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# THE BUDGET ISSUE

- > COUNTING THE BEANS
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## NEWS

Adelaide's Her Majesty's Theatre Re-Opens

D2N and AIDA

Bose Wins at Work

Eventec and High End Systems

Riedel's DisTag Social Distance Monitor

Vale Harley Richardson

## REGULARS

Tech Talk

Listen Here: Andy Stewart

Toni McAllister's Women in AV

Jenny Barrett covers NZ

Dunc's World by Duncan Fry

## ROAD TEST

EAW RS Series



MORE INFO ON PAGE 11.

# inDESIGN

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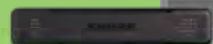
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Cover Photo: Six60, Joel McDowell  
Contents: Trio of Flags, The Electric Canvas

CX is published by VCS Creative Publishing Pty Ltd  
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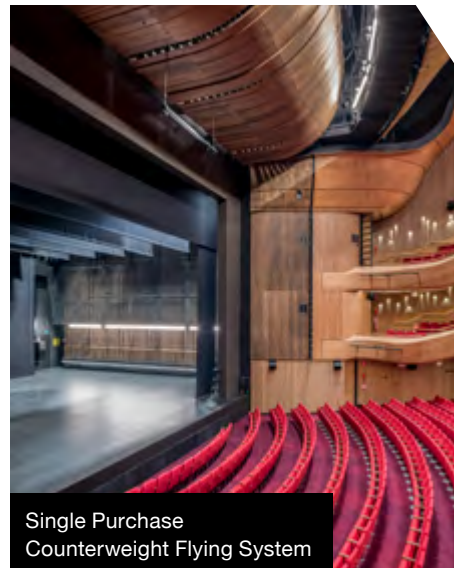
Editor and Publisher: Jason Allen  
Layout: mark wood design – Mark Underwood and Alisha Hill

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New Facade



Single Purchase Counterweight Flying System

# Adelaide's Her Majesty's Theatre Raises Curtain On \$66 Million Redevelopment

Photos by Chris Oaten

**Australia's most exciting theatre project is now complete with the new-look Her Majesty's Theatre unveiled. A Welcome to Country and smoking ceremony led by Uncle Mickey Kumatpi Marrutya O'Brien, a Senior Kurna and Narrunga man, marked the official completion of the venue.**

Work on the \$66 million redevelopment commenced in June 2018 to transform the iconic South Australian theatre into a world-class, larger and more accessible venue with state-of-the-art facilities ready to house more blockbuster productions.

The Adelaide landmark was built in 1913 and is the last remaining example of the famous chain of Tivoli theatres, although redevelopments in the 1960s and 1970s removed many of its unique architectural features and more than halved its capacity to around 900 seats.

The increased capacity, combined with more spacious backstage facilities, will allow Her Majesty's Theatre to host at least 50 extra performances a year and attract some of Australia's most popular touring shows and musicals.

While the building's heritage façade and eastern wall have been preserved, the theatre now features a 1467-seat auditorium over three levels, with the Grand Circle returning for the first time in more than 50 years.

The stunning new design, featuring two sweeping staircases in the expanded main foyer reintroduces some original Edwardian elements, including a pressed metal ceiling and elegant architraves and moldings. Other outstanding features include custom-built curved timber balcony fronts in the auditorium, stylish foyer bars on all three levels, a larger backstage rehearsal room and a dramatic glass façade to the new west wing.

In a nod to the theatre's rich performing arts history, backstage features the return of the famous 'signature wall' which had to be deconstructed and reconstructed brick by brick. The wall is covered with signatures from visiting stars including Julie Anthony, Rowan Atkinson, Lauren Bacall and Barry Humphries and is ready for a new generation of artists to sign.

On the floors of each foyer level, brass tiles are engraved with the names of some of the notable stars who have graced the stage over the past 100 years. Accessibility improvements include wheelchair access to all levels and backstage areas and improved seating on all levels.

The redevelopment was designed by Adelaide-based COX Architecture and built by national construction company Hansen Yuncken, managed by the South Australian Department of Planning, Transport and Infrastructure and Adelaide Festival Centre.

The project employed more than 150 construction workers at its peak and engaged a 90 per cent South Australian work force, including specialist artisan contractors and local craftspeople.

South Australian Premier Steven Marshall said it's fantastic to see the redevelopment complete: "This redevelopment will attract world-class productions and provide a massive boost for our arts sector. Her Majesty's has served the city well for more than a century, and it will continue to be a cornerstone of our creative industries for many years to come."

Adelaide Festival Centre CEO & Artistic Director Douglas Gautier AM: "South Australia's arts and entertainment scene is entering a new era with the redeveloped Her Majesty's Theatre, which has been the pride of Adelaide for more than 100 years. Having two large-scale theatres will help Adelaide Festival Centre accommodate our valued local home companies while also attracting some of the blockbuster shows coming to Australia. This means South Australians will no longer need to travel interstate to see some of the biggest and best shows."

Adelaide Festival Centre Trust Chair, Michael Abbott AO QC: "We believe that this once in a generation project will provide a venue that is truly unique in the way it combines heritage



Rehearsal Room



Under-stair view to Pressed Metal Ceiling from Main Stalls Entry



Her Majesty's Theatre Opening Night 1913



1963



Her Majesty's Theatre Historic Exterior

### Her Majesty's Theatre redevelopment fast facts:

- The widest proscenium arch and deepest fly tower of all 1400-1500 seat commercial theatres in Australia
- Seating increased from 970 seats to 1467
- At least 50 additional performances a year and more commercial blockbuster shows
- Expanded foyers, bars and toilets on all three levels, improved accessibility.
- More spacious backstage areas, new dressing rooms, Greenroom and a rehearsal space the same size as the stage
- 150 construction jobs at peak activity
- Signature Wall took 9 days to remove on 12 pallets – has been reinstated backstage leaving a lasting legacy for future performers
- Her Majesty's Theatre heritage façade and eastern wall retained. It required 54.6t of steel and over 400t of concrete retention bracing
- Last surviving Tivoli theatre frontage in Australia
- Original Edwardian design features reintroduced including brass fixtures, curved staircases and pressed metal ceiling

architecture with modern facilities to reach new standards of comfort and accessibility for theatregoers. This project should be celebrated by all South Australians and provides an opportunity for the community to reconnect again when Her Majesty's Theatre reopens.”

‘The Maj’ has showcased many big names across 107 years including Luciano Pavarotti, Dame Gracie Fields, Bill Haley & His Comets, Maggie Smith, Chris Isaak, Archie Roach, Alan Cumming, and Paul Kelly,

and Her Majesty's Theatre ambassadors including; Adelaide's own Robyn Archer AO, Greta Bradman, David Campbell OAM and Peter Goers OAM along with Kate Ceberano AM, Ali McGregor, Todd McKenney, Rhonda Burchmore OAM and Meow Meow.

While the theatre was scheduled to officially reopen to the public in June with *Six The Musical*, restrictions relating to COVID-19 mean the theatre will have its grand reopening at a later date, when it is safe and practical to do so.



# D2N and AIDA Form a Partnership in Australia

**D2N – Technology Solutions has announced a new Australian distributor agreement with AIDA Imaging. Producing a range of fixed small form-factor and PTZ cameras with a range of suitable lenses, AIDA Imaging offer SDI, HDMI, all the current IP encoding formats including NDI, RTSP, and RTMP, and much more.**

The appointment of D2N as the local distributor presents AIDA with their first opportunity to shine in the Australian market. Known all over the world for their high quality products, and having seen them exhibiting at many of the International Tradeshows over the years, Jason Owen, D2N's Managing Director, is excited for the prospect of working with AIDA.

"Coupled with our existing video brands, AIDA Imaging gives us the ability to deliver a large

portion of the signal chain. With their new range of NDI enabled PTZ and fixed cameras, AIDA fits perfectly into our premium products model. Personally, I am excited to be able to represent such an innovative company," said Owen.

At AIDA Imaging, innovation is key, and they strive to raise the bar by engineering and manufacturing cutting edge cameras and converters. From concept to reality, AIDA Imaging meticulously creates products that

are applicable to various solutions, ranging from corporate AV, Events and Broadcast TV or Film.

"We are excited to be represented by D2N in Australia, a great company that shares the same core values in service as we do. Here at AIDA, we believe the products we design are only half as great without the exceptional service that comes along with it. With D2N's extensive knowledge of technology and integration for the AV space, we strongly believe AIDA will be very well represented," commented Jon Budino, Director at AIDA Imaging.

AIDA Imaging joins D2N – Technology Solutions stable of video brands including Kiloview, TVU Networks, SimplyLive and SiennaTV.

All AIDA Imaging devices are proudly designed in the United States and manufactured with the highest practice and quality in South Korea.

[www.d2n.com.au](http://www.d2n.com.au)

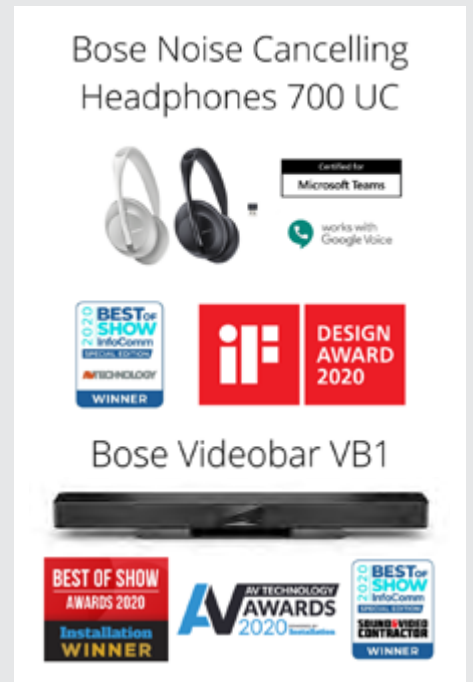
<https://aidaimaging.com/>

# BOSE WINS AT WORK

## Bose Professional have hit the awards season with winners!

They recently accepted two Best Of Show awards for Bose Work products - The Bose Videobar VB1 All-in-One USB Conferencing Device won Sound & Video Contractor Magazine's Best of Show Award, and Bose Noise Cancelling Headphones 700 UC won AV Technology Magazine's Best of Show Award at InfoComm Connected in June. This follows a Best of Show award for the VB1 Videobar at ISE, an AV Technology Awards finalist, and an iF World Design Award for the 700UCs.

The Noise Cancelling Headphones 700 UC are now Certified for Microsoft Teams, joining the already certified ES1 Ceiling System. Microsoft customers have the added assurance that the Bose Work products provide the high-quality experience and compatibility they require for use with Teams.



## Eventec become official resellers for High End Systems

Eventec are proud to announce a partnership with High End Systems. High End Systems is a household name in the entertainment industry. Now in their fourth decade of operation, High End Systems Hog consoles and LED luminaires are found throughout Australia and New Zealand, in every application from corporate to concert production. Since 2017, High End Systems have been part of ETC, and continue to innovate in high power LED automated lighting, digital lighting fixtures, and lighting controllers.

"Electronic Theatre Controls Asia, are excited to have Eventec as our official High End Systems reseller for the Australian market," says Wynnies Cheung, ETC General Manager in Asia. "Eventec is a company with great passion in lighting and is committed to providing great customer service and technical support. We look forward to serving our High End Systems customers in Australia."

The Director of Eventec, Emanuel Maniatis, has expressed his pleasure with how this partnership adds a wide range of world-

renowned products including high powered LED lighting fixtures and lighting consoles to the Eventec portfolio.

Eventec have already begun to build up stock of key products. Their team is undergoing training across the entire High End Systems range, and will provide the Australian market high-quality support and a great customer experience. All of High End Systems products and spare parts are available to order from Eventec immediately.



An advertisement for HOG 4 Consoles. The background is a dark, atmospheric image of a stage with a large HOG 4 console in the foreground. The console has a large screen displaying a control interface and a keyboard. The text "HOG 4 CONSOLES" is written in large, bold, yellow letters. Below it, in smaller yellow text, is "Automated lighting and media control for any show, any size". In the top left corner, the High End Systems logo is visible. In the bottom right corner, it says "NOW AVAILABLE AT EVENTEC" with the Eventec logo and the website "www.eventec.com.au".



# Riedel Launches DisTag Distance Monitor for Maintaining Social Distance

**Riedel Communications has introduced DisTag, an all-new distance monitoring device. Worn around the neck or carried in a pocket, DisTag is a reliable and precise instrument that immediately alerts its wearer via haptic, visual, and acoustic signals whenever the mandatory minimum distance to other people is about to be breached.**

“After weeks of quarantine and other limitations due to the coronavirus pandemic, our society is gradually returning to normal – but it’s a new type of normal. Slowing the spread of the virus is still a number one priority as key industries, organisations, and institutions start to reopen and people begin returning to work,” said Thomas Riedel, Founder and CEO, Riedel Communications. “In recent months, we’ve learned as a community to adapt to new behaviour patterns and situations, and a fundamental aspect is for employees, visitors, and customers to maintain a safe distance between each other. That’s where the new DisTag device comes into play.”

Featuring a compact and minimalist design, DisTag is ideal for media and event production, industrial operations, retailers, medical facilities, public and cultural institutions, and schools and universities. The device offers three signal levels: a two-stage vibration alarm (haptic), a two-stage LED signal (visual), and a two-stage sound signal (acoustic). The proximity limits of the warning

signals can be individually defined and

adjusted in accordance with local regulations for social distance.

Jacky Voss, Corporate Business Development Manager at Riedel, added, “With its small size (93 mm by 41 mm) and low weight (61 grams), the device is compact, comfortable, and hardly even noticeable to users. DisTag can be used virtually anywhere, whether indoors or out, and its integrated battery provides power for up to 12 hours. And, as it requires no additional infrastructure, it is easy to expand the system at any time – all that is needed are more DisTags!”

## DISTAG

WHERE DISTANCE MATTERS

- Can be worn around the neck or carried in pockets; lanyard included
- Acoustic, visual and haptic feedback  
Optional „Vibration only“ mode
- Intuitive, light-weight and compact
- For outdoor and indoor use
- No data logging
- Distance detection accurate to 10 cm
- Quick and easy to disinfect
- Made in Germany
- Battery life of 10-12 hours  
Charging via micro USB
- No need for a base station

# VALE HARLEY RICHARDSON

by Stephen Devine



**He was born on a farm near Dubbo NSW in December 1955. Growing up on a farm was surely instrumental in shaping Harley's inventiveness and practicality and his capacity to make do when the chips are down - characteristics that stood him in good stead all through his busy and successful life.**

In his early years Harley was involved in bands in the Dubbo area and was the FOH engineer for a well-known Australian band The Reels, who originated in Dubbo. Harley's burgeoning sound and technical expertise saw him accompany The Reels to fame as the band's sound engineer, in fact Harley's growing skill as the sound guy was one of the fundamental reasons for The Reels early success.

The early years with The Reels saw Harley evolve as a sound engineering enthusiast and a professional operator. He teamed up with Michael White who owned Sound On Stage in Sydney. That was a sizeable operation that sold and hired sound and lighting gear for live performances. It wasn't long before Michael White asked Harley to establish a new outlet for Sound On Stage - in Brisbane - so Harley went into partnership with Michael White and moved to Queensland in the mid-80s. Queenslanders were delighted! Under Harley's direction and management, Sound On Stage Qld became a thriving business.

Sound On Stage closed in Queensland following Expo 88 and Harley went to work for himself doing installations all over Queensland. In about 1993 he was offered the position as General Manager at Impact Technical Solutions, the install division of Australian Concert Productions.

I knew Harley from the SOS days but got to know him very well as I also was working at Impact, having just moved to Queensland in 1995. We got on famously.

One thing led to another and we decided to

go out on our own, so Richardson and Devine was born.

We were not sure what R&D was going to do, but we were sure our combined talents would make it an interesting venture. We had nothing to put into the venture, so we had nothing to lose. Between us we knew everybody in the industry who was worth knowing, and some that were not.

Incidentally, we argued for years over whose name should go first. We settled by agreeing that whoever went first had to be the secretary and do the accounts. The other had to do the freight and buy the former flowers on Secretaries' Day.

After about 12 months of living hand to mouth, selling bits and pieces to our mates and spending too much time at the Brekkie Creek Hotel, the opportunity presented itself to represent Meyer Sound, a loudspeaker manufacturer based in Berkeley, California.

Over a period of 22 years we installed PA Systems in venues around Australia and New Zealand. Having access to the Meyer's expertise enabled us to do large projects that were out of reach to the usual two-man company like ours. For this I thank them.

We provided PA systems to almost every performing arts centre and convention centre in the country. Sydney Opera House, Victorian Arts Centre, Aotea Centre Auckland, to name just a few. We did in excess of 40 premium hotels. Most major event companies. We kicked so many goals.

We had some unique concepts that gained us some notoriety in our industry. We always knocked off at lunchtime and went home. Due to this we instituted a price rise at 2PM each day on the basis we had to get out of the pool to answer the phone. During the GFC we released a price list in South Pacific Pesos.

I would be here for days telling the story. That is for another day. In any event, Harley and I agreed not to rat each other out unless there was serious money to be made doing so.

We decided at the start to keep our relationship strictly business. I suspect that is one of the reasons it lasted so long. Having said that, if either of us fell over, the other was always there to pick up the pieces. Rarely did we ask each other a question or seek permission. We both knew what the others answer would be. We preferred seeking forgiveness after the act.

We trusted each other implicitly, even when we were arguing, which was often. We never questioned or had reason to doubt each other's honesty and integrity.

When the chips were down, which was often, We ALWAYS had each other's back.

Our business relationship lasted for 23 years. Two years ago, both of us decided it was the right time to knock it on the head. Harley wanted to travel and spend time with his family. I wanted a change.

Our official response when asked how we lasted so long was "Mutual greed". We also used to say that the sum of the parts is less than the individual. The truth is we were brothers.

Harley was generous, friendly, intelligent, resourceful, courageous, tenacious, creative, caring and loving. Our lives are better for having had Harley in them. He was my left arm. I will miss him forever.

by John O'Brien



# Elite solution for Budget Application

**inDESIGN iD-BGM6 & EZ8-15MK2**

**Nestled in the bushland shadow of Canberra's Black Mountain, Alivio Tourist Park is a holiday and relaxation venue consisting of cabins and villas and centred around a big building, colloquially known as the 'Clubhouse'. This hub comprises a general store, wood fired pizza restaurant, bar, games rooms for the kids and plenty of undercover areas for relaxation or looking out over the outdoor activity spaces. The clubhouse recently underwent some renovations and overhauls.**

As these renewals had moved some and added more zones, it was time to upgrade the audio along with the buildings. In the five years of the current GM's tenure, the original 11-year-old audio system had never skipped a beat. He was keen to re-employ the firm that kept it all so stable for so long and trawled

through paperwork to find details for original installers Elite Event Technology.

**Job outline**

Elite Sales and Installations manager Kevin Abbott and Elite Managing Director Darren Russell got involved and met with the client.

The brief called for audio to 12 zones (up from three) and speaker systems that had "a bit of stick". The main audio zone is nearby the kid's waterpark and had to overcome the high background ambient noise floor that playing children bring. Further, Alivio also has a big screen on the wall of the covered deck area and management wanted to have complimentary audio for screening popular events like the footy and Melbourne Cup.

They were after a result with high SPL and reasonable bottom end but they wanted it all on a budget. Kevin asked himself "What's the biggest, best thing we can get in there for a good price?" As often happens with AV and building, Elite were engaged after the renovations were well under way, so discrete pre-wires and mounting solutions were limited. There was no room for bulky subs and restricted cabling options meant deploying a full range speaker.

**The gear used**

Darren, Kevin and Elite's answer was to install 12 inDESIGN iD-BGM6 in three runs of four for the main covered deck area. These two-way plastic cabinets use a high impedance transformer, a 6" LF driver and a 1" dome

# inDESIGN

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### EZP-6020 Pendant Speaker

Two-way  
70/100V  
6.5" woofer  
1" silk dome tweeter



### EZ8-15MK2 "EZ FIT" Ceiling Speaker

Two-way  
100V with new EZ-TAP selector  
8" woofer  
13mm PEI dome tweeter



### ID-BGM8 Weather Resistant Loudspeaker

Two-way  
Weather and UV rated  
8" woofer  
1" silk dome tweeter

Designed and Developed in Australia and Australian Owned.



tweeter. The construction of the ceiling has no cavity for flush mounts so a surface mount was required. The only available mounting point was along the aluminium lighting tracks but the BGM6 speakers fit neatly and discretely along there.

The DSP was upgraded to a Yamaha MTX and some more Yamaha amps added to complement the existing Crown units. Whole system control is achieved via custom software loaded to roaming iPads in ruggedised cases. A dedicated Pakedge WiFi network with high power access points covers all control zones. From Darren: "The clients are just loving that. They are extremely happy."

Secondary spaces like toilets and other peripheral areas use another 12 inDESIGN EZ8-15MK2 flush-mounts. The Elite crew like to refer to these as "Easy 8s" – the 8" coaxially loaded two-way speakers are a dream for installers. EZ by name and easy to install. According to Darren "They have this ingenious installation method where, basically, you don't need a screw gun as each speaker comes with a little plastic tool. You cut the hole, terminate the speaker, set the tap, pop the unit in the main hole and the tool goes click, click, four times and you're done. We did a shopping centre with about 180 of

them in it and the guys were doing night time fit offs. It only took five crew with three scissor lifts less than 24 hours all up. They sound good too!"

### Fit for purpose / bang for buck

Darren had trialled an earlier version of the inDESIGN surface mounts and found them not quite there. When he heard the BGM6 he was impressed but when he saw the price point, he was blown away. "These units are a huge step up. They're good - almost a bit too good for the money!" Elite conducted A-B testing against their regular premium 6" install speaker and found minimal difference in sound quality. The BGM6 are now their "budget job go-to unit", particularly when bought by the pallet load, further enhancing the margin.

Back at Alivio, Darren commissioned the new audio system with very little tweaking. "Stuck the reference mic out there, fired up the software and adjusted maybe two notches at 3 dB! And it sounds really good too." It also looks good, with inDESIGN units available in both black or white, a rarity at the lower price points. "Little things like that where they've gone the extra mile make a difference" to installers like Elite. NAS have spent a lot of time and effort working with the design team at inDESIGN and it's starting to pay off.

**"The main audio zone is nearby the kid's waterpark and had to overcome the high background ambient noise floor that playing children bring."**

### Finale

This job went ahead through lockdown. Venue management not only honoured their quote acceptance but opted to use the quiet period as an opportunity to get all the disruptive work out of the way while their customers were kept at home. Elite responded promptly and delivered a lower budget job with higher end outcomes. It seems that everyone was happy with the result.



# Work better, together.

## BOSE ES1 CEILING AUDIO SOLUTION

Clear the table for better collaboration. The Bose ES1 Ceiling Audio Solution combines the premium performance of the Bose EdgeMax in-ceiling loudspeaker and Sennheiser TeamConnect Ceiling 2 microphone\* — along with a Bose amplifier and DSP — to deliver a seamless meeting experience that empowers productivity.

### MICROSOFT TEAMS CERTIFIED

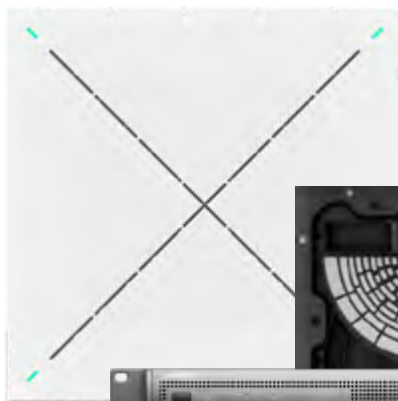
**Deliver a truly integrated premium conferencing solution**, combining the directional EdgeMax EM180 loudspeaker, Sennheiser TeamConnect Ceiling 2 microphone, ControlSpace EX-440C processor, and PowerSpace P2600A amplifier

**Clean up the conferencing experience** with fewer devices on walls or tabletops, giving people the freedom to focus on work, the flexibility to sit or stand anywhere in the room, and the confidence that they'll hear and be heard clearly

**Bring clarity and intelligibility to large meeting rooms** with superior echo-cancelling technology, so remote meeting participants can communicate freely and feel like they're in the room

**Deploy quickly with reference configurations** that help reduce installation time

**Combine with popular unified communications platforms** such as Microsoft Teams, Zoom, Google Hangouts Meet, and more, to provide enhanced audio performance in fully integrated meeting rooms



Sennheiser TeamConnect Ceiling 2 microphone\*

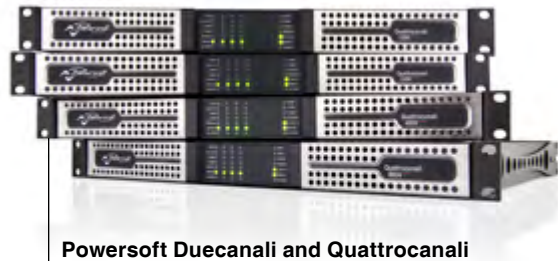


EdgeMax EM180 loudspeaker



PowerSpace P2600A amplifier  
ControlSpace EX-440C processor





### Powersoft Duecanali and Quattrocanali

Powersoft has extended two of its most popular fixed install ranges with the introduction of the two-channel Duecanali 6404 DSP+D and the four-channel Quattrocanali 8804 DSP+D (Pictured). Both products feature Dante digital audio networking architecture and on-board, high-end signal processing, as well as being able to deliver 175 Vpeak, making them ideal for applications where high SPL is required, such as clubs, performance venues and stadiums.

**Australia and New Zealand: PAVT**  
[www.pavt.com.au](http://www.pavt.com.au)  
or +61 (0) 3 9264 8000 / +64 (0) 21 410 050



### Bose FreeSpace FS

Bose is pleased to announce the release of the FreeSpace FS Series of speakers, which will transition from the DS range in the coming months. This new range boasts 2 inch and 4 inch surface and flush mount versions, as well as the unique FS2P Pendant speaker. Featuring remarkably consistent tonality, engineered for high-quality performance in both background music and voice announcement applications, FS loudspeakers are ideal for almost any commercial space.

**Australia and New Zealand: [pro.bose.com](http://pro.bose.com) or +61 (0)2 8737 9999**

### Epson EH-LS500B

Enjoy the ultimate home theatre 4K experience with the new EH-LS500B, a 4,000lm ultra-short-throw laser projector. With the ability to project a 100 inch image only 62cm from the projector lens, this is a unique big-screen TV alternative that is also perfect for homes with limited spaces. The EH-LS500B comes with HDR10/HLG and Dynamic contrast ratio of up to 2,500,000:1 ensuring a quality 4K experience. Enjoy further choice of entertainment with the inclusion of Android TV built into the projector. The projector also comes with 2 x 10W sound speakers with convenient setup and connectivity features for minimum cabling.

**Australia: Epson - [www.epson.com.au](http://www.epson.com.au) or (02) 8899 3666**  
**New Zealand: [www.epson.co.nz](http://www.epson.co.nz) or (09) 366 6855**



### Cameo F2 FC

The Cameo F2 FC is a Fresnel spotlight for professional applications in front of the camera and in theatres. Its white tones can be adjusted in CCT mode from 1,600 K to 6,500 K at a constant CRI of over 90, and perfectly adjusted to skin tones, camera sensors and ambient light via additional green-magenta correction. RGBW colour-blending in HSI mode facilitates rapid adjustment of colour, intensity and saturation at the light desk using only three control circuits. The 200 mm lens creates a soft-edged beam of light, which can be manually and gradually adjusted in the 18° to 55° beam angle from spot to flood and all intermediate positions. At the same time, the integrated condenser lens provides evenly blended colours and colour shadow-free light dispersion, even when using the barndoor.

**Australia and New Zealand: Direct Imports [directimports.co.nz](http://directimports.co.nz) or (+64) 21 352 598**



### Barco PDS-4K

The PDS-4K is a full-screen presentation switcher that includes eight 4K inputs and two 4K fully seamless mixing program outputs. The new generation PDS relies on the power of the tried and trusted Event Master processing product line. The PDS-4K incorporates Athena scaling technology for stress-free scaling and seamless mixing performance. It is built according to the same flexible principle to ensure expandability and future-proof upgradability. The PDS-4K is compatible with all the familiar Barco visualisation solutions (LED, LCD and projection) and collaboration devices. And thanks to the API, the PDS-4K can also be combined with the Event Master Toolset, Barco Overture, or other third-party control panels.

**Australia and New Zealand: Barco Systems [www.barco.com](http://www.barco.com) or +61 (0)3 9646 5833**



### Micker Pro 2 In 1 Speaker/Hand-Held Microphone

The Micker Pro 2 In 1 from Altronics is not only a microphone, but also a speaker and amplifier you can hold in one hand. No longer raise your voice to convey your message to your audience. The built-in lithium battery provides six hours continuous use with a 2.5 hour recharge time. It's an ideal choice for celebrants, teachers, small lecture rooms, small gatherings indoor or outdoor, and tour guides.

**Australia and New Zealand: Altronics**  
[www.altronics.com.au](http://www.altronics.com.au) or +61 (0) 8 9428 2122.





**Robert Juliat Sully RJ 650SX**

The Robert Juliat Sully RJ 650SX profile series is an LED alternative to the classic 1kW theatre zoom profile. This variable zoom profile range features a high-quality 115W warm white LED source. It delivers a white light (CRI of 96 / TM-30 Rf=92 Rg=98 / TLCI of 97) and an output comparable to a 1000W tungsten luminaire. A cool white LED version is also available for times when 'daylight' rendering is required. Sully profiles offer accurate framing with clean shutter cuts and superb gobo projection. With its silent operation, Sully 650SX offers three zoom options - 28°-54°, 16°-35° and 11°-26°.

**Australia: Show Technology**  
[www.showtech.com.au](http://www.showtech.com.au) (02) 9748 1122  
**New Zealand: Show Technology**  
[www.showtech.nz](http://www.showtech.nz) (09) 869 3293

# GEAR



**Alpha Lite LED Fresnel Spot Light FS Series**

The Fresnel Spot incorporates the Fresnel characteristics of continuous focusability from spot to flood and a smooth, homogeneous light field. It takes full advantage of LED technology and allows for complete control over the intensity of light. It is specifically calibrated for optimal reproduction with broadcast and digital cinema cameras, ensuring pleasing natural object tones. Physical design is constructed to be robust and ergonomic.

**Alpha Lite LED Panel Light A Series**

The A Series are self-contained, high quality panels that feature ultra-soft RBG+WW LED control with adjustment between 2500K and 10000K. Optimised for film and TV, the A Series produce a high output, even wash, achieving a CRI of 95 – 98 in an elegant, fan-free, compact design.

**Alpha Lite LED Base Soft Light E Series**

E Series are fully tunable, with a correlated colour temperature that is adjustable between 2800K and 6000K. E Series incorporates a unique lighting distribution pattern on light guide panels. Light lamp chips are arranged at the edge of the fixtures so that the frame is a part of the exothermal process. There is no need for cooling fans and the fixtures are completely silent. They are perfect for noise-sensitive applications such as TV studios and radio stations.



**Australia and New Zealand: Showtools International**  
[www.showtools.com.au](http://www.showtools.com.au) or +61 (0) 2 4646 1199



**Dynacord MXE5**

The MXE5 is the first member of the MXE matrix mix engine series. The 24 x 24 crosspoint performance audio matrix offers both routing and mixing functionalities, with 12 analog mic/line inputs, eight line outputs and 24 Dante audio channels. At the same time, the MXE5 serves as a communications hub for all IP-based peripherals and provides comprehensive supervision of all system-wide commands. The MXE5 offers a variety of functions beyond being a powerful crosspoint matrix; it also works as both a system manager and an OCA controller with complete monitoring and supervision abilities. In addition, it also serves as an FIR-Drive speaker controller. Third-party integration is enabled via plug-ins to upgrade existing systems for enhanced performance, starting with a plug-in for Q-SYS. The MXE5 also incorporates the entire network infrastructure, with Dante audio transport, AES70-compliant control and no requirement for retrofitted external cards.

**Australia: Bosch** [www.boschcommunications.com.au](http://www.boschcommunications.com.au) or 1300 026 724  
**New Zealand: Pacific AV** [www.pacificav.co.nz](http://www.pacificav.co.nz) or (09) 947 523



# D&B SOUNDSCAPE UPDATES



**German audio technology and solutions company d&b audiotechnik have announced the introduction of a new set of performance enhancing capabilities for the company's d&b Soundscape audio platform.**

These latest updates to the d&b Soundscape platform further enhance a user's ability to deliver outstanding multi-dimensional audio imaging, resolution and emulated acoustics.

A Soundscape system has three elements: DS100 Signal Engine, the hardware platform with comprehensive matrix functionality that can operate in a standalone system configuration mode or be combined with one or both of two software modules, En-Scene, an object-based positioning tool, and En-Space room-emulation software.

The latest feature updates are: Scenes – hardware-based scene memory capabilities within the DS100 Signal Engine and for the Soundscape software platform; two new room signatures within En-Space; and a configurable 'Spread factor' for function groups in En-Scene.

## Scenes

Scenes enables snapshots of all DS100 and Soundscape parameters (Matrix / En-Scene & En-Space) to be stored within the DS100 hardware memory.

The user can create scenes in R1, d&b's remote control software, offline without the DS100 for later transfer to the DS100 hardware memory. These scenes can be recalled from there using R1, but also via OSC commands - either as a direct call to a desired scene number or by stepping through the Scene list step by step using the 'Next /

Previous' function. These OSC functionalities allows d&b systems to be easily integrated into third party control systems - from advanced show control software such as Q-Lab up to creation of UIs on a tablet or smartphone with e.g. TouchOSC.

## Spaces

En-Space room emulation software is an in-line technology, intended to generate or expand the acoustic environment. It does not use microphone feedback loops. Its simple setup and operation make access to some of the world's most acoustically renowned performance spaces a reality for installation and touring both indoors and outdoors.

Two new rooms from Ravenna, Italy join the existing seven concert and recital halls, significantly extending the scope of En-Space room emulation. With the very short and 'dry' reverberation of 1.3 sec from the Alegrie Theatre and the (massive & manifold) 5.6 sec from the Cathedral of San Vitale, users now have two new environments at their fingertips. These additional Space options are distinctly different from the extraordinary concert halls already available and open up new applications and new creative possibilities for existing designs.

## Spread Factor for Function Groups

Uniquely, the Soundscape software allows for loudspeakers to be combined into Function Groups. This ability to organise and address

loudspeakers by groups - according to their function within the whole loudspeaker system (like mains, front fills, delays, etc) is one of the things that ensures the flexibility and simple operation of a d&b Soundscape system.

The new 'spread factor' further increases the functionality and flexibility of these function groups. With an individual spread factor per function group, the user can now adjust how the spread setting of the objects are handled by the various function groups, thus determine the energy distribution between the loudspeakers within the different function groups according to the specific needs of the setup.

"In the field, we're seeing people use the DS100 and the Soundscape software toolkit in all sorts of interesting and creative ways - some of them far beyond what we expected or could even imagine - we're delighted to find that in the hands of sound designers and mixers the results are really impressive," said Georg Stummer, Product Manager, d&b audiotechnik. "These latest updates are driven by feedback from real users which, as always, is a vital part of the product development process for us."

This Soundscape toolkit is fully integrated into the d&b workflow, so it can be used with an existing d&b system in the familiar ArrayCalc and R1 processes and routines, similar in operation to any conventional d&b loudspeaker system. The extent of the loudspeaker system configuration is in the hands of the user: the more loudspeakers used, the greater the resolution and stability of the sound over the audience area. The system configuration can be extended to a full 360 surround design for venues the size of an arena, enveloping the entire audience in exceptional clarity and detail.

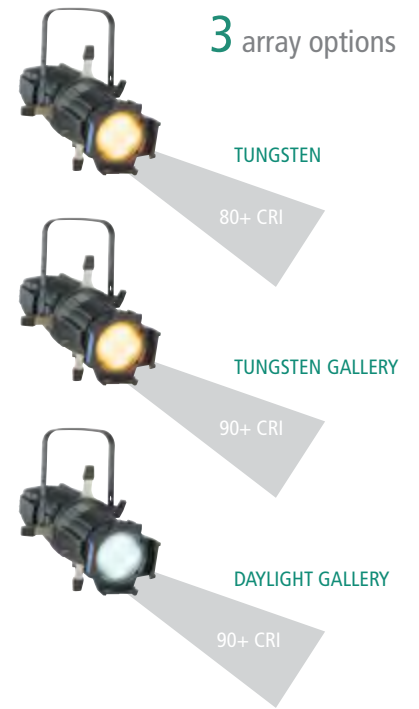
## Australia:

**NAS nas.solutions or (03) 8756 2600**

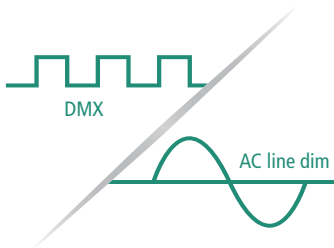
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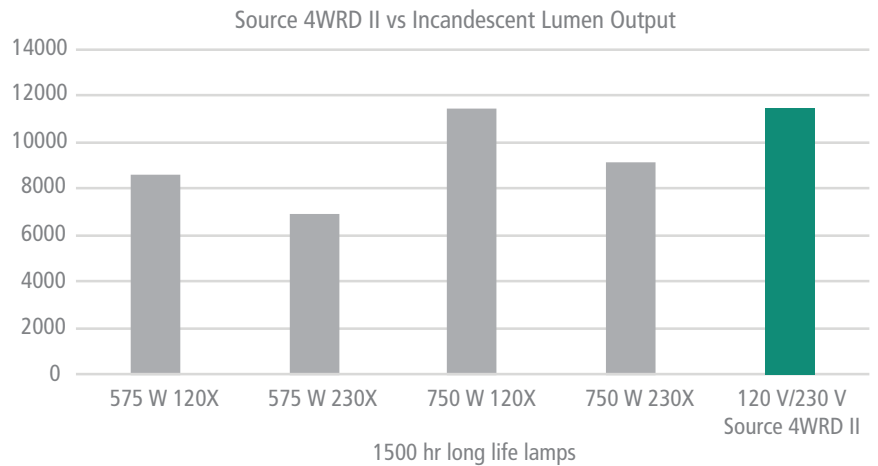
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# The Light on The Hill – The Electric Canvas map The National Carillon for Reconciliation Week

by Jason Allen

## It's been an interesting few months for The Electric Canvas in Canberra.

After finishing up work on the Enlighten festival in mid-March, the National Capital Authority (NCA) asked TEC to have a look at the National Carillon on Lake Burley Griffin's Aspen Island. The spectacular 60 metre tower that houses our national bell instrument is turning 50, and has been fitted with two new bells; one tiny high D, and one truly enormous low G named the Ngunnawal Bell after the land's traditional custodians. Fittingly, the bells were cast and installed by the same English company that cast the originals. The NCA were planning a bit of projection mapping to celebrate the re-opening.

Then, of course, the lockdown. The English bell fitters promptly exited the country, literally leaving their tools in the tower. The mapping event was of course cancelled. Having done preliminary measurements and site scoping, MD of TEC Peter Milne was now itching to aim his projectors at the

stunning monument.

Peter reached out to the NCA with the idea to produce a projected tribute to the frontline workers of the pandemic, and got the go-ahead. After driving to and from Canberra (no flights, of course) and finishing their survey, the tribute was shut down three days before bump-in. An ANZAC Day projection was suggested. That was a no-go too.

Never say die. A month later, the NCA contacted TEC and floated the idea of projection on the Carillon during Reconciliation Week. It would be over eight nights, with each night dedicated to a different artist, community, or organisation. The catch was that TEC would only have two weeks to create the content and get the site ready.

"Culturally sensitive work with a lot of stakeholders involved usually takes months," says Peter Milne. "It's a lot of time, and a

lot of people. We decided to take on the challenge. The first step was briefing the participants and explaining how a projection on this type of structure works; it's not just putting someone's painting up on a flat wall. The Carillon is 60 metres high and made of three triangular columns that are six metres wide on each facet."

The next challenge is working out how it would look to the viewer, who could be almost anywhere around the Parliamentary Triangle. "We had to figure out how it would look when you see half of column A and half of column B. We couldn't travel, so we had a local tech go to select viewing spots we marked on a map and take vantage point photos so we could strategize. As the island was closed to the public, the closest viewing spot was 150 metres away. On the other side of the lake, you'd be viewing it from 850 metres away. The content, especially the content with messaging or branding, had to make sense from different angles and distances. We had to educate the participants on what limitations they had to work with, and what the opportunities were."

Peter held the initial meetings with the participating organisations and artists, then the TEC team took over. All design and creation was handled in house by art director Richard De Souza and junior designer Gisele Nour. The huge volume of communication required to make the project work was the responsibility of content producer Jacqueline Livermore.

TEC set-up four projection towers, each home to three 25K Christie Crimson laser projectors running in portrait mode. Media was handled by TEC's Modulo Kinetic media server system with full hot back up. As Aspen is an exposed, inhospitable island with no shelter, TEC commandeered the top level of the Carillon, known as the Viewing Room, to house their site tech. Surveillance cameras were trained on the towers and fed back to a multiviewer for the on-site tech to monitor.

Days before opening night, restrictions were lifted slightly, and the NCA decided to allow groups of 10, mainly the participants and their families, onto the island while the projections ran. "This created an opportunity to present something more intimate with a lot of detail that could be seen close-up," relates Peter. "The tower locations were chosen when we thought the island would be open, so we already had a clean shot at an internal facet. This allowed us to project text and explanatory items on an internal facet that you couldn't see from anywhere else."



**Date:** Thurs 28th May 2020

**Title:** 2000 Walks for Reconciliation – In this Together

**Artist/Contributor:** Image: Montage of various photographs by Glenn Campbell/NewsPix, News Ltd/NewsPix, Brian Condron/NewsPix, Richard Cisar-Wright/NewsPix). Narrative created by Reconciliation Australia

**Description:** '2000 Walks for Reconciliation – In this Together', is a montage of imagery from the 2000 Reconciliation Walks across Australia. The People's Walk for Reconciliation (as the bridge walk was titled) had a profound impact on those who participated, and a roll-on effect around the country. The 28th of May 2020 marks the 20th Anniversary of the first Reconciliation Walk.



**Date:** Sat 30th May 2020

**Title:** Sea of Hands

**Artist/Contributor:** Artist: Australians for Native Title and Reconciliation (ANTaR). Narrative created by ANTaR, Senator Pat Dodson, Dr Jackie Huggins AM

**Description:** In 1997, not far from the Carillon on Federation Mall, thousands of Australians came together to plant a Sea of Hands in solidarity with First Nations peoples to stand up for their land rights. Over two decades later, our Hands in Reconciliation are still going, even digitally.



**Date:** Wed 27th May 2020

**Title:** Reconciliation, a continuing journey of growth and togetherness

**Artist/Contributor:** Artist: Nikita Ridgeway. Narrative created by: Reconciliation Australia

**Description:** The artwork is by Nikita Ridgeway of Boss Lady Design and Communications. The artwork's design elements represent Australians together on a national journey of reconciliation, while paying homage to the past and recognising the present.



**Date:** Fri 29th May 2020

**Title:** Voice Treaty Truth

**Artist/Contributor:** Image: The 3 themes of the Uluru Statement from the Heart. Narrative created by: ACT Reconciliation Council

**Description:** 'Voice Treaty Truth' - The Uluru Statement from the Heart is an invitation from Aboriginal and Torres Strait Islander people to "walk with us in a movement of the Australian people for a better future". It inspires this artwork.



**Date:** Sun 31st May 2020

**Title:** Galambany

**Artist/Contributor:** Artist: Richie Allan. Narrative created by the United Ngunnawal Elders Council & Winanggaay Language Group

**Description:** 'Galambany' The story of the Artwork is about Mother Earth gifting the three rivers that flow into Canberra. Ngunnawal people breathed life into these rivers and the rivers gave life to the Ngunnawal people.



**Date:** Mon 1st June 2020

**Title:** ACT Reconciliation Day

**Artist/Contributor:** Artist: Lynnice Church. Pledge content developed by ACT Reconciliation Council

**Description:** Canberran and Ngunnawal, Wiradjuri and Kamilaroi artist Lynnice Church created this artwork for the city's

Reconciliation Day. Lynnice's artwork embodies the essence of reconciliation, equity and understanding. As well as showcasing Lynnice Church's artwork on the Carillon, these projections incorporate Reconciliation pledges made by the Canberran community. All Canberrans were asked to make a pledge and demonstrate their support and commitment towards Reconciliation.



**Date:** Tues 2nd June 2020

**Title:** Trio of Flags

**Artist/Contributor:** Image: Montage of the Australian Flag, Aboriginal Flag, Torres Strait Islander Flag. Narrative created by ACT Reconciliation Council

**Description:** 'Trio of Flags' - Flying the Aboriginal and Torres Strait Islander flags shows respect. We acknowledge First Nation peoples, build community partnerships and demonstrate our commitment towards reconciliation. Credits: © Copyright Harold Thomas 1971. Aboriginal flag reproduced digitally with the permission of WAM Clothing.



**Date:** Wed 3rd June 2020

**Title:** Mabo Day

**Artist/Contributor:** Artist: Gordon Bennett with permission from NPG and The Estate of Gordon Bennett and Gail Mabo

**Description:** This artwork celebrates Mabo Day, and was projected on the anniversary of the historic Mabo decision in 1992. On 3 June 1992 the High Court of Australia delivered its landmark Mabo decision, which legally recognised that Aboriginal and Torres Strait Islander peoples have a special relationship to the land.

**Credit:** Eddie Mabo (after Mike Kelley's 'Booth's Puddle' 1985, from Plato's Cave, Rothko's Chapel, Lincoln's profile) No.3 1996 by Gordon Bennett. Collection: National Portrait Gallery, Australia. © Gordon Bennett Estate. With thanks for permission from The Gordon Bennet Estate and Gail Mabo.

# INFOCOMM CONNECTED 2020 Everywhere and Nowhere

by Jason Allen

**Boy, did I get lucky back in January. As my mouse hovered over the ‘Book Now’ button for a flight to Las Vegas in June to go to InfoComm, a little voice in my head said ‘maybe just hold off in case this virus gets out of hand’. It’s pretty much the only break I’ve caught in 2020. And so I found myself sitting at home, logging onto a website to cover my first virtual tradeshow. Spoiler alert – it’s nowhere near as good as being there.**

As we are now all crushingly aware, streamed product presentations, Zoom meetings, websites, and webinars are orders of magnitude less engaging and enjoyable than actually being in a room and interacting with people, regardless of the fact that the information being presented is the same. It’s an energy-sapping experience to sit through back-to-back streamed presentations, even if the content is great and the presenters engaging. To use an audio metaphor, its equivalent to the difference in listening to a live band through an iPhone as compared to in a concert venue; it’s the same music, but robbed of three dimensions and most of its impact.

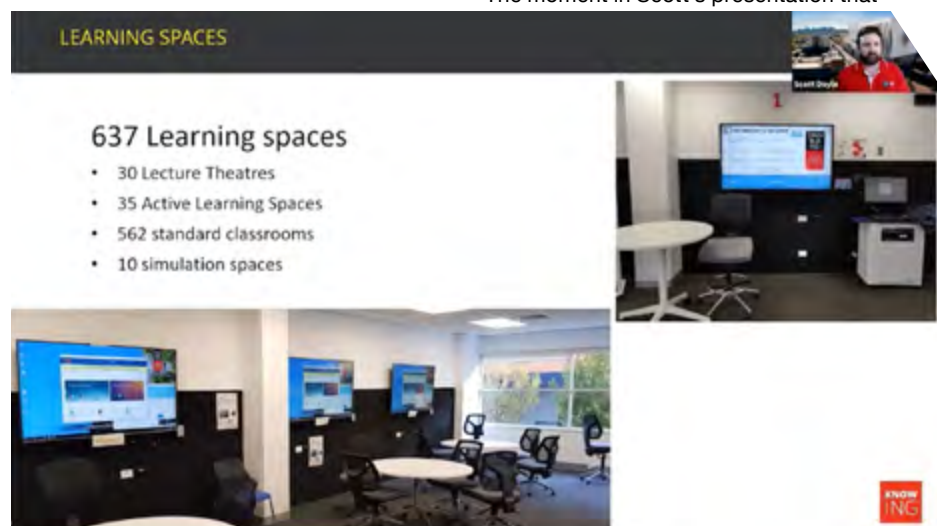
Of course, most live material was scheduled for US time, and fair enough. Happily, there were sessions early in the day for our European cousins, and late in the day (mid-morning here) for ourselves in APAC. AVIXA did a creditable job in hosting Q&As with notable AV boffins from around our region, including Australia’s own Peter Coman, now

working in New York. It was actually nice to get to ‘go’ to these sessions, as I’m usually completely tied up on the show floor. But still, a streamed Q&A still lacks the life of being there, and was ultimately just depressing.

## Bang for Buck

On Thursday 18 June our time, Swinburne University of Technology’s Scott Doyle, also President of the Audiovisual and Educational Technology Management Association, gave a fantastic presentation on ‘Using data to extend system life on a small budget’, a case study of his work at the Uni. It was a refreshing look at AV life in the real world. Over the last three years since he started at Swinburne, Scott has headed a team that has done a full audit of all AV systems on campus. They found more than 100 spaces that weren’t even listed on the database. They’ve compiled data on everything that plugs in, standardised new space roll-outs, maintained and repaired where they can, and added an amazing degree of efficiency. He made a business case that proved the Uni needed to increase its Capex for AV, and got them to do it. It’s paid off in reliability and ROI.

The moment in Scott’s presentation that



## AV CAPEX BUDGET JOURNEY

### 2017 Projects - (Total - 74)

- \$1M budget
- \$500K projects

### 2018 Projects - (Total - 99)

- \$1M budget
- \$200K projects

### 2019 Projects

- \$4M budget
- \$1.8M projects

### 2020 Budget – the year of change

- Requested - \$2.5M
- Begun with- \$1M
- COVID-19 Rev 1 - \$500K
- COVID-19 Rev 2 - \$0

### 2021 Outlook

- \$500K



gave me pause is when he charted his Capex budget over the last three years, and then compared that to this year post-COVID, and projected to next year. 2019 saw Scott's team have a budget of \$4m with \$1.5m of projects. 2020 started with a request for \$2.5m overall, \$1m of which was granted. The first COVID revision took that to \$500K. The second took it to \$0. 2021 is likely to see Swinburne's AV budget at \$500K total. When you multiply this across the entire education sector, this augurs a grim year in AV in Australia.

## The 'Exhibition'

This was the most disappointing aspect of InfoComm Connected. Now, no-one has ever had to build an experience like this before, so I'm not blaming anyone for the result, but the digital equivalent of an exhibitor's stand was a web page with some text, videos, downloads of pdfs, and a couple of pictures. And that was the ones that made an effort. I'm usually running around a show floor with a camera and voice recorder, attending launches on stands, having experts talk me through products, and if I'm lucky, having my eye caught by something unexpected. You can't replicate that.

It's also really inefficient. All of us who work in AV are familiar with the tools we use on a regular basis. When one of the brands we regularly deal with releases something new, it's usually an improvement to an existing technology. You can learn about this in a three-minute conversation on the stand: "Oh, your new version adds that capability, does that core function in a slightly different way, and costs less. Cool." And you're on your way to the next shiny thing. Getting to the same point by watching videos and reading pdfs takes ten times longer. You also miss getting a sense of the physicality of the product – what's the build quality like? How does that screen really look? What does that speaker actually sound like?

## The Gear

### Adamson

Adamson Systems Engineering made the biggest splash of the show with their new CS-Series – AVB enabled, powered line arrays, subwoofers, and point source boxes, backed with new power, data, and signal management tools.

The new CS-Series is comprised of the ultra-compact CS7 two-way, full-range array



enclosure; the CS7p point-source enclosure; and the companion CS118 subwoofer, along with the sub-compact CS10 two-way, full-range array enclosure; the CS10n narrow-dispersion array enclosure; the CS10p point-source cabinet; and the companion CS119 subwoofer.

The turnkey CS Upgrade Kit allows any existing S-Series cabinets to be easily converted to CS models in minutes by simply removing four screws, connecting the CS Jackplate with the provided wiring connectors, and switching the front grille.

CS-Series also includes four rack-mounted products designed to provide the necessary tools to get the highest level of performance out of the CS-Series. The CS Gateway is a 16 x 16 matrix with 16 channels of DSP, containing dual-LAN, Milan-ready AVB, AES/EBU, and analog connections. The CS NDS is a network and analog patch bay that allows users to send redundant audio and control to CS loudspeakers on a single network cable. The CS PDS ensures that all CS-Series systems receive ample power,

regardless of region, and also allows the user to monitor consumption data, both per power output as well as overall draw. The CS Bridge is designed to replace existing network infrastructure in Adamson's E-Rack, allowing users to seamlessly integrate the CS-Series into their existing inventories by converting dual-LAN, Milan-ready AVB signal to AES/EBU, while also offering six channels of DSP per unit.

### Shure

Shure extended and 'completed' their IntelliMix and Microflex range of conferencing and collaboration audio products with the introduction of a new linear array microphone, the MXA710, a networked ceiling speaker, the Microflex MXN5 Networked Ceiling Loudspeaker, and tied it all together with a global mute control, the Networked Mute Button. Slickly presented in a virtual product launch that took place the Friday before InfoComm, the full range is now a compelling one-manufacturer solution for install.

The MXA710 comes in a two foot long or four foot long model, and can be mounted



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under or next to screens. You can even get a dummy unit if you want to mount it next to a screen and maintain symmetry! Like the ceiling tile MXA910, it runs Shure's IntelliMix DSP, is PoE, and outputs Dante/AES67.

The MXN5-C Networked Ceiling Loudspeaker is a powered active 2-way driver system with a 13.3cm woofer that runs on PoE and some DSP, including EQ, delay, limiting and a signal/tone generator. I/O includes two Dante inputs and one Dante output, which is handy for setting up an AEC reference.

The MXA MUTE is a configurable PoE-powered mute button that ties the system together. Integrators use Shure's Designer system configuration software for easy setup and configuration of all of the products in their IntelliMix and Microflex ecosystem, and facility managers can use Shure's SystemOn asset management software for remote management and troubleshooting.

## Bose

Bose released the SoundComm B40 Headset, for professionals who work in high-noise, communication-critical environments. The new SoundComm B40 headset is engineered to deliver the best combination of noise cancellation performance, clear communication, comfort, and durability to live event professionals, production crews, and sport sideline coaching and support

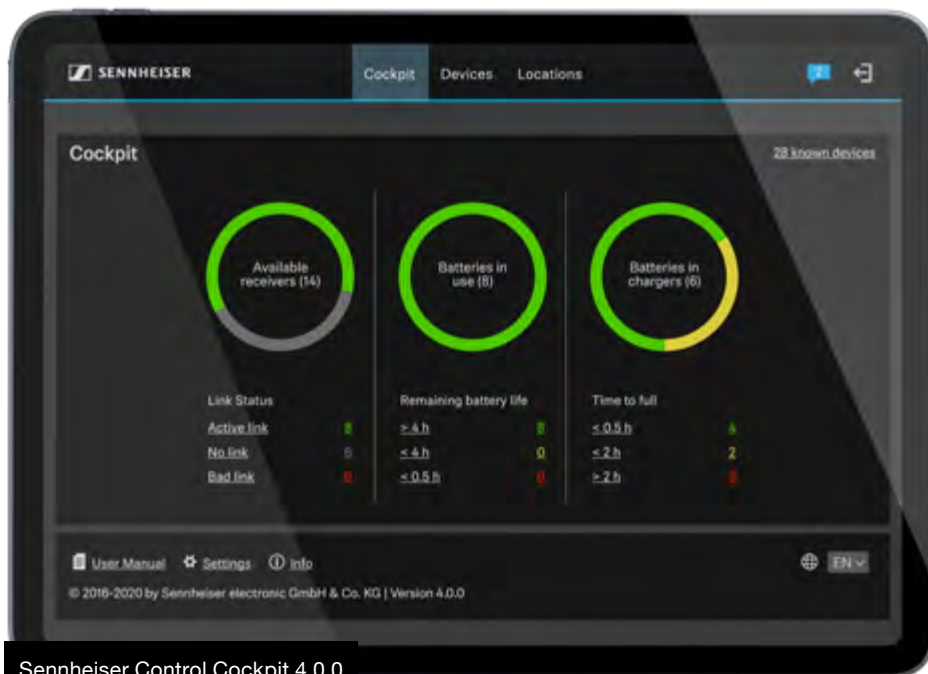


staff.

## Sennheiser

Sennheiser announced a major update of its Sennheiser Control Cockpit software. Besides design and usability enhancements, the latest version 4.0.0 now adds the ability to monitor the new SpeechLine Multi-Channel Receiver and the EM 6000 receiver from Sennheiser's Digital 6000 series, in addition to evolution wireless G3 and G4, SpeechLine and the TeamConnect Ceiling 2 microphone. This makes the software a universal tool for corporations and education facilities.

Sennheiser Control Cockpit also now features a "location-based Mute" functionality:



Sennheiser Control Cockpit 4.0.0

all devices in a room, for example, can be grouped and their mute switches synchronised, so that all devices can be muted and unmuted together, either centrally

via the Sennheiser Control Cockpit or locally on one of the devices. Location-based Mute is available for TeamConnect Ceiling 2 and SpeechLine Digital Wireless, including

the new Multi-Channel Receiver. Also, the software now employs SSL encryption to make data transmission between the user interface and the host server even more secure.

## Allen & Heath

Not actually released at InfoComm, but completely new to me is the AHM-64; an audio matrix processor for sound management and installation. It is designed for audio distribution, paging, conferencing and speaker processing in a multitude of environments including corporate, hospitality, education, event and multi-purpose venues, retail, theatres, cruise ships and sports venues.

The AHM-64 processor is complemented by an extended ecosystem of remote audio expanders, remote controllers, interfaces, apps and software. A family of portable, rack-mountable or wall-mount audio expanders is available with a choice of proprietary point-to-point Layer-2 or Dante transport protocols.

It sports a 64x64 processing matrix, 12x12 local analogue I/O, and an I/O port for audio networking, up to 128x128. You can add an optional 96kHz 64x64 Dante card that's AES67 and DDM ready, there's a 128x128 built-in SLink port for audio expansion, and the beast can handle 64 configurable processing outs, which gives you up to 64 mono/stereo zones.

## Audinate



AHM-64

“While new products at InfoComm Connected with Dante ports on them numbered in the dozens, Audinate itself released these charming little numbers.”



Dante AVIO USB-C

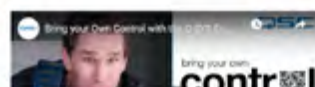


Dante AVIO Bluetooth

While new products at InfoComm Connected with Dante ports on them numbered in the dozens, Audinate itself released these charming little numbers. The Dante AVIO Bluetooth Adapter connects to your Dante network and supports 2 x 1 channels of wireless audio, allowing PCs and mobile devices to playout and receive audio with any of your Dante-enabled devices using only a Bluetooth connection. Connect audio applications like media players and conferencing software to speakers, microphones, mixers and DSPs on your network. The Dante AVIO USB-C edition delivers the same great performance as the AVIO USB adapter and delivers power from any PoE network switch to your mobile device for continuous connectivity. It supports 2 x 2 channels of bidirectional audio, allowing PCs and mobile devices to playout and record audio with any Dante-enabled devices over a standard IP network. Use audio applications like media players, conferencing software, presentations and recorders with network-connected speakers, microphones, mixers and DSPs. Cost effective, compact and built for the road, the Dante AVIO family of adapters bring the modern network connectivity that every audio pro needs in their toolbox.

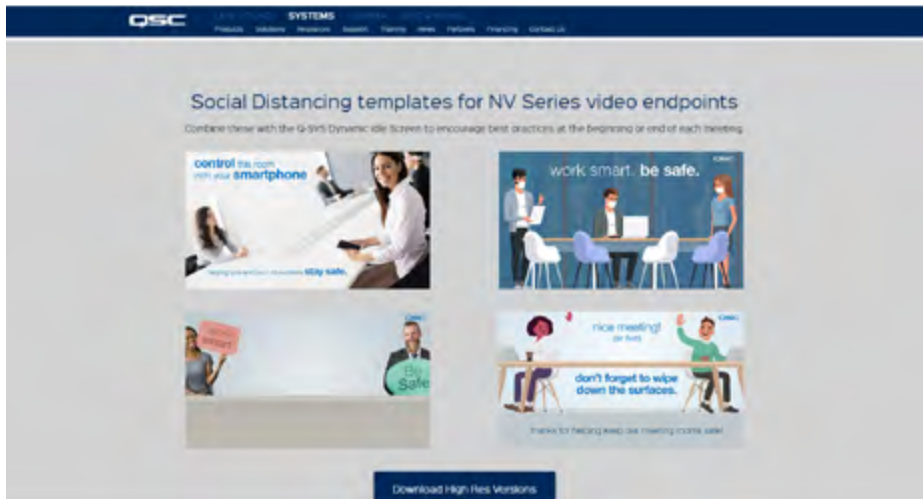
**QSC**

Continuing to totally dominate in the world of installation and integration due to sheer innovation, QSC continued its winning streak by adding the COVID world’s hottest functionality – BYOD control so we don’t all have to share touch screens. This new



Control the room from your smartphone  
Allows users to access specific Q-SYS UCIs without touching the room's touch screen controller.





functionality allows users to access specific Q-SYS UCIs without touching the room's touch screen controller. You can add a custom QR code to your UCI, and users simply open their camera app, aim at the QR code and instantly take advantage of the room controls on their smartphones. Either brilliantly or depressingly, QSC also produced a raft of resources for programmers and integrators to help them implement social distancing logic, social distancing video signage, safety timers, and audio reminders to remind meeting goers to clean and reset the room at the end of each meeting.

## Panasonic

Again, not new to InfoComm Connected but completely new to me, is Panasonic's Kairos, an IT/IP-centric live video processing platform. There's three parts to the system; the Kairos Core mainframe, the Kairos Control hardware controller, and the Kairos Creator control software. It's aimed squarely at video for live events. It incorporates newly developed software that processes ST 2110 and NDI streams of any resolution. This platform achieves higher performance by fully utilising the power and flexibility of its CPU and GPU, balancing total processing load without the configuration constraints of traditional hardware-based systems. This open architecture platform facilitates

the linkage of diverse external sources and destinations as well as the integration of hardware and software systems.

Kairos fully supports baseband and IP signals such as SDI, ST 2110 and NDI, in any combination and also supports PTP (Precision Time Protocol) synchronisation. As a native IP system, Kairos is well suited to be used for remote video production as part of a completely IP-based environment. Mixed input sources with different resolutions, such as HD and UHD, can be processed simultaneously. For instance, it enables the production of videos not only in the standard 16:9 format, but also in the 32:9 format suitable for display walls. Kairos is not restricted by the number of MEs or keys, like a conventional switcher, and allows as many layers as the GPU capacity permits. Keys and scaling can be set in each layer without any restrictions, and various effects and keys can be added to each layer. Kairos' processing latency can be as low as one frame, so sports and live performances can be presented with the ambience intact and sync can be achieved easily.



# KAIROS

Incredible Productivity


**IT/IP Platform "KAIROS"**  
\*Scheduled for release in the third quarter of CY2020

**Configuration**


**Kairos Core (Main Frame)**  
1 RU size, OS: Linux  
Including baseband input/output expansion boards, NIC, GPU

**Kairos Control (Control Panel)**  
2 Facers with 24XPT style Layout;  
all elements user assignable - operable in linked condition


**Kairos Creator (GUI Software)**  
OS: Windows  
For various settings and operations



Kairos Core




Kairos Control




Kairos Creator

**Main Specifications [Preliminary]**

- VIDEO Input/Output: The numbers that can be attached to the system is not limited.  
In terms of simultaneous processing:  
- For HD/3G: Max. 32 inputs, 16 independent outputs (option)  
- For UHD: Max. 8 inputs, 4 independent outputs (option)  
Mixed operation with combinations of the above or other formats is also possible.
- Baseband Input/Output: Compatible with various interfaces such as 12G/3G/HD-SDI, HDMI, Display Port via gateways
- IP Input/Output: Compatible with various interfaces such as ST 2110, NDI, RTP
- Multiviewer Output: 2 outputs (DisplayPort, 4K/HD compatible, up to 36 screens)
- Numbers of Virtual MEs/Keys Layered Effects: No restriction (Limited only by GPU performance)
- Canvas (format-independent, multiple screens) output function (option)
- Video File Retention: 8-ch built-in RAM recorder (uncompressed) 2-ch (1-ch on 4K) Media Player (compressed)
- Still Picture File Retention: 100 files
- PTP (Precision Time Protocol) synchronization



[https://pro-av.panasonic.net/en/products/it\\_ip\\_platform/](https://pro-av.panasonic.net/en/products/it_ip_platform/)



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# MESSING UP INPUTS, MANGLING OUTPUTS.

by Andy Stewart

**Sometimes conventional recording and mixing techniques need to be tossed out the window in favour of new, experimental, unorthodox thinking. Want your new production to have some fresh ideas in the mix? How about dispensing with your favourite techniques and trying something different!**

Let's face it, as we grow more experienced in our professions, we tend to lean more heavily on techniques we've learned or developed over the years, some of which eventually become habitual and repetitive – safe.

But as inevitable as this experiential growth surely is, there's a downside to it – as our skills develop there's a genuine risk that we become more conservative in our approach to the work. We experiment less and less, discover fewer new sounds by accident, and grow disinclined to try things that seem intellectually 'wrong', 'stupid' or (dare I say it), 'amateurish'.

Put another way: nothing gets in the way of new audio discoveries quite like our own egos!

## Your Top 10 Sounds

One of the best ways to break with this tendency and rediscover your enjoyment of sonic experimentation is to list on paper some of your favourite techniques and ask yourself point blank: 'Why do I repeatedly perform these tasks this way, and are there different approaches that might be more imaginative, compelling or outrageous that I could try?' And while you're reflecting on your answer, ask yourself this: 'Am I, in all honesty, satisfied with what I achieve using these techniques?'

Chances are you're probably bored with your own work, at least some of the time. But I have good news about that. Unlike working as a bank teller, being a record producer, mix engineer, ad composer, film, television or live mixer engineer allows you to try new ideas! That's the exciting part about our jobs in this crazy industry – we're not bound by rules and

regulations. On the contrary, our job is to find ways to break them!

So what's stopping you?

If you're a bit sick of your own process or bored with how similar everything that you work on winds up sounding, pull your finger out and try new stuff! You don't even have to have ideas, as such... just go a bit silly and try things! Loosen up your thinking or dispense with it altogether for a while. What's the worst that could happen – you'll not like something and have to hit 'Command Z'?

Start by avoiding some of the techniques on your Top 10 list. Do something else instead, and when your habitual thinking rushes in to question the point of the exercise (which it surely will), push it aside. Make an effort to break the habit by either thinking long and hard about an alternative approach, or by throwing caution to the wind. Some habits are hard to break. Others are an addiction, which find their way into everything you do, even when they're sonically inappropriate (do you have one of those?).

The exciting thing about ditching these habitual workflows is that new sounds are almost inevitably right around the corner the moment you do. After that, your fresh new sounds will inspire more and more experimentation, and then we're off to the races.

## I Can't Do That, Can I?

Despite the irony of trying to guide you towards discovering new sounds for yourself, here are some of my favourite challenges I confront from time to time that you might consider.

First up, re-imagine how your tools work, and the specific roles they play. What other tasks, for instance, could a compressor, a distortion plug-in, or key inputs play? (These three tools alone have countless other roles). Can I use a de-esser for something else other than vocals? What does it sound like if I put a distortion plug-in, an EQ filter, a pitch shifter and a flanger into a reverb send? What will the outcome of all that sound like? (The point is not to wonder what it might sound like, but rather to go ahead and do it!)

And what does it sound like when I record drums in a tiny space, or alternatively, a super live one? Can I record my vocal outside? (Tom Waits does!) What does it sound like when I completely distort the send to that vocal delay, or put a sound savagely out of phase? So what if my ambient synth pad disappears in mono? If its only role is to add stereo width to the stereo mix, perhaps it's actually better if it disappears in mono!

Can you see a pattern here? The idea is to question convention and your own professional thinking, and concern yourself primarily with what something sounds like, not what an engineering panel might make of your workflow. That will never happen anyway, of course – no-one's ever going to scrutinise your work, and who cares if they do? End listeners certainly don't. All that matters in the end are the sounds you create, and whether you – and listeners – dig them.

## New Tools, New Sound?

There are lots of tools in your sonic arsenal, but there are even more ways to deploy them. Unfortunately, we're all inclined to search for new tools first, rather than experiment with the ones we already own. We do it with mics, with outboard, with plug-ins and instruments... always looking for a new solution, rather than reworking or redeploying the ones we already own. We're all guilty of it, but very few of us really walk that talk.

Far too often we use the tools at our disposal for a single purpose: compression to control dynamics, gates to control spill, distortion to add grit and menace to guitars, de-essers to manage sibilance, and so on. But for every plug-in you own, there are 10 additional roles

each of them could play that would transform your sonic palette.

The trick is to mix things up. Why not add some extra layers of plug-ins to your auxiliary chain prior to the main element, whether that be a reverb, a parallel bus or whatever. That way the feed-in signal will be transformed before it arrives at its destination. Now let's add something else after the main element. Why not? You could add a compressor after the reverb output and use that to expand the reverb? Woah, that sounds wrong, doesn't it... until you feed the original vocal into the compressor's key input. Now the reverb is being subdued by the vocal til the end of the delivery, at which point, the reverb leaps forward to emphasise the space! Cool!

## Something Borrowed, Something New

How about setting yourself the challenge of adding at least two new sounds to your next mix that are the direct result of throwing caution to the wind. It might be the way you record the piano, or you might decide to record a mono drum kit via a single ribbon overhead that's heavily compressed, rather than placing 16 mics around the room. You might specifically choose not to use reverb on sounds that are typically wet in your mix, and instead add it to the stuff that's normally dry.

Next up, listen to some music in your studio one evening, from any decade or genre, and pick a favourite sound. Scrutinise that sound and try to determine how it was forged. Now try to copy it. It may not work in the song you're currently producing, but it may lead you down a road you would otherwise never travel. That is never time wasted, and almost always leads to a cool new discovery of your own.



Very few truly great audio productions are made with safety in mind. When you're an engineer or producer it pays to experiment at least some of the time, casting safety aside in the pursuit of something unpredictable and new. Sure, there are no guarantees this will always work, but that's okay. There are no guarantees playing it safe will either.

**Andy Stewart owns and operates The Mill on Victoria's Bass Coast. He's a highly credentialed producer/engineer who's seen it all in studios for over three decades. He's happy to respond to any pleas for recording or mixing help... contact him at: [andy@themill.net.au](mailto:andy@themill.net.au)**



Andy Stewart



# Two Way Radios

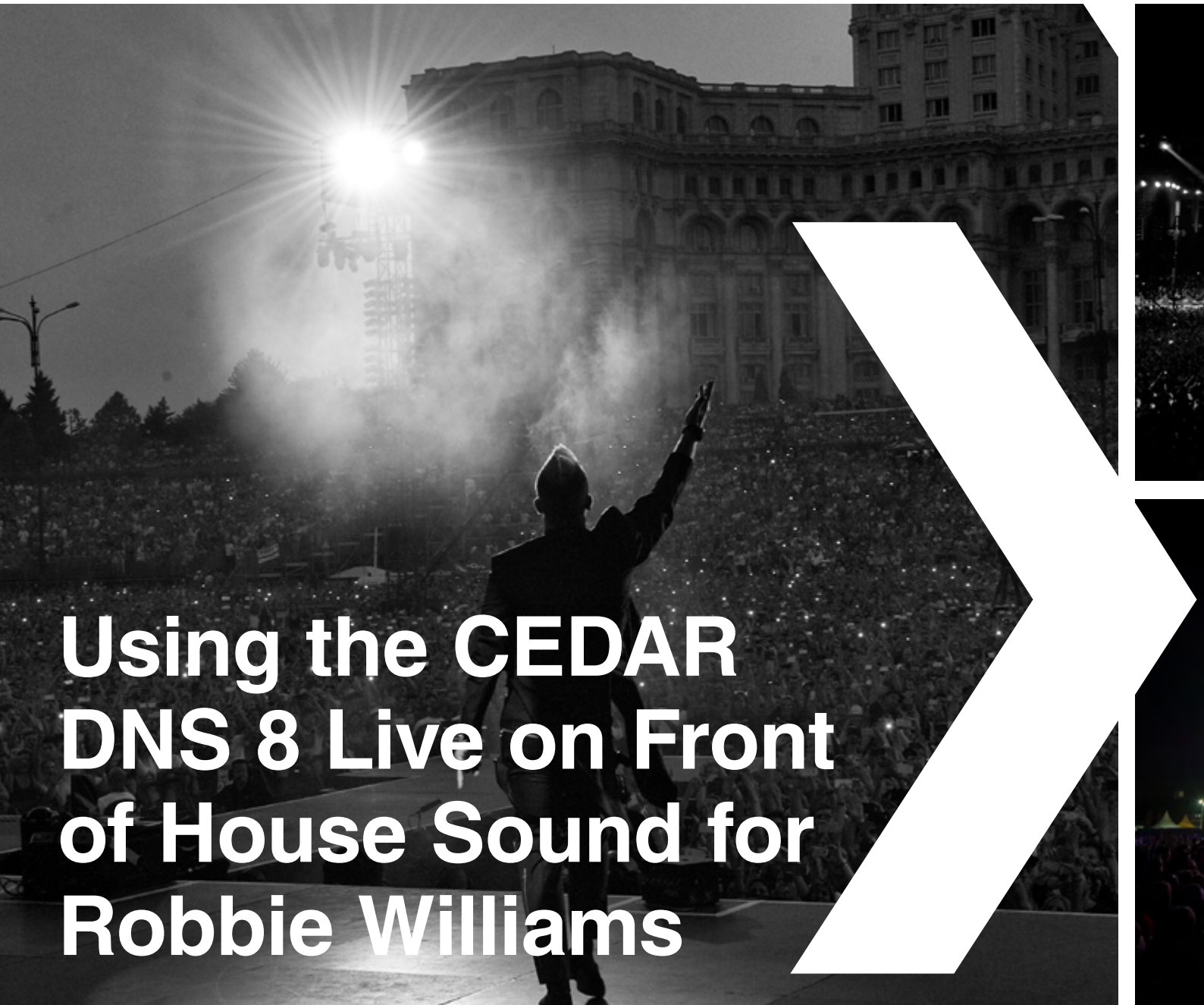
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# Using the CEDAR DNS 8 Live on Front of House Sound for Robbie Williams

**Robbie Williams has been playing some huge events in the past year, headlining the British Summertime Festival before moving on to Denmark, Austria and the Czech Republic. His sound engineer is Simon Hodge, who has worked with him for the past nine years and whose own communications services company, Surfhire, was recently acquired by Britannia Row to provide sophisticated comms systems, integrated backstage and production office packages, and much more.**

Simon told us, "I first encountered a CEDAR DNS 8 Live when I was mixing in the broadcast truck at the Bambi Awards in 2017

and then again in 2018." (The Bambis are Germany's most prestigious media awards and, in their own words, 'a benchmark for

success and popularity in Germany'.) Simon continued, "The DNS 8 Live was very cool and I was very impressed with what it could do to clean up the signal. As a result, I mentioned it to Sam Smith's monitor engineer, Saul Skoutarides, and he tested one in December 2017 before using it to clean up the audio for the artists' in-ear monitors on Sam's 2018 tour."

"I also spec'd one for last year's Robbie Williams shows, obtaining it from Britannia Row for the 2019 tour starting with the BST Festival in Hyde Park, which was Robbie's only open-air concert in the UK in 2019 and was attended by 65,000 people. After some experimentation, I placed the DNS 8 Live across all of the vocal mics except for Robbie's, controlling it over Ethernet to remove the background noise and spill from all of the backing vocal channels. The clean audio was then used for the FOH mix at the shows, and I also used it in the same way for



the Radio 2 and ITV specials later in the year."

"I work regularly with artists performing through large PA systems at festivals and in stadiums where spill can be a real problem, but the DNS 8 Live really cleaned up the sound at some pretty enormous venues, and I have recommended it on many other occasions."

The DNS 8 Live was designed to remove noise for broadcast and live sound in venues such as theatres, concert halls, conferences venues, and places of worship. With near-zero latency it can be placed in the audio chain without loss of synchronisation, eliminating traffic noise, air conditioning, wind, rain, babble, spill and general background noise. It also helps to compensate for unfavourable acoustic conditions and poor microphone placement, and will even suppress excessive reverberation. It was replaced in 2019 by the CEDAR DNS 8D which offers improved processing plus a Dante audio interface.

**For more Information, contact CDA Pro AV**  
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# Counting the Beans

by John O'Brien

**Who wants to be a millionaire? So the old refrain goes... Well, I don't. Apart from the millions of stars I get to look at on clear nights, I'm good living like a pauper. But I can't do it without watching the pennies pretty carefully.**

## Looking down the back of the couch

We've all had to do some hard sums and fiscal reality checks recently. Whether you are the employer, the employed, work for yourself or just plain don't have any work, the great shake-up has found everyone checking the piggy bank and tallying up the change. Hopefully, you have found some way to get by. Video conferencing and streaming people may have even prospered a little. Well done them.

Budgets are all about balancing the incomings and outgoings. With either good luck or providence you end up with more in the plus than minus column. In our industry, this negative column is much more prominent right now. There are some loud voices making considerable noise, but it is so far falling on the tone-deaf ears of a culturally vacuous national leadership. Nothing towards the plus column for the arts sector. Already under a steady decline in support, we have been hung out to dry.

So, as ever, we have to go it on our own. The announcement of the Live Entertainment Industry Forum (LEIF) gives me hope. Allying many major entertainment bodies to work on our own solutions seems the only way out. It leans heavily on sport, but their broadcast and associated industry is closely aligned to ours. Different performers but same tech,

same technicians and same logistical support teams. Speaker boxes are sector agnostic and push out sound waves in the sporting arena just as well as in an intimate theatre.

## Creative Accounting

We have built our industry on our own sweat, hard toils and taken the risks required in an uncertain environment. When planning an event, you never really know how many tickets are sold until the doors have closed. I've been part of plenty of well-intentioned and seemingly bankable gigs that failed or fell over and plenty more that rocked way beyond what anyone could expect. On most of them, regardless of differing degrees of accounting professionalism, the pennies were always counted only after they were banked, not before. Even the promoter who fleeced me as he debunked overseas with the pre-sale's takings knew how much he was holding as he ran. Event people are far more aware of working within budget than those who get a pay cheque every week, regardless of the efficacy of their output.

The intriguing farce of the JobSeekerKeeperStimulusWriteoff appears an exercise in budgeting on the fly by those whose biggest financial worry is their third investment property. This is both from the national perspective and the personal. On the sole trader end, I've spent more time

researching and trying to gain access to potential assistance than I would have to earn any equivalent income received had my income stream not crashed due to the shutdown. I understand why things have happened the way that they did, but it doesn't make it any easier to keep filling the fridge as I continue working at my chosen career.

On the federal end, they had no option but to think quick to make some big decisions. That's why we pay them big bucks. It must be more than a wee bit embarrassing to get the numbers so far wrong. I mean, what's \$60 billion between friends? Surely a little bit more than a mere rounding error.

Now, when the creative, cultural and sporting events industries are again allowed to stage public spectacles, let's not forget the \$150+ billion that they will contribute annually to the plus side of the national balance sheet. Equally, let's consider the contributions from the public purse to aforesaid entertainment and events scene. Even rudimentary maths suggests a major imbalance here.

We gave our services for free over the Black Summer, but goodwill doesn't quell a rumbling stomach or pay the utility bills. Continuing this largesse can only last so long.

## More fun than MYEFO

For someone who has long prided their professional selves on delivering large commercial projects on or under budget, I have simultaneously been a little hopeless when it comes to personal budgeting. Somehow, it all seems easier to take seriously when it's someone else's money! To compensate, I have consulted greater wisdom to help juggle the pesos.

There are some popular methods. Elizabeth Warren's 50/30/20 budget rule (that you

allocate your after-tax earnings 50% Needs, 30% Wants and 20% Savings) is all well and good if you earn enough to cover your needs (rent / mortgage, utilities, food) with 50% of available income.

Another oft promoted model is the 70% rule, where the split is 70% Needs and Wants, 20% Savings (or pressing debt) and 10% Donate or Invest. Try doing that when you are already on the breadline. Even with temporary top-ups, benefit schemes like JobSeeker leave little room to become a philanthropist when it's a struggle to fill even a shelf on the fridge.

Here at the country bogan villa, we are used to living on sweet Fanny Adams, so we treat those rules as ideals that nice, preppy first world people can gloat over. Even before this year's craziness, we were mending clothes, baking bread, growing vegies and generally living frugally. We tend more to the 100% rule, where we cover 100% of our bills and then see what is left over to eat with! The spreadsheet says if we get steak this month.

Whatever your methodology, accounting is all numbers. Finding which ones to value and what column they go in is the trick.

**Performance without an outlet**

With the gigs shut down, many have turned to other outlets to keep the flame alight. Performing artists have pivoted to streaming,

podcasts and vlogs (is that even a term anymore?).

Free online streams might be cheap for the punters and keep a known artist's profile high but that is little solace to supporting crew that aren't getting a job or those less established artists out trying to make a name for themselves.

Further, freely giving away your talent for exposure doesn't exactly cover the bills. The arts industry has long been rife with intern-like scams such as this. Even furloughed rent has to be paid eventually. For most artists, this amounts to little more than online busking. For (previously) live crew, this model doesn't leave much to do beyond setting up the stream or mix.

Of course, many a professional YouTuber / Twitcher / social media influencer started off as a nobody. We've seen umpteen rise from obscurity to become extremely lucrative media enterprises (that employ crew to shoot and produce their content). However, this is rarely an overnight proposition and it takes a lot of time and effort to successfully monetise an online presence. I'm sure more fall by the wayside than succeed.

Major changes in the income streams necessitate major changes in business models. If you can pivot online, or turn the side hustles into dollars, great - do the sums

and get on with it. If this is not an option, do what you can to survive. Gigs will come back, but they will be different for quite some time and so must our approach be.

**Live to a budget, work to a budget**

I consider myself lucky enough to have lived in pre-ATM days ... if you wanted to party all weekend, you'd have to set a budget in advance and make sure you got to the bank before 5 pm Friday closing. Then, when all the fun vouchers ran out, it was home time. No finding the nearest hole in the wall for a cash top up and certainly no tap to pay options back then. More than once, I got near the end of the night or weekend and made the call to blow the taxi or train fare on another drink or two. St Kilda to Moonee Ponds on foot took a few drunken hours but not as epic as walking from Richmond to Ringwood.

Add a beer or two to the plus column and put sore feet on the minus side. Seemed like a good idea at the time. Leaving something aside for contingency seems like a better approach right now.

More than ever, it's time to get your budgets sorted. Crack out the financial software, spreadsheet or crayons of choice and stay on top of the accounts. If you get good at it, I hear that some quality bean counters might be needed in Canberra.

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# Diagramming for free - Draw.IO

by Simon Byrne

We all find ourselves having to create diagrams to communicate our ideas. It might be a stage plot, vision flow chart, rack layout or desk input diagram.

Visio is popular for this, but no version exists for Mac users. And many people use tools that are either way too complicated for the job such as Vectorworks, or at the other extreme, Microsoft Word! There is a better way.

Draw.io is a free diagramming application that allows users to create and share diagrams within a web browser, or you can download the desktop app for macOS, Windows and

Linux. Think of it as a free Visio, but without the grief.

Draw.IO is powerful, but simple enough to get stuff done quickly and intuitively. It comes with a host of built in icons, clipart, arrows etc and you can import your own as well with full connection functionality. You can import images as icons too. As you'd expect, it has full support for snapping, including connection between icons. You simply drag an arrow from one to the next and Draw.IO does all the connecting and layout on screen so you can rapidly build up a diagram.

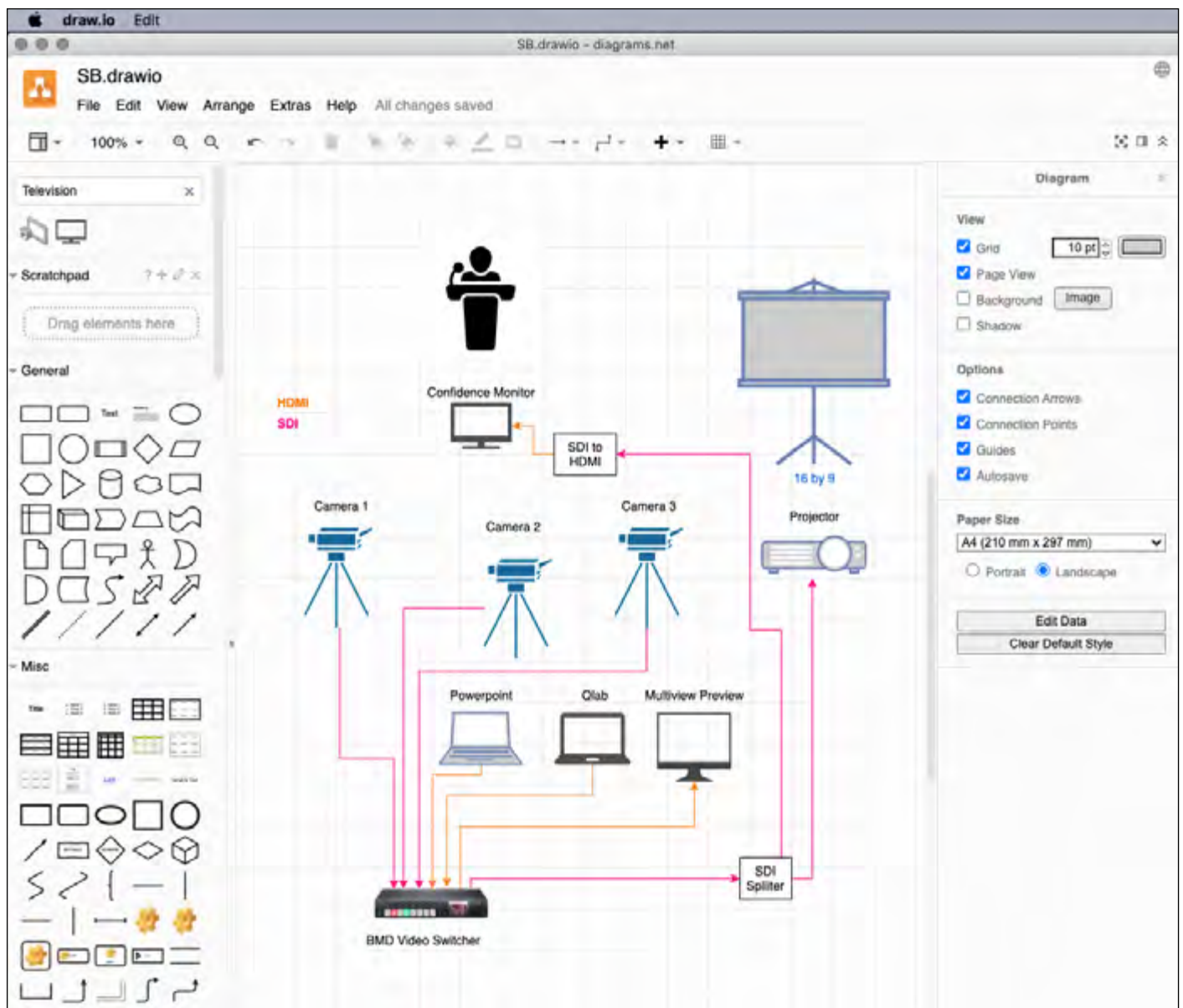
The online version allows saving to Google Drive or Microsoft OneDrive, so that opens up online sharing and editing. It also has layer support which is great for teams. Perfect for those of us who have to collaborate remotely.

Draw.IO is a must-have application.

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You're welcome.



# Event Lighting Lite

The Event Lighting Lite brand from Eventec was born out of the need to offer low budget fixtures to the market, without compromising on quality. Complimenting the Pro range Event Lighting, the Event Lighting Lite range includes LED Pars, LED moving head fixtures, lighting controllers, effects lighting and cases and bags for those products.

One of the most popular fixtures in the range is the PAR12X8L which features 12 x 8W RGBW LEDs and sells for \$209 RRP. Their compact size, together with multiple control options including IR remote, make them an ideal affordable flood lighting solution for many applications including stage lighting, band lighting and parties.

Since introducing the lite series of movers, the LM6X15 has become the fastest selling compact moving head fixture in the range. The LM6X15 features 6 x 15W RGBW LEDs with zooming and retails for \$599 RRP. The Lite series of moving heads follow the same quality as the Event Lighting range, but without some of the higher level features to keep the price as low as possible.

Stepping up in brightness is the LM180 moving head spot, selling for \$1,390. This fixture delivers outstanding brightness,

outclassing similarly priced fixtures currently on the market. Using a high powered 180w white LED light source, the LM180 features a 7-colour colour wheel, fixed and rotating gobo wheels, prism, dimming strobing and DMX focusing.

Also part of the Event Lighting Lite range are the five moving beam effects fixtures. The effects range includes The Storm, Saber and Nitroball, while the Darkstar and Orbit have been upgraded to include red and green laser effects as well. All these effects are great for the budget conscious user, without compromising quality, and the first lot of stock is available to buy now.

**For more information, contact Eventec [www.event-lighting.com.au](http://www.event-lighting.com.au) [sales@eventec.com.au](mailto:sales@eventec.com.au) +61 (0) 2 9897 3077**



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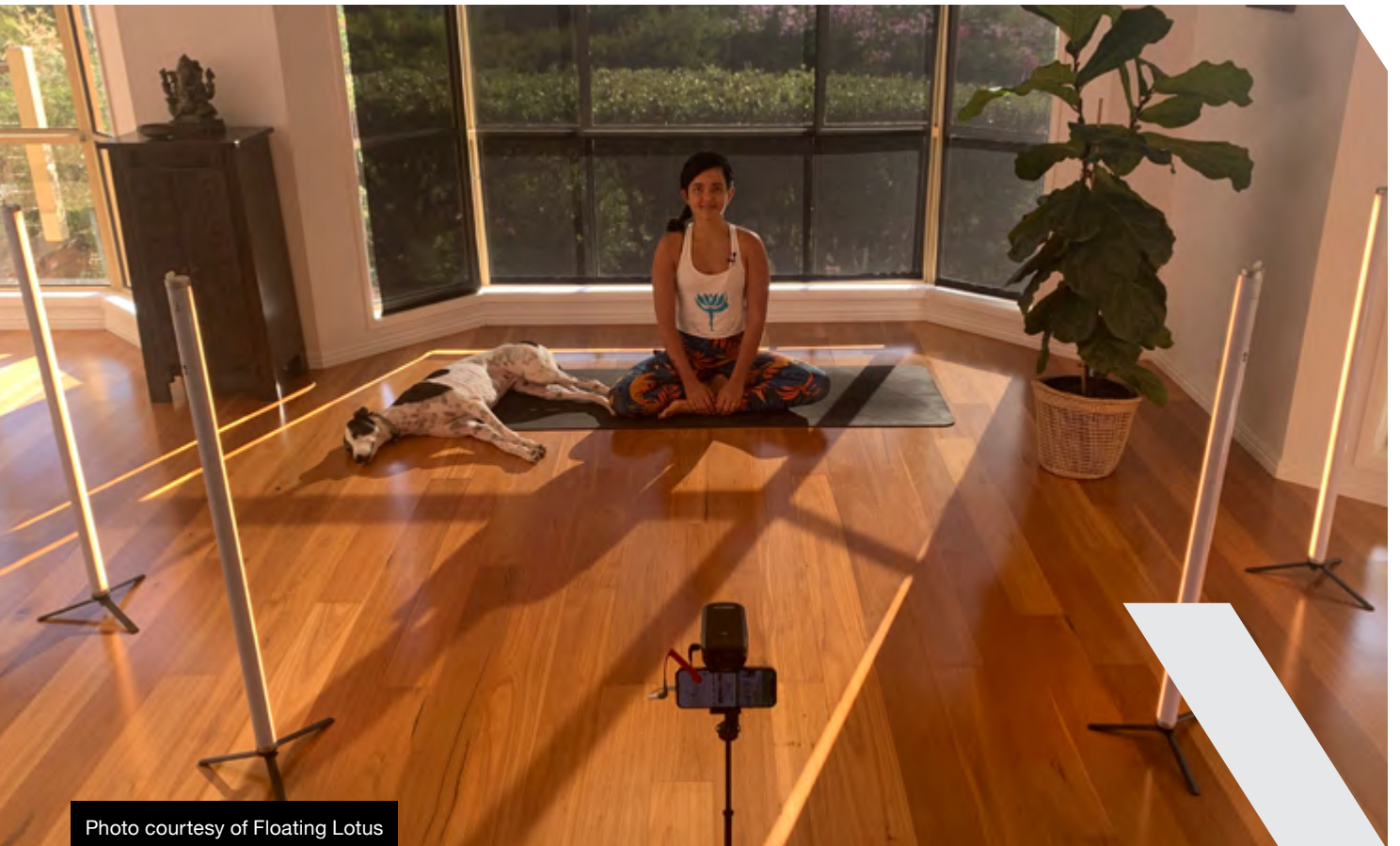


Photo courtesy of Floating Lotus

# Astera For Floating Lotus Yoga Streaming

**Nalini Tebbey owns and runs Floating Lotus, a thriving yoga studio based in Helensvale, Gold Coast, Australia, offering a busy weekly schedule of 41 yoga, pilates and meditation classes.**

Recently, helping to create a harmonious ambience in the studio have been six Astera Titan Tubes.

The business had just moved into a beautiful and tranquil new premises with large windows, lots of incoming natural light and panoramic views, a fully conducive environment for relaxation and concentration, when the coronavirus pandemic and resultant lockdown meant the doors had to be temporarily closed to the public.

Ever resourceful, Nalini started streaming her classes.

While perfect for live sessions, the Studio space needed additional lighting to keep up the quality and style associated with Floating Lotus. Nalini wanted her broadcasts to look

polished and professional, and Astera Titan tubes were recommended, and then sourced from the ULA Group, Astera's Australian distributor.

"I needed good skin tones and lighting that added a subtle glow, not too harsh, just a very nice quality of light," explained Nalini.

Titan Tubes were also a great solution as they come with so many different rigging and fixing options, out of which she is using the floor stands to mount them on.

They are lightweight, easily manoeuvrable and being battery-powered eliminate the need for cabling, while they can be easily controlled from Nalini's phone using the Astera App – fast, intuitive, and fuss-free.

Six Titan Tubes are placed in an arc on the floor around Nalini for a typical streaming session and she dials in a warm, tungsten white ambience using the App, which looks ideal on camera.

This neat installation is further enhanced by the elegant appearance of the Titan Tubes themselves, which look comfortable in the geometry of the yoga space. From some camera angles the lights are on show, so the aesthetics of the fixtures themselves were also important.

Nalini has not needed to dip into any of the many colours and effects, the different CT whites alone have been enough to generate the atmospheric variances required for the different disciplines. Yoga and meditation need lower levels of warmer light while Pilates lends itself to more vibrancy and a cooler, crisper colour temperature.

Keeping her business running via streaming and social media during the lockdown has been crucial, comments Nalini. Classes resumed on Saturday June 6 with reduced numbers, so streaming additional sessions to meet demand is still an option.

## LED Display Systems for the Most Demanding Environments

### FINE PITCH



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Mount Paran Church has notably become the first house of worship to install L-ISA technology



# Atlanta's Mount Paran Church Becomes First House of Worship to Install L-ISA Hyperreal Sound Technology

**Integrator Diversified designs and integrates an L-Acoustics A Series-based configuration to deliver an engaging experience throughout the entire sanctuary**

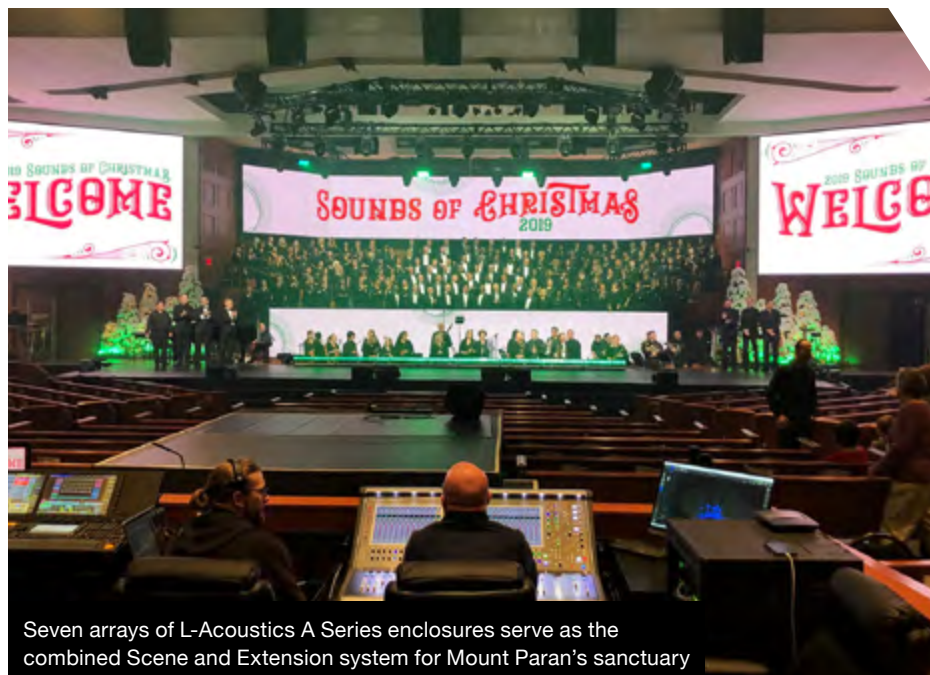
For more than half a century, Atlanta, Georgia's Mount Paran Church has been celebrated by the evangelical world as a beacon of effective ministry and engaged, growing membership, evidenced by its 13,000-plus member congregation. In fact, it was this very community of faith that pioneered the "one church 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.

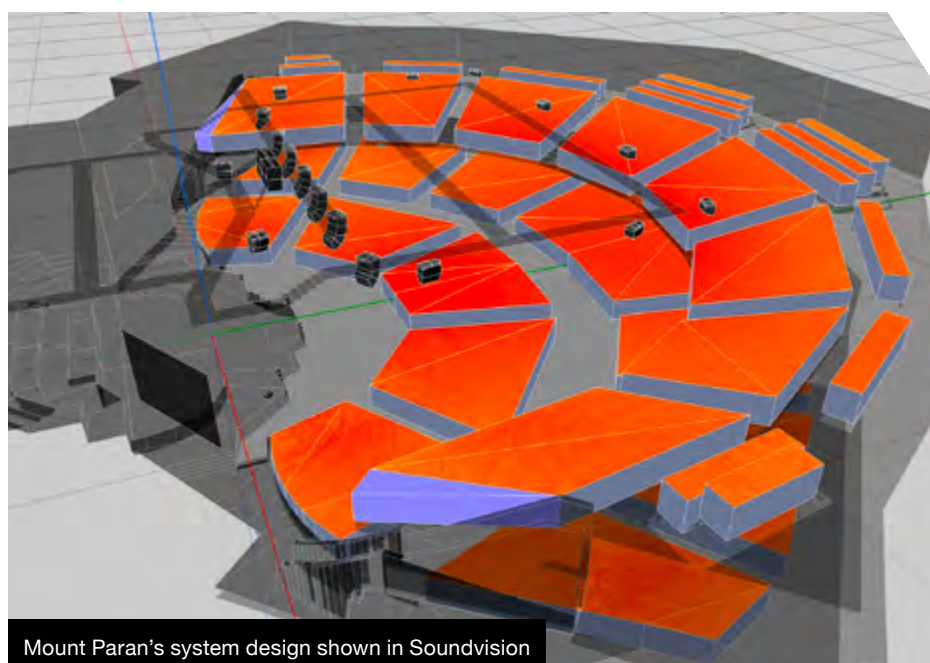
"Good sound is one of the most essential elements in today's churches, and achieving consistent, engaging audio throughout an entire worship space is mission-critical so that the congregation has a shared community experience," says Tim Corder, Strategic Accounts Director - House of Worship for Diversified, the technology solutions provider that delivered the project.

"The previous loudspeaker system in Mount Paran's main auditorium had been in place for many years, and 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."

Although Diversified initially considered specifying a left/right array-based design for Mount Paran's loudspeaker retrofit, the presence of large LED screens on either side of the stage meant that the array lengths necessary for providing optimal coverage would create sightline issues, particularly for those seated in the balcony. Furthermore, the church wanted to minimise the amount of modifications made to the worship space's striking architecture, both for aesthetic and budgetary reasons.



Seven arrays of L-Acoustics A Series enclosures serve as the combined Scene and Extension system for Mount Paran's sanctuary



Mount Paran's system design shown in Soundvision

"With so little space to work with above the screens, we chose to explore an L-ISA design, which offered us the ability to spread the system's power out horizontally versus vertically," says Nick Geiger, Account Executive and Audio Lead for Diversified. "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," Corder shares. "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.

Frontfill is achieved by six short-throw X8 enclosures deployed across the stage lip, with four compact 5XT systems located at centre 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.

Diversified also furnished Mount Paran's FOH mix position with a new DiGiCo SD12 console, which is connected to L-ISA via Desk Link, natively bringing all source controls onto the desk surface and allowing engineers to access L-ISA as an integrated element of their existing workflow.

## INSTALLATION

“L-ISA is an incredible tool for Houses of Worship,” enthuses Geiger. “As an audience member, you don't just want to feel as though you're sitting in the room spectating something that's happening onstage. Mount Paran has a large choir, orchestra and praise team, and L-ISA enables you to feel enveloped by their sound, like you're a part of it, in every seat in the house.”

Corder agrees, adding that 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 feel it come from the left side,” he says. “I've heard them stagger vocal intros between the left, right and centre sections, and you really feel that localisation—and it's stunning! You totally forget that you're listening to a PA because it just feels like you're listening to the choir. I've never had that experience before.”

Mount Paran Church Technical Director David Mendoza says that intelligibility was one of the key points his church was striving to improve with a new system, and L-Acoustics delivered on that, and more. “We wanted our 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,” he says. “When I heard L-ISA, I was blown away; it was a completely euphoric feeling. 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 minimises the distractions within the worship experience here at Mount Paran, helping our congregation feel more connected to what's happening onstage.”

“We at Diversified pride ourselves on being at the forefront of emerging technologies that are making an impact in our industry,” Corder adds. “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 that 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.”

**Mount Paran Church's home on the web is at [www.mountparan.com](http://www.mountparan.com)**

**Diversified can likewise be found online at [www.diversifiedus.com](http://www.diversifiedus.com)**

**“Good sound is one of the most essential elements in today's churches, and achieving consistent, engaging audio throughout an entire worship space is mission-critical so that the congregation has a shared community experience.”**



The DiGiCo SD12 console and L-ISA Controller at FOH

# Sometimes it all gets too much...



The *Support Act Wellbeing Helpline* is a free, confidential counselling service that is available to anyone working in Australian music who needs to talk to someone about any aspect of their wellbeing.



THE SUPPORT ACT WELLBEING HELPLINE IS MADE POSSIBLE WITH THE SUPPORT OF:



by Jenny Barrett



# VISION MEETS BUDGET AND BOTH WIN

**Human Person takes Six60 Tour to the Next Level**

**Six60's *Saturdays* tour started on January 25, hitting Lower Hutt, New Plymouth, Hamilton, Whangarei and Auckland before wrapping up where it all started in Dunedin on March 7. The show began with the band standing silhouetted in front of a static TV screen, incorporated a marae and the national kapa haka champions, and culminated in acclaim for the 'production values of an international act'. The reason: Human Person, the show/production designers that pushed the tour to world class standard and a production team that came to the party.**

Today Wellington-born Human Person lead designer Ben Dalgleish is internationally

renowned, having worked with the likes of Post Malone, Drake and Janet Jackson. But

back in the day, Ben worked alongside Six60 as their lighting designer, "They went from a small bar band to a large New Zealand act touring overseas. We became really tight, traveling to heaps of amazing shows around the world, doing Glastonbury and the likes." Ben relocated to the USA five years ago and although unable to work on the 2019 stadium shows for Six60, both Ben and his company Human Person leapt at the opportunity to design the 2020 tour.

Ben's team reviewed the 2019 show and committed to stepping it up to the next level, "We wanted to visually put the band centre stage. They are the biggest act in New Zealand right now and we wanted to present them in an iconic way." They opted for a three-tier stage design that gave the band the opportunity to move around within different environments, and to elevate them both physically and literally. They determined that the start and the end of the show had to be distinct and really embody Six60. The result - the band suddenly appearing silhouetted



against a static TV-esque backdrop to which they returned at the close of the show.

In Ben's initial proposal to the band he had also suggested incorporating a marae and a kapa haka group into the Six60 anthem *Don't Forget Your Roots*, a show highlight. To do this, automation was incorporated in a simple and effective way, "We had four automated eight metre long strips of LED that could drop down then angle inwards together to create architecture reminiscent of a marae."

Ben knew that working in New Zealand brought added challenges around resourcing and budget, "I made a promise to myself not to accept any limitations to working in New Zealand. The band was investing money in flying myself and the whole team out, and I wanted to design a show of the standard that Human Person would create anywhere else in the world." Ben credits the hard work and innovation of all members of the production team for making this possible, "It took some back and forth with all parties to get the show

to this level, some conversations more heated than others," he laughs, "But at the end of the day everyone pushed the envelope and made it happen."

Ben name checks Global Production Partners (GPP), Big Picture NZ, Spot-light Systems and Theatrical Solutions, "They all came to the party during the pre-production period before I flew into the country. We decided to make the most of the equipment that the vendors had, using larger quantities rather than premium fixtures and making minor adjustments here and there rather than gamechangers."

GPP partners Leon Dalton and MJ van Lingen had managed production and video for the 2019 stadium shows and were excited by the scale of the initial proposal, "I saw the first renders and thought that is a lot of moving lights. There were 16 video screens four of which moved with automation."

Leon reiterates Ben's praise for the suppliers, "We went through a tender process and

those who were involved last year really did their best by us." Newcomers to the team, Stageset, also get special mention, "They were incredible. They came on board for all the B shows with a fourteen metre roof. Ben commented that it looked quite small. Not to the regions!"

Ben wanted to try and bring the biggest possible production to all of the shows, not just the Auckland swansong, "I wanted to do my part to help level up the New Zealand production scene and put the same effort into regional shows. Audiences everywhere should have the opportunity to experience the best possible Six60 show."

Again, GPP and the vendors moved mountains, quite literally, "We toured with four semi-trailers not including the stage, unheard of in New Zealand. There were thirty crew plus the locals and an incredible amount of lighting and video not normally toured by NZ bands to regional centres."

Among the thirty strong touring crew was

**“Human Person brought a level of international expertise that tied all the elements of the show together - the lighting, the video, the set.”**

Six60 production manager Ben Klinkenberg who was instrumental in bringing the whole show together, coordinating closely with the band and the Human Person team. At FOH, sound engineer Chris Tate and the lighting director Jade Fraser manned Soundcraft and MA2 consoles respectively, and at the other end of the snake, David O’Brien handled monitors and MJ van Lingen ran disguise media servers and cut cameras.

One thing that Human Person pushed for which probably had the most profound impact on the tour, and maybe on the New Zealand industry going forward, was a week of production rehearsal time, “This was one of the harder things to get across the line. It certainly isn’t standard in New Zealand, unlike in the rest of the world.”

With the vital support of Six60, their management and Eccles Entertainment, the band and crew spent a week with the full regional rig setup. Human Person used the

time to create moments in which the band would interact with video content, as well as other choreographed moves. Ben was blown away by the result, “As well as being the biggest tour of New Zealand by a home grown band, I am so proud that we got to spend the time to craft such a unique show of the highest standard. Everyone involved was onboard with the vision to create something special.”

Leon agrees. “Human Person brought a level of international expertise that tied all the elements of the show together - the lighting, the video, the set. There was never any discussion about the vision not being possible. We might have had to compromise on how we got there, but we made it work and pulled off an unforgettable tour.”



Regional Shows	Auckland, Western Springs – the ‘A’ show	
<b>Lighting</b>		
20 x Robe BMFL Blade 08 x Robe Tarrantula 06 x Robe 600 LED Wash 20 x Robe 100 LED Beam 24 x Sharpy Spot 08 x Mac 2k Profile 14 x Acme LED Wash / Strobe 08 x RGBW LED Moving Wash 06 x RGBWA LED Par Wash 08 x 4 Lite Molefay 04 x Par 64 MFL MA2 Consoles	47 x Robe BMFL Blade 42 x Robe BMFL Spot 28 x Robe MegaPointe 20 x Robe 100 LED Beam 56 x Sharpy Spot 28 x Mac 2k Wash 54 x Acme LED Wash / Strobe 18 x RGBWA LED Batten	06 x RGBWA LED Par Wash 16 x 8 Lite Molefay 12 x 6 Lite Molefay 08 x 4 Lite Molefay 36 x 2 Lite Molefay 05 x Gladiator Followspots MA2 Consoles
<b>Video - LED</b>		
43sqm of 6.2mm LED for UPSTAGE CENTRE 70sqm of 7.8mm LED for IMAG 55sqm of 12.5mm LED for FRAME & RISERS Eilon Engineering Wireless Loadcell weight management TOTAL LED = 168sqm	78sqm of 6.2mm LED for UPSTAGE CENTRE 160sqm of 7.8mm LED for IMAG 164sqm of 12.5mm LED for RISERS, COLUMNS & AUTOMATED BANNERS Eilon Engineering Wireless Loadcell weight management TOTAL LED = 402sqm	
<b>Camera/Control System</b>		
2 x disguise Solo Media Servers with Notch Playout Custom built 1ME slimline camera system Barco Image Pros Lightware 4K HDMI Matrix Panasonic HS410 1ME Camera Switcher with full Engineering Control 3 x Sony HXC-100 Camera Chains with Canon/Fuji lensing 2 x Sony BRC700 PTZ Cameras 2 x Hitachi HD20A POV Cameras Lightware & Gefen Fibre Optic signal management	Custom built 1ME slimline camera system Barco Image Pros Lightware 4K HDMI Matrix disguise 4x4 Pro Media Servers with Notch Playout Panasonic HS410 1ME Camera Switcher with full Engineering Control 4 x Sony HXC-100 Camera Chains with Canon/Fuji lensing 2 x Panasonic AW-HE130 PTZ Cameras 2 x Hitachi HD20A POV Cameras Lightware & Gefen Fibre Optic signal management AJA KiPro HDD Record System	



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**Amber TECHNOLOGY**

# MELISSA GOLDSWORTHY

## FREELANCE AUDIO ENGINEER

By Toni McAllister



**A love of music drew Melissa to the world of audio and 17 years later she is still here, doing what she loves – helping musicians sound their best and bringing client’s visions to life.**

**What sparked your interest in AV?**

My dad was a musician, so from a very young age I would go to his sound checks and sit up the back with the sound guy and watch him twiddle the knobs and wondered how it all works. Going through high school I was always interested in music and I just knew I wanted to be involved with sound somehow.

I did a couple of courses. An Advanced Diploma of Music Industry Technical Production at NMIT and then a Bachelor of Music Technology at Victoria University. I was the fourth female in Victoria to ever receive that qualification.

**Where did you get your first foot in the door?**

I started off helping out in studios, doing live sound at pubs and things like that. And then I thought I should probably get a real job and I came across AV. I didn't really know what it was to begin with. I had only done audio production. So I applied for a couple of jobs and I got an interview with Staging Connections. That was 14 or more years ago now.

I had no idea about vision or lighting but I picked it up and ran with it. I worked my way up through the company to be a senior audio technician. I also did a few other roles like Technical Support Advisor, a little bit of sales here and there, a little bit of crew rostering.

When I left Staging I got a job at MCEC as a technician. I worked my way up to Technical Director / Technical Services Manager. I had quite a lot of roles there. I managed crew and

operated a lot of the bigger events.

After I left there I went back to freelance and that's where I'm at now.

**What kind of work do you normally do in the freelance capacity?**

Live audio for corporate events. That's my niche. I'm quite well sought after. Obviously not at the moment due to lockdown, but my calendar is booked out a lot of the year, which I'm always grateful for.

**What kind of work do you love most and would say yes to before anything else?**

I really love doing monitors for bands. That's probably my favourite thing to do. You get a lot of appreciation from the band when you pull a good mix for them. Plus, you don't normally have to deal with stressed out clients because you're backstage. I get a lot of enjoyment out of being at the stage and helping the musicians out because if I can give them a good mix, then they're going to play the best that they can play.

**Is there a band or gig that stands out most in your memory?**

They do all start to blend together after a while. A really fun one was an event where we had Guy Sebastian and a 50-piece orchestra. I did monitors for that and I had to do a 50 send headphone mix to all of the musicians. That was really fun. It was the most sends I've ever had to do in my life. It sounds difficult but it actually wasn't too bad.

**So many competing requests.**

Yeah, that's kind of why I love doing monitors. I like taking charge of the stage. I find that if you just take the initiative and run with it, then things run a lot smoother than waiting for other people to make up their minds about things. I normally have an order in which I work and everyone's happy with that.

**Is there a band that you would love to do monitors for?**

I would love to do Tool or someone like that. That'd be amazing for sure.

**Have you worked on the concert or festival side of things?**

Mostly corporate. I do the odd festival or band gig here and there. But I think I do well in the corporate environment because of my people skills. And it pays well (laughs).

**I'm guessing you haven't seen the likes of Tool on the corporate circuit?**

Sadly, no. The corporate world doesn't tend to mix with large scale international acts. I've done monitors for plenty of iconic Australian artists such as Darryl Braithwaite, The Veronicas, Guy Sebastian etc. Mixed for plenty of the reality TV show kind of singers and obviously, lots of corporate cover bands. The great thing about corporate is that there's such a wide variety of acts that you come across. You could be mixing anything from your standard corporate conferences, to string quartets right through to large brass big bands. No day is ever the same.

**What do you think it is that sets you apart from other audio engineers?**

I'm very people focused. I love working with clients and bringing their visions to life in the best way that I know how. That's really rewarding to me. I always remember that even though I do this every day, this might be a one-off event for a client and something that's really important to them. Really understanding that allows you to have a better relationship with them. And it makes you want to do the

best that you can do for them.

**You've been working in the industry for over 15 years. Often people, particularly women, don't seem to stick around that long. Can you put that down to anything in particular?**

Various reasons. AV can be a big shock to the system when you're new to it. It's a very fast paced industry, very stressful with crazy hours. A lot of the time you don't have any social life, all of your social interactions tend to come from your work colleagues. So I think a lot of people, not just women but people in general, find that difficult to cope with for a long period of time.

I think also you have to be good at your job to stick around for a long time. And again, I don't necessarily think that's female based. The thing is that, because there are so few women it might seem like more are leaving. But if you're not so good at your job, you're not going to get work and that goes for women and men.

**The best person for the job, regardless of gender, right?**

In my experience, I haven't seen too many women get knocked back because they're women. Sometimes there's just been somebody better for the role. And it's got nothing to do with their gender. I think it's important to not play that gender card, because it can make us feel like a gimmick.

International Women's Day is a really good example. It is the one day of the year where all of the women in tech get so many requests from all these various companies to work. Now that's great that they want female techs but at the same time, you might not get calls from half of these companies any other time of the year. And it makes you feel devalued because they only want you there so it looks like they're being progressive rather than wanting you for your skill.

**I'd like to think that we don't have this female/male thing going on anymore. That you just get the role because you are good at your job. And you have the right attitude.**

Absolutely, you don't want it to be tokenistic in any way. But we do need to actively encourage more women to be involved in the industry.

I think it really starts with the younger generation, the kids. From a very early age, seeing women in roles that perhaps they didn't traditionally see women in. Getting them exposed to things like STEM. So they can explore different options rather than just the traditional.

**That notion of 'You can't be what you can't see'.**

I think probably the most discrimination that I've seen has not actually come from the industry. It's come from clients and punters. You know, I still get on a very regular basis

"Oh, I've never had a female technician before" or you'll get the client come up to speak to a team of people and they'll always go to the man first. It's little things like that. It makes me feel like our industry is actually quite progressive, even though we don't have as many female technicians. It might be other industries that we're working for that actually have that bias.

Everyone that I work with is completely respectful and loves having women on the team. I think we bring a really beautiful dynamic to work and create balance on jobs. We have a lot to offer.

**Have you had a time when you've been working on a gig where something just didn't go according to plan?**

(Laughs) That's sometimes a weekly event. Honestly, that's just part of being a technician because technology fails on a daily basis and you just have to work around it, you need to keep a cool head. And be able to communicate if there is an issue, not only to your colleagues, but also to the client. I think being up front with the client is the best possible thing you can do, because then they have trust that you're going to be honest and do your best to fix it.

Also knowing when to push that panic button is a good skill to have. For a lot of people pride gets in the way. I think they feel like they need to figure stuff out on their own. But we're a team, we're all here to help each other. I think knowing when to ask for help is a really important skill to have.

**If you weren't working in AV, what do you think you would be doing?**

My hobby for the last year has been dog training. Just for a bit of fun I completed a course in dog training and behaviour and I've been working for a company on the side

running classes. Now because of lockdown so many people have bought puppies so there's actually quite a bit of work going around. So it keeps me occupied and it's fun and who doesn't love a cute puppy?

**Any memorable words of advice that you've received along the way?**

My philosophy is to always back yourself and don't take no for an answer. I think I've always gotten where I wanted to go because I had a huge drive that I could do anything that anyone else could and better. So just having that drive to push you forward will give you the motivation to learn more, to connect more and to get your hands on as much gear.

**Any role models that you've really looked up to along the way?**

I admire most of the people that I work with and I take a little bit from those people and try to incorporate that into my life. I think everybody is a book, and they all have a story to tell.

**Any advice for women or anyone wanting to start a career in AV?**

It's okay to be scared or afraid. I do know that a lot of girls or people who are new to the industry might shy away from things because it's all very overwhelming. The technology might seem confusing in the beginning, but it's okay to be scared of something new, just change your outlook from scared to curious. Tackle the fear with knowledge.

**To find out more about Women in AV Australia follow:**

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# LISTEN EVERYWHERE WITH BEYOND NETWORK SOLUTIONS

by Jason Allen



**Beyond Network Solutions are a networking, AV, and communications company with live events in their DNA. Fronted by George Kostopoulos and Ben Gore, both have extensive experience in live production, with George a specialist in video, and Ben in audio. Born out of a lack of holistic IT services for live events, Beyond handle network and Wi-Fi deployment for festivals and other complex events, ensuring production, ticketing, catering, marketing and every other service on-site is logged on and ready to go.**

With the recent increase in demand for drive-in, socially distant, or live streamed gigs, Beyond went in search of a fit-for-purpose, affordable, and reliable way to broadcast audio to an audience, and came to the conclusion that audio over Wi-Fi via Listen Everywhere was the way to go. With the benefits of being BYOD, license free, scalable, customisable, and not reliant on an internet connection, Beyond's basic Listen offering can connect up to 1,000 users to high-quality stereo audio with no latency, and more users can be added if required.

The tech core of Beyond's Wi-Fi audio system is the Listen Everywhere LW-200P-08 eight-channel server. In addition to being able to run

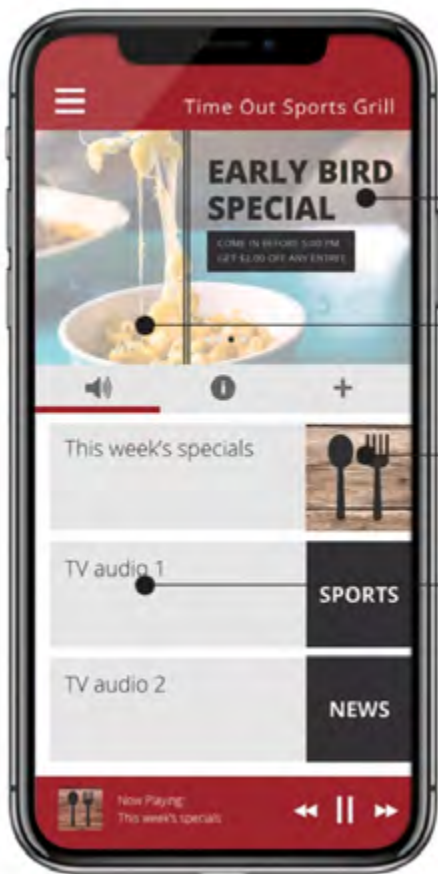
eight separate audio channels, the free app that receives the audio can be customised with branding and run ads and special offers that don't interrupt audio.

"After extensive testing, we determined that Listen Everywhere is an incredibly good product," says George Kostopoulos. "It's such a user-friendly app, and doesn't just do audio. With the ability to run marketing banners, you can do things like offer your audience '\$5 off catering when you show this ad.' And the multichannel audio capability means you can have simultaneous translations of speech running, and the user can select which language they want to hear."

With so many live streamed gigs relying on platforms originally intended for video conferencing, George was sure there was a better way. "These web concerts all using Zoom just didn't make sense to me," he observes. "Not only do you have to rely on an internet connection, there's the delay, and the extra hassle of meeting numbers and passwords, not to mention the problem of people posting inappropriate things in chat. There's just so many points of failure. FM is another technology often used on-site, but then you have the expense and hassle of licensing. We've seen all the problems and believe this is the solution."

With a solid backbone of enterprise grade Ruckus and Ubiquiti IT hardware, Beyond Network Solutions have both the gear and knowledge to roll out complex high-density networks on any site.

"Most production companies don't have all the IT hardware that you need to support site-wide implementation of technologies like Listen Everywhere," elaborates George. "We focus on high-density networking. There's a lot of configuration and custom settings of access points that need to happen for a network to function properly. For example, you need to understand how both data and Wi-Fi actually works. Wi-Fi sits on the most inefficient radio frequencies you can use, and it chews up bandwidth and resources. You have to be across all of your VLANs and subnetting to ensure your network can handle the speed and density of IP addresses being handed out in a short amount of time, make sure there's no conflicts, and not create too much traffic. There's also a lot of optimisation



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that needs to happen to ensure that devices automatically connect to their nearest access point, not one on the other side of the site.”

Beyond Network Solutions offer a full-service on-site deployment, including pre-event preparation. “We help with things like pre-show marketing to attendees,” illustrates George. “Communicating and encouraging them to download the app before they get there. At the show, we’ll help with putting up QR codes and download prompts on LED screens around the venue, and provide simple

‘1-2-3’ instructions on how to get connected. If there are any issues on the day, we’re always there on site, we don’t just set up and leave!”

George also sees a huge market for Listen Everywhere as an installed product. “There’s so many applications for this technology,” he enthuses. “And it’s really easy to incorporate into any permanent installation that has a Wi-Fi network– just plug in an audio input and it’s ready to go. In these cases, we can help with custom branding and design for the app, and

any upgrades or configuration of the Wi-Fi network. Listen Everywhere is so much more cost-effective and easier to deal with than FM and other broadcast technologies.”

[www.listentech.com/assistive-listening/listen-everywhere](http://www.listentech.com/assistive-listening/listen-everywhere)

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Chris Johnson

# SDI vs IP? Riedel Builds Bridges with MediorNet

by Jason Allen

**With the recent release of 13 new hardware devices and nine new software apps in Riedel's MediorNet series of video networking devices, the German comms legend is now an even bigger player in video distribution and processing.**

The acquisition of Canada's Embrionix in 2019, experts in the manufacture of SFPs for handling SDI and video over IP, has put a rocket under Riedel's video line up. I interviewed Chris Johnson, Director of Riedel Communications Australia, about the expansion of their video toolkit, the future of video over IP, and the new world of software-defined hardware in AV.

**Chris, most people know Riedel as a comms company, but video has been a significant part of your offering for a while now, hasn't it?**

That's right - the first MediorNet device was released in 2009, so video has been a big part of our business for over ten years now. We now like to think of ourselves as a real-time networks company; voice communication

is part of that, and so is video. We've been watching and been active in the transition to IP video. We're particularly interested in the development of SMPTE 2110 (essentially the IP equivalent of SDI) as the ecosystem matures. We've been front-footed in contributing to standards development, and in running the 'plug fests' that happen around the big tradeshow. Some say that the move to video over IP has already happened, but it's not the case; the reality in both installations and live productions is that it's a hybrid world, with SDI and IP used simultaneously.

**What are the barriers to video going totally IP?**

Basically, it's harder to turn video into IP than audio, which you could fairly say has made the transition already. When audio went IP, we

weren't pushing the boundaries of switching networks. Honestly, you could do a lot with Dante on even a humble 100MB switch. When we started to look at video over IP a decade ago, the really big switches that did the specific things we needed just didn't exist, and even now the portfolio of video capable switches is still very small. Not to mention that when we look at an SDI cable, it's easy to see only the video, when in fact there is lots of audio and data in there too which needs to be considered.

**So Riedel's not championing one workflow over another?**

We see our video offering as both IP and SDI. We're not one of those manufacturers that force their customers to go one way or the other. There are times where IP makes sense, and times where it doesn't. Events might be more suited to baseband workflow because its quick, plug and play, and easy to troubleshoot. In a facility, IP might make more sense because we want converged infrastructure and the ability to move signals around at will. So now we have a video portfolio that's SDI, IP, and all the bits in the middle, which is the reality of the landscape. If you go into a big IP facility, you'll still find SDI cables.

A good real-world example is Hillsong Conference, which has a serious video requirement. The most fundamental need for the video system at Conference is that it goes from being in a truck, to pushing signal around the venue, in four hours. MediorNet SDI is the right solution for that, and will continue to be for the immediate future. IP will one day be that simple and user friendly, but it isn't yet. If you want plug and play, there's a bunch of development that still needs to happen in video over IP.

Another factor is that the cost of 4K infrastructure can be astronomical. You buy cables to run HD for 100 metres for not much money, But that's much harder for 4K signals, so there's a necessity for tools like MediorNet when dealing with UHD workflows. If you need half baseband and half IP, no worries. We're about the bridge. If you own a fleet of 4K 12G SDI cameras, you're not going to spend seven figures to replace them because they've got the wrong connector – that's just commercial reality. Riedel see ourselves as being able to build our customers an ultimately flexible infrastructure.

**Why did Riedel decide to acquire Embrionix?**

Embrionix shares some of the same DNA as Riedel - it was started by a small team, and

developed in a niche in broadcast. Their video over IP products are incredibly innovative. We recognised that the technology they had was a great fit with what we'd built in MediorNet, but on the IP side instead of the baseband side. We moved to acquire them at the end of last year. The meeting of our companies' respective technology and culture makes it feel more like a merger than an acquisition.

It's amazing what Embrionix can get into an SFP. They're doing multiviewers in an SFP. It wasn't that long ago that doing multiviewers in a single rack unit was an innovative idea. With our MediorNet MuoN SFP, we can get 32 multiviewer heads into a single rack unit, and each one can be 16 PiPs. It's amazing.

**Most of the MediorNet family, excluding the JPEG encoder/decoders, does not use compression. Why?**

Our aim is to keep everything uncompressed until the end of the signal chain, to avoid creating artefacts. Also, it doesn't matter how good your compression is, it is by definition slower than not compressing, because there's a process that has to happen. So staying uncompressed helps keep latency as close to zero as possible. Compression is also expensive; a pretty powerful chip is needed to do it, and that adds cost to a product.

**The MediorNet products are software-defined. This is a new paradigm in our industry; what's led this development?**

While software-defined is pretty new for our industry, it's nothing new to the world in general. For example, we don't buy 'accounting' or 'design' computers, we buy a computer and install whatever software we need. MediorNet originally started as hardware-defined, card-based, and modular; there were multiple parts and multiple SKUs. Then when we introduced the MicroN, we brought the software defined concept to the product, and we've continued that through our whole product lineup. When you produce something software-defined, you have just one hardware SKU. The customer then buys the functionality they want, giving them a future proof investment

Apps control all of the new MediorNet products. You decide what's running on your SFP and what it's doing today. Once your video is converted to SMPTE 2110, we're in the processing space. From there, you can switch, route, create a multiviewer, take signals off the network, put them back on the network, plug into a monitor. We can do up, down, and cross conversion. Whatever you need, 'we have an app for that'!



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# Robe for Lux Partum Art Installation

Photos: courtesy lighting.stream

**‘Lux Partum’ – ‘emission of light’ in Latin – was a beautifully sculpted interactive lighting installation and live stream staged at the Motorwerk event space in Berlin, running May 08-17, created by lighting and show designer Chris Moylan and his team.**

This comprised Lars Musasch, Andreas Schindler, and Matthias Schöffmann together with acclaimed DJ and music producer Paul van Dyk, who composed a special soundtrack and played a three-hour live concert during the first weekend.

The work utilised 54 Robe moving lights including MegaPointes, Pointes plus TETRA2 moving LED battens which were installed in the venue with LED screen elements, and all rigged, programmed and set up to be accessed by the public via the <https://lighting.stream> website and ‘played’ in real-time.

By the end of the 10-day run, over 43,000 visitors from 94 countries had engaged with the art work in 6,355 registered sessions utilising lighting.stream’s bespoke user interface technology. They chose over 200,000 different combinations of lighting / video which were viewed over 528,404 minutes of activity.

Visitors could select the colour and patterns of the lighting and video effects as they played out to the music track, changing at pre-determined points to keep the groove flowing harmoniously.

Running over two weekends and the

intervening week, Paul van Dyk played a three-hour live set at the Motorwerk on the first Sunday night, enabling his massive fanbase to tune into the stream and be part of making the concert visuals look spectacular – each visitor to the site having a three-minute slot.

Chris, like so many others in the industry, was regularly chatting to friends and colleagues, all of whom were getting itchy feet in lockdown, trying to think of some meaningful way of generating positive energy and doing what they love most – designing shows!

He hit on the idea of creating an art piece with light that could be shared and enjoyed remotely and safely by as many people as possible.

He gathered his team, who also happen to be great friends, and they started talking. Matthias is based in Austria and works with Chris extensively on programming light shows, and he developed and energised all the web streaming geekery; Lars helped source the venue via his extensive network of connections and called on rental company TLT Event to provide the kit as well as supplying some himself, including the LED screens and the console. Video expert

Andreas Schindler designed and produced all the generative visuals.

The physical starting point was getting the venue. From there, Chris took the Motorwerk’s striking interior and evolved his visual brainchild! The former engineering factory and industrial space built in 1921 is now a heritage-listed building, renovated to retain all the original character and raw elegance to become a charismatic event space.

The main hall stretches over 90 metres long, has a good height and is full of iron columns and RSJ beam-work, so Chris wanted to accentuate the scale and architecture of the space and integrate it into the design.

“It immediately lent itself to a distinctive geometric lighting design,” explained Chris, “and to having beams and LED battens as the lighting instruments”. He adds that it was also relatively easy to rig the lighting in the space utilising the house rigging facilities plus structural elements like the balcony rails and RSJs.

He measured out the room meticulously, and lights and LED video panels were positioned precisely.

In the case of the lights it was so their beams could create a series of closed hexagons running all the way down the hall, optimising the sense of perspective for the webcam position from which remote viewers would see and experience the work.

Using hexagonal geometry as a base also enabled multiple other shapes and patterns in different combinations, all of which looked good together.



Lighting equipment, including some of the 20 Pointes, 20 MegaPointes and 14 Tetra2 bars – were supplied and rigged by TLT Event. Additional Robes were supplied directly from Robe, and the final two MegaPointes needed came from Berlin’s Friedrichstadt Palast Theatre (closed right now but Chris has designed their current show, and the fixtures were from the house rig).

Two rows of MegaPointes deployed on the floor were mirrored by two rows in the ceiling all at exactly the same distance away from each other. Rigged along the middle section

– just beneath the balcony that traverses the entire length of the hall – were two rows of Pointes immediately above / below one another, with exactly four metres between the top and the bottom MegaPointes and the Pointes.

This set-up created the perfect geometric patterns that Chris envisioned.

He has used both fixtures extensively in his work, and likes them for their speed, brightness, and versatility. “For a relatively small amount of lights in a large space, we

could make a massive impact.”

A series of LED PARs were installed between each of the columns.

It was his first-time using Robe’s new TETRA2 LED battens, and he was blown away with their brightness and intensity. “They are like monsters!!” he exclaimed, “We could not use them at full intensity as it was too much, so they were tweaked down!”

Seven TETRA2s were positioned vertically each side at the back of the room, with one

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column of 10mm LED screen in the middle to produce a blisteringly bright and dynamic end feature that helped create an illusion elongating the physical space which was especially effective onscreen.

Chris enjoyed the “impressive” walls of light that could be created with the TETRA2s and he also included its flower effect in the stream’s viewer options. “It’s a very cool innovation to have this sort of feature on a linear bar.”

The other LED sections were attached to the pillars all the way down the room.

Lighting was all programmed on a grandMA2 console and the generative visuals were created by Andreas using Notch running via a disguise media server which mapped it to the screens, playing out via Resolume. When prepping, they visualised all the video and lighting effects on the screens in Depence2 so they knew exactly how they would look when combined.

Considerable time was spent on ensuring that the lighting and video elements would look great together in every different possible combination. What might sound like a simple

task was in fact very complex, and required a balance of calculation, experience, and the team’s mutual understanding of each other’s specific disciplines.

Those logging on to the website to ‘play’ the visuals were able to change the colour and shape / angle combinations of cues which were executed at the next musical change – which they could also see coming up.

Getting Paul van Dyk involved was the icing on the cake in many ways. Chris has worked as his lighting designer for many years. He suggested the proposal and like all artists unable to perform live right now, van Dyk was super keen to be involved in something imaginative and fun.

“We had some stipulations about the music track,” explained Chris. “The main one was that there needed to be a lot of shifts and multiple lifts and falls to trigger the (visuals) change commands in the software ... and he got it immediately.”

For Paul van Dyk’s pumping live set, Chris was himself onsite activating the lighting changes, with guests to the website choosing the colours and positions. He admits to a

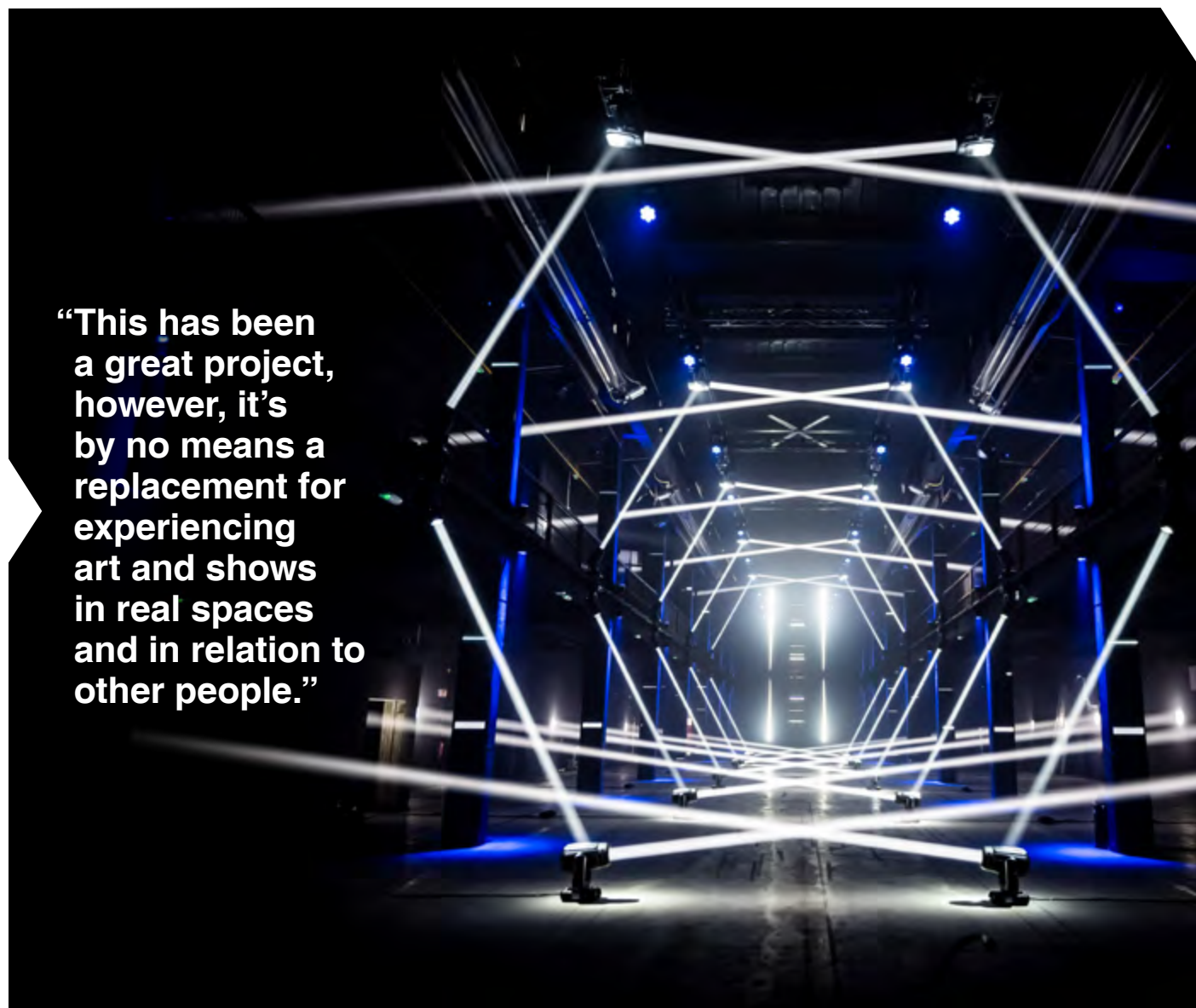
few sharp intakes of breath when it came to colour combinations ... “but that randomness was all part of the fun!”

All the team and the crew from TLT Event loved being on site again and being involved in a show. “You cannot believe how excited we all were to be there and be working together – all socially distanced of course – but there in the venue for real! We are all so passionate about this industry and what we do, so really appreciated the opportunity like never before!”

Apart from Lux Partum being a massive success, the work is most definitely an inspired and brilliant product of the coronavirus pandemic, lighting.stream is a technology with a huge future potential, which Chris and his team fully intend to explore.

Chris concludes, “This has been a great project, however, it’s by no means a replacement for experiencing art and shows in real spaces and in relation to other people. Culture must continue, and people most definitely need haptic experiences in three-dimensional environments.”

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**“This has been a great project, however, it’s by no means a replacement for experiencing art and shows in real spaces and in relation to other people.”**



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Luxibel B Direct II

# LUXIBEL'S UVC STERILISATION FIXTURES

by Jason Allen

**UV light has been used for sterilisation and disinfection since the mid-20th century. It has also been widely studied, with countless publications on the effectiveness of UVC for the sterilisation of air and surfaces. With advancements in technology, specifically in the UV bulbs themselves, UVC's reliable lifespan in the thousands of hours and smaller size has broadened the field for where it can be used: water, air, fruits, vegetables, surgical utensils, and on electronic devices where liquid disinfectants would either be less effective or damage the items.**

Luxibel UVC fixtures use Philips Germicidal Lamps; low-pressure tubular fluorescent ultraviolet (TUV). Extensive laboratory studies have been published on the effectiveness of the Philips Germicidal TUV lamps, gaining them approval for use in air, surface and water purification.

With a range of UVC fixtures from Luxibel on offer, and an obvious urgency in the market to keep everyone Covid-19 free, we asked Luxibel's International Sales Manager Damon Crisp and Paul Rumble, General Manager for Victoria with Australian and New Zealand Luxibel distributor ULA Group, some hard

questions about safety, validation, regulation, and deployment of these unique products.

**Were Luxibel already considering manufacturing UVC fixtures before the COVID-19 pandemic?**

Damon: Luxibel's CEO Mr Glenn Roggerman is heavily involved with the medical community in Belgium, so much so he flies the emergency Helicopter Medic 1 to assist in serious life threatening situations. He was aware before Covid-19 that hospitals and medical centres the world over were suffering acutely from HAIs (Healthcare Associated

Illnesses) and seeking a solution. UVC had all ways been part of our plan to grow the Luxibel lighting division, but it's fair to say this became a priority as the pandemic started to hit Europe. Something was required immediately to stop its onslaught, and to help the industry return to the road safely.

**Which health/regulatory bodies have confirmed UVC's effectiveness for disinfection?**

Damon: The CDC (Centre for Disease Control and Prevention), FDA (U.S Food and Drug Administration), ICNIRP (International Commission on Non-Ionizing Radiation Protection), and the National Health Service UK have all confirmed UVC's effectiveness.

It is also worth noting the warnings against so called "domestic/handheld" UVC sanitation fixtures that some companies are promoting. The Luxibel fixtures should not be mistaken for the units spoken about by the ARPANSA (Australian Radiation Protection And Nuclear Safety Agency) and CIE (International Commission on Illumination).

**Which specific health or manufacturing standards do the fixtures meet?**

Damon: They specifically meet ISO 15858:2016(en), and we have FDA approval pending.

**Does the person or company installing products from the UVC range need any special training, qualifications, or licenses?**

Paul: As the units are mains powered, they have to be installed by a certified electrician.



Luxibel B Direct

Luxibel B Air

Luxibel B Hybrid

Beyond that, the B Air, as an enclosed unit, works by fan-forced air passing by the germicidal lamps at a rate sufficient to ensure a maximum kill rate. When designing an installation, the volumetric space to be treated needs to be calculated to determine the number of units required, as we do when specifying the correct haze machine for a project.

The B Direct units are treated as we would any luminaire, using software to plot their location within the 3D environment. Consideration is given to any objects that will cast shadows, sometimes requiring multiple fixtures to ensure a consistent and even coverage across surfaces. The performance of surfaces within the space will also influence the coverage, so for areas with reflective materials, the ambient coverage will increase as it does with production lighting. Once we have the 3D model with sufficient coverage, we can calculate the time required to reach the desired kill rate. The main influence on this is the distance the fixture is from the area to be treated. Just as it is in photography, the lower the light level the longer the exposure required.

#### How is an installation validated?

Paul: Once the system is installed the coverage and exposure time can be measured and focused for maximum effectiveness through the use of dosimeter stickers or cards. These very simple and cost-effective products consist of a photochromatic ink which is stimulated by the UVC light. An enclosed colour scale displays the dosage level it has been exposed to, much the same

as a PH test kit does for liquids.

#### What special safety measures need to be adhered to during installation?

Damon: All UVC product should be fitted to a separate mains spur, which we advise should have MCB and RCD protection. Our partners must have fully calculated the cubic capacity of the room, and taken dosimeter readings so the client can be sure their purchase will do what we claim. Only authorised professionals should undertake to evaluate the quantity and type of units required in specific rooms. We have a range of medical strips that can confirm kill rates on surfaces, along with special air meters that can read the purification process both before and after. Testing of all safety features, including the 360 degree cut off sensor, audible alarm and red 'Warning- In Operation' LED, must be done to ensure the installation is safe to hand over to the end client.

Paul: These are electrical devices that need to be terminated by a competent person holding the correct qualifications as set out in the Australian Standards. Also, PPE such as gloves and eye protection should be worn when handling lamps of any type, including the low-pressure tubes used in the Luxibel UVC range.

#### What safety measures need to be taken when the unit is in use?

Damon: The B-Air Kills up to 99.9% of all airborne bacteria and is totally safe to operate when human beings or animals are in the room due to its enclosed housing. Direct kill units used for decontamination

and disinfection of surfaces like the B-Direct units can only be operated when no humans or animals are present. It is advised that rooms in public buildings are locked with a two-stage lock during this cleansing process to prevent accidental human interruption. Luxibel provide a sticker and UVC label pack that can be stuck to doors and windows to advise the process is in place.

#### What automatic safety features are included with the units?

Damon: Luxibel have the most intelligent UVC lights on the market today, with 360 degree movement sensors, audible warnings and a red flashing LED to notify that the cleansing process is in operation. All units will shut down if the cycle is interrupted, and a full cycle is needed to ensure effectiveness after a shut-down. For safety reasons, that can only be triggered by a full restart.

#### Have there been any specific clinical trials to determine UVCs effectiveness against COVID-19, or are there any currently in progress?

Damon: A recent study at Boston University shows that the specific UVC tubes used by Luxibel for the Direct, Air, and Hybrid units are proven to kill Covid-19. You can find more information on that here: <https://tinyurl.com/y8awv6nz>

[www.luxibel.com/en/products/uvc-systems](http://www.luxibel.com/en/products/uvc-systems)

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# Something for nothing... Almost – Antennas

by Simon Byrne

**We use radio frequency links a lot on gigs. From wireless microphones, in ear monitors, crew comms, camera links, presenter remotes, wireless DMX, and nowadays, lots of people are using 4G LTE modems to stream events. All of those uses are considered critical in a show environment where even a minor failure is unacceptable.**

So how do we make those links more reliable? More power is rarely the answer. Check out this example.

Say we have a wireless audio link and we want to get a hundred metres range which is twice its specified range. If we use perfectly omnidirectional antennas, known as an isotropic on both ends of a radio link, and we want the link to travel twice as far by using power only, you'd think that you need twice the power, right? Unfortunately not. That won't work because it is not a 1:1 ratio, you actually need about ten times the power! That is because the inverse square law applies and twice the power only gets you about forty percent more range.

The other downside to more power using isotropic antennas is potential interference with other devices because we are pushing out a lot of power in all directions. Not good.

However, by using smart antenna design, the amount of power is dramatically reduced.

Before I go further, we need to revisit decibels with reference to power, which is calculated differently to decibels in reference to sound pressure level. With power, an increase of 3 dB is double, 6 dB is four times, 10 dB is ten times, and 20 dB is one hundred times the power. With SPL, a 6dB increase is double because the base of the logarithm is twenty.

Isotropic antennas are really only theoretical. They are the perfect idealised omnidirectional antenna that do not exist in real life. They are however our reference point for antenna gain. Now importantly when we talk of gain in antennas, we are not talking of gain where an amplifier is involved. With antennas, gain is in reference to our theoretical perfect isotropic

antenna and defines the degree to which an antenna concentrates radiated power in a given direction. That is, instead of radiating the power omnidirectionally, the power is focussed in a given direction, thereby radiating more power in that direction. That of course means that an antenna has to be poorer in the other directions.

Now, if we have a directional antenna on just the receiver alone of our example above with a gain of 10 dBi (10 decibels of gain when referenced to our isotropic), we have solved the problem without extra power because the receiver is now pulling in ten times the power from a single direction. Now imagine if we had a directional antenna on the transmitter too which also had a gain of 10 dBi bringing the total gain in the system to 20 dBi. As long as you have line of sight, we now have a link capable of five hundred metres! This is because we have increased the gain by one hundred times.

By way of background, the International Space Station has a standard Kenwood D700 amateur radio with a transmission power of just 5 watts on 145.8 Mhz. The ISS is 408 kilometres above the Earth, yet ham radio enthusiasts routinely establish dialogue. The key is great antennas!

Radio waves are a type of electromagnetic radiation with wavelengths. The wavelength of radio waves can be anywhere from millimetres to many thousands of kilometres. Like all other electromagnetic waves, radio waves travel at the speed of light in a vacuum and the wavelength for radio signals can be calculated by dividing the speed of light by frequency.

To receive radio waves, you need an antenna of some sort which electrically resonates to the frequency.

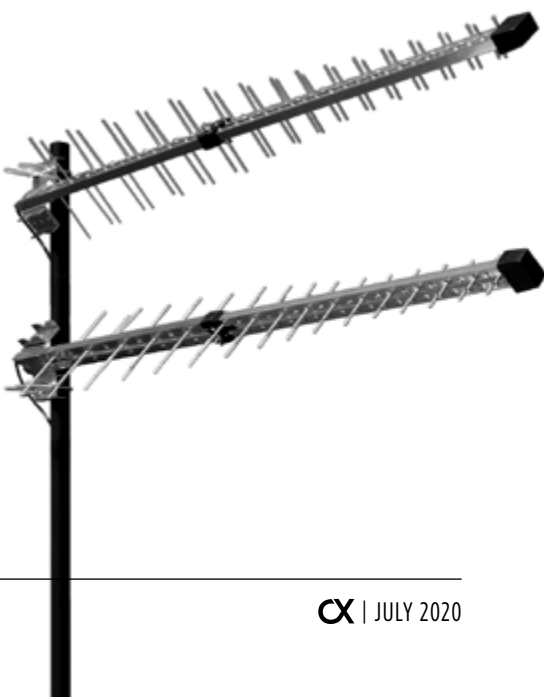
## The 1/2 wave dipole

In real life, the fundamental antenna is the 1/2 wave dipole. The 1/2 wave dipole is made up of two 1/4 wave conductors. For example, the wavelength of 600 Mhz from a wireless microphone is five hundred millimetres. Therefore, a dipole will be made up of two 1/4 wave conductors 125 mm long. Why not a full wave antenna? If you think about it carefully, a full wave antenna will not work because both the positive and negative portions of the wave are being presented to the antenna at the same time, so it cancels itself out.

Say our 1/2 wave dipole is oriented vertically, it is said to be vertically polarised. It will pick up vertically polarised signal from all directions around it horizontally, but not so well from directions above and below it. This is because its reception is like a doughnut.

These antennas are considered omnidirectional in the real world and 1/2 wave dipoles have a gain of just over 2 dBi.

Most other antennas are derivatives of the dipole. Designers can do some clever beam shaping by using multiple omnidirectional antennas and manipulating the phase of the signals on those multiple antennas.



**The 1/4 wave monopole**

The 1/4 wave monopole is really just the top half of a dipole, referenced to a ground plane. You see these everywhere as they are the cheapest, simplest antennas to deploy. For example, many lower end wireless microphone receivers often come with 1/4 wave antennas.

A 1/4 wave antenna must always have a ground plane. That is, something for it to work off. For example, in wireless microphone receivers, the case of the receiver itself (which could be considered the other half of a dipole). As long as you have a really good ground plane (you rarely do), theoretically you can get as much as 5 dBi gain because the ground plane tends to focus the energy into the 1/4 wave. In the real world however, a good ground plane on portable is rare, so the gain is usually much less.

It is for this reason that separating a 1/4 wave antenna from its device with a cable in between is usually a bad idea.



**The Yagi**

Yagi antennas are made using a 1/2 wave dipole with other elements to direct and reflect the waves. A typical Yagi antenna has one element behind the dipole. This element is called a reflector. The reflector is slightly longer than 1/2 wavelength. The elements in front of the dipole are called directors. The practical gain of Yagi antennas is 6 to 20 dBi, depending on the number of elements. As a consequence of its ability to provide high antenna gain on a tuned frequency range, the Yagi antenna is not good for picking up a wide range of frequencies which is needed for a wide band system such as a wireless microphone system which can operate from say, 520 Mhz to 694 Mhz.

**The LPDA**

The solution to the bandwidth problem is a log periodic directional array, sometimes known as an LPDA. They look similar to, and are often confused with, Yagis. LPDAs are directional antennas that can resonate over a wide range of frequencies. All they are is an array of carefully spaced dipoles, sized to resonate at the different frequencies within the required range. Depending on the frequency being picked up, the matched dipole acts as an antenna, and the others act as directors and reflectors. Super clever! A typical LPDA has a gain of 7.5 to 9 dBi across a wide bandwidth. That is an increase of nearly ten times the power which is very respectable. Paddle antennas are LPDAs.

**Cable**

Don't throw away your gains with poor cable! It is important to note that a lot of power is lost in the antenna cable and you must plan for it. Generally speaking, the higher the frequency, the greater the loss. Using the classic RG58 coaxial cable at 600 Mhz, you'll loss 3.8 dB over a ten metre length.

But using the more expensive LMR400 coax, you only lose 1 dB over ten metres. Losses in cable can be overcome by using as shorter lengths as possible, or with radio frequency amplifiers. For example, Shure's range of paddles have switchable RF amplifiers built into them, solely to overcome cable and connector losses.

It should be noted that terminating good RF cables can be quite tricky. There is a lot of voodoo to how RF works within a cable because you want maximum power transfer within the cable without reflections. The power does not travel within the conductors. Instead the electromagnetic field exists between the inner and outer conductors so spacing and design is of utmost importance. For critical RF cables, I get RF specialists to make cables for me, usually out of LMR400 with quality connectors. By quality connectors, I mean a brand that has been tested in a lab and proven to perform. A lot of the copies may look exactly the same, but quite often their performance is very poor.

As well as high performance antennas, there are lots of other things you can do to improve wireless links.

Line of sight. Duh! No wireless link should be considered reliable on a show unless there is line of sight between the transmitter and receiver.

Get them up high and pointing correctly. By getting at least one end up high, you are obviously removing signal path obstructions, but also reducing the strength of any multipath reflections from the ground because they have to travel much further as a result of the greater distance and angle of the antenna from the ground.

Talking of multipath reflections, they are always there because there is always at least one other RF reflective surface, the ground

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you are standing on. In addition to the the ground reflections, there are usually walls, steel rigging, vehicles etc which all reflect radio waves. They can meet at the receive antenna in a constructive way, in that they add to each other which is good. Or they can combine destructively, which is bad. This is why diversity reception exists.

Say you had a one in one hundred chance of a dropout as a result of a multipath signal combining with the direct signal destructively at the receiving antenna. On a gig, that is not good enough. However, add another antenna and receiver that is physically uncorrelated to the first which also has a one in one hundred chance of a dropout. What is the chance that they'll both dropout at the same time? One in two hundred perhaps? Or is it more? In theory, it is one in ten thousand because you multiply the probabilities. This is obviously why diversity receivers are so popular, but for the diversity to really work, they must be genuinely uncorrelated. That is, picking up the signal independently.

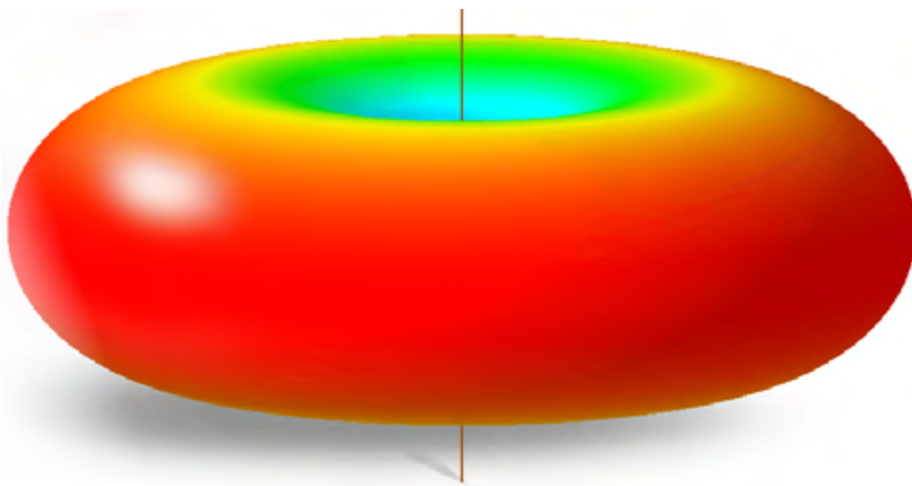
To do this, your diversity antennas must be spaced by a large multiple of your wavelength. In our 600 Mhz example, the wavelength is half a metre, so as long as your spacing is more than that, and up high, you are good to go.

What about two antennas connected together in parallel to a single input on a receiver? This does not work because they can work against each other. You can have an out-of-phase signal being received which cancels out an otherwise good signal from the other antenna.

## 4G LTE

A lot of us are now streaming events using 4G LTE modem dongles. In Australia, 4G networks use seven different frequency bands, ranging from 700Mhz (known as Band 28) through to 2600Mhz (Band 7). As a user, you have zero control as to what band is provided to you by the network. That is a shame because the band that you connect to really affects your speed. The higher frequency bands tend to deliver greater speeds, but with much less reach, and the lower 700Mhz frequency is great too because it tends to get around obstructions much better, albeit with less upload/download speed.

Because of these wide range of frequencies, your modem dongles need very wideband antennas. This is no easy feat as the wavelengths range from 11.5 centimetres up to 43 centimetres, and the modem dongles normally have the antennas built into them. Then, as the modem is usually indoors, we lose transmission power through the walls, have to deal with multipath reflections, and so on. And lastly, our modems may have to compete with the interference generated by every other mobile phone in the room, as well as any other users between the venue and the cell tower. It is impressive that they work at all!



The network cells are spaced roughly three kilometres apart. In sparsely populated areas they are spaced further apart and will tend to use the lower frequency bands as the lower frequencies propagate further. In densely populated areas, there are many more cells spaced more closely. This is so the telcos can use the available spectrum more efficiently by using lower power transmissions which gives the telcos more capacity, plus there are many more obstructions in populated areas. More smaller cells in an area equals more users.

4G LTE can use multiple frequencies and may switch at any time. It is done as part of a technology called MIMO. Multiple In, Multiple Out works by using at least two antennas and transceivers on both ends (known as 2 by 2). It is an extremely sophisticated version of diversity that takes advantage of the polarisation angle and phase of both signals to extract out more capacity. In MIMO, one channel is polarised at +45° from vertical, and the other is at -45°. That is, 90° apart which gives it diversity separation. MIMO configured antennas are easy to spot because of this.

So how do you get a reliable signal? External, well designed antennas, in a MIMO configuration. Many modem dongles have two connectors for external antenna. They'll instantly give you about 4 dBi, but if you are able to put them outside, you can get as much as a 20 dBi increase. That is one hundred times more power getting out of your modem dongles to the cell! I regularly get 40 Mbps upload speed with my 2 by 2 external MIMO antennas, whereas indoors I usually only get about 9 Mbps upload using the internal antennas.

If you want to know which band your cell tower has assigned to you, most modem dongles can display that information by way of their diagnostics page using a web browser. In these pages, you can get a whole heap of other information too.

RSRP and RSRQ are the two important indicators of signal strength and quality. RSRP stands for Reference Signal Received Power and RSRQ stands for Reference Signal Received Quality.

These two indicators combine to give you a very good picture of what is going on with your connection. You can have a low strength connection, but still good quality. Normally though they go hand in hand.

There is another indicator, RSSI which is Received Signal Strength Indicator. This is the one that gives you the bars on your phone. It is however quite a poor indicator of what is really going on because it is showing the received power across all the LTE bands, not just the ones you are using.

For this article, I've stayed away from 5G because its coverage is still patchy. However, it is a spectacular set of technologies that operates at much higher frequencies and may use as many as 128 MIMO antennas to achieve very sophisticated beam steering. As a result of the very high frequencies, the telcos need many more low power base stations to achieve the same coverage.

Get to know your local RF specialists. These are the guys who sell commercial two-way radios, repeaters, point-to-point data links, properly designed MIMO antennas for 4G LTE, and so on. They are a wealth of information as they live RF theory, plus they have the quality cable by the metre as well as the connectors that work properly. In my experience, they really enjoy working on our projects as well.

Now for you grammar police, I'm aware that many of you think the plural of antenna is antennae, not antennas. But when researching this piece, most of the RF engineers refer to them as antennas, and so have I.

4G LTE Power and Quality	RSRP (dBm)	RSRQ
Excellent	Less than -80	Less than -10
Good	-80 to -90	-10 to -15
Mid Cell	-90 to -100	-15 to -20
Cell Edge	Greater than -100	Greater than -20

# EAW RS SERIES



the LF and HF stages on the performance boxes, while the crossover on the professional models is higher at 1kHz.

While I've given up quoting SPL specs on the basis that I find them generally useless in relation to real-world performance, I note that the performance range boxes run a couple of dB higher on paper. I do credit EAW for having the decency to include some detail

by Jimmy Den-Ouden

If you were looking for some speakers which sounded good and weren't too heavy to lift or expensive to buy, you'd be hard pressed to look further than RS series by EAW. The line-up comprises four two-way cabinets and two subwoofer options, and in the compact point-source market there's not too much more you could really want for. Let's first look at the range on paper, and then get onto more detail about what I think.

The RS121 and RS151 "professional" models are the entry point to the full range boxes, in 12" and 15" designs respectively. The "performance" range RS123 and 153

take sonic performance a step up, the most notable change being a 3" voice coil neodymium compression driver. This allows for a lower crossover point of 800Hz between

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## ROAD TEST

on how the spec was derived, which lends it more credibility than I've come to expect. Frequency response is slightly extended at the low end on the 15" models compared to the 12" boxes.

Amplifier power is listed simply as "Max Output LF/HF 1500W peak", and while you'd think this indicates a passive crossover the spec sheet actually tells the story differently – the cabinets are bi-amplified. In any case while the power spec looks like the right number in today's market, who'd care even if it wasn't? You're never gonna link that amp module to anything else so it really doesn't matter.

Weight is a big thing with RS, or more accurately it isn't such a big thing. Upon unboxing the brand-new demo gear I was surprised to discover most of the weight was in the packaging. The speakers themselves are very easy to handle – 24 or 29kg for a full range box, and 32 or 40kg for the subs. I love a PA that is actually practical for a solo operator to deploy. There are even optional castors to bolt onto the back of the subs. Clever. The two-way boxes have an angle on one rear edge, so you can lay them sideways and use them as wedges (or on the other side as front fill).

The full range boxes have fly points everywhere. Some small details like the plastic handle backing cups or top hat mounts may draw criticism, but for the weight of the box they're completely fit for purpose. The important take-away here is that the RS series is just as good on the road as it is in a permanent install.

Visually I'm pedantic about things looking nice, I'm sure I've probably made passing remarks on this in the past. The RS series is solid on that front – the wooden cabinets are nicely finished with matte grilles and it's all very subtle. There's an argument for painting or removing the badges and going full "stealth mode", personally I'm fine with my clients knowing I've invested in decent tech so I'd leave 'em as is.

Down at the business end of things, the back panel of the sub includes input and loop out XLRs (in stereo) and a couple of buttons. LPF can be switched between 80 or 100Hz, and the loop outs can run with HPF or full range. There's also a "punch" button that gives you some extra output at the expense of a slight reduction in extreme low end. Actually it's a pretty good button, I like it. There's a power switch, IEC input socket and an input level pot which goes all the way up to +15. So you can compensate for inadequate drive gear if need be.

The full range boxes are similar on the rear panel front – very simple. Mic/line input choice, level pot again good for +15, and a main/monitor mode switch. After pulling out a dozen screws and removing the front cover I discovered you can rotate the horns

to change the nominal coverage angle from 90x60 to 60x90. Useful for wedge mode. The horn is actually the same constant directivity design as used on the MK series product, so it's a proven design.

The very minimalist rear panels belie the quite detailed processing behind – the RS series implements a DSP with both EAW Focussing and DynO processing. While I can't tell you how these work, the phase response plots are a pretty good indication they do work. But again while it's all well and good to talk about graphs on paper, at the end of the day real-world performance trumps numbers. And my word do these perform...

The test system comprised a stereo setup of RS123 tops and RS115 subs. The threaded mounts in the subs meant I could just use a threaded distance rod to mount the RS123s on top. Tidy. Running some content it was apparent there was a good deal more PA there than my factory space called for – the limiter in my head lit up while the speakers showed no signs of even touching a limiter. The signal LED flickered as if to taunt me, while the limit LED stayed off.

The long and short is that the test system had bucketloads of level and it sounded great. The top/sub combo actually stuck together really well, which isn't always (or even often) the case with such systems. I think pushing the switchable crossover down to 80Hz helped, but again you could probably eek a few more herbs out of the RS123 by taking that up to 100Hz. Really I think it's a decision best made based on the content you're dealing with. The important thing for me is the smooth and very usable performance. It does what you tell it to.

The other striking thing for me was the imaging. I know large format stereo simply isn't practical for 90% of the audience, but that didn't stop me appreciating that as a system, my demo kit presented the stereo image really nicely. It really has no right to sound this good for the money. The whole RS series is priced very attractively.

I like that the brains of these speakers exist but they're not out on show. RS is a speaker you could easily dry hire to people and not worry about them a) killing it or b) being confused by a huge array of controls. It's the kind of thing you can just push out the door regularly and watch it pay for itself. Neat enough to ace a corporate show, and punchy enough to do a rock band. It's my kind of gear.

**Product Info:** <https://www.eaw.com/products-series/rs-series/>

**Distributor, Australia and New Zealand:** <https://www.pavt.com.au/>



# Part 1:

# MY EARLY DAYS OF AUDIO

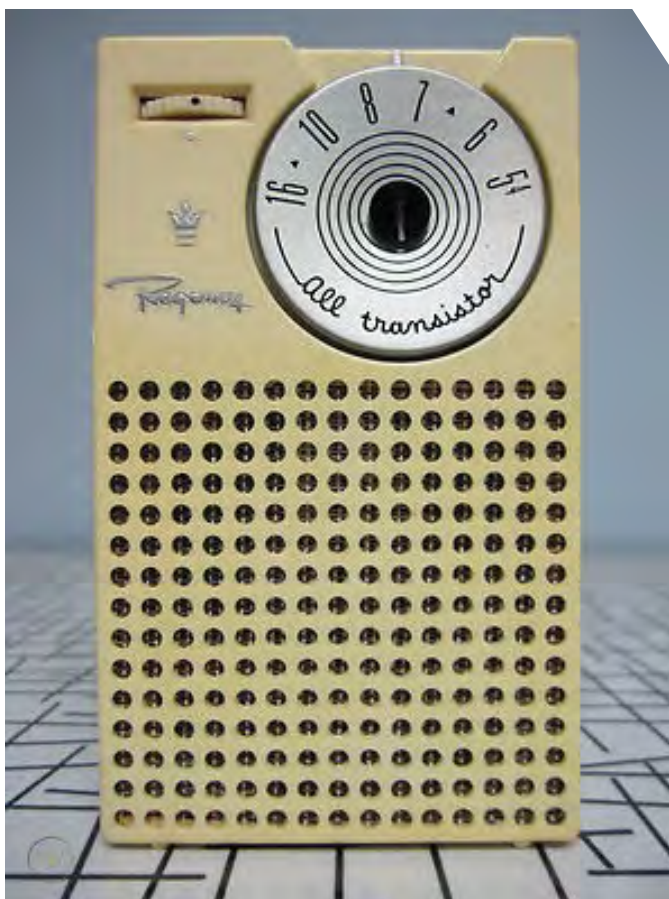
by Duncan Fry

**My introduction to recorded music, as far as I can remember, was the family record player when I was kindergarten age. It played 78 rpm 10" singles and needed a new needle each time you put another record on.**

We soon graduated to a more modern one that played 45s and LPs, and so I was forced to listen to my mother singing along with endless albums of show tunes, leaving me with a dislike of the genre that has stuck with me ever since.

But, on my 10th birthday she came back from America (she was a fashion buyer for Marks & Spencer) with one of the first tiny transistor radios, one that would fit in my pocket and had a tiny earphone for solo listening and came with a sturdy little leather case. It was a cream coloured Regency TR-4, one of the very first mass-produced transistor radios. In keeping with the times it was mono, AM only, but who cared - it represented audio freedom, much like the first mp3 players and iPods 30 years later.

This opened up a whole new world of sound, meaning I could listen to all the music on the radio that I liked, which was rapidly diverging from my parents' tastes. It was a great little unit that people thought was a camera and were amazed



when I switched it on and music or the news came out.

Sadly, one day my father borrowed it and took it to work to show his colleagues, one of whom promptly nicked it off his desk and it was never seen again. He never made any effort to replace it either, something that burns inside me even now. Ah, families; can't live with 'em, can't shoot 'em!

When my mother came back from another U.S. trip a couple of years later, she brought back another piece of iconic audio equipment for me - a tiny reel-to-reel tape recorder with 3" reels, built-in small speaker and a little crystal microphone. A Nagra it wasn't, but to me it seemed like a complete recording studio! It was about 50mm thick and the size of an A4 piece of paper.

I used it and used it until one day it just clogged up and died. I knew nothing about cleaning the heads or the drive mechanism, and I guess it just plumb wore out!

When the family moved to Australia, my parents bought a bigger record player as well as a TV. The small record player from home came with us, and I moved it upstairs to my room, when I started to buy my own records. I used to play them non-stop day in, day out, until my parents weakened and bought me a cheap pair of headphones, getting the local electrical shop to put a headphone socket in the record

player so I could plug them in.

In the meantime, my longtime friend LL, who has starred in many of my stories, had been working away on a method of recording the audio from the TV music shows that we used to watch. A self-styled audiophile, he had bought himself a nice Sanyo reel-to-reel tape recorder that took 7-inch reels of tape, which held enough music to keep a party going for hours until the police would arrive to shut it down.

LL's parents had a big old walnut piece of furniture, which also happened to be a 21" TV, and it had a thumpy 12-inch speaker mounted in the bottom of it. Rummaging around behind it, he discovered that he could get his fingers on to the speaker terminals and attach an audio lead to them with little alligator clips.

On the other end of this lead he attached a mini-jack cut off from a microphone lead. None of us had the slightest idea of soldering, so we just stripped the wires back and twisted them together, wrapping it up in a gooey lump of insulation tape and plugged it into the Sanyo's microphone input.

When 'Hullabaloo' or 'Shindig' came on the TV, we just set the deck to 'Record' and sat back.

Perhaps I should point out that a few other things we had no idea about were impedance, gain and line level. The volume that came out almost bent the needles on the Sanyo, but by a trial and error process (a lot of error) of lowering the volume on the TV and using the absolute minimum recording level we managed to get quite an acceptable sound.

LL being a person who knew the value of a dollar, most of his recordings were in mono on four separate tracks - 2 in each direction - to save tape. Economical in theory, but a real tishfight to edit forty years later!

Work beckoned, and I went to Mt Gambier, working at SES 8, the local TV station. I often felt the urge to try my hand at recording some music, but the audio facilities at the station consisted of a single mono Byer tape deck and not much else. My main problem was I had nothing to record onto. I had a good stereo system courtesy of my 21st birthday, and a Phillips cassette recorder, which although state-of-the-art for its time, was not a particularly flexible recording medium. So one Saturday morning I went down to the town and scoured the local Op shops for tape recorder bargains, coming back home with a compact Sony tape recorder for the princely sum of \$25, including half a dozen 7" reels of tape.

The beauty of this particular machine was that it had a big square record button that was two buttons in one. Press the top half and it recorded the Left channel, press the bottom and it recorded the Right channel. Press both together and it recorded Left and Right channels at the same time. This opened up a world of opportunity for very basic multi-track



recording and track bouncing. Les Paul would have been proud of me.

So, I could record a guitar track, say, on the Left channel, then play it back while I recorded another guitar track on the Right channel. Then I could playback both tracks while I put the microphone from the cassette deck next to the speaker, where it would pick up the two backing tracks and record my golden tonsils vocal and blues harp solo at the same time. I could then copy that track to the Left channel of the tape deck and start the process all over again. At some point the level of hiss would overtake the level of the music, but up to that point it was quite listenable. No Tubular Bells, that's for sure, but a lot of fun.

My main problem was I didn't have any drums. My guitar was the semi-legendary EastDoncaster, the cheap Telecaster copy I had bought after my 1964 Rickenbacker 12-string had been stolen, but I had no percussion instruments to create the beat.

Still, when the going gets tough, the tough get drumming. In my spare time I did a fair amount of experimentation on home-made drums, and I worked out that there were three different ways of getting a drum sound (apart from the obvious method of using a drum, of course).

A good quality cardboard box makes a flexible approximation of most drums, from kick to snare depending on where you hit it.

Smacking your hands on the back of an acoustic guitar covered with a couple of layers of tissue paper can make a surprisingly realistic snare drum, and finally rolling up my T-shirt and slapping my guts with my hands.

Naturally I chose door number three, since I already carried the necessary equipment with me at all times. When inspiration struck, my DynaSonic Gut™ was ready and waiting!

Next Month: Audio life continues with a guest appearance from V 1, my first ex-wife. Stay tuned!

**“So one Saturday morning I went down to the town and scoured the local Op shops for tape recorder bargains, coming back home with a compact Sony tape recorder for the princely sum of \$25, including half a dozen 7” reels of tape.”**

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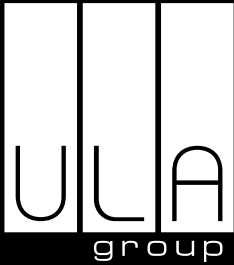
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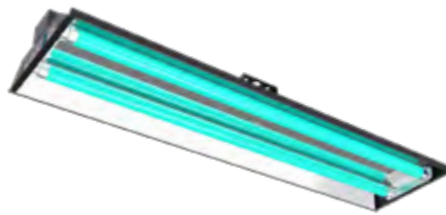
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