Mini

Vaddio ROBOSHOT30E, Blackmagic ATEM Mini

For medium to larger churches, it's worth considering a two-camera setup. The easiest way to create a broadcast studio look is by switching between multiple cameras. Dedicated close-up and wide-angle shots, with a video switcher to alternate between the two, makes for a professionally-produced effect that will give your congregation at home an entirely different and engaging worship experience. The ATEM Mini from Blackmagic Design was made for this purpose. It takes what can be a complex task, a multi-camera shoot, and makes it easy enough for almost anyone to learn. By stripping away all the extraneous functionality that you just don't need for most modern streams, operators can select cameras, audio inputs, and well as video effects and transitions just by pressing the big, easy to read buttons on the face panel. Switching between cameras has never been easier. But, for the more experienced in your tech ministry, the ATEM Mini comes equipped with a Fairlight audio mixer, too, for up to 12 channels of video source audio and microphone mixing into your stream. Now let's meet the two RoboSHOT cameras

from Vaddio. What sets them apart is their Tri-Synchronous motion technology for simultaneous 3-axis pans, tilts, and zooms, giving you some of the smoothest, most intricate shots available on the market. And you're going to need a controller with some serious functionality to take full advantage of those movements, so we've included Vaddio's Precision Camera Controller and its broadcast-quality joystick into this bundle. What makes it broadcast-quality? Its latency-free response and precision. Get exactly the shot you need, when you need it. And the large focus wheel will let you quickly manually focus once you get there. Fully-featured yet easy to use—the perfect bundle for growing churches with technical crews at every level of expertise.

300' Distance Dual Camera Video Switching and Streaming Bundle

Panasonic AWHE40SWPJ9 PTZ & AWRP60GJ Controller, Roland V-1SDI Switcher, Matrox Monarch HDX-K Encoder

And finally, the setup for larger churches with big stages that allows you to really capture the whole service and let your home viewers have an immersive experience. Offering the widest shots and the tightest zooms

of any camera in these bundles, the two Panasonic PTZs feature not only a 30x optical zoom, but a 40x Intelligent Zoom, plus a 1.4x Digital Extender. That means you can start with a very wide shot from 300 feet away and still zoom down for an extreme close-up. Its HD-SDI out captures full HD, and the 16-axis color matrix control and 1/2.3-type MOS sensor allow for precise camera "painting" and matching. The Panasonic Remote Camera Controller features a 3.5-type LCD screen for a GUI menu that gives you all the information you need at a glance. The thicker joystick is 1.5 times larger than the previous model, so it's easier to perform smooth pans and tilts. And the controller lets you make gamma, white balance, and other color adjustments for fine-tuning your video image. The V-1SDI from Roland is a switcher made for large systems. It supports 3G-SDI so can take advantage of longer SDI cable lengths, making this a suitable solution for larger settings. But it's still compact and intuitive, allowing you to switch between cameras and multiple playback sources like smartphones, tablets, computers, and Blu-ray players with ease. Also, it features a T-Fader, for those who prefer that type of control, and backlit buttons allow it to be operated in darkly lit booths. This bundle wouldn't be complete without a robust recorder, the Matrox Monarch HDX has two independent H.264 encoders for redundancy, or to stream and/or record at individual settings. While both of its 3G-SDI and HDMI inputs use frame synchronization to compensate for unstable sources, so they won't adversely affect your stream.

For even more bundles, and a guide on how to get started, check out the Full Compass blog post, *10 Solutions for Easy Video Streaming*. 🆃

There's a whole staff of Full Compass Professionals who know these systems inside and out and would love to answer your questions. Call 800-356-5844, M-F, 7am-5:30pm CST.

CFX (www.churchfacilitiesexpo.com) has a growing repository of information for Houses of Worship, from topical newsletter articles to webinars; podcasts to case studies. Below we share just a taste from their newsletter.

5 Tips and Best Practices
for Church Disinfecting Protocols

BY ALISON ISTNICK

In upcoming weeks and months, our states, cities and local communities will begin lifting stay at home restrictions as non-essential businesses start reopening. Fluid social distancing mandates will affect how we all move forward into society. More than ever, diligent sanitation practices will become a necessity as people begin to gather in higher numbers.

Your church facility will undoubtedly be scrutinized for social distancing and other precautionary measures. Churches who can show transparency in their efforts to provide the safest church environment possible for their staff and congregants, will better manage this indefinite time of transition. With this in mind, now is the time for houses of worship to brush up on their cleaning and disinfecting protocols.

On the Frontline

It's important for your church leadership to recognize your janitorial staff and volunteer team for what they really are: health care providers. The crew at your church who tackle infectious surfaces with chemicals are on the frontline of ensuring safety for your community against viral transmission.

Recognizing the difference between cleaning, disinfecting, and sanitizing

While these familiar terms seem interchangeable, they entail very different aspects of the overall cleaning regime. Cleaning loosens and removes grime, dirt and germs from surfaces and does not necessarily kill germs, but by reducing them, it lowers the risk of spreading infection.

Disinfecting uses EPA registered chemicals to kill germs on surfaces or objects. This process does not necessarily clean dirty surfaces or remove germs, but by killing germs on surfaces after cleaning, it can further lower the risk of spreading infection.

Sanitizing uses chemicals that lower the number of germs on surfaces or objects to a safer level, generally using FDA approved chemicals that are less toxic.

Not All Chemicals are Created Equal

Today there are janitorial chemical manufacturers with products that can greatly benefit church facilities. The idea of bringing in unfamiliar chemical solutions may be daunting to some facility managers. Refer to available guidance when selecting and questioning the use of cleaning chemicals. Organizations like ISSA (International Sanitary Supply Association) offer resources such as paid online training. Google searches will locate online product demos and video tutorials to help familiarize yourself with available cleaning solutions and proper applications.

Facility Specialist with Smart Church Solutions, Nathan Parr has been involved with worship facility management specifically for 15 years. He advocates for the investment of a professional line of cleaning products because of the many advantages they offer. "Most commercial cleaning supply houses will offer training material and information on their products, says Parr. "Oftentimes their salespeople will even come out and train church teams on how to use chemicals properly. It's a valuable service that a lot of churches don't take advantage of." ◨

Read the rest of the article here:
https://churchfacilitiesexpo.com/newsletter-1

Alison Istnick *is a freelance writer and editor who has more than ten years' experience bringing readers excellence and trends in church design, communications, leadership, worship technology and operations.*

YOU HAVE NO

NOW AND FOREVER GOD YOU REIGN

The Bridge Church, Chino CA

LEA Professional Integrator, TechArts, Bridges the Gap Between Quality, Flexibility and Affordability for Church Sound Amplification

The Bridge is a multicultural and intergenerational church located in Chino, California. Over the last few years, the Church moved to a beautiful new, purpose-built facility, allowing for the build and installation of new systems, including upgrades to their AV and sound equipment.

Being a large church with a range of services and events conducted in English and Spanish, the facility's systems are of critical importance. With the goal of delivering pleasing, intelligible music and spoken word audio with good coverage, local systems integrator TechArts, installed several sound systems built around network-ready amplifiers from LEA Professional.

TechArts is an integration company specializing in audio, video, and lighting system design for event venues, churches, live performance, and more. The company is committed to finding the right solutions for a client's needs within budget. With a team of experts in audio design, TechArts specializes in a range of services, including

PHOTOS: LEA PROFESSIONAL AMPS FLEXIBLE NETWORKING CAPABILITY ALLOWS THE BRIDGE TO PROVIDE CRISP, CLEAR AUDIO THROUGHOUT THEIR CAMPUS, BOTH INSIDE AND OUTSIDE. PHOTOS COURTESY OF THE BRIDGE

systems integration and permanent installation as a C7 contractor. The team also offers system programming, training, maintenance, and follow-up services.

As part of the audio system installations at The Bridge, the team at TechArts recommended and installed a set of Dante-ready audio amplifiers from LEA Professional within the church café area, outdoor meeting area, green room, and cry room areas.

Christian Spurlock, Operations Manager, for TechArts, explained that they were previously specifying

> **"The LEA amps have network capabilities, and that is what initially attracted us. We have been making the move to all network-based products and the fact that LEA will soon be releasing a cloud system as well, was very appealing…"**

amplifiers from a different manufacturer, but they were not happy with the performance. The LEA Professional amplifiers had the right specifications at the right price point, and the team decided to give them a try.

"The LEA amps have network capabilities, and that is what initially attracted us. We have been making the move to all network-based products and the fact that LEA will soon be releasing a cloud system as well, was very appealing to us," said Jason Vandergrist, Designer/Programmer, TechArts. "We looked at the amp at ISE, and it looked great. The ability to log in and change settings remotely and not have to go to a job site is significant for us. We have the capability on most of our systems to log in remotely and

monitor everything. Not only is it great for us, but it is great for the clients that we can address problems much faster."

LEA Professional introduced the world's first IoT-enabled, professional-grade amplifier family, the Dante Connect Series, in 2019. Perfectly suited for small to medium scale installations, these two, four, and eight-channel amps feature direct HiZ (70V or 100V) or LoZ selectable by channel. With three ways to connect, integrators can engage the built-in Wi-Fi access point, connect to the venue's Wi-Fi, or use the FAST Ethernet to connect to any local area network via Cat5 or Cat6 cable.

Additionally, the LEA Dante Connect Series is the first professional amplifier family to feature Cloud connectivity (coming in 2020), allowing integrators to harness the power of the Cloud for remote control, monitoring, notifications, and more from any personal device.

"We knew we needed Dante, and one thing that is nice is the density of the amps because we can do so many channels at a single rack space," added Spurlock. "In the long run, this helps a lot; if we had done normal, two-spaced amplifiers, it wouldn't have had enough room."

The team has had such bad experiences in the past with other amplifiers, they wanted to try something new that fit the budget, had the needed networking capabilities, and the long-term reliability that is critical for house of worship facilities.

"I like the build of the LEA products, they are easy to install, and LEA has been really responsive to all our questions," said Spurlock. "The amps are very-well engineered you can tell the design team knew what they were doing."

"We will definitely be using LEA amps again in the future," added Vandergrist. "The company has been great in supporting us, super responsive, and easy to work with — and the quality, features, and performance of the amps perfectly fit this project. We look forward to using LEA more." ∎
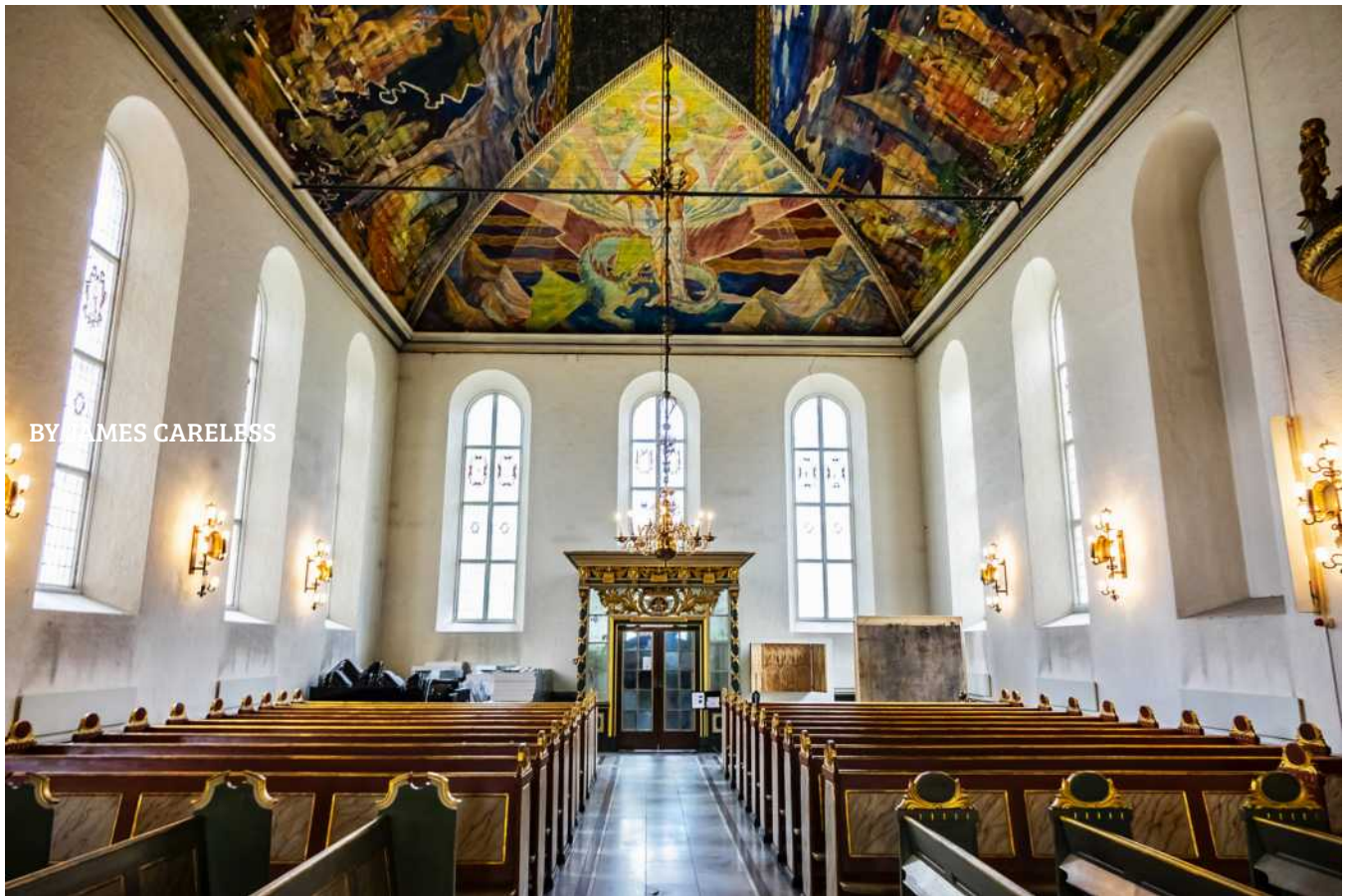
BY JAMES CARELESS

How Acoustical Design Affects Church Audio: Part One

'Acoustical design' is one of those terms that can baffle A/V novices and church officials. They understand what loudspeakers and amplifiers and microphones are, because these devices are tangible physical objects that do very specific things. But acoustical design isn't as easy to grasp, because it involves assessing and optimizing the church's physical environment for clear sound reproduction.

In the first of this two part series, TFWM will explain what acoustical design is and why it plays such a big part in achieving optimal church sound reinforcement.

What is Acoustical Design?

"Acoustical Design studies how sound waves move through space," said Daryl Little of Mankin Media Systems (do you have a specific title?).

"The two key elements we focus on are standing waves and reverb time: Standing waves present themselves as very small frequency ranges that are too loud or too quiet compared to the rest of the sound in the room and are directly related to the shapes in a room. Reverb time is directly related to the surfaces in a room. Think of everything that is contained in a room, not just what is on stage."

In creating Acoustical Designs for in-room audio reproduction, audio engineers use predictive models to determine how standing waves and reverberant sound will affect the overall sound environment as it now stands. This data helps them decide what changes must be made to optimize sound reinforcement in this space.

When it comes to houses of worship, "an Acoustical Design is a specific plan for altering a church's interior and wall treatments to deliver the best sound to parishioners throughout the room," said David Ellis, President of Ellis Pro Media. Factors that govern the successful creation of such designs include:

- *room geometry*
- *desired reverb time (RT60) across relevant bandwidth*
- *mechanical noise/vibration*
- *ambient room noise*
- *isolation between the church and adjoining spaces*
- *room materials and treatments*
- *construction details*
- *external road noise*

Why Acoustical Design Matters to Churches

It bears repeating: The goal of a church Acoustical Design is to ensure that the sound reaching people inside is "as clean and intelligible as possible," said Jon Taylor, Presonus Audio's Technical Sales Lead. "To do this, you have to consider not just the room's shape and its materials, but also where the people listening will be and how the frequencies being delivered to them will be reflected and absorbed."

"Now every room has different characteristics that work and don't work with what you're trying to do, based on the elements within that space" he continued. "So some things within that room will have to be augmented and others will have to be taken away – and deciding which is which is what good Acoustical Design is all about."

SPL from the air-handler and, when an audience is present that figure increases by 6 dB SPL from audience noise to 91 dB SPL; noise created by feet shuffling, fingers texting, breathing, and whispering," Ellis said. "Due to the size of the room and audience noise, we need to amplify the presenter. We might fairly assume a 6-10 dB SPL increase for the PA and suddenly, we are operating at an average level of 97-101 dB SPL. The National Institute for Occupational Safety and Health (NIOSH) lists safe exposure at 91 dB SPL for just two hours; 97 dB SPL at 30 minutes and 100 dB at only 15 minutes! Most services go a lot longer than that."

Acoustical design heads off these problems by aiming for an SPL that is safe for parishioners while delivering clear, intelligible audio in all parts of the room. Be warned: This is a job that can't be done by the audio system alone.

> Two key elements in acoustical design are standing waves and reverb time: Standing waves present themselves as very small frequency ranges that are too loud or too quiet compared to the rest of the sound in the room and are directly related to the shapes in a room. Reverb time is directly related to the surfaces in a room. Think of everything that is contained in a room, not just what is on stage

Acoustical design is also vital to matching the church's sound delivery system to the type of worship services delivered there.

"A standard Catholic church can clearly project spoken word sermons using lapel mics and ceiling speakers, plus some organ music and choirs singing without amplification," said Taylor. "In contrast, an evangelical church that uses 'rock'n'roll' services to energize the crowd pumps a lot of amplified, distributed sound throughout the room – and if the room has not been designed to deliver this sound clearly, it will fight back and distort it. This is why acoustical design matters; not just for big churches, but small ones as well."

Why Ignoring Acoustical Design Can Make People Sick

For church people not accustomed to thinking about Acoustical Design, the concept may seem intimidating. As a result, they may be tempted just to plug in a pair of speakers to an overpowered amplifier and blast the room with sound.

The problem with this approach is that the resulting audio can be hard to understand and unpleasant to listen to. And even if the sound reinforcement isn't distorted in itself, "if a space is noisy from a loud air handler or has too much reverb, or both, it becomes uncomfortable to be in that space," explained Ellis. "In extreme cases, poor acoustical properties can have an impact on our auditory health."

The reason poor audio can make people sick has to do with the cumulative nature of sound pressure: As more pressure-generating sources are added to an enclosed space, the total sound pressure level (SPL) goes up. Exposure to an excessive SPL can literally make listeners physically ill.

Here's how it can happen. "Let's consider our first room and say that our room has a noise floor of around 85 dB

"Once the sound leaves the speakers, the speakers no longer has any control over the reflections of those sounds -- and those reflections directly impact the intelligibility of speech and clarity in the mix," said Little. This is why an acoustical design is required before the audio equipment is selected and installed. "The best PA won't fix a space with bad acoustics. But a great acoustical design will make any PA sound better."

The Bottom Line

Acoustical design is a must-have for any church that relies on audio in its services -- which is to say, all of them.

"When you go into a church where this hasn't been considered, you see intelligibility be very poor," said Garrison Parkin, Southwestern Territory Sales Manager at Renkus-Heinz. "If you want to be understood – and you want your message to be heard – acoustical design is critical."

In Part Two of How Acoustical Design Affects Church Audio, our experts will explore the relationship between audio equipment and acoustical design – their conclusions may surprise you! – why after-the-fact fixes can fail, and where churches can get help in obtaining/executing their own acoustical designs. ▣

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.*

DMX 101
A DMX 512 Handbook from Elation
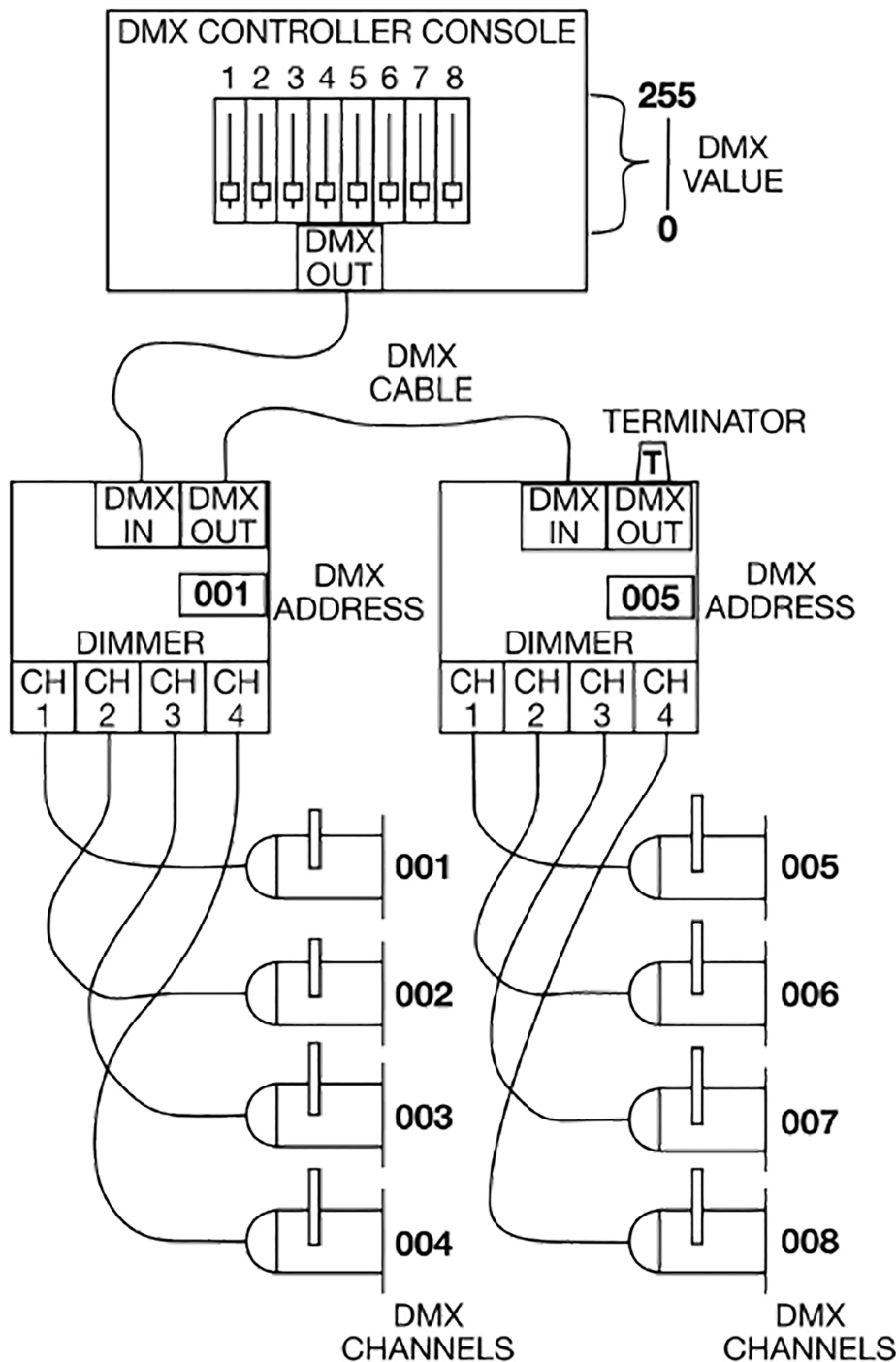
DMX is an acronym for Digital Multiplex, a communication protocol (a set of rules) used to remotely control lighting dimmers and intelligent fixtures. It is designed to provide a common communications standard between these lighting devices regardless of the manufacturer. 512 refers to the number of control channels used on one network segment (often called a 'universe') of devices. In a simple dimming system, one channel controls the intensity of one dimmer. A single intelligent fixture, however, may require several channels to control its various parameters (one channel each for pan, tilt, color, gobo, etc.). Understanding DMX and properly calculating your DMX channels is vitally important to plotting your lighting grid and implementing a successful lighting design.

Our friends at Elation Professional have produced a helpful handbook designed to provide a basic understanding of the DMX 512 protocol,

including theory of operation, proper equipment use, and some basic application examples.

Introduction to DMX

Often those of us plunged into the entertainment lighting industry, through work or circumstance, find ourselves inundated with industry jargon and information overload. What is a moving head fixture, and how do you control it? What is this DMX I keep hearing about? This handbook is designed to promote a basic understanding of the DMX 512 protocol. With this in mind, it covers the basics in theory of operation, proper equipment use and some very basic sample applications.

DMX 512 is a communication protocol, a set of rules, that are used to remotely control lighting dimmers and intelligent fixtures through a communication standard, a common way of communicating to these lighting devices regardless of the manufacturer. DMX is the acronym for Digital MultipleX, and 512 is the available number of control slots, or channels, for transmission. The 512 channels comprise a DMX 'universe'. In a simple dimming system, one channel controls the intensity of one dimmer. A single intelligent fixture, however, may require several channels to control its various parameters (one channel each for pan, tilt, color, gobo, etc.), and in many cases, functions or colors are controlled within a given value range on a single channel as seen with the COLOR WHEEL on the sample chart below (especially in the EXTENDED column). A basic dimming control console may support only a few of the 512 available channels, whereas many professional control consoles can support multiple universes, allowing for thousands of control channels.

> **Understanding DMX and properly calculating your DMX channels is vitally important to plotting your lighting grid and implementing a successful lighting design.**

Industry Standards

Before 1986, most manufacturers used their own proprietary control protocols, forcing system designers to mostly use fixtures and control consoles from the same manufacturer. Although there was no control standard to allow the use of a different manufacturer's products, a number of companies developed adapters and patches for this purpose, which created control arrangements that were overly complex and somewhat expensive.

Given that a control standard comprises a set of widely agreed-upon guidelines for interoperability at both communications and mechanical level, standardization of protocol and equipment provides many benefits to manufacturers and end users, which include:

- Increased product quality and safety
- Reduced development time and cost
- Sound engineering practices
- General cost savings via protection against product obsolescence

Theory of Operation

In technobabble, DMX 512 is an asynchronous serial digital data protocol. This section will attempt to explain how DMX operates in a simplified and easy-to-understand manner using a Cable TV Analogy and DMX Communications.

The Cable TV Analogy

A central concept of DMX 512 is the ability to transmit data on multiple channels over a single cable. To better understand this concept, imagine a simple cable TV system with four major components: a Cable TV Company, a Cable, a Decoder, and TV - see image 1.
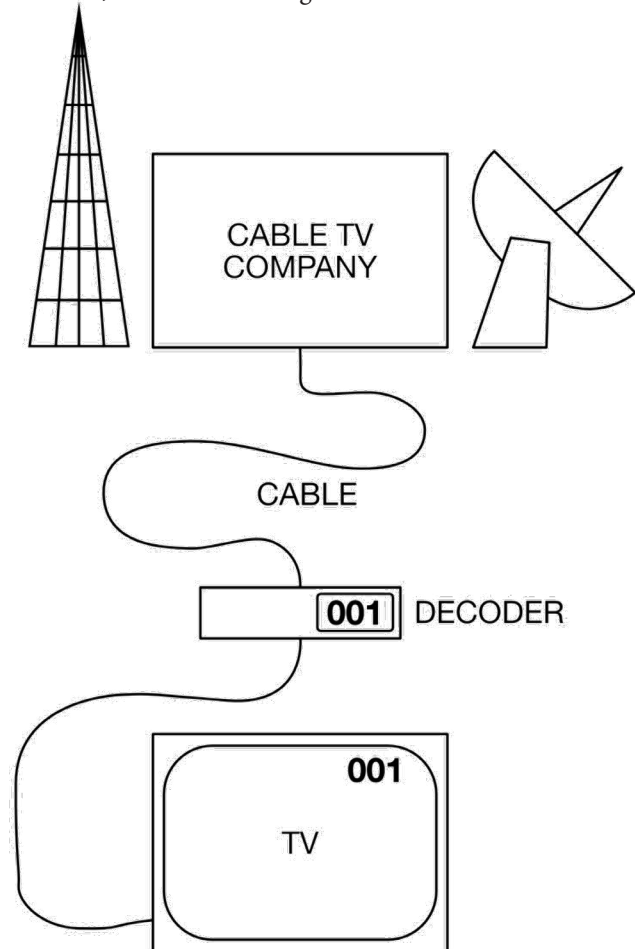
(IMAGE 1)

The DMX Control Console will broadcast up to 512 channels over one DMX Cable. Some of these channels may not be used, but will still be transmitted, as required by the protocol. The Decoder in image 2 is built into the Dimmer. It must be set to a desired channel (channel 001, in this example) to control the connected Light Fixture. This is usually accomplished using a DIP switch (manual electric switch), or LED/LCD display. This desired 'channel' is commonly known as the DMX address.

Now imagine a simple DMX system where the Cable TV Company is the DMX Control Console, the Cable is the DMX Cable, the Decoder is the DMX Decoder built into a Dimmer, and the TV is the Light Fixture.

(IMAGE 2)

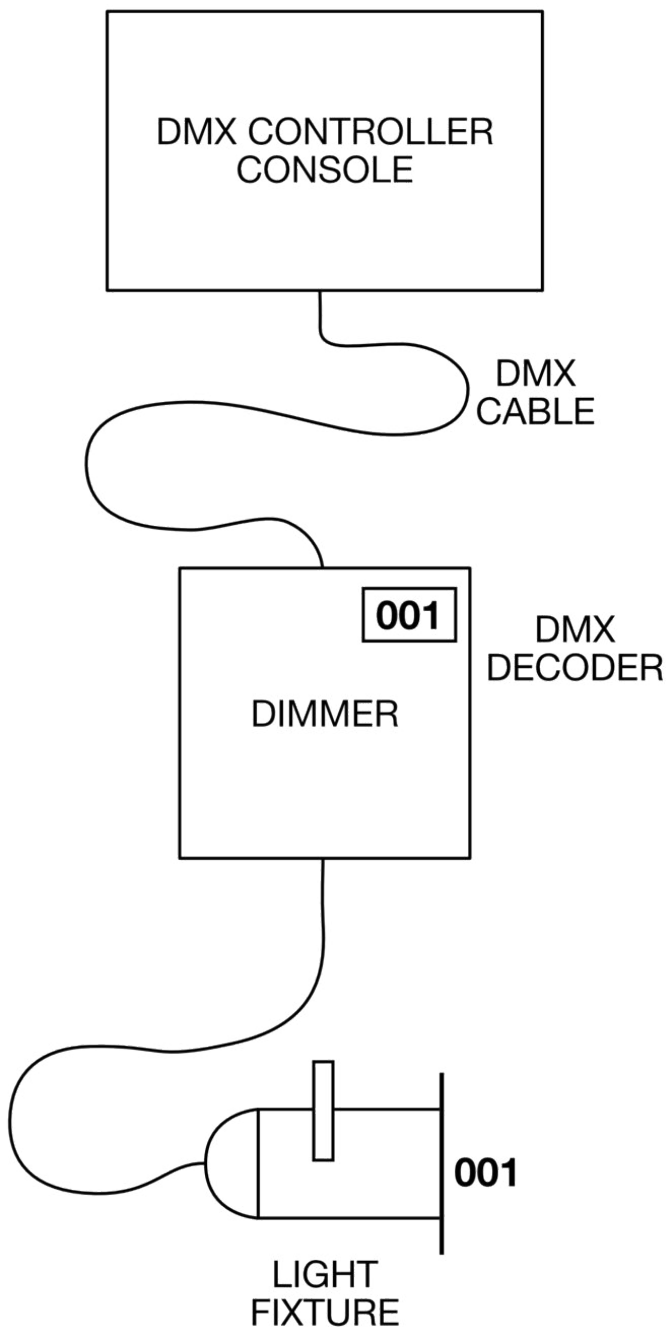The DMX Control Console will broadcast up to 512 channels over one DMX Cable. Some of these channels may not be used, but will still be transmitted, as required by the protocol. The Decoder in image 3 is built into the Dimmer. It must be set to a desired channel, as with the previous example, starting with channel 001 to control the connected Light Fixture.

Many DMX devices, such as dimmers and intelligent fixtures, are capable of receiving several control channels at once. If a Dimmer has four channels capable of controlling four Light Fixtures, it must know which four control channels to receive. This is accomplished by setting a 'base address', or the DMX address for the first Light Fixture, channel 005 in this example. The remaining Light Fixtures will be controlled by the next three sequential control channels. The DMX Decoder knows it needs only these four control channels, and will ignore the rest.
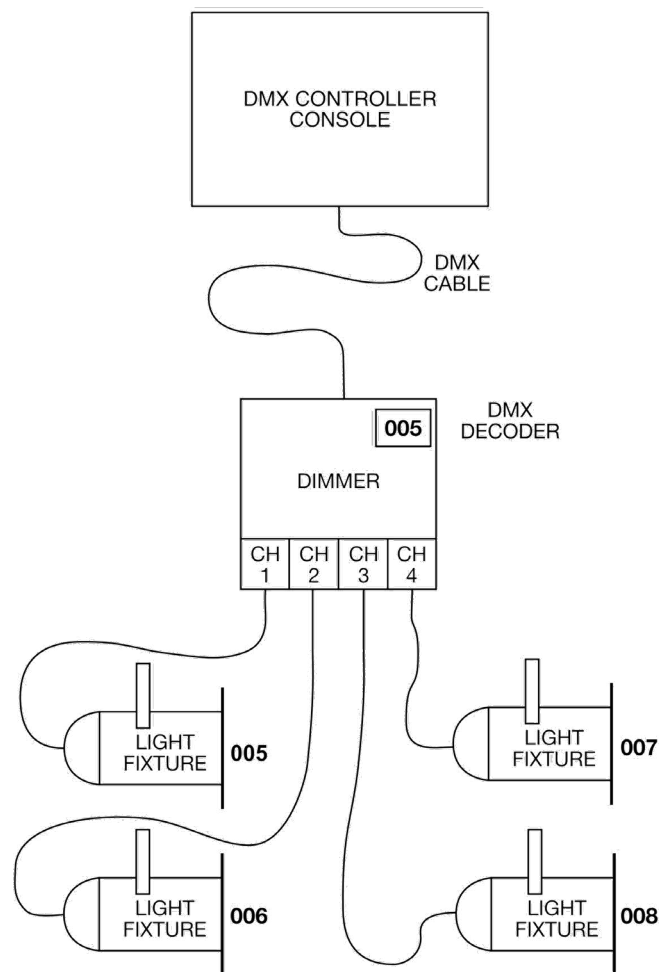
(IMAGE 3)

DMX Communications

In the world of digital communications, information is sent using precise electrical voltage pulses. A positive voltage pulse represents a 1, on, and a zero-voltage pulse (or no voltage) represents a 0, off. Systems using 1's and 0's to encode information are called binary systems (a bicycle has two wheels, a binary star system has two suns).

Each pulse in a digital signal is called a binary digit, or bit. A bit can only have one of two values, 1 or 0. A grouping of eight bits, called a byte, is used to carry one piece of information. This 'information' is simply a value ranging from 0 to 255.

The most common method of transmitting digital signals is to send data one bit at a time in one direction over one wire. Since each bit is transmitted in series, this method is known as Serial Communication. In its simplest form, Serial Communication requires one data wire for transmission and one common reference (or ground) wire.

There are two types of serial communication: asynchronous and synchronous. With asynchronous data transmission, data is sent one byte at a time, which means that asynchronous devices do not require perfect synchronization (a "not", syn "together", and khronos "time"). That said, their timing signals (pulses) still need to be somewhat close [at least within a plus or minus 5% range of the data sampling clock circuit, which makes this method relatively simple and inexpensive]. [A data sampling clock circuit is data sent/received relative to its clock position, wherein a stream of data has information in the beginning, center, and end to signal the position of the data within a given or known period (data rate)]. Think of a five second long data signal, which can be sent at a relatively arbitrary time (plus or minus 5% of the clock circuit used), and know that once the beginning of the signal is received, it signals that it will last exactly 5-seconds, with another signal to mark its end. With synchronous data transmission, data is sent as a group of characters in a single stream of bits known as a bitstream. Synchronous serial digital data protocol requires precise and expensive synchronized devices at both ends.

There are many standards for Serial Communications, each having its own advantages and disadvantages. Communications standards generally fall into two broad categories:
– Single-ended (unbalanced)
– Differential (balanced)

> **A basic dimming control console may support only a few of the 512 available channels, whereas many professional control consoles can support multiple universes, allowing for thousands of control channels.**

The single-ended specifications allow for data transmission from one transmitter to one receiver at relatively slow data rates and short distances. When communicating at high data rates, or over long distances in real-world environments, single-ended transmission methods are often inadequate.

Differential data transmission offers superior performance in most applications by helping to nullify the effects of interference on the signal. This is achieved by using two wires to transmit the signal (with opposing polarity) instead of just one.

The DMX 512 protocol is based on the EIA/TIA-485 standard (commonly known as Recommended Standard 485 or RS-485), which uses asynchronous differential data transmission. This standard supports 32 devices on one network at a distance of up to 4000 feet. One device functions as the master (the DMX controller) on a network, while the rest function as slaves (dimmers, intelligent fixtures, etc.). Only the master transmits over the network, and all slaves receive the same data.

While 4000 feet may be specified by the standard, most manufacturers recommend DMX runs of no more than 1000 feet (300 feet between devices) before using a repeater to regenerate the signal. Each device should have input and output connectors, but these are usually wired so that there's no re transmission or amplification.

Devices are connected in a daisy-chain fashion, from the controller to device #1, then device #1 to device #2, and so on. The final device in the daisy-chain must be terminated. The terminator absorbs signal power which would otherwise be reflected into the cable and degrade the data. A terminator simply places a 110-120 Ohm, 0.5-Watt resistor across the two transmission wires.

NOTE: DMX cannot be split reliably by making Y-cables or T-connectors. DMX splitter/repeaters typically use optical isolation to protect each segment from electrical faults on other branches. These can be used to increase the number of devices on one network beyond the limit of 32. Each branch of a splitter/repeater can support up to 32 devices.

So how does all this information relate to controlling a light fixture? Think of it in terms of the simple DMX Controller Console. The console may have up to 512 control faders on it (8 in this example). Each fader controls the intensity of one light (using one DMX Channel). The position of the fader represents an 8-bit value (DMX Value) between 0 and 255, where 0 is off and 255 is full on.

Up to 32 devices may be connected in a daisy-chain, with a terminator on the last device. Using a DMX splitter/repeater (opto-isolator) can extend both cable distance, as the signal is regenerated and retransmitted, and the number of devices, up to 32 per branch. ◼

• *Don't forget to download the Elation DMX handbook to learn more about Protocol Specifications and Sample Applications, including diagrams and charts at www.elationlighting.com/dmx-101-hand-book*

Choosing the Right Mixers for Your Channel Count
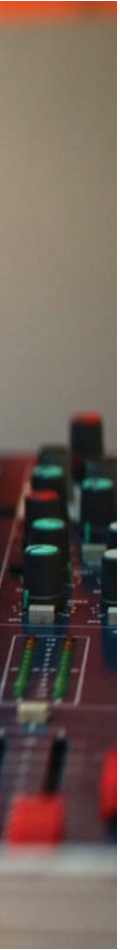
BY TIM ADAMS

How many channels do you need when you're upgrading your audio mixer? Do you simply choose the same amount you currently use, do you get a larger mixer, perhaps a smaller one?

This might seem like a basic question, but how you answer this question has potentially far-reaching consequences. My method is looking 5 years into the future and starting with where the needs of the sound system and input sources will likely be in that amount of time. This helps focus leadership to thinking about where growth is likely to occur, what goals can or should be achieved in that span of time, and how that affects the needs of the sound system.

Generally, my experience has shown churches tend to want a slightly higher channel count, if only to have the additional flexibility. This has tended to be a jump of about 8 channels or so. It's rare to see a church move from a 16-channel mixer to a 32-channel or larger mixer. It does happen, but only if there is a plan for aggressive growth in the worship ministry.

When you are evaluating your needs into the next few years, you should account for all of your inputs, both

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local (those residing in the booth) and those on the stage (vocals, instruments, computers, etc.). Depending on the size of your church and your worship style, you might only have a few stage inputs or you could have a couple dozen. Think about what capabilities you have needed in the past that you had to find a temporary solution for. How would adding not only additional inputs channels, but perhaps an additional floor pocket or two help you achieve that capability in the future with a permanent solution?

What about wireless microphones? With wireless mics becoming more reliable and less expensive, many churches are moving to wireless handheld microphones to help clear up the stage clutter and what can become a rat's nest of cabling underfoot. Where do you put your receivers? On the stage for best reception or in the booth so you can monitor battery, signal and other important information?

Instruments can quickly overwhelm your available channels, particularly if you have musical groups visit throughout the year. Generally, I always advise thinking through your "worst case" scenario; the one situation where you needed a significantly larger number of channels than your current capability. Then, ask how often or likely that situation is to be repeated. If it's more than a couple times a year, choosing a mixer that can handle that situation would be my recommendation. Yes, you can rent a mixer for that event, but that solution can sometimes represent a steep learning curve with an unfamiliar user interface, even if it's using the same brand mixer.

For your booth sources, you have computer, CD player, DVD player, and/or other sources that

sometimes require a stereo input, which can take up to 2 of your available channels, particularly if you run out of stereo inputs to use. You can always use a direct box to help ease that load, but it's another consideration to think about.

On the flip side, there are options for consolidating signals, such as using an inexpensive sub-mixer for your drum kit that provides a single channel "mixed" output into your larger system. Similarly, you can invest in a wireless lectern/podium mic to help reduce the number of wireless earsets or lapel mics you need, each of which require a channel.

While I always suggest purchasing a mixer that can natively handle not only your current needs, but your needs into the future, there are sometimes the harsh realities of budget, a lack of space required for a large enough mixer and a host of other reasons why this sometimes cannot become a reality. There are options available, but those options will always come with at

least one major compromise.

If you can, give yourself a buffer of eght more channels than you currently need, but also re-evaluate your current channel count; do you really need as many channels as

> **If you can, give yourself a buffer of eight more channels than you currently need, but also re-evaluate your current channel count; do you really need as many channels as you currently think you're using?**

you currently think you're using? Can you consolidate media (audio and video) playback to be handled by the computer so you don't need separate inputs for a CD player, DVD player and a computer? If you have several microphones on your drum kit, can you reliably consolidate those multiple channels into a sub-mixer to "buy back" those channels for other uses?

I think it's just as important to take an objective look at your true needs rather than automatically assume you need a larger mixer; after all, we are called to be good stewards of the resources given to our care and that means not wasting money. Please note, I'm NOT saying this gives us the right to be cheap and only focus on bottom line price. We need to move away from this scarcity mindset and focus on long-term value; that is where good stewardship lies and this is where I try to land with every client-ensuring they receive the maximum value for their money, with

long-term reliability, ease of use, and the functionality they need for now and for many years into the future.

Churches do amazing things with very little, and I have seen many houses of worship extending the useful life of equipment well beyond the expected lifespan. So if you're going to make the investment in buying a new audio mixer, then let's make sure the process you follow to evaluate the options available takes into account more than just the casual observation of "I need more channels because I currently don't have enough."

If you have started the process of researching, but feel overwhelmed by the sheer number of options, I would suggest you contact an integrator or a consultant simply to pick their brain about what might be a good 2 or 3 options to consider. Their knowledge and experience can help narrow down your research time to those mixers that will fit your criteria. And you gain the additional advantage of having them back check you and ask questions you may not have considered. And that is a good thing because it ensures that you are indeed being a good steward. Right? **T**

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.*

FOR-A HVS-2000 Video Switcher Helps Pivot The Orange Conference to a Streaming Event

Custom Media Solutions, a live event video production company based in Cumming, Ga., has provided streaming coverage of The Orange Conference, an annual event in Atlanta for Christian family ministry teams, for years. When the COVID-19 pandemic forced Orange Conference 2020 to convert from a live, arena-sized event to a three-day streaming program that began on April 29, CMS relied on its HVS-2000 video switcher from FOR-A Corporation of America to deliver a high-end production to a much larger online audience, and deliver a state-of-the-art online presence for people who could not attend.

"We automated as much as possible using the features from the switcher," said Marc Shroyer, president of CMS. "We had a couple of still stores with user flags and a lot of lower-thirds from the ProPresenter presentation system. We used DVEs for picture-in-picture looks that we could display on the multi-view at all times, so we could decide when to use them on the fly."

Most of the content was prerecorded, but live hosts connected the short segments together. Orange converted its local retail store, which was closed due to COVID-19, into three studio sets. Client cameras were used as studio cameras for the two main sets, and robotic cameras were positioned above the two sets to provide wide transition shots and a birds-eye view for the production
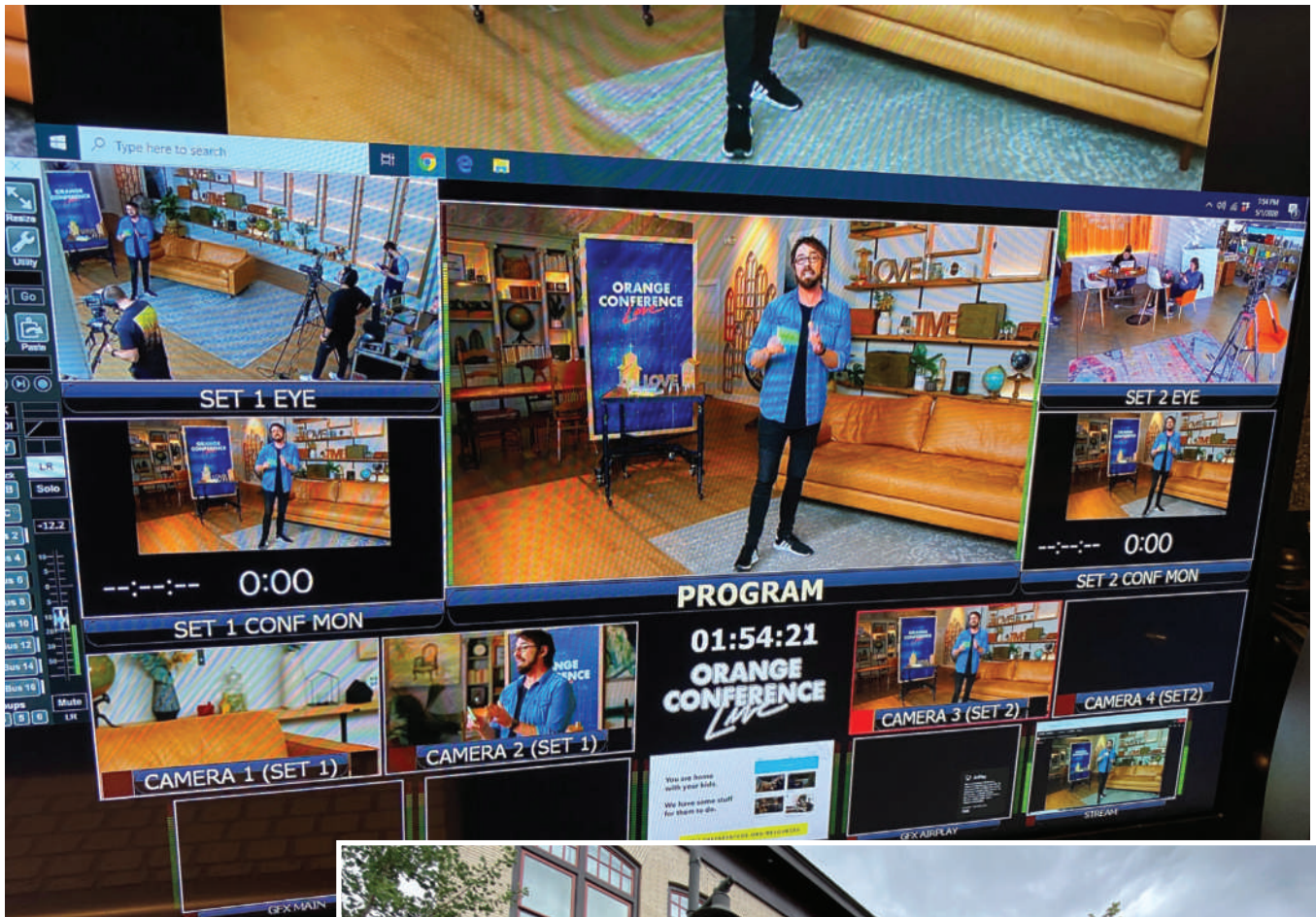
crew. The third set, located upstairs and equipped with CMS's Hitachi production cameras, hosted two live keynote presentations.

Due to social distancing requirements, CMS had to produce the event using less than half of its usual crew in its production trailer. The coverage required 16 inputs, 10 keyers, 11 DVEs, and at least four AUX buses. "The FOR-A was great, it always performs for us," Shroyer said.

One challenge the production faced was integrating a Zoom-based game show into the live program. During the game, the video switcher received two separate computer feeds, so the TD had the option of taking the Zoom gallery display of the four

players or the full-screen speaker display. The host interacted with all four players through a monitor on the set (populated by one of the HVS-2000 AUX buses), which showed the Zoom gallery display as a

picture-in-picture inside the game graphics and allowed the players to the see the game board. To avoid audio

feedback, a USB interface sent the mix/minus from the digital mixer to the participants.

PHOTOS: **TECHNICAL DIRECTOR MICHAEL SIMMONS USES A FOR-A SWITCHER FOR THE ORANGE CONFERENCE'S STREAMING EVENT. PHOTOS COURTESY OF FOR-A AND THE ORANGE CONFERENCE**

The ProPresenter system was used for playback of the recorded content, and two keys were used to show the timers from the ProPresenter's second display on the confidence monitors. A backup system rolled the videos on a slight time delay. Each of the two main sets had a confidence monitor, which received feeds from the HVS-2000's AUX bus.

Using the HVS-2000's internal GPI system called user flags, the AUX bus feeding the confidence monitor would switch automatically to the second display from the backup system when necessary, so the hosts and crew always knew when the recorded content would end. The user flag would also make it switch it back to the primary stage display graphics when any other source was selected.

There were two streaming feeds; the main feed provided all programming to the Orange website, while a second feed only shared the two-hour main session to Facebook Live on April 29. At one point, the production had to cut the Thursday night feed to Facebook Live because of potential music copyright issues.

In anticipation of the interruption, Shroyer created a GPI interface between the HVS-2000 and a Clear-Com intercom system to allow switcher commands to be fired from communication panels at several stations in the production truck. From his location in engineering, Shroyer switched the AUX feed with transition to a graphic (without sound) and keyed a countdown timer from the ProPresenter system using the HVS-2000's key over AUX function to let the Facebook Live audience know when programming would resume.

"Production companies appreciate the flexibility of the HVS-2000, which went from backstage to center stage for Orange Conference 2020," said Adam Daniul, FOR-A director of midwest and south regional sales. "We are proud to partner with Custom Media Solutions and provide the live production equipment to help them deliver high-quality coverage for such a prominent event."

The HVS-2000 2 M/E video switcher offers 24 inputs and 18 outputs as standard, and can be expanded up to 48/18 or 40/22 with optional I/O cards. The switcher also includes MELite™ technology that previews output from an AUX bus when applying transitions or keying for expanded M/E performance, as well as FLEXaKEY architecture for flexible reassignment of keyers separate from the standard keyers of full M/E buses. ▪

CHURCH SERVICES HAVE CHANGED FOREVER

Here's How You Can Make Sure Your Message Reaches Your Local Congregation and Beyond...

BY DARREN FORDHAM

Due to unforeseen circumstances, churches today are finding themselves facing the same difficulties that are sweeping many organizations across the country. Their ability to serve their congregation and community-at-large has been altered. Despite many states slowly re-opening and others considering similar plans in the near future, there is a strong likelihood that many worshippers will continue to stay home until they feel safe. These unprecedented and uncertain times brought on from the COVID-19 global pandemic have forever changed the way Houses of Worship operate.

Spreading your church's message, interacting and building a sense of community with your congregation, and attempting to extend your reach is no longer as simple as opening up your doors, because for many right now, that is not possible. Prior to the spread of the virus that forced churches to shutter their doors, video production in worship was already on the rise. Long gone were the days where broadcasting on television was the only way to receive and view worship services. The current situation has only accelerated the need for higher-quality video content production in a way that previously was unimaginable.

Beyond sharing the word of the Lord, a significant responsibility for your local church is to build a sense of community for your congregation. Parishioners don't merely walk through the doors of their church during their day of worship and go home, not interacting with their fellow worshippers throughout the week. A congregation is fundamentally an extended family for worshippers, and the best Churches make their building feel like a second home. Unfortunately, for many, these interactions aren't currently possible, forcing the onus on local churches to figure out a way to build this sense of community in a virtual setting.

There is no better example of that than Red Rocks Church, who was chosen by YouTube as their official Easter Sunday service stream. An astonishing number of over 260,000 devices watched the streaming service live. Now imagine the potential reach for your church with the proper video production equipment installation. A creative services department and having the ability to record or stream your service, all once considered a luxury for a house of worship, are no longer that – they are now a necessity in order to stay connected.

If your church hasn't started, it is certainly not too late to quickly catch-up. While history will remember what brought us to this point, ultimately, how we got here does not matter, there is no turning back. I've sure you've heard this in other walks of life, the all-familiar term being tossed around that this is the "new normal," well that couldn't be truer for Houses of Worship.

While at face value, this might sound all doom and gloom, I promise you that is not the message I want readers to take away from this article. On the contrary, there is no better time to invest in the equipment needed to either begin or expand streaming and recording capabilities and the offerings of a creative services department.

An investment today isn't just for the present. It's an investment in the future of your church. Simply put, there is no faster way to expand the number of people your church reaches than with the ability to record and stream services in addition to developing engaging and exciting video. No matter the size, big or small, there is a solution for every church out there, starting with a camcorder and elevating all the way up to cinema and broadcast cameras.

There is a New Door to Your House of Worship

What if I told you the beautiful and grandiose physical door of your church is being surpassed in importance, by another door, a virtual one? This notion is starting to crystalize and become more the reality every day.

When our society begins to open up again, the limitations of social distancing will be lifted. Still, the geographical boundaries of recording and streaming of your church's video production content have already begun and will continue to be further erased. As churches, you are no longer just competing with the neighbors but instead with churches across the country, essentially any organization that has the ability to get their message to a viewer's screen.

The borders have opened up, ushering in a period of "open-enrollment" that will only continue to grow. Worshippers will continue to understand further that shopping around for a new church online is becoming as easy and simple as buying a new pair of slacks. Gone is the need to take an excessive amount of time traveling to other churches to learn more about their offerings-- the door to a church hundreds, even thousands of miles away is just a click or two away. This wealth of choice at a worshipper's fingertips will significantly drive the need for specific things from churches: more and more content to satisfy the hunger of a worshipper, and content with exceptional image quality.

The churches producing the best video content and quality will win the most eyes on their services. Engaging and visually striking imagery is more likely to pull in and keep viewers over quality that is not up to par. Consumers invest thousands of dollars every year into home entertainment systems to mimic being at the movies or a ballgame – Churches should treat their video production content the same way.

A Message from Calvary Chapel

As states began to institute a strict stay-at-home order, effectively closing the brick-and-mortar doors of churches, I took the time to check-in with my clients and hear their thoughts on how they have been handling the daunting image of empty pews.

One client in particular, Bennett Lamb, is the creative director for Calvary Chapel in Chattanooga, TN. Bennett shared the unique perspective from a church that thought they were prepared enough, but quickly realized adjustments needed to be made to satisfy worshippers, both near and far…

"Before the pandemic started, our staff team, along with the body of our church, viewed online streaming as an obligation for an organization our size. Our senior staff had created a culture of excellence that was only implemented within the walls of our building. We mixed audio for the sanctuary, but the video shots were marginal, at best. But hey, in our mind, it was working…or so we thought.

Once the shutdown began, our senior staff came to me and said, 'What do we have to do to provide an excellent streaming experience?' No pressure, right? Fortunately, we had the cinema cameras in our creative department that we migrated over to the sanctuary. We purchased the needed lenses and went to work. After two weeks of dialing everything in, our audio engineer stopped me and said, 'I have never seen such a clear shot in our sanctuary before.' This was a wonderful comment, however, would the 'new' look really translate outside of the walls of our building?

On an average weekend, we can see around 3,500 people in house and maybe 200-300 online. With everyone at home, we knew the streaming numbers would change, and we just didn't know by how much. For our Easter Sunday service, we had over 9,000 people watch our service. For each Wednesday night Bible study stream, our average viewership is in the thousands. The growth during the month of April has been the highest we have seen, ever. Instead of the parishioners texting me telling me the stream is blurry, I am receiving texts of how blessed individuals are by having the Word in their homes in such a beautiful way.

It is my humble opinion that streaming is now the front door to churches around the world. If you are not investing in your online streaming experience, you are truly missing out on an opportunity to bless the flock you have been given to look after. If you view streaming as a 'must-have' as we did, I would ask you to pray that God gives you a fresh set of eyes to see this new opportunity for what it is… A genuine chance to bless individuals around the globe from the seat in which you sit."

Creative Services Department: Taking Your Message a Step Further

If the pandemic has taught our society one thing, as the weeks continue to fly by and mesh together, it seems the days of the week no longer matter. Eventually, as we begin to get back to normal that feeling will surely subside slowly, but that doesn't mean your creative services department shouldn't be developing engaging content for every day of the week.

Churches should be taking this opportunity to expand and hone the skill of their creative service department offerings. The department not only has the ability to create engaging content that supplements typical services, but they also can take an approach that is more targeted to the different audience segmentations of your respective church. Each day of the week can deliver a different message to a diverse group: Mondays can be for the youth ministry, Tuesdays for the elderly, so on and so forth. These messages can quickly be posted to your church's website or social media channels, like Facebook, YouTube, and Instagram. While this added work might seem like a potentially expensive and time-consuming undertaking, at the end of the day, churches should see it as another way to expand their reach. When a creative services department develops engaging content that resonates with the audience, those viewers are more likely to stick around for regular services. **T**

Darren Fordham *is the National Accounts Manager for House of Worship Sales at Canon U.S.A., Inc. He can be reached at dfordham@cusa.canon.com.*

Projection Solutions from Maxell

Small Churches

Maxell's MP-WU5603 provides high-brightness, high-quality enhanced visuals for small-scale venues and house of worship facilities. Featuring 6,000 ANSI lumens brightness and WUXGA 1920 x 1200 resolution, the 3LCD projector is designed for up to 50,000 hours of maintenance-free operation using Long Life 2 mode to extend the life of the projector. Maxell's cloning function and Perfect Fit 2 make setup simple and efficient whether a house of worship facility is mounting the projector or rolling it out every week for service. Additionally, the 3LCD projector provides wireless presentation compatibility allowing users to connect to the projector using a USB wireless adaptor while Picture by Picture and Picture in Picture can be used to display multiple images at once. Users can connect to the 3LCD projectors using HDBaseT, HDMI, Maxell's Projector Quick Connection App for Mobile Devices or using an optional USBWL5G wireless adapter.

Medium Churches

Maxell's 3LCD MC-WU8461 projector is designed for mid to large-sized venues and house of worship facilities. Featuring 6,000 ANSI lumens brightness and WUXGA 1920 x 1200 resolution, the MC-WU8461 provides a crisp, clear image even in spaces where natural light would typically disrupt image quality. To further improve picture quality, features like High Dynamic Contrast Range (HDCR) and Maxell's Accentualizer technology are designed to enhance sharpness, gloss and shading to make the picture come to life. The MC-WU8461 is designed for streamlined and intuitive use, allowing for PC-less presentations through the use of storage devices as well as the ability to connect the projector to your computer through a network or USB adapter. Additionally, the MC-WU8461 is compatible with the projector quick connection application on both iPhone and Android devices allowing house of worship leaders to control the projector through their mobile devices. If things get complicated, this LCD projector includes a status monitor that gives users access to real-time diagnostics in addition to configuration information and maintenance history to aid in troubleshooting.
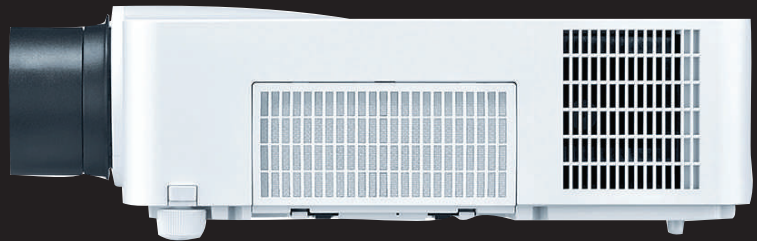
Large Churches

Maxell's MP-WU8801 3LCD laser projector provides a heightened dependable and affordable visual experience by delivering vibrant and crisp graphics for large venues. Featuring 8,000 ANSI lumens brightness and interchangeable lens functionality, the MP-WU8801 offers up to 50,000 hours of maintenance free operation with Life Long 2 mode and reduces cost of ownership by eliminating the need for lamp replacement.

The laser-light projector delivers visual clarity and brilliance with enhanced sharpness, gloss and shade using the integration of High Dynamic Contrast Range 2 (HDCR2) and Maxell's signature Accentualizer technology. The MP-WU8801 also makes it easy for house of worship facilities to set up with blending and warping capabilities via manual control or with Maxell's Projector Blending Tool 3, which utilizes a camera and software to automatically make adjustments.

The MP-WU8801 enables 4K signal input on HDMI1, HDBaseT and Display Port input terminals. Both models feature WUXGA 1920 x 1200 resolution with a 2,500,000:1 contrast ratio and comes with the industry leading 5-year/20,000 hour warranty in the U.S. and Canada. ∎

Step in Time Sequential Power Control Is Critical to Today's HoW AVL Installations

BY MARK BISHOP

With the proliferation of digital audio, video, and advanced lighting technology, many theaters, houses of worship, stadiums, and other AVL venues need advanced power protection and control solutions that will provide connectivity to power combined with convenient on and off control. While many of the new AVL technologies draw less electrical current than previous models, there are simply many more devices added to the average installation, which has made power automation more important than ever.

It used to be that AVL installations fell into two buckets; there were the large venue installations with widely distributed electrical gear, and then there were the smaller single room AV installations that could be managed by one or two rack mounted sequencing modules.

The large venue installations were best served by wall mounted power control solutions such as motorized circuit breaker panels or wall mounted electrical relay control panels. The theory here being that all electrical devices, regardless of installed location, had to eventually be protected by a circuit breaker at a centralized location. If you add control to this centralized meeting point, then you have greatly lowered your installation and maintenance costs.

These wall mounted control panels operate at the circuit level and can be set up into zones in order to operate subsets of equipment separately as well as having sequencing and power protection built in at the panel level. With widely distributed gear — much of it hanging high off the floor— this greatly simplifies power distribution and control.

The small AV installations have historically been best served by the single-circuit, rack mounted sequencing module — of which there are many options. The theory in the small installs was simple as well, all the gear is in a single rack in a single location so integrators can mount the control where the devices requiring electricity are housed, and bring control to one point.

Today, we are seeing the electrical game change. There are new digital technologies deployed and others that are gaining in popularity that require decentralized equipment racks with power control being coordinated at multiple locations. In other words, there is a new power control solution needed. Solutions here are harder to find but increasing as new products are being developed and introduced into the pro AVL marketplace.

Consideration 1: Venue Size and Gear Distribution Area

AVL gear is being more widely distributed all of the time. Power management these days isn't limited to one room — or in some cases, one building — and even when it is there is probably gear in every corner. There can be projectors, video walls, audio devices, speakers and lighting fixtures spread out over the entire area or campus, which can make convenient control more complicated. However, with today's power control options, controlling large venues or equipment across a multisite campus can be done by networking units to operate as a single system — provided they're hooked up to the same IP network. There's no distance limitation. In addition, these sophisticated systems enable control of lighting and AV gear across multiple control zones and via multiple control protocol inputs and simple contact closures. Networked power control

systems allow you to operate far-flung gear on the same operating interface.

Consideration 2: Sequential Power Automation for Today's Digital Audio Equipment

Although traditional sequencers were originally created to spread out the electrical inrush associated with turning on high-powered amplifiers to prevent nuisance breaker trips or damaging loudspeakers, the advent of soft-start amplifiers has rendered the sequencer's

lighting fixtures and LED video wall panels can have an inrush electrical draw thirty times the normal operational requirements. In fact, most LED video wall manufacturers recommend sequential power control when powering on their installed panels.

Another wrinkle to the sequential operation of newer AVL systems is the need for customized or flexible step-rates and delay settings. Today's sophisticated digital consoles, wireless microphones, and other

sequencing capability can be customized to provide the proper order of sequencing and the time required between each step in the sequence.

Consideration 3: Managing More Powerful Equipment

More often AVL gear requires 208/240 volt power. This is true for both audio and LED lighting. Higher voltage provides greater wattage availability for high performance gear. Many older power control solutions only offered 120

Cost of Electrical Contractor Installation

In smaller venues or with small installations, the cost of electrical installation may be prohibitive. In many smaller jobs, the work is installed entirely by the low-voltage integrator. In this case, a rack-mounted option with standard cords and plugs will be the least expensive option.

With today's advanced power control options, rack mounted units can be networked together to create a comprehensive solution. Users simply plug in to

AVL gear is being more widely distributed all of the time. Power management these days isn't limited to one room — or in some cases, one building — and even when it is there is probably gear in every corner.

protective role less important. Sequencers today are still needed for some brands of amplifiers and powered speakers, however powering the audio system down is more about protecting the equipment by removing it from the power grid when not in use, than to spread out electrical inrush.

Interestingly, powering on and off LED lighting systems and LED video walls has become a far bigger inrush concern than audio systems these days. Because there are so many more LED fixtures in todays HOW installations, turning lighting on and off now requires sequential power control in order to avoid nuisance breaker trips or damage to the lighting equipment. LED

installed audio equipment demand specific boot-up and shutdown sequences. They also require a set amount of time before they're fully booted and can perform the necessary "handshake" to communicate with other equipment in the chain to function properly. If one or more components of a digital system doesn't "see" the console, for instance, then that equipment won't function. In short, digital systems must be turned on in a specific order, with specific delay times between each step for the system to function correctly. What's more, the delay times and step rates differ dramatically between manufacturers. Today's power control solutions featuring advanced

volt power. New systems make 120 and 240 volt options that allow for the control of all electrical loads on a single platform.

In addition, superior electrical control systems offer multiple circuits of current control in single rack mounted or wall mounted enclosures. This saves rack space and eliminates the need to jury-rig multiple single circuit power control boxes together.

Investing in proper power management also protects other sensitive gear in the rack and the venue. More sophisticated solutions will offer the ability to program auto shutdown as well as provide under and over-voltage protection to protect very expensive AVL systems.

Consideration 4: The

a power source, connect whatever system needs power, and set the start-up parameters on the browser interface.

The rapid evolution of AVL systems demands that power solutions evolve as well. Installing and scaling power management properly ensures that any size system can be run without fear of constant reboots, or power loss. With more sophisticated power control and management solutions being offered at the rack, it's never been easier to deliver great installs and protect your state-of-the-art AVL system. **T**

Mark Bishop *is the President of LynTec*

Live Streaming for Worship:
The Evolution of Digital Congregations

BY IAN SHARPE

The human impact of COVID-19 has been exceptional, with no manner of business or society left untouched. With many of us social distancing, connecting and interacting 'in-person' is virtually impossible, but are 'virtual' touchpoints the solution to isolation?

The uncertainty and fear that accompanies this pandemic has led to new behaviours and beliefs from consumers. They want to stay connected, entertained and educated. As a result, video streaming and live content consumption has soared, with global viewing increasing by nearly 21% during the first three weeks of March. A recent report released by Nielsen* suggests that Stay at Home policies will lead to almost a 60% increase in the amount of content watched by audiences, reinforcing that online streaming is more essential than ever.

Nowhere is this sense of renewed connection more apparent than in our churches. Houses of Worship are some of the fastest-growing groups online, with video streaming increasingly being used to reach out to congregations and enhance the way they practice their faith. Congregations are now unable to physically meet to practice their faith or offer comfort and support. During this challenging time, when the bonds that hold people together are tested, many churches have turned to video streaming to create a lifeline to those for whom the church is family. Indeed, it may well prove vital to churches and temples themselves who have seen a loss of up to half of their funding through charitable giving.

With advancements in video technology, it is vital for places of worship to understand the constantly evolving video streaming trends, in order to successfully reach audiences and provide solace during this challenging time - and that means interactivity and engagement across digital platforms.

Understanding Live Streaming Trends

Video trends are shaping the ways in which churches can engage with congregants, both now and in the future. Mobile devices are quickly becoming the channel of choice for many churchgoers, especially millennials. Combined with an internet connection, the reach for digital congregations is expansive. With the right tools, Houses of Worship can take advantage of this to share their messages on the devices their audience are most comfortable using, facilitating uplifting and memorable experiences.

> With the right tools in place, places of worship can access video analytics to implement more accurate and timely data. Equipped with these insights, Houses of Worship can build an understanding of their members viewing behaviour and create deeper connections.

Furthermore, live video church services improve the flexibility and freedom that the congregation has. With many of us self-isolating, congregations are unable to physically meet to practice their faith or offer comfort and support. Live streaming platforms also allow worshippers to interact at the same time as watching a live stream, emulating an in-person interaction at a church service to engender an engaged community.

Social Media Integration

You would be forgiven for thinking that live streaming on social media platforms will give churches exponential reach. Whilst it is clearly a useful tool for messaging, Houses of Worship will find themselves tackling challenges from Facebook's algorithm. For example, even if the whole congregation liked the Facebook page, and they're on Facebook during live streaming, only a fraction of them would see the stream, such is the nature of the platform. A more favourable alternative would be embedding the live stream into the church's native website. With a recent 15% increase in Facebook, Twitter and Instagram searches, live streams can be complemented by social media to promote and reach out to digital congregants. Churches can also seamlessly integrate it into video content to build a community, emulate 'in-person' interactions and convey their messages to their digital audience.

Leveraging Video Analytics

With the right tools in place, places of worship can access video analytics to implement more accurate and timely data. Equipped with these insights, Houses of Worship can build an understanding of their members viewing behaviour and create deeper connections. This will allow churches to supply accurate and personalised recommendations for their congregants, including related video content or suggestions on what to watch next. The use of video analytics will give a better insight into what the audience likes to consume, giving Houses of Worship excellent scope to tailor their services to the needs and desires of their congregation, especially when engagement and connections are now more important than ever.

Supporting the Church

Houses of Worship are about community: sharing the faith, coming together in times of struggle, and lifting each other up. Online donations continue to be a popular source of funding for churches, especially during periods of national crisis. Over the past year, online giving has steadily increased by 12.1%, making for the sixth consecutive year of growth.

Video streaming is a great way to continue creating the content that congregants love, while letting them show their appreciation and donate toward the church's efforts. During a traditional, face-to-face Sunday service, only 10-25% of the congregation will contribute to the church. On the other hand, if places of worship accept donations online, it has been reported that a third of the congregation will contribute. This demonstrates that higher levels of engagement will lead to greater amounts of donations received.

Furthermore, a national survey from GivePlus and The Data Revolution discovered that 62% of congregants would prefer to donate to churches through some digital means. For millennials aged 25–34, that percentage increased further to 75%. Although this was reported in a 2017 survey, we can almost certainly predict that the percentage of people wanting to make digital donations has only continued to grow.

Connecting with Digital Congregations

Keeping up to date with the latest in video technology may not be the top priority of many clergymen, and the vast choice of potential solutions would try the patience of a saint. Yet, the benefits are readily available for those willing to persevere: new tools and technologies will help churches successfully reach audiences and provide uplifting or memorable experiences during these periods of self-isolation. With the addition of mobile optimisation, social media integration and personalisation, as well as the opportunities for online donations, places of worship will be able to digitally bolster their messages from the pulpit. This is vital during this challenging time, when faith and commitment are the bonds that hold communities together. There are huge opportunities for Houses of Worship willing to be the good shepherds and create a lifeline to those at home. ▪

Ian Sharpe *is CEO of Promethean, an award-winning online platform for monetizing video. He has twenty years' experience building teams and businesses at the forefront of technology with IMG, Atari and Electronic Arts. He was also former CEO of Twitch competitor Azubu, a global live streaming pioneer.*

Solutions

BY TIM ADAMS

With the rise of live streaming this Spring due to the COVID-19 situation, we have seen the largest implementation of live streaming systems in history and many churches even now are looking for ways to improve on the systems they scrambled to get setup and in place.

With states opening up again, churches are now faced with the need to provide an installed system for their church buildings rather than the temporary solutions they were able to cobble together.

For the sake of argument, we'll be looking at the two main solutions for producing a live stream; hardware and software. While there may be other options out there, such as a hybrid system, these two categories are by far the most common and account for well over 90% of solutions currently available.

Let's start with software. This system will be comprised of a single camera and a computer outputting some form of graphics, be they lower thirds or full screen slides or both. These signals are then input into a second computer that is running software that will ingest these signals, allow switching between them on the fly, and will allow the user to encode that audio and video signal to live stream to an external platform, such as Facebook, YouTube Live, etc.

This setup can become more complex by adding additional cameras and sources. There are many churches that, with the help of online Facebook groups and user forums, have built custom computers with the ability to ingest multiple cameras and computer sources in order to provide a live stream with higher production values. There are companies that provide "all-in-one" software solutions that will allow users to ingest multiple cameras, generate graphics, mix audio, record and live stream. The value seems self-explanatory with these systems and churches have a tendency to flock to these as they are fairly reasonably priced given the alternative.

Speaking of the alternative, this setup involves built-for-the-purpose hardware that separates the functionality out; you have cameras feeding signal into a production switcher, which also tends to accept an

external audio signal input from the front-of-house mixer (usually an Aux send). The switcher then combines audio and video and outputs that to an external recorder and/or live streaming encoder. Again, there are many manufacturers that offer solutions in this category, as well.

Windows lock up multiple times during the same event. Of course, I have also seen software solutions operate flawlessly for years. If you have a dedicated person that can learn about the software and can be the first line of support and troubleshooting, then software could be a viable

solution up and running without spending a lot of money. However, using a solution like OBS can lead to issues due to incompatibility issues with external video interfaces designed to allow the connection of video cameras to computers, external audio, and more. While there is

advantage to investing in great lighting is that when you light for video, it also looks great for the local congregation and, assuming you invested in reputable and high quality fixtures, can represent an investment that lasts many years into the future, whereas your live streaming setup is likely to change well within the next 10 years, especially if you are using a software-solution as that tends to require updates far more often than hardware. Which is right for you? Hopefully, using the considerations above, you can more fully evaluate whether hardware or software is ultimately the best solution for you.

Your lighting system will have the most direct impact on the quality of your image, even if you are using consumer-level cameras

How do you evaluate and decide which one is best for you?

The way I accomplish this is by asking about budget, the experience level of the people who will be using the system and equipment, is the ministry going to grow in the next five years, what is the overall mission and vision of the church and how will the video/live streaming ministry support that vision/mission what are the top three priorities in a system? Cost? Reliability? Ease of use? Long-term functionality? The answers to these questions can go a long way in establishing which system would be best suited for your church.

In the interest of full transparency, I almost always push for the hardware system simply from a reliability standpoint. One of the big cons with software is that a simple operating system update can render your entire system useless; I've seen it happen too many times to consider it a coincidence or an uncommon occurrence. I've seen $20,000+ software-based systems running on

solution for you. Rather than do a pros and cons approach, I want to lay out things you should consider before making your decision and I will attempt to be as unbiased as possible.

Budget nearly always raises its ugly head when talking about purchasing equipment, but if we do an apples to apples comparison, assuming that you must buy a new computer to support your software solution, the difference in costs between a software and hardware streaming setup can be somewhat negligible. However, sometimes you can get away with using a computer you already own, in which case the cost benefit swings in favor of the software solution. Of course, purchasing separate hardware components isn't exactly inexpensive, either, though the cost of entry continues to fall.

Capabilities is usually where software wins, simply because you can switch between sources, create and integrate graphics, record and live stream in piece of software. Or, you can cobble different software solutions together in order to get a

generally almost always a workaround, software solutions, especially free or inexpensive ones, will require a compromise of more time spent monitoring and troubleshooting to keep your system functioning properly.

Hardware is not immune from issues, either, as failures can still occur and removing a component also removes the functionality that component provided. The upside of separating out functionality is that should any one component fail, the rest of the system should be fine; with the exception of the video switcher which serves as a central hub for signals to pass through.

Which solution is best? Honestly, it's a toolbox and it's best to seek out others who use the solutions you are evaluating and get their honest opinion on both the good and the bad.

And we cannot discuss live streaming without also at least having a token mention of your lighting system as that will have the most direct impact on the quality of your image, even if you are using consumer-level cameras. One big

As always, please ensure that you are looking at long-term value vs. upfront cost whenever you are researching equipment options, regardless of whether it's live stream related or not. And if you are still unsure as to which way to go, please reach out to a system integrator or consultant and ask their thoughts. We are happy to answer questions and help you feel confident that the solution you end up with is the right solution for your particular situation AND your budget. **T**

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.*

Mount Paran Church

BY TIM CORDER

For more than fifty years, Atlanta's Mount Paran Church has been celebrated by the evangelical world as a beacon of effective ministry and engaged, growing membership, evidenced by its 13,000-plus-member congregation. In fact, it was this very community of faith that pioneered the "one church in two locations" concept in the late '80s that eventually laid the groundwork for multiple satellite campuses, now a hallmark of many of today's houses of worship. So it should come as no surprise that Mount Paran is forward-thinking when it comes to the technology it uses to communicate its message, a point that was clearly underscored by its recent distinction as the world's first house of worship to install a sanctuary loudspeaker system built upon L-ISA Hyperreal Sound technology.

At Diversified, we understand that having a good sound system is one of the most essential elements in today's churches. Achieving consistent, engaging audio throughout an entire worship space is mission-critical to offer the congregation a shared experience, and we were honored to share our expertise with Mount Paran, who had an existing loudspeaker system that had been in place in their main auditorium for many years. As it aged, it began to have component failures that created erratic coverage—sonically 'hot' and 'cold' spots throughout the room—which was hampering the worship experience for many of their congregants.

Mount Paran's auditorium features striking architecture – a 2,400 seat room with an expansive balcony that wraps the entire seating area, natural finishes, and a faux coffered ceiling that seamlessly integrates catwalks for lighting positions throughout. In order to meet the church's expectations for dramatic audio improvements, we initially explored a left/right traditional line array-based design for the loudspeaker retrofit. However, the presence of large LED screens on either side of the stage meant that the array lengths necessary for providing optimal coverage would create significant sightline issues, particularly for those seated in the balcony. Furthermore, the church wanted to minimize

the amount of modifications made to the worship space's architecture, both for aesthetic and budgetary reasons.

With so little space to work with above the screens, we experimented with an L-ISA design, which offered us the ability to spread the system's power out horizontally versus vertically. This enabled us to achieve the SPL and coverage that we needed while keeping the speaker hangs compact enough to not cause visibility issues with the lighting and video facilities.

In a case of near-perfect timing, L-Acoustics had recently rolled out its medium-throw, constant curvature A Series, and the new product line was quickly deemed ideal for the project. The A15, in particular, is really what made L-ISA a viable, practical, and budget-friendly option for Mount Paran. We designed a frontal system featuring seven A Series arrays, and the overall price point was very comparable to a traditional left-right PA design while also allowing us to meet our fidelity and sightline goals.

Installed late last year, Mount Paran's new loudspeaker complement is now comprised of five arrays of four L-Acoustics A Series enclosures—two A15 Focus over two A15 Wide—evenly spread out and flown over the front of the stage as the Scene system and flanked by two arrays of one A15 Focus over two A15 Wide as the Extension system. Dual hangs of two A15 Wide deliver outfill coverage to the far left and right front seating areas, while two rear-firing A15 Wide positioned above the stage provide monitoring for the approximately 150 choir seats. Four KS28 subs, concealed by a scrim and centrally flown behind the Scene system, deliver ample low-end reinforcement throughout the entire auditorium.
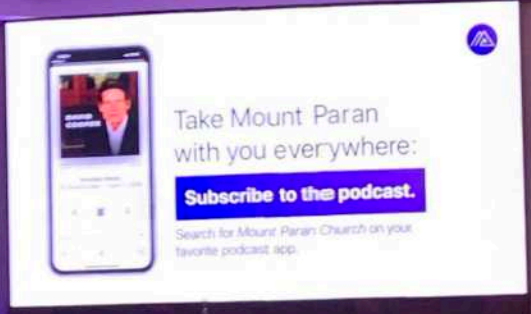
Front fill is achieved using six short-throw X8 enclosures deployed across the stage lip, with four compact 5XT systems located at center stage for sermon monitoring. Farther out in the house, two A15 and eight ARCS

Focus systems serve as the delay ring around the catwalk covering the upper reaches of the balcony, while four locations of Kiva II provide underbalcony outfill. A combination of one LA12X and 13 LA4X amplified controllers power and process the entire loudspeaker system, while an L-ISA Controller and Processor combo facilitate the church's new panoramic, object-based mixing approach.

We also furnished Mount Paran's FOH mix position with a new DiGiCo SD12 console. This console platform is unique for its on-board integration with L-ISA for control via DeskLink, natively bringing all source controls onto the desk surface and allowing engineers to access L-ISA as an integrated element of their existing workflow.

The installation was completed over the course of a very tight 2 week window of time including wire pull, rigging of 24 loudspeaker positions, system installation, and calibration and training for Mount Paran's team.

Mount Paran didn't just want their worship community to feel as though they were sitting in the room spectating something that was happening onstage – they wanted their audience to feel as if they were being enveloped by sound from the large choir, orchestra or praise team, regardless of where they were seated within the main auditorium. It is a fun fact that this loudspeaker system was chosen primarily for how it would fit into the room, maximize sightlines, and achieve a desired performance level within budget. All of the creative benefits of L-ISA are a bonus that have taken the overall live experience for the church over the top!

The audio imaging capabilities of the new system produce a very natural-sounding binaural listening experience. When the left side of the choir has a solo, you actually feel it
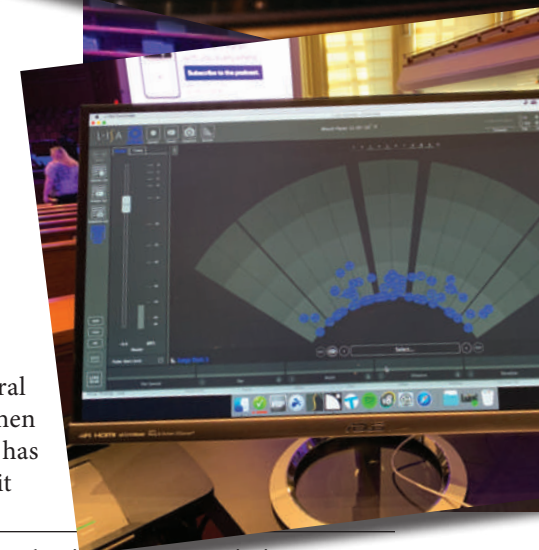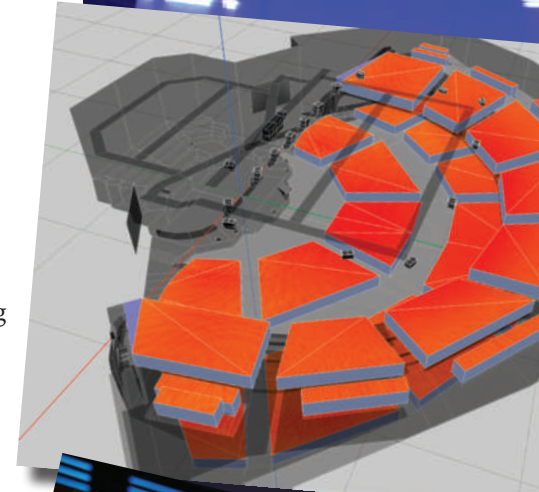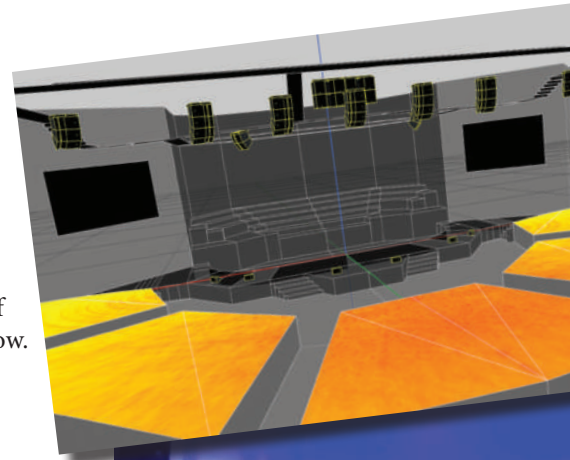
Mount Paran Gear List:

MAIN ARRAYS:
L-Acoustics A15 FOCUS x14
L-Acoustics A15 WIDE x18
L-Acoustics LA4X Amplified Controller x8

FLOWN SUBS:
L-Acoustics KS28 x4
L-Acoustics LA12X Amplified Controller x1

FRONT FILLS:
L-Acoustics X8 x6
L-Acoustics LA4X Amplified Controller x1

UNDER BALCONY DELAYS:
L-Acoustics KIVA II x4
L-Acoustics LA4X x1

OVER BALCONY DELAYS:
L-Acoustics A15 FOCUS x2
L-Acoustics A15 WIDE x2
L-Acoustics ARCS FOCUS x6
L-Acoustics LA4X Amplified Controller x2

L-ISA PROCESSING:
L-Acoustics L-ISA Processor A & B
RME MADI Format Converter
RME M-32 PRO MADI to AVB Converter

CHOIR MONITORS:
L-Acoustics A15 WIDE x2
L-Acoustics LA4X Amplified Controller x1

STAGE LIP MONITORS:
L-Acoustics 5XT x4

AUDIO CONSOLE:
DiGiCo SD12 at FOH x1
DiGiCo Existing D-Rack with Optocore x3
DiGiCo Existing SD9 at Broadcast x1
DiGiCo Orange Box Optocore to Dante Interface for Monitors

PHOTOS: THE 2,400 SEAT SANCTUARY IS COVERED BY 5 HANGS OF L-ACOUSTICS A SERIES. A DIGICO SD12 WITH THE L-ISA CONTROLLER INTEGRATED VIA DESKLINK IS INSTALLED AT FOH.

come from the left side. The system allows for staggered vocal intros between the left, right and center sections that allow the audience to really feel that localization. You completely forget you're listening to a PA because it just feels like you're listening to the choir. That's not an experience I've had before – and it's stunning!

One of the main goals outlined to us by David Mendoza, Mount Paran's Technical Director, for the new system was intelligibility. The church wanted the entire congregation to be able to understand every single lyric being sung by the music team and every single word being spoken by the pastor, and L-Acoustics delivered on that, and more. "When I heard L-ISA, I was blown away; it was a completely euphoric feeling," said Mendoza. "Not only is the sound pristinely clear everywhere, but the amount of control that it gives our tech team over the placement and presence of each object is amazing. Being able to creatively control so many parameters—like distance, width, and elevation—maximizes engagement and minimizes the distractions within the worship experience, helping our congregation feel more connected to what's happening onstage."

At Diversified, we pride ourselves on being at the forefront of emerging technologies that are making an impact in our industry. Saying that, you really must experience L-ISA as one of the several thousand people gathered in the room during a service to understand the full impact this technology and loudspeaker system makes on the engagement of the congregation. Words do not do it justice. It is inspiring on a level that is quite literally paradigm-changing. **T**

Tim Corder, *Strategic Accounts Director - House of Worship for Diversified*

Q&A with Josh Maichele,
L-Acoustics Application Engineer,
Install - House of Worship Specialist USA and Canada

TFWM: What was it like working with Diversified on this project?

Josh: I've done a lot of work with Tim over the years. We've done many, many, many churches together, and all have been pretty amazing, but when this opportunity came up, we knew that the room had some very special challenges. We also knew that sound had been really lacking there for quite some time, and when we started looking at this project, we quickly realized there were some issues with a left/right design, both aesthetically and in coverage.

So Tim challenged me to find a way to meet all the aesthetic requirements at Mount Paran so that the install would not only look good but more importantly, make sure the room was covered impeccably well – and that is what really started the conversation about L-ISA here at Mount Paran.

What was the biggest challenge in the sanctuary for you?

Josh: One of the major challenges we had was not having loudspeakers dip down in front of the video walls. We initially looked at a Kara solution; however, to get the amount of SPL that we needed in the room, such a long line array was needed to reach every seat in the balcony the video would have definitely been obstructed.

We quickly realized that implementing our L-ISA system would solve that problem.

Can you elaborate?

Josh: What L-ISA did is it gave us the ability to spread out that SPL over multiple loudspeakers instead of relying on just two loudspeakers to be able to cover the entire room. And really, one of the game changers for us in this was the A Series. Our A15 box allowed us to have a very high density of SPL in a very compact package, with the same tonality and frequency response that we've come to expect from K1 and K2.

L-ISA allowed us solve the aesthetic issue, but also meet the requirements for SPL and coverage that we needed for the room.

One of the really unique things about L-ISA is the what we call L-ISA zone, and the L-ISA zone is where we have really good spatialization and localization to what's onstage. But in a room that's as wide as this, one of the other challenges in a traditional left/right system is the mono outfill. L-ISA has that mono outfill in the areas that are not part of the L-ISA zone, and it's unique in that it can still provide an immersive experience in those areas because of the localization of the outfills to the center channel, and the extensions that wrap you in sound as well. This means that everybody who's in the L-ISA zone is getting a vastly different experience than they're used to, but the people who are in the mono zone who would have traditionally been there anyway are now getting as good if not better of an experience than they would have gotten in a traditional left/right PA.

Anything you would like to add?

Josh: For over four years now, I've been involved with L-ISA and getting into what this can be for the house of worship market. And I think the thing that we really need to focus on is what it does for the ministry. Ultimately, when the constituents are engaged with the stage, and the stage is engaged with the constituents, we have that level of communication that really needs to be there to convey the spoken word or the songs or whatever's happening onstage in a meaningful and connected way.

One of the unique benefits of L-ISA is the connection that it provides from the stage to the audience. Because we're localizing to what's happening onstage, we're no longer looking at something right in front of us and hearing it coming from the side. One of the unique benefits of L-ISA is the connection that it provides from the stage to the audience, and that level of engagement really breaks down the walls between the stage and audience and helps establish a two-way conversation instead of everything from the stage just being pushed towards the audience. **T**

QSC's KS118 Subs

"He Thunders with His Majestic Voice!"

I am fortunate enough to live within driving distance of the QSC Factory and we are huge fans of their products. Not because they're close and cost effective, but because they sound great and they produce products that fits in a variety of applications for houses of worship. We recently moved into a sanctuary that seats 160 and we use the QSC K12.2 speakers for front of house and although they are adequate enough for the room, I was wanting a little more punch and presence in the low end. We do a lot of events for musicians and recently had Dominique DiPiazza, Norm Stockton and Dave Owens do an incredible bass and drums demonstration for the musicians in our area and the need became obvious.

One of the problems I face with many subs is what I call the "woof" factor. You plug in a sub and it adds more woof, which I'm told can be an EQ issue. However, when you start changing EQ for one thing then it causes a chain reaction with everything else. I didn't experience that with the QSC KS 118 Subs. In fact, the word that best describes the sound is transparent. What that means to me is you could feel the fullness, you could feel the power, you could hear the extra punch... but you didn't hear the SUB. It didn't have the woof factor.

The KS118 is a front-loaded dual-ported cabinet with a single 18" speaker. I personally think you need a minimum of 18" to get a full rich bass response. The cabinet is a solid a 124.5 lbs. and I was thankful that the model we reviewed had wheels on them. You will need them. It's constructed out of 18mm Birch Plywood and it just looks cool. We placed two subs on the ground on opposite sides of the stage for this review. The SUB is described as a very high output active subwoofer. It features an 18" (460 mm) long excursion direct radiating driver powered by a 3600 Watt Class D amplifier. It operates in two modes, omni-directional or cardioid radiation which requires two units to get the full benefit. It's rated at a maximum SPL of 136 dB and peak at one meter (which is somewhere between an air raid siren

them up. If they don't like what they hear...you get the drift. The KS118 SUBS filled out the sound in the right places in a way that didn't put pressure on your ears. When they were turned up, they didn't sound like mud like many subs do. That allowed me to get volume with clarity and without sonic confusion. In a church setting where you're mixing for a wide audience, the bass can cause a lot of problems for people with hearing issues. I loved the clear and transparent sound of the KS118's.

The second thing that impressed me was the cardioid configuration where you can set them as "rear" or "forward" – and you can definitely tell the difference. This is designed to work with two subs together. You can stack them, place them side by side or place them back to back. The key is to place one sub facing away from the audience and the other facing towards the audience. The one facing the audience you set forward, the other you set rear and what it creates is a cardioid pattern that "throws" the sound forward and lessens the sound 15 dB behind the speakers. That means the sound is where it needs to be and the band isn't living in the woof zone. How they came up with this is pure genius and it sounds amazing. Even when you use the speakers alone, the rear and forward configurations add their own unique characteristics to the sound. When using as a standalone

(one on each side of the stage), I actually preferred the "rear" setting. In our venue it produced a pleasant fullness without the mud. You also have an option to turn the Deep mode on or off. When you select the Deep mode it extends the low-frequency below 60 Hz without reducing any available headroom. In our application, we preferred to turn the Deep Mode off. I also liked the simplicity of the crossover. You have basically an 80 Hz low-pass filer or a 100 Hz low-pass filter. The 80 Hz is optimized for the CP and K.2 Series (which we have) and it did sound the best in our application. The 100 Hz is optimized for the K, KLA and KW speakers.

The third thing that impressed me was the power of these speakers. We ran them for consecutive church services with different settings over four weeks and had nothing but compliments for how

great the sound was, without it being too loud or overpowering. We were able to achieve a fuller sound at what was perceived to be a lower volume, even though we were mixing a little louder than normal. When the people cleared the building, we pumped the sound and it was just as clean, clear and punchy at loud volumes with no noticeable distortion or harshness. We were advised we could get by without subs, but after experiencing the KS118's I'm convinced they're a game changer even for a smaller venue. ▣

Holland Davis *is a teaching pastor, veteran worship leader, composer and author. He is the Senior Pastor of Calvary Chapel San Clemente and CEO of worshipsong. com. You can follow him on twitter or Instagram @ hollanddavis*

and a jet engine at takeoff). The frequency range is 35 Hz – 111 Hz (-10 db) and the frequency response is 41 Hz – 98 Hz (-6 dB). That's all the basic tech info like getting the length, weight and gender of a newborn baby.

Now let's get into what really impressed me. First, it passed the people test. At the end of the day, it doesn't matter how impressive the specs are. The bottom line is how they sound, and whether or not people want to turn them down or turn them up. If they like what they hear, they want to turn

HOLLAND'S REPORT

FLEXIBILITY	★★★★★
SCALABILITY	★★★★★
RELIABILITY	★★★★★
COST	★★★
OVERALL VALUE	★★★★

TF Rack from Yamaha

BY JOSE RIVERA

Centro Christiano Restauracion Church is a dynamic, multi-cultural and multi-generational church, committed to impacting the city of Orlando, FL and the nations. We live motivated by the passion that each person be restored and achieve their purpose in God.

Combining traditional and contemporary music with a lot of Latina flair and rhythm, our vision is to reach the large Latin community of east Orlando. We currently run two main services and can sit around 900 people in our main sanctuary. We have a wonderful worship team full of people from all different backgrounds, and rely heavily on using multitracks, which offers us the opportunity to add trumpets, loops, different orchestration, as well as adding different alternatives for our gear, to really make the music work well within the parameters of worship and for our community.

Being right in the middle of Orlando, our church community is incredibly savvy when it comes to what sounds good and what looks good. We are competing for attention with Disney, with Universal Studios, so researching and learning about whatever equipment a church is looking

at bringing into their facility is really important.

When I was looking to add to our audio mix, I knew I would need a tool that was compact, versatile and would deliver the crisp, clear sound our community was expecting – and that is why I added a Yamaha TF RACK to our audio mix. I chose the TF RACK because of its transparent sound, and also because it is easy to utilize with multitrack and record, which allows me to run the TF RACK as an audio interface as well. I can use the TF RACK as an audio interface, digital monitor mixer and digital snake, which make it incredibly multifunctional for our needs.

I currently run nine channels of multitrack from the TF RACK to our FOH TF Console via Dante, have the FOH engineer make a better audio mix and then send it back to me. This means I can avoid cable noise and reduce the number of analog snake cables in my stage area.

The Dante virtual soundcard audio interface also allows me to conduct a virtual soundcheck and store settings, which saves time.

The TF can read the inputs and outputs of my DAW as well. As soon as I connected the TF RACK to my PC

computer, it immediately recognized it as an audio device, which means the sound response and processing capacity I have available for playback of my sequences are impressive. I record all my vocals through the TF RACK, and the DAW records pristine sound through the main mixer. I don't have to connect any extra cables to the FOH mixer for the two pieces of equipment to connect, so it replaces a digital snake.

In the past, we had used a personal monitor mix system for musicians to monitor their own mixes of the FOH mix, drums, SEQ, vocals, guitars, bass, keys, director and click.

Now, using the TF Rack, I can receive those mixes through Dante to create my own monitor system, and assign them to channels in the TF Rack. This gives me the opportunity to create my own mix in my own area, and our musicians can use the Monitor Mix app to control their own mixes independent of FOH via the phone app.

I believe the church is really living in the best time right now, because technology has become so much more affordable and available. We can do great things houses of worship could never have imagined even 25 years ago, growing the Kingdom using technology to spread the Gospel to more people than we could have ever imagined. really incredible, and I am excited to be doing my part.

Adding Yamaha's TF RACK to our audio workflow was an excellent decision for us, because we are able to do so much with it. As a matter of fact, we are planning on adding another TF RACK for our audio streaming mix, as we are currently adding to our streaming for regular worship, kids and youth programs, and plan on expanding our streaming to meet current and future needs. ⊤

Jose Rivera *is a Worship Pastor at Centro Cristiano Restauración*

JOSE'S REPORT

FLEXIBILITY	★★★★★
RELIABILITY	★★★★★
EASE OF USE	★★★★
COST	★★★
OVERALL VALUE	★★★★★

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