

# CX

**MONTHLY TECH NEWS**  
For Entertainment and Broadcast

CX 70, MAY 2012 . \$5.50

SOUND • LIGHTS • VIDEO • STAGING

## SCREWUP KILLS 7 Dumb stage mistakes revealed

**VIDEO WALLS & RFI**  
Hidden audio time-bomb

**PANASONIC GO 20K**  
Move over Christie and Barco?



ISSN 1320-5595



### REVIEWED:

Allen and Heath GLD mix system /  
Panasonic AG-HMX-100E Vision Mixer /  
LSC Redback Patch Bay System

### NEWS AND VIEWS:

Sydney to close event venues /  
The Maiz on workplace sex /  
Fry on Frankfurt & sausages

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2 x E110A

300

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4 x E110A

350

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evolving light.

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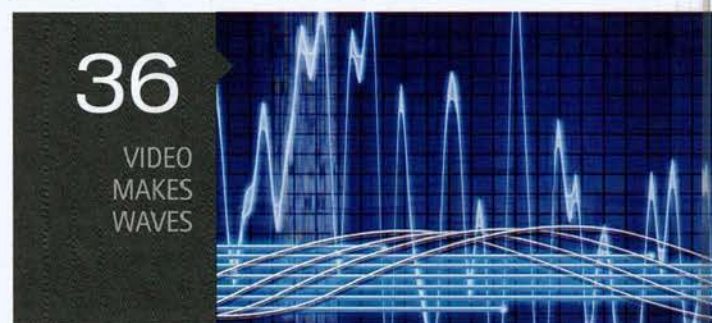
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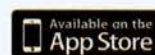


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### EXCELLENT ISLANDS

Inside we venture to Audio Visual Events, a great big small AV firm here in the northern reaches of Sydney. One of the constants here at CX is the march of the start-up firms. While AV Events has been around a while, it illustrates how a combination of energy, enthusiasm and commitment can be applied to building a business in our industry. The barriers to entry are very low, but the risks are there. See next item.

### BAD MANAGEMENT

As if the harping from our Biz Page isn't enough. It was rammed home to us last month how easy it is to take a popular production business and let it fail. (The company concerned is not featured in this issue). A growing business requires feeding and the instinct is to acquire more equipment to serve more customers. This comes with the double whammy of capitalisation and tax. You take cash flow money instead of seeking new capital, use it to buy equipment, then reel in horror as the accountant totals up the tax on your profit, and spells out the implications of provisional tax (tax paid in advance) that follows. The spiral commences.....

### A LOT OF INDIANA

It was the worst stage disaster of modern time, and the expert reports (released in April) were very well written. There are significant and costly implications for the production industry that will flow down-under, so we've gone hard and devoted feature space in this issue. There's a cost for safety and compliance and very soon it will be felt for outdoor events in particular, just as the festivals take stock of their declining profitability – let alone viability.

## CX EDITORIAL

### LA TRAVIATA WINS

As we went to press last issue, the outdoor opera in Sydney that was La Traviata looked like it might almost bankrupt the Australian Opera. Ticket sales were at 60%, breakeven was 80%, and the weather had been atrocious. Call it the reverse of the Macbeth curse, but as the show opened its three week run the sun came out and Sydney enjoyed 20 sunny days with just one washout. Ticket sales boomed. As soon as the show closed and the electronics were bumped out, the rain lashed in again, and the mould continued to inch down the walls of the CX bunker.

### SKILLS SHORTAGE AND WAGES

While we focus on the faint hope that IBSA can revive the entertainment technical training package, the emerging problem is pay rates. The Victorian Arts Centre recently advertised for a senior audio technician, 20 hours per week with a pay rate of pro rata \$52k. Seriously is that the best we can do? A Senior Audio Technician, under their definitions, is a most capable experienced person with at least 5 years professional experience – probably a lot more. 52 grand? What?

### WAGES AND COSTS – THE MEANING?

I can't help but feel that there is a slab of production work happening at a price lower than cost. With the example (above) of lousy pay allied with the new growing costs of safety, alongside the strange reality that running a business actually costs money, a shakeout is inevitable. When productions start to cancel because they can't find crew or equipment, ticket prices will need to rise to resolve the problem.

– Julius



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# NEWS

## α INDUSTRY NEWS



### Sydney to shut Convention Centre Three dark years spells event doom

**W**hen Diversified Exhibitions purchased the Integrate trade show and announced it would expand by moving to Darling Harbour in Sydney, they clearly didn't expect the NSW government to close

the facility. From November next year the Sydney Convention and Exhibition Centre, and the Sydney Entertainment Centre will all be bulldozed to make way for a much larger facility. The news has shocked many in the events industry, and threatens the

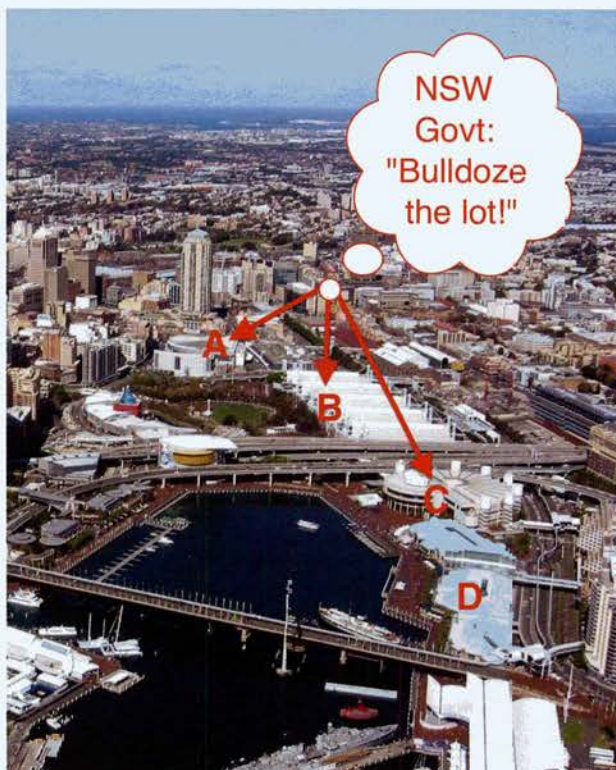
permanent loss of large events to Melbourne or Brisbane – whose convention centres are already near capacity.

Now the NSW government is scrambling to try to provide 'alternative facilities' for over 120 large events, in a city that does not have another convention facility with more than 10 meeting rooms. There is talk of temporary structures, but the only two sites near the CBD are Barangaroo (in development and without transport links) and White Bay (promised to the cruise line industry and not on transport).

Diversified boss Matt Pearce told the Sydney Herald that most of the 10 top events his company staged at Darling Harbour each year needed more than 10,000 metres of space, making them too big for alternative venues proposed by the government.

Instead of building in stages, by demolishing the entertainment centre (arguably the least most critical component) and building convention facilities there, the master plan will see developers maximise return with mixed accommodation options and retail, while the events and trade show industry in NSW takes a very large hit.

Of most concern to CX is the loss of the intellectual capacity with the staff and AV teams at SCEC disbanded.



The plan calls for demolition of:

- A: Sydney Entertainment Centre;
- B: Sydney Exhibition Centre; and
- C: Sydney Convention Centre.

However the beloved and unsuccessful Harbourside Shopping Centre (D) avoids the chop as it is privately owned.

# Safety Alliance Steps Up

## Indiana disaster draws industry together



**T**he Event Safety Alliance was created after the Indiana disaster killed 7, followed by several similar weather related collapses last year. Now the Alliance has joined safety officials in Indianapolis to jointly formulate an industry code for outdoor events.

Proving that a peak industry body (Alliance represents 65 firms) can have a place at the table, the Alliance prefers that industry practitioners have a voice in the process to legislate how stages and events should run.

CX reports this month that the Indiana State Fair delegated authority to the band Sugarland to perform or delay their show in the face of a forecast deadly storm. This adds weight to the recommendations made at the CX Stage Safety Seminars earlier this year, that venues alone should call off or suspend shows, since promoters, production crew and performers are all afraid of costs or consequences of a cancellation.

- Indiana disaster report: page 20.

<http://eventsafetyalliance.org>

# Contractor super 'timebomb'

## LPA warning on underpayments

Live Performance Australia has drawn industry attention to the entitlement of superannuation pay for almost all contractors and casuals in entertainment.

Writing in this issue of CX, they advise that the *Superannuation Guarantee (Administration) Act 1992* expands the usual definition of employee to include the majority of persons engaged in the entertainment industry including persons who are paid to provide services in connection with a performance or presentation of any music, play, dance, entertainment, sport or any similar activity.

"This means that in the majority of cases, all employees and individual contractors performing services in the entertainment industry (earning over \$450/mth) are required to be paid superannuation contributions", they say.

CX is aware that disgruntled and former staff, including loading agency crew has increasingly had pay audits with substantial costs awarded against some firms.

- LPA column: page 61



### HISTORY

Howard 'Denim Legend' Page at his first Jands mixing gig, in the back of a rental truck at Heddon Greta Speedway near Newcastle in January 1970. Picture from the excellent history collection at: [www.jps.com.au](http://www.jps.com.au)

# Meyer embraces Audio/Video Bridging

## AVB will end networking limbo, they say

**I**n recent years, a dozen or more legacy and proprietary digital networking protocols have created a fractured marketplace. As a result, networked systems are complicated to implement. Without a widely adopted standard, designing systems with multiple manufacturers' devices inevitably involves a significant amount of guesswork. AVB promises to unify the industry.

As the first wave of products is close to release, John McMahon, executive vice president, digital products at Meyer Sound, explains the firm's position. "Before AVB, there was never a networking standard that manufacturers could agree on, and because there were so many proprietary networking protocols, the industry had to confront their limitations. Before LCS Audio was acquired by Meyer Sound, we were the sixth full licensee of CobraNet, which was a proprietary networking protocol for audio over Ethernet. As time marched on, we started running into limitations with CobraNet".

"At some point, there were 17 proprietary AV networking solutions, which were all focusing on the end point, and not on the bridges (switches). To improve audio networking, we need to adopt AVB switches that can provide precise timing synchronization for audio and video streams with the guaranteed bandwidth availability. When

we learned that AVB was an open standard, and would enable media-aware bridges and end points, it became very appealing to us".

AVB is policed by the AVnu Alliance - a group of more than 40 automotive, semiconductor, and AV manufacturers that have come together to define the standards and testing requirements that can ensure each AVB product, once certified and has the AVnu logo, will interoperate with each other on an AVB network.

"AVB has the backing of IEEE, the association that defined Ethernet, as well as the most powerful chipmakers Intel and Marvell collaborating with AV and auto manufacturers for a single set of networking standards", McMahon said. "The vast majority of the chips in computers today are already AVB capable. This is another unique advantage of AVB over any proprietary protocols."

Meyer's D-Mitri was originally designed around a proprietary close-loop ring. If you had to connect a D-Mitri module to another manufacturer's device, the system design would have to switch to CobraNet, then AES and other protocols as needed. Now the D-Mitri backbone is completely replaced by the AVB approach, which gives them a much more flexible architecture with extremely high-quality audio over AVB infrastructure.

"The AVnu Alliance has turned competitors into technology partners", McMahon concludes.

# d&t launch V-Series

**J**oining the J-Series and the Q-Series line arrays, comes V-Series: a mid-sized line array for d&t. The system comprises the V8 and V12 loudspeakers supported by a dedicated V subwoofer which incorporates d&t cardioid technology.

The V8 and V12 loudspeakers are 3-way passive designs housing two 10" LF drivers, one hornloaded 8" MF driver and two 1.4" exit HF compression drivers with 2.5" voicecoils mounted to a dedicated waveshaping device. The symmetrical dipolar arrangement of the neodymium LF drivers around the centrally mounted coaxial MF and HF components results in an exceptional 80 and 120 degree horizontal constant directivity dispersion respectively, this is maintained down to approximately 250 Hz, which is an outstanding feature for a passive 3-way system. The mechanical and acoustical design enables flown vertical columns of up to twenty four loudspeakers to be suspended using vertical splay angles of 0 to 14 degrees with a 1 degree resolution.

The V-SUB is an actively driven cardioid subwoofer powered by a single amplifier channel housing two long excursion neodymium drivers in an integrated cardioid setup: an 18" driver in a bass-reflex design facing to the front and a 12" driver in a two chamber bandpass design radiating to the rear. The rear driver provides the patented d&t cardioid cancellation. • [www.dbaudio.com](http://www.dbaudio.com)

## Corrections

Last month's review of the **Sennheiser XS Wireless system** should have noted that the evolution series is priced closer to the \$1000 mark. Evolution transmitters output 30mW, not 50mW as we stated. If you do need 50mW output, Sennheiser offer the 5000 series products - both the 5000 and evolution series can also be dialed back to 10mW output if required. Also our explanation of the **Midas AES50 system** was a little open to interpretation. Audio transport to and from the PRO2C is achieved via dual AES50 cable runs, each delivering 24 bi-directional channels at 96kHz 24 bit resolution. The DL251 stage rack can be switched to 48kHz mode when used as part of a standalone digital snake. A variety of other interfaces exist for MAD1, Dante, etc. The point we were trying to make here is that a lower samplerate frees up available bandwidth in cable allowing transport of more channels. Full info at [www.supermac-hypermac.com](http://www.supermac-hypermac.com). **CX apologises for any confusion.**

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# Panasonic takes on the biggest boys



JIM UROSEVIC AND SHUUJI TERANISHI & 20K PROJECTOR

## New high def projector - lighter & cooler!

**20K PROJECTORS** are what you use for the largest shows. Until someone makes a brighter box, this is pretty well the upper limit.

by John Maizels

**P**anasonic has been playing in the video projection sandbox for a long time, and they know a thing or two. They know their market, and they developed a range of projectors which neatly fit into the market. They've been curiously lateral as well, with their range of electronic whiteboards and other devices targeted to, for instance, the education market. What you might not know is that Panasonic acquired Sanyo in 2009, and they've spent the last little while integrating the two businesses. The word was that Sanyo has specific expertise in battery and short-focus projector technologies, while Panasonic has the kit in larger projectors and the origination technologies that feed the screen. Now with Sanyo's Oceania division officially integrated into the Australian operations of their former competitor, Panasonic has signalled their intention to wade into a much larger pool.

At a nicely-balanced mid-April project launch, Mark Deere-Jones Director of Panasonic's Business Systems Group, introduced the range of 50 models, and telegraphed his group's strong intention to take on the existing suppliers at the big end of town. The flagship members of the new range are aimed directly at the live production and high-end architectural markets.

The really big banger of the family is the one that probably interests you most if you're doing live gigs. The PT-DZ20K family is a set of three 3-chip DLP 20,000 ANSI lumen units which are claimed to be the lightest in class, at around 50kg. That got my attention for a start: the projector is going to be an easy two-person move, and that's heaps better for load-in than some of the traditional product which weighs upwards of 150kg.

Panasonic has also been clever about the light source. The projector uses four 465 watt UHM (Ultra High Pressure Mercury) bubbles, and the number of active lamps can be managed so that they all run, or groups run. That's going to give less light, but longer between physical lamp changes, for an expected 2000 hours per lamp. Good for architectural and unattended permanent installations. It's also good for power consumption: 20k lumens from a traditional xenon globe would require 3-4kW. Best part: if a lamp fails, it's just one lamp. You'd notice that the brightness was 25% down on a multiple projector panorama, but you'd notice it a lot less than a blank screen. And while a set

of UHM globes is going to be significantly more expensive than a single xenon, do the numbers and come to a conclusion about total cost of ownership.

The announcement came just as we were going to press, and real technical detail is sparse. I've been told that the projector has the bells and whistles that you'd expect to come with a \$110k RRP price tag. VGA, DVI, and SDI inputs are standard, along with colour management, geometric and panoramic functions. All this in resolutions ranging up to native WUXGA (1920x1200). It's claimed to be fully 3D ready, both in terms of input handling, and syncing with external devices.

This projector has potential to take on the high end competitors, provided there's a suitably sharp pencil on the pricing and a good TCO/ROI story available by the time the projectors get to market in June. The pictures that I saw at the launch made the projector look very promising, and I'll get back to you after we've done a 3D field test of the PT-DZ21K at a CX Bunker theatre night.

**BARCO AND CHRISTIE** have been fighting the battle at the top end - where prices bust through \$100,000

# SHARPY

# 5 ★★★★★

# AWARDS IN ONE YEAR



www.claypaky.it

## DO NOT ACCEPT IMITATIONS!

### To all lighting industry stakeholders

CLAY PAKY S.p.A. has become aware of some attempts to market products, primarily manufactured in China, which appear to be copies of CLAY PAKY's SHARPY spotlight.

CLAY PAKY commits significant resources to ongoing research and development to create new products such as the SHARPY spotlight. Besides being original designs, these products bring about innovations that benefit all lighting industry stakeholders.

In order to protect its innovations, CLAY PAKY systematically invests in intellectual property.

Please note in particular that:

CLAY PAKY S.p.A. is the owner of registered Community design N° 1234009-00, which protects the SHARPY spotlight in all EU countries. The same design has also been protected in China (201130039967.8) and the USA (US 29/387.114).

CLAY PAKY S.p.A. has filed patent applications to protect the technology used in the SHARPY spotlight in China, Germany, Italy, the United Kingdom and the USA.

**It is important to be aware that it is not only those that manufacture copies of products, covered by exclusive rights, that are punishable by law but also those who import and distribute such copies.**

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Maiz and Jimmy



Will Robertson, Peter Collis and Richard Kaub

# SMPTE pictorial

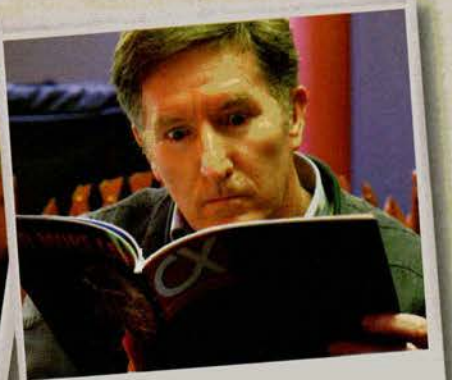
**SMPTE NOT-AT-NAB FUNCTION.** You read this correctly, this was a Sydney gathering of those who were NOT in Vegas at the prime broadcast show of the year. Encouraged (or otherwise) by CX's Jimmy D and John Maizels, the party went off. Really off.



Rob Rutherford and Peter Ryhs-Jones



Rob Rutherford, Michael Day (BG), Peter Rhys-Jones and John Lock



Craig Ncrris reads CX



Will Robertson



Visser and Norris on crap cam



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OR SCAN THIS >



# What If?



## What If there were one set of rules for motorised chain hoists?

Part 1

By Andrew Mathieson

**F**ollowing on from the last issue, let's look at what is involved in selecting an appropriate motorised chain hoist and controller for use in Australia, and how you can discharge your obligation to provide a safe working environment for the crew who are working the show and a safe venue for the unsuspecting throng who are attending the show in absolute faith that "they" know what they're doing, so it must be safe to be here...

As we discussed last time, there is no uniform body of legislation or regulations in Australia that mandates the Standard(s) that a motorised chain hoist for use in an entertainment venue must comply with, however, most State based WHS (OH&S) legislation requires compliance with "the relevant sections of AS1418" for any crane, winch or hoist, and when harmonised WHS legislation is eventually adopted in every jurisdiction in Australia, this requirement is unlikely to change until a specific Australian Standard for machinery for use in the entertainment industry is published and adopted.

In the interest of brevity, we will look at the principal differences between a chain

hoist designed and certified to the German BGV-C1 and BGV-D8 codes, and a chain hoist that meets the minimum requirements to comply with existing WHS regulations in Australia (by default, compliance with AS1418).

The BGV-C1 code covers hoists for use in the entertainment industry, and hoists certified to this code are permitted (in Germany) for both moving and suspending loads over persons with no additional safety devices. The BGV-D8 code is for general industrial hoists and may not be used for moving loads over persons or for suspending loads over persons without the use of an additional safety device. A classification of D8+ is often quoted, but there is no such code as BGV-D8+. Hoists claiming to be BGV-D8+ are usually a D8 hoist fitted with an integral secondary safety device, typically a speed activated fall arrestor on the load chain.

Contained within AS1418 is a definition of what is termed a "Special Lifting Application". Where a hoist would be required to be certified to BGV-C1 in Germany, a hoist appropriate for use in Special Lifting Applications as defined in AS1418 would be required in Australia.

To paraphrase this definition - if a risk assessment concludes that a single point of failure in the drive train of a hoist would result in significant damage to property or injury to persons, then a full load brake must be fitted directly to the load and be operated in the event of an overspeed (runaway load) occurring.

In contrast to this approach, the German BGV-C1 code mandates the use of 2 braking devices and overspeed management in all circumstances, but (and here is the main point of difference) it permits the use of high factors of safety in the drive train to "guarantee" that the load is always connected to a braking device.

To put it another way, AS1418 requires you to consider the consequences of each and every single point of failure in the drive train, no matter how low the likelihood of occurrence and BGV-C1 allows you to exclude from consideration a single point of failure in the drive train if certain minimum factors of safety are employed in the design of the machine.

In the next issue, we'll look at the added complexities of selecting appropriate controllers and whether we need to consider using synchronised hoists in multiple point lifts.

This article forms general opinion only and must not be relied on without a detailed, professional risk assessment undertaken specific to your situation. Consult a professional staging company every time you consider anything that may involve risk with flown objects or people.

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ON AIR

Church  
Production  
News

**B**usy times for Hillsong as they announce firm plans for a new Melbourne church. Hillsong pastors Tim and Nicola Douglas have been named to lead the church, which will emerge towards the end of the year. The Douglases are developing groups, networking and holding meetings ahead of the physical location announcement. Hillsong used a similar method to plant a new church in New York city last year, which now operates several services each week.

"We certainly don't see ourselves as 'God's great answer to Melbourne,'" Senior Pastor Brian Houston writes.

"We are VERY aware that there are many great churches in Melbourne and we are

## Hillsong firm up Melbourne plans, add new Sydney Church

blessed with so many wonderful ministry friendships that we deeply value and respect. Our heart is to honor and respect those relationships. We are very appreciative of the warm response we have received from so many local church pastors.

"Our intention is not to build on anyone else's foundation and we will do our best to

work alongside the greater Church in the city, as we look geographically at our potential location (or locations). In any big city, some people-movement amongst churches is inevitable, but that is not what we will intentionally build on, nor is it what a church should be built on."

Hillsong are well regarded in the tech

production community as they maintain high production values, to which many other churches aspire. The main facility in Sydney's Hills district boasts an Adamson line array, extensive live vision, and very creative stage lighting. Sunday night services resemble a live concert, with over 4,000 attending.

Speculation has the Melbourne church initially running services from one of Melbourne's many theatres, similar to Hillsong London which operates four services at The Dominion Theatre each Sunday - the day off for We Will Rock You, resident within the theatre. Hillsong's semi is a regular Saturday night sight, loading in after the musical closes around 11pm.

## Second Sydney City Church for Hillsong

Hillsong's Young Street Church in South Sydney has for some years been at capacity, and now hosts 2 services on Saturday night and 5 on Sundays. Residential developments have slowly strangled on-street parking, and an alternate site has been sought for some years.

A warehouse in adjoining Alexandria at Doody street has been acquired and after a long battle with Sydney Council, the church recently won a court case for the right to develop the building for an 1,100 seat worship centre and expansive off street parking.

It will run alongside the existing Church.

## Forefront at The Edge



Edge Church Melbourne recently underwent a full renovation. The auditorium is an old warehouse building, complete with 'saw tooth' style roof. It presented some interesting challenges, most notably with the low roof in places. Selection and placement of suitable speaker elements, by Forefront Productions, was crucial to the audio coverage. Lighting included LED fixtures for stage colour wash & effects as well as LED profile moving lights. With a mixture of in-ear monitors & monitor wedges all run from the one mixing console at FOH, a Digico SD9 was chosen for its ease of use, sound quality, features, plus future expandability.

The overall result of the complete installation gives the auditorium a completely new look, feel and sound.

Here's what Edge Melbourne's production team leader, Craig Taylor had to say: "Forefront have completed a number of other projects for Edge Church in Adelaide and are Edge Church's preferred supplier for sound, light and video systems. The time from our equipment order to our preferred installation date was short but Forefront managed to complete our installation within our time frame.



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# INDIANA DISASTER REPORT

## Seven dead and 40 injured in stage roof collapse

### How and Why it happened

INVESTIGATION BY JULIUS GRAFTON

**IN SUMMER HOLIDAY SEASON THE USA** has more than 70 large State Fairs, most offering concerts. For country rock act Sugarland it was peak touring time, and rolling into Indiana on August 13 last year was just another routine outdoor gig. Mid-America Sound Corporation were ready, for over 20 years they supplied the sound, lights and the stage roof and rigging. No one knew then, but this gig would change the way outdoor events are managed around the world.

**T**he Indiana State Fair negotiated away the rights to cancel their show, allowing American country act Sugarland to dictate whether to appear. They chose to play in the face of a devastating storm, sent the spot operators up into the rig, and then everything collapsed onto the audience.

Amazingly after agreeing to give the band complete control over the gig, no one signed the actual contract. The promoter claims it was normal practice to only sign the contract once the gig was underway.

Now extensive engineering reports prove the roof structure was unsafe - designed for 65 mile an hour wind but failing as gusts exceeded just 43mph. CX showed video of the collapse at the national Outdoor Stage Safety seminar in February, and audiences were amazed to observe audience members with hats intact as 'vicious winds' blew the stage roof over.

20 tonnes of lights, sound and video wall transformed the 14-metre-tall James Thomas Engineering structure well beyond its design limitations. The stage roof weighed 11 tonnes bare of production.

No one checked the construction, or the rigging that day. The guy lines, essential to secure the tall roof structure standing on thirteen truss columns ran off to concrete 'Jersey' road barriers which, once the wind hit, just slid along the tarmac.

Before the collapse the band tour manager was holding firm. They would appear, they had to maintain their schedule. The band's contract gave it "sole and exclusive authority to cancel the concert due to inclement weather", stage and production supplier Mid-America Sound Corporation alleged in court documents.

After the show the band and crew would sleep in their tour coaches on the nine hour drive to Des Moines for the next days show.

Emergency services scrambled to respond to the disaster as rain lashed the site and the almost 12,000 fleeing punters. Different communication frequencies created confusion; the first rescue truck became bogged, closing one access track. Volunteers from the crowd surged into the disaster area, as a state trooper yelled for someone to turn off the power which was potentially lethal to rescuers and victims.

**AT 8.35 PM**  
the National Weather Service Doppler radar indicated a line of severe thunderstorms with damaging wind in excess of 60 mph, destructive hail, deadly lightning and very heavy rain. The weather warning: For your protection, move to an interior room on the lowest floor of your home or business.

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Staggeringly, another outdoor event just across town escaped the storm with no injuries, because they had a clear disaster plan. The Indiana Symphony announcer calmly read this pre-arranged script, activated within their plan: "The National Weather Service has confirmed that threatening weather is moving into the area. For everyone's safety, we are canceling the concert due to this threat. Please return to your cars as soon as possible."

7,000 people did just that, and sat out the tempest (see sidebox on page 29).

Players

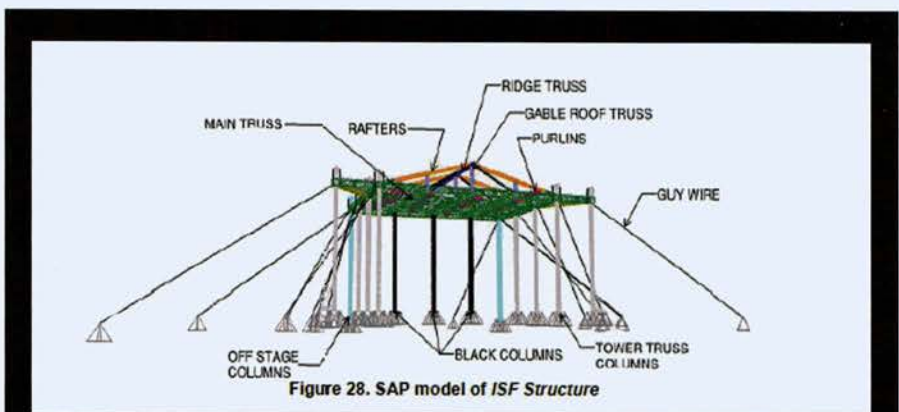
Sugarland is a country rock duo with supporting band who travel in seven tour busses with nine semi-trailers. The act was contracted to appear at the State Fair for US\$340,000 guarantee plus a cut of the gate.

State Fairs are like an Australian agricultural show, where the animal and cake competitions take second place to the carnival and the concerts. Indiana attracts just under a million people to its Fair – similar in scale to the Sydney Royal Easter Show.

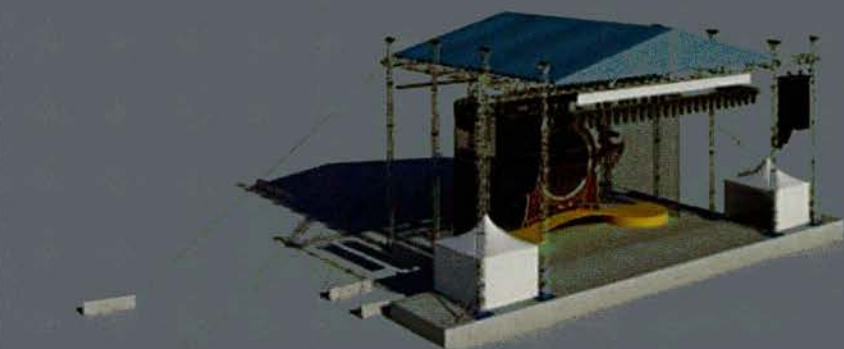
The Indiana State Fair had a healthy program of music concerts, more typical in the USA than Australia; where Sydney or Brisbane agricultural shows have a mixed program that doesn't usually have a roster of concerts. At Indiana, bands like Kiss, Train and acts like Janet Jackson featured, alongside more country styled acts like Sugarland. Typically a headline act and a support act would feature on a given day.

Mid America Sound Corporation were the only production firm in the state able to supply a VDosc PA. They purchased the JTE load bearing roof specifically to sit atop the concrete stage platform, which has dressing rooms underneath. The firm has done production for the State Fair more than 20 years, and: chief "Kerry (Darren-camp) is a hometown guy" reported Eric Milby, the Fair production manager. The last report available shows Mid America were paid \$139,600 in 2009 for the stage and production across the 17 day duration of the Fair, and had agreed to hold price increases at no more than 2% yearly.

The pecking order in the command chain goes like this:

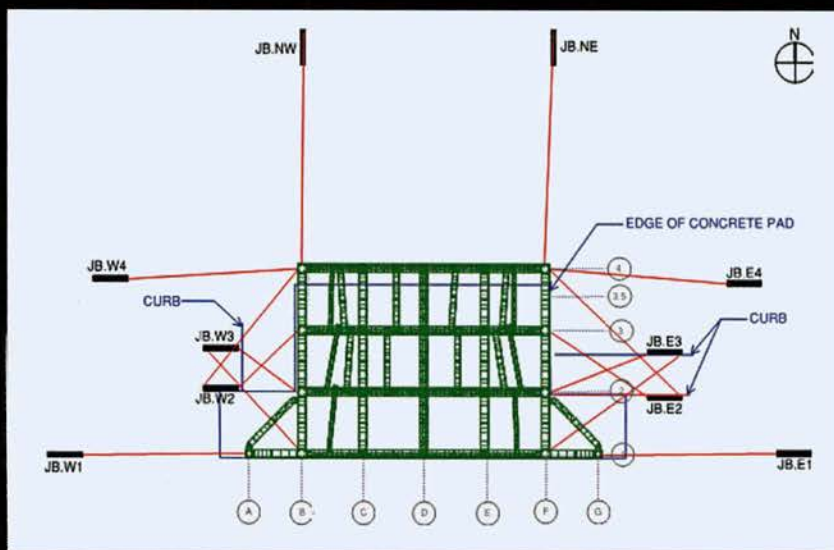


# Failure Sequence



The Jersey barrier nearest the stage failed first, triggering failure of these four crucial ballast points. Within seconds, the whole structure toppled

Note: Displacements exaggerated for visual clarity

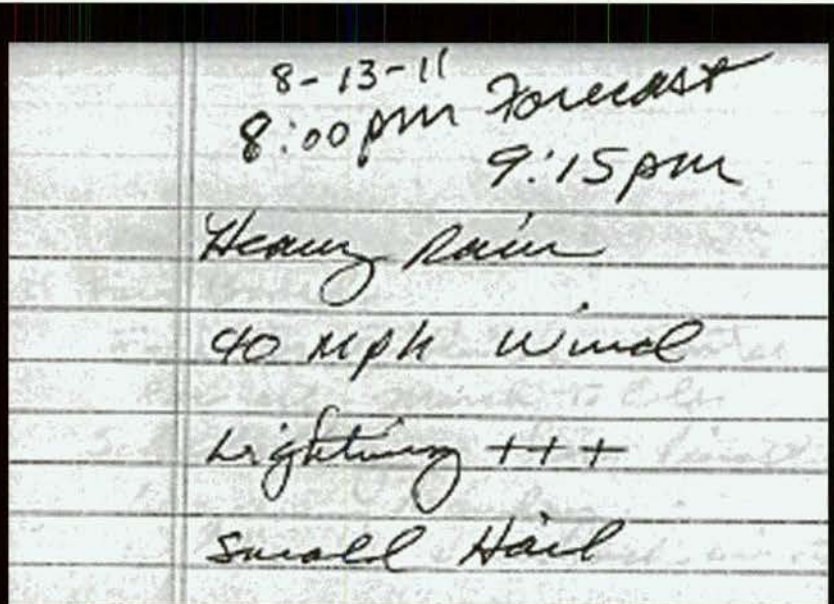


Dave Lucas Entertainment Group, LLC (Lucas), books the acts. Margaret Davidson, The Fair Event Producer, managed the Lucas contract and Lucas employee Anne O'Toole, VP of Booking, worked with Davidson to select the acts for the 2011 State Fair.

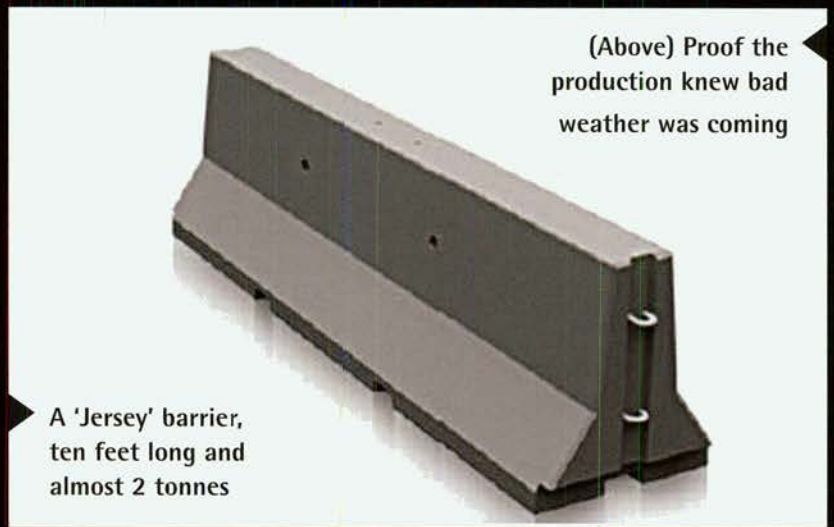
O'Toole then negotiated price and terms with Sugarland's booking agency. O'Toole had limited involvement in production of the events also.

For the Sugarland production, Eric Milby's role was to serve as the liaison between Sugarland's touring company and the Fair. As an example of his role, before the event Milby received information about how to set up the band's production equipment from Sugarland's representative and provided the information to Mid-America Sound Corporation, International Alliance of Theatrical Stage Employees (IATSE), and the Fair. On August 13th, Milby was on site as the Sugarland crew, Mid America Sound Corporation and IATSE workers unloaded and installed equipment from 8:00 a.m.

With the assistance of Lucas, the Fair worked with Creative Artists Agency (CAA) for the musical group Sugarland to perform on August 13th. Lucky Star is the legal name for Sugarland's company. Gellman Management is the band's manager. Helen Rollens of Gellman was the Tour Manager. Chris Crawford was the Production Manager.



(Above) Proof the production knew bad weather was coming



A 'Jersey' barrier, ten feet long and almost 2 tonnes

## Anatomy of a disaster

Witt Associates provided an Independent Assessment report on the disaster. This is their summary:

The National Weather Service (NWS) issued notices throughout the day and evening, warning of strong thunderstorms in Central Indiana. Ray Allison, the Fair's Director of Public Safety and Logistics, periodically called the local NWS office for updates. Twice he relayed the forecasts to Fair personnel via a newly acquired system which allowed for voice or text messages to be distributed to those on a preset list. After 7:00 p.m., he communicated that we will experience heavy rain, possible high winds, hail and some lightning between 9:00 and 9:30 p.m.

The Fair Executive Director, Cindy Hoye, scheduled a meeting for 8:00 p.m. to discuss the implications of the forecast on the scheduled 8:45 p.m. start time for the Sugarland concert.

Per Director Hoye, the meeting was about timing of the production; public safety was not the focus. The State Police were not involved in the 8:00 p.m. meeting or any discussions regarding delaying the show. Following the meeting, Eric Milby, a subcontractor to Lucas, was sent to speak with band management and communicate the Fair's desire to delay the show.

**THE FAIR DIRECTOR stated that 'the bands always led' and 'no one is going to tell them what to do'**

Milby spoke with Helen Rollens, Sugarland's Tour Manager, in the band's office underneath the stage. Both concur that they spoke only about the forecast for rain. Noting that Sugarland plays in rain frequently, Rollens said the band wanted to go on and, if the weather got bad, would stop and then come back to finish the performance.

A few minutes after the initial conversation, Milby returned to the band's office with Anne O'Toole, his colleague from Lucas who had booked the performance on behalf of the Fair. O'Toole was concerned that Rollens' proposal to start

and then stop the show would be detrimental to the flow of the performance. After discussion, they agreed on an 8:50 p.m. start time. When this information reached Director Hoye, she concurred, assuming that it was the band's call. The crews all began preparation for the performance. Four spotlight operators climbed into their stations.

Following the meeting in the production trailer, Director Hoye was backstage

addressing another issue when she recognized Captain Brad Weaver of the State Police. Captain Weaver expressed concern about the threat that the approaching weather posed to public safety. Up to that moment, Fair staff had focused on the effect of the weather on the timing of the production. Captain Weaver and Director Hoye discussed an evacuation plan.

Director Hoye instructed her staff to begin preparing for the evacuation of

the Grandstand area. At 8:39 p.m., the National Weather Service issued a severe weather warning for the area. Neither Director Hoye nor Captain Weaver received this information. Director Hoye dictated a message to Bob Richards, local radio personality, that he delivered onstage to the audience. Richards told the audience that bad weather was expected but the band was going to start. He related that if the bad weather came the audience should evacuate to nearby buildings. This was not the message Captain Weaver expected and he confronted Director Hoye. They headed up the stage to announce an immediate evacuation.

The Structure collapsed before they got the chance make that announcement.

## Police backstage

While the conversations about the weather and show were underway in the production trailer, Bryan Jones, the Security Supervisor, was backstage and approached State Police First Sergeant Gary Coffie with a complaint from Sugarland personnel. State Police troopers were allowing off-duty law enforcement officers and their families to access and congregate backstage. The additional people were in the way of the concert setup.

Approximately 8:15 p.m., First Sergeant Coffie saw State Police Captain Weaver, who was off-duty and attending the concert with his wife, and asked for guidance on how to handle the troopers backstage. Captain Weaver advised First Sergeant Coffie to disperse the troopers backstage and remove anyone who did not have proper credentials.

Unknowingly this saved their lives.

As the tour prepared for the 8:50 p.m. show start, the spot operators climbed up the Structure around 8:30 p.m. Scott Bauer, the IATSE Chief Steward, expressed his concerns that the show was going on despite the weather with Chris Crawford, Sugarland's Stage Manager. Spot Operator Enoch Vinegar stated he and the other spot operators all had radio communications with the Lighting Director.

The band was preparing to go on at 8:50 p.m. and created a prayer circle below the stage. At some point Helen Rollens saw lightning and stopped the band. Word was given to bring the spotlight operators



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5:00 PM SARA B. SOUND CHECK

5:00 PM DINNER

6:30 PM DOORS

7:30-8:15 PM SARA BAREILLES

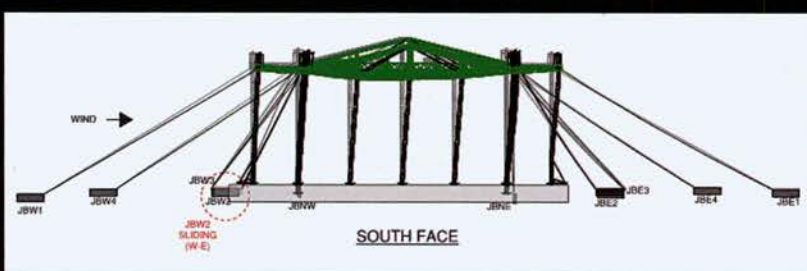
7:45 PM JN/KB MEET & GREET

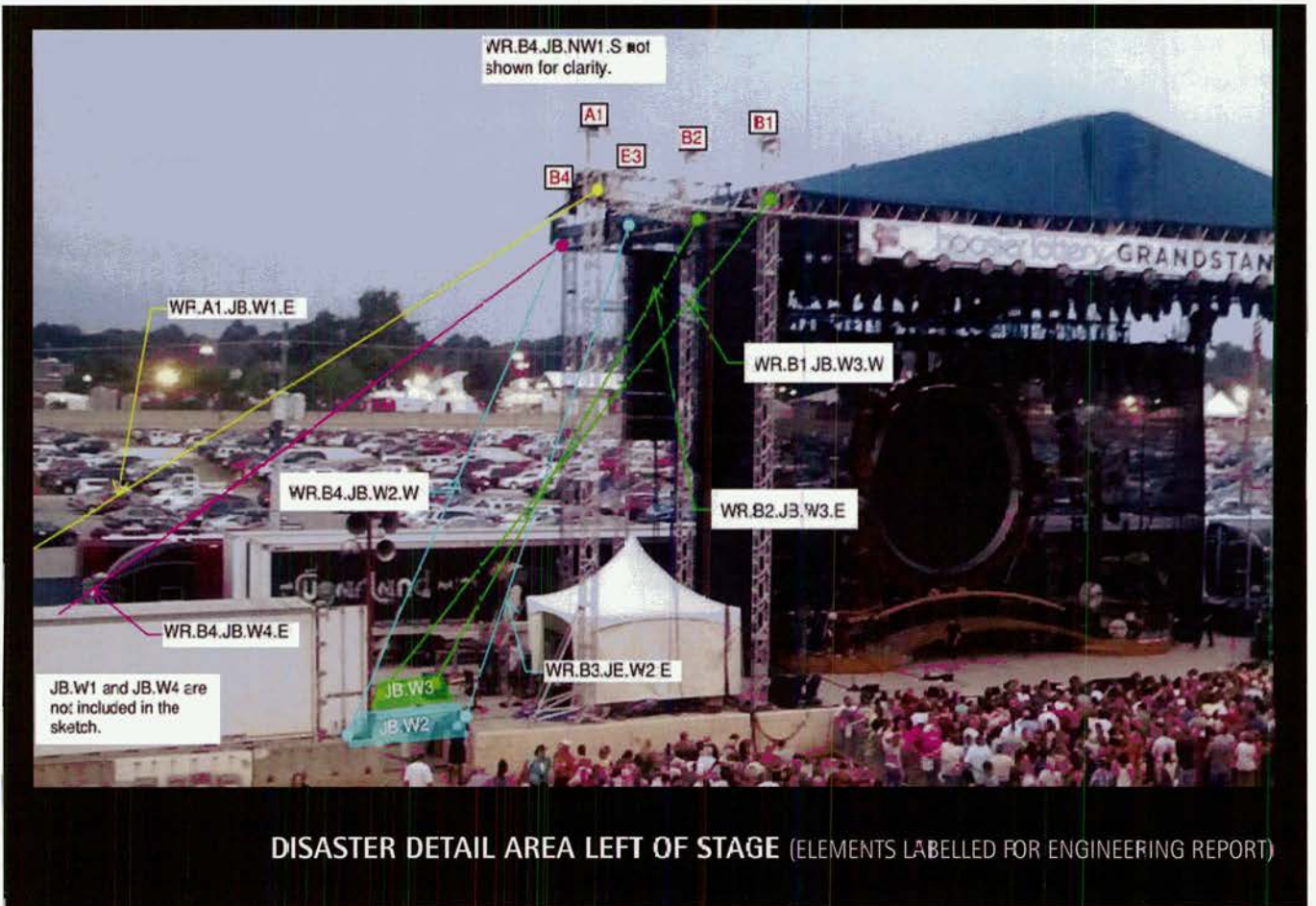
8:45 PM SUGARLAND

10:00 PM CREW CALL BACK

MIDNIGHT DRIVER PICK UP

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DISASTER DETAIL AREA LEFT OF STAGE (ELEMENTS LABELLED FOR ENGINEERING REPORT)

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## STAGE DISASTER OVERVIEW

down and they were in the process of coming down after Bauer called the operators down from the spot light positions at 8.45pm.

But at approximately 8:46 p.m., a strong gust of wind (commonly known as a gust front) blew, dust went up and the structure collapsed and fell onto the people on the track, near the stage.

### Legal fight

Media reports emerged late April this year following two days of testimony given by Sugarland and others during court hearings.

It was claimed in court that Sugarland was asked twice to delay the show, but according to Fair Director Hoye's deposition, the band refused "because Nettles, the lead singer, had already warmed up

and the band had to be in Des Moines, Iowa, the next day".

The band's contract also gave it "sole and exclusive authority to cancel the concert due to inclement weather," lawyers for Mid-America Sound alleged in court documents.

Sugarland's attorneys said in a court filing earlier this year that "some fans were responsible for their injuries because they didn't seek shelter". This provoked a

media storm that rattled the band, but not sufficiently to avoid further claims after the latest court appearance, that the two band members did not accept any responsibility for their role in the disaster.

### STATE POLICE

First Sergeant Gary Coffie had been behind the Stage when it collapsed. After it fell, he remembered yelling "Cut the power!" The band had three x 400 amp three phase supplies for lights alone.

Sugarland's court account did not satisfy the attorney for several of the victims.

Attorney Kenneth J. Allen said he was "struck by the lack of emotion and compassion" shown by band members Jennifer Nettles and Kristian Bush while they gave depositions. The band comprises Kristian Bush and Jennifer Nettles. Co-founder Kristen Hall recently filed a lawsuit for \$14 million against Bush and Nettles stating that she was being

excluded from sharing profits as had been agreed upon after her departure in 2005 to pursue a solo career.

Earlier this year separate court actions on narrow issues brought by Indiana's Occupational Safety & Health Administration



SUGARLAND

ordered large fines against Mid-America Sound Corporation.

They were issued three "Knowing" citations, which essentially claim that the company had knowledge of these requirements but willfully ignored them.

This included:

(1) not having an operational plan for the 2011 shows,

(2) not supplying cross-bracing as recommended by the manufacturer, and:

(3) not taking into full consideration weights of all equipment.

Mid-America Sound Corporation's total fines were \$63,000, while the Union faced four citations and was fined \$11,500.

This narrow set of actions will be dwarfed by the victims compensation case that will follow the recent set of depositions from the band and the Fair organisers.

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## Why the stage roof collapsed

The stage roof was purchased from James Thomas Engineering, specifically to sit atop the concrete stage platform at the Fair. On 13 truss columns, it weighed around 11 tonnes.

For the Sugarland show, the eventual production equipment weight added around 20 tonnes – line array, lighting and LED scrim and screen.

Once erected, the bare roof structure was secured using concrete road barriers as ballast or ground, known in the USA as Jersey Barriers. These are ten feet long, and weight almost 2 tonnes each.

A total of ten barriers were located in an arc out from the PA wings, 180 degrees around the rear of the stage. Each barrier was located sufficiently distant from its rigging point so that the guy wire would run at approximately 45 degrees from the barrier to the top of the structure.

Some Jersey Barriers had a guy wire from each end, to a different point of the structure. Some were located longways, with just one guy wire. Fourteen wires cross braced and secured the entire structure to the ten barriers. Each guy wire had a ratchet strap arrangement for tensioning.

Crucially the barriers were plonked on various surfaces – gravel, grass – and not

secured to the ground except by gravity.

The investigating engineers constructed a scale model of the stage and the production equipment, which was wind tunnel tested. Alongside calculations, they determined a north to south wind would collapse the structure at just 25 mph. At best, wind from the west would cause failure at 43mph.

The entire rig should not have failed until winds hit 68 mph under the code in place at the time.

Watching video you see the wind strike up dust, then the tarp rips away before the structure falls. The first failure was at the left of the stage.

The barrier closest to the PA power slides, then the guy wire fails. The barrier furthest out from upstage follows and fails. The final pair of barriers on stage left then shift and fail. Some barriers are dragged for significant distance.

The wind is at 43 mph, the structure is now doomed and within three seconds it has tipped over onto the crowd and stage crew.

## Findings

The engineering firm Thornton Tomasetti of Chicago (who produced an engineering report on the collapse) made the following findings.

They said "the technical information

presented in the James Thomas Engineering catalog is insufficient to adequately design a structure such as the ISF Structure, yet there is no explicit direction to engage the services of a licensed design professional to analyze complex loading configurations or conditions".

But the manufacturer got off lightly compared to the findings regarding the owners of the structure. "Regardless of the inadequacy of the directions of James Thomas Engineering's structural engineer, Mid-America Sound Corporation's installation of the ISF Structure deviated from the directions provided in the calculations performed by that structural engineer with regard to the lateral load resisting system."

"Even if the ballast system had provided sufficient resistance, the synthetic webbing ratchet straps and the guy wire ropes used did not have sufficient strength. Even if (they had), the 'fin plate' connections to the structure did not have sufficient strength".

"Mid-America Sound Corporation's configuration and erection of the ISF Structure did not include a review by a licensed design professional to determine the capacities or limitations of the ISF Structure."

The blame spreads: "The Indiana State Fair Commission staff has no records, documentation, plans, engineering reports or related technical data regarding the

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## A Case Study: Indiana Symphony Orchestra

An example of good practice in procedures dealing with weather at an outdoor event can be found with the Indianapolis Symphony Orchestra, which on August 13, 2011, was having an outdoor concert at the same time as the Sugarland Concert was about to start at the Indiana State Fair.

*Evidence in the Witt report from Mr. Thomas Ramsey, VP and General Manager for the Indianapolis Symphony:*

Orchestra advised that he made the decision to cancel the show at 8:10 p.m.; the announcer got on stage and advised the participants of the cancellation at 8:10 p.m., and the evacuation lasted twenty minutes. The majority of the public was in their cars by 8:35 p.m. The Indianapolis Symphony Orchestra has a decision making process and written protocols that were in place on the evening of August 13th and are outlined in their Conner Prairie Symphony 2011 Operations Procedures and Symphony on the Prairie, Weather Information, Management & Rain Check Procedures. Such protocols were also outlined in the Fishers Police Department Unified Command Incident Action Plan for Symphony on the Prairie 2011.

The Indianapolis Symphony Orchestra combines weather information from several public sources and subscribes to a private weather service. The final decision for an event to be started, delayed or cancelled is clearly spelled out as the responsibility of the Vice President and General Manager of the Indianapolis Symphony Orchestra. Continuous training and exercising is done with the Fishers first response community.

The symphony performance for the evening of August 13th was cancelled due to weather conditions, and in time for the entire concert area to be vacated.

This case study provides an example of a local standard of care that should be used as an example of a best practice that should be considered by the Indiana State Fair Commission.

*(From Witt Associates Independent Assessment report)*



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ISF Structure that is erected at the Fairgrounds on an annual basis."

Witt Associates looked at the organisational aspects of the Fair's emergency planning, and the City rollout in response. They slammed the venue – the Fair – for not having properly developed plans.

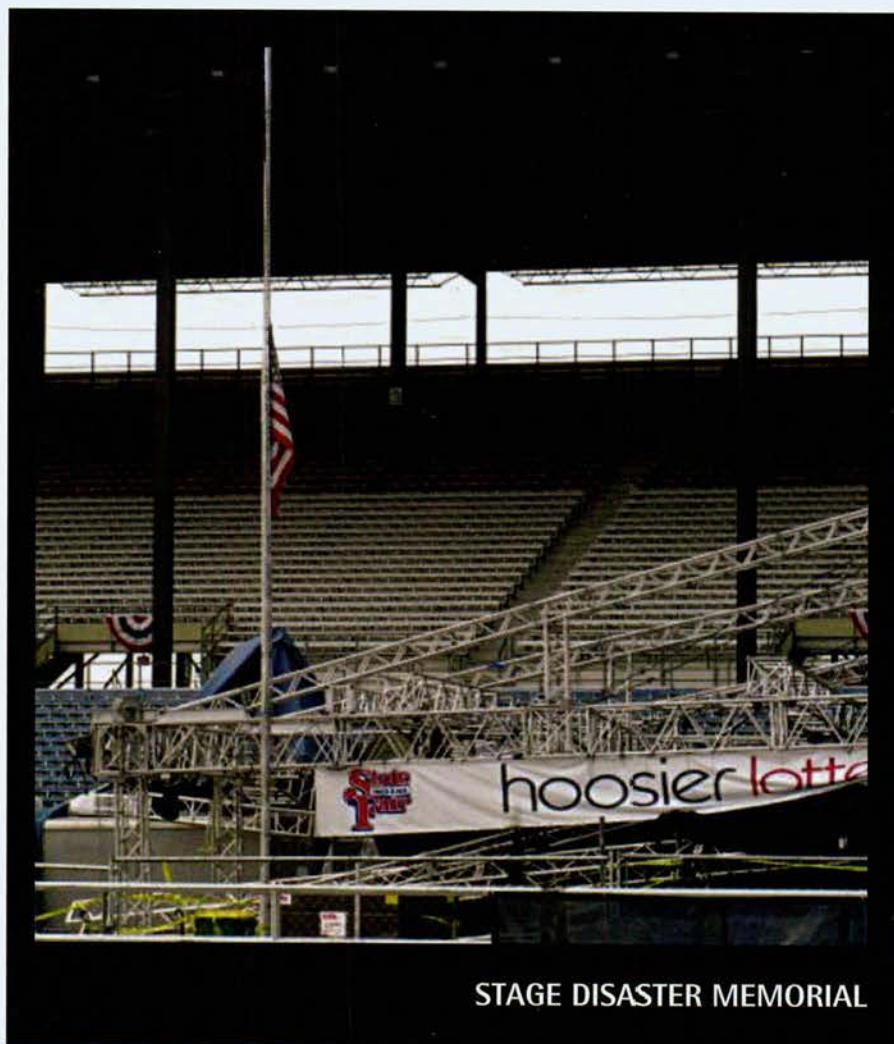
"Emergency response plans and procedures were not fully developed. The plans were not referenced or used on August 13. Multiple agencies were involved in aspects of public safety prior to the State Fair, although no entity had a clear responsibility for overall public safety. The plans did not address multi-agency coordination."

Crucially, despite there being some emergency planning in place, albeit inadequate, the Fair did not share the planning with the production! "The State Fair relies on contractors for Grandstand production; they were not aware of the plans", Witt concluded.

## Recommendations

At the CX Stage Safety seminar earlier this year, recommendations were made regarding compulsory inspections of stage structures and production, before audience admission to events.

Thornton Tomasetti recommended the same thing, and in better detail. "Entertainment structures should be designed by a licensed design professional with experience in the design and evaluation of tem-



STAGE DISASTER MEMORIAL

porary entertainment structures with complex loading configurations. Analysis should be performed for the engineered structure and for the establishment of highly specific

rigging rules and limitations for its use. For productions that do not conform to the resulting "pre-approved" rigging configurations, a separate engineering analysis should be performed."

They continued: "Operational controls implemented or considered in the design and use of entertainment structures should reflect the complexity of modern productions, including the limited ability to rapidly reduce loads by removing the suspended entertainment technology used in these productions." This is a key point – many emergency plans CX has seen do rely on rapidly lowering production elements as bad weather approaches. As a strategy this cannot be guaranteed.

Thornton Tomasetti recommended that guy line anchor systems for entertainment structures should utilize fixed, mechanical anchors (into ground) whenever possible.

They conclude: "The entertainment industry would benefit from the development of comprehensive engineering-based documents related to the design, construction and use of entertainment

## Unsigned Band Contracts

So who would think that NOT signing a performance contract is a good idea? The Fair organisers say it is industry practice to only sign once the show is underway. A review of previous shows bears this out – the Fair signed almost all contracts, but the artists didn't.

Maroon Five, Janet Jackson, Train and Lady Antebullum were all recent acts that came, played, collected and departed without bothering to sign. The upshot of this disaster is that not only will contracts need to be signed, the VENUE will need to ensure that it takes the LEAD over the disaster planning – after all the entity with the MOST control is the venue.

Imagine a stage manager, or a production person, trying to call off a gig – with the promoter yelling that they don't have insurance so they will be ruined and no one will be paid.

A promoter without weather insurance? Yes, happens all the time. Google Playground Weekender as an example....

structures.”

Witt Associates urged the State to regulate structures for outdoor entertainment. They name PLASA as the peak industry association and nominate its standards for consideration, specifically ANSI E1.2 2006, Entertainment Technology Design, Manufacture and Use of Aluminum Trusses and Towers, and ANSI E1.21 2006, Temporary Ground Supported Overhead Structures Used To Cover Stage Areas and Support Equipment in the Production of Outdoor Entertainment Events.

“PLASA is also actively promoting certification for theater and arena riggers and entertainment electricians called the Entertainment Technician Certification Program (ETCP)”, reports Witt.

## Conclusion

The State of Indiana and the industry more widely has now had the most terrible of wakeup calls.

The collapse of the structure at the Indiana State Fair was not unique. There were four high profile temporary stage canopy collapses during the 2011 summer concert season: one on July 17th at the Cisco Ottawa Blues Festival in Ottawa, Canada; one on August 7th at Brady District Block Party, Tulsa Oklahoma; one on August 13th at the Indiana State Fairgrounds; and another on August 18th at the Pukkelpop Festival in Kiewit, Belgium.

All collapses resulted in tremendous property damage and two in multiple fatalities.

The three big lessons from Indiana are that you need far more ballast than you think – they had 20 tonnes on the deck, but with one wind direction, from the North, only two of the ten ballast blocks had effect (as a comparison, a fully closed 20m x 25m Hoecker structure requires 2 tonne PER LEG for each of 18 legs. Reference HRIA Weighting guide).

The second lesson is a harder one, but the Indiana Symphony Orchestra demonstrated that very same tragic night that you can evacuate an audience safely if you have a proper plan – a plan which must be implemented by the VENUE.

The final lesson – the HARDEST – has to be that a band is the LAST ENTITY you let control an event – think about Limp Bizkit at Big Day Out a decade ago, when fans rushed the stage in the mosh pit, and teenager Jessica Michalik died of asphyxiation. The corner said that lead singer Fred Durst should have acted more responsibly when the problem became apparent.

For an emergency plan to work, it has to be written into the venue hire contract, the performer contracts, and the production contracts. Everyone has to be on the same page so that, given a trigger event, the call is made BY THE VENUE and the plan rolls out.

• **CX acknowledges the assistance of Roderick van Gelder from Stage Safety Pty Ltd in the preparation of this article.**

### LINKS:

- **REPORTS:** [www.in.gov/sfc/](http://www.in.gov/sfc/)
- **HANDY:** [theatresafetyblog.blogspot.com.au](http://theatresafetyblog.blogspot.com.au)

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# EASTER SHOW SPECTACULAR GOES OFF – NIGHTLY!

## Didge Ya See That Cracker?

**RECIPE FOR SUCCESS:** Take a boss on vacation, a pyro team tossing ideas over a post-show beer, two musos with a unique approach, a crack production team and an audience expectation of greatness. Mix with gusto. Light fuse and stand back!

BY JOHN MAIZELS

**L**ike so many stories, the success factor of this one can be traced back to a series of coincidental right-place-right time moments. Andrew Howard, falls across didgeridoo player Mark Hoffman and percussionist Lukas Bendell, who have been playing amazing didge-and-drum sets in Darwin's Mindil Beach Sunset Market under the name "eMDee". Andrew's company, Howard and Sons Pyrotechnics, pulls together the firework display for 2011 Territory Day right on the water at Mindil Beach. The design floats eMDee on the ocean as they perform a live soundtrack to Howards' fireworks, which are launched from a barge on the sea and fixed positions on the sand. The show is called "The Colours of Kakadu".

Lynelle Smith, Entertainment Manager for the Sydney Royal Easter Show, rocks up to the beach and sees the Territory Day fireworks. Literally, she just happens to be there on holiday after winding down the 2011 Royal Easter Show, and it seems like a thing to watch. Along with the thirty min-



Easter Show Pyros

utes of shells that go off as part of the gig, Lynelle is totally blown away. She immediately seeks out Andrew Howard to talk about repeating it as an Easter Show gig. Timing is everything. Howard is about to take "Colours of Kakadu" to the Montreal International Fireworks Competition, arguably the Olympics of the pyrotechnics world. Competitive fireworks is not just about how many bangs, it's about style and theme and bringing something unique to the display.

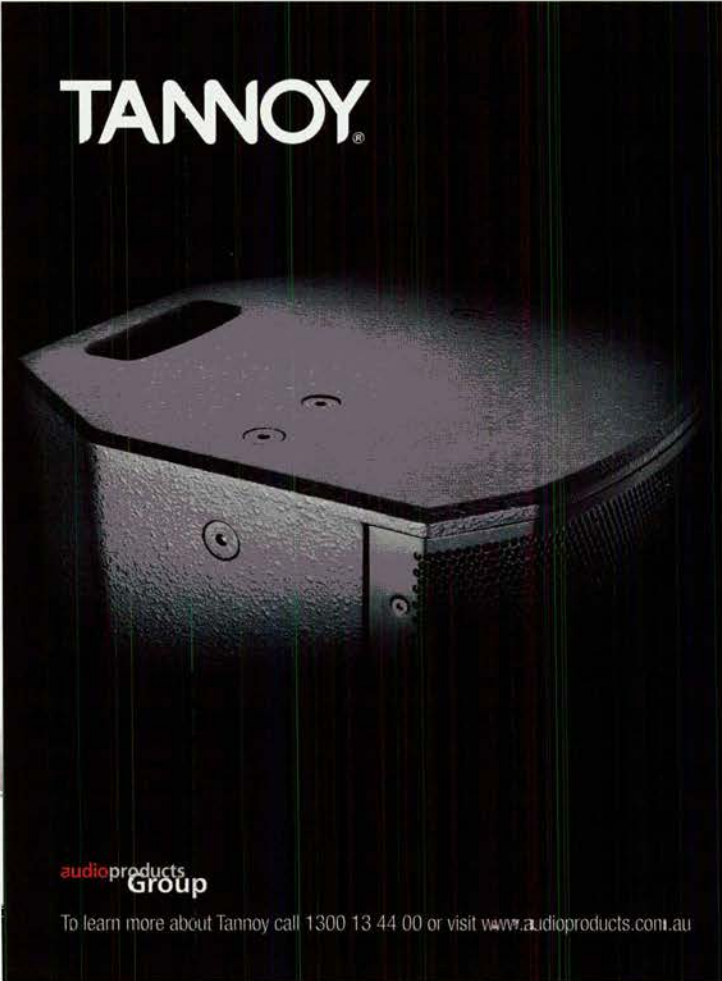
Howard uses the Darwin gig to work through the nuances of combining the live feel of a band performance with the choreographed precision of a massive fireworks show. Two weeks after Territory Day, the team, now named "The Bang Collective", is in Montreal preparing a one-shot thirty minute show like nothing that has been seen or heard before. Against eight other world-class competitors, they take Overall Bronze Jupiter for the Competition and the Gold Jupiter for best soundtrack. Discussions about doing a show in Sydney become really serious.



4:25 PM	Grand Parade	1035R4
5:10 PM	Tentpegging	E0144
5:40 PM	150th Anniversary NSWPP	1022AR4
6:35 PM	Bareback - Round 4	10226R4
6:35 PM	Saddle Bronc - Round 4	1022CR4
6:35 PM	Bull Ride - Round 4	1022DR4
6:35 PM	Ladies Barrel Race - Rd 4	1022ER4
6:35 PM	Steer Wrestling - Rd 4	

SYDNEY SHOWGROUND  
Sydney Olympic Park

Easter Show  
Daktronics screen



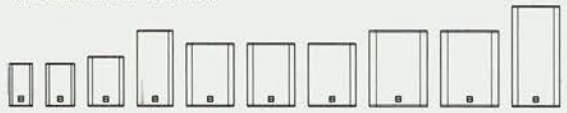
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An arena spectacular is something that doesn't happen by accident, and we've seen pretty amazing stuff over the years at the Easter Show. The punters who come to the arena each night have been serenaded, motocrossed, precision driven, Snowy Rivered, brass banded, and theatred. They expect story. They expect big. They expect fireworks. They expect impressive. But few in the audience could have expected the show that would be delivered by The Bang Collective.

A number of other confluences come together, without which the show wouldn't have been possible in the same way. The need to expand the arena to become the home ground for the new Greater Western Sydney AFL team means addition of a new stand, a new scoreboard, and engineering works that play right into the staging that Andrew Howard and Lynelle Smith have developed. By October 2011 it's all locked in place and production begins.

## The show

Translating the Kakadu show into "Colours of the Outback" is clearly the sort of work relished by Andrew Howard and his team. First they map out how the show

might work, what the soundtrack might be like, what effects they could use, and then consider practical stuff like venue, sightlines, special facilities, general theming, and likely weather. It's an outdoor event, and you always have to consider the weather.

Unlike development of a song, where you can all head into the studio with an idea and jam until it comes together, fireworks are expensive. You do it once, and you do it right. To avoid the need to keep the neighbours expensively awake, night after night, Howard and Sons have developed a computer and video simulation approach. This allows them to design a show, see what it will look like, and run it as many times as they need while production elements are added and tested. "It's not just a matter of setting off every firework available, because some will be too loud or unsympathetic for the show" explained Andrew Howard.

As each new firework is developed, it is tested against a black sky and captured on video. Over the years, Howards' have built quite a library of firework images and sounds which can be scaled, positioned and layered into the simulation video. This becomes the basic tool, allowing the full

show to be built against the soundtrack for the event. The simulation lets them sort out lots of fine detail before anyone lights a fuse.

One very striking effect was use of "fire-jets", small boxes which shoot long plumes of flame perfectly on cue. Andrew Howard explained that they use "isopar", a synthetic isoparaffin liquid not even flammable under normal circumstances. To create the effect, pressurised nitrogen is used to force an atomised spray of isopar through a fine nozzle, and a small electric arc ignites the mixture on the way through. The process is fully DMX controllable, and quite frugal. The total of twenty four fire-jets (four cantilevered from the big video screen, ten across the stage, and another ten on the arena) used only 200 litres of isopar for the whole run of show. Firejets can be very closely synchronised to beats from the drums and didge, and the effect received special mentions from commentators at the Montreal show.

## Lighting

The lighting for the arena was provided by Chameleon, and designed by Paul Collison. The arena lighting had to do multi-

MA onPC Command  
Wing overlooks show



ple jobs, catering not only for special effects and mood during the fireworks display, but also providing general and special lighting for the other arena events. LX Operator Addam Campbell took me through the techy details. In each of the main stands, a horizontal truss carried twelve Mac 2K washes and four Clay Paky beams "to do the fruity stuff". Two of the stands are still under construction, and their roofs had not been certified for hanging lights by the time it came to bump in, so additional fill on the northern side of the arena was provided by sets of Macs and Clay Pakys flown from the lighting towers. The overall effect was smooth.

LX control was by MA. Paul Collison used a grandMA2 to program the show, but space constraints in the control area meant that a smaller solution had to be used for runtime. The answer was a MA onPC command wing, running in conjunction with the grandma onPC software, and to ensure no fail there was a fully redundant system running in parallel. Much of the general show in the arena was run live by Addam Campbell from the command wing. As implemented, the system had enough DMX to support over 3000 parameters, which

fully loaded the number of universes deployed. "It's a problem with some of the lights – they come with functions that we don't use, but they still take up parameters" Addam told me.

Chameleon installed the LX over two days, half a day hanging the lights, and the rest of the time was taken running cables. Power is flown via three main distros located at the spot tower, but the big time absorber is the DMX cabling. A couple of years back when the cable was run round seat backs (as you do) someone came in and started cutting the DMX lines. He did that on several days, and proved his ineptitude by being caught. Now the cables are run high up, and have to be cable-tied from a cherry-picker. The LX cues for the spectacular were programmed in two overnight sessions, and locked in place.

**AS EACH new firework is developed, it is tested against a black sky and captured on video.**

### Sound and staging

Another first for the RAS arena was construction of a temporary event stage over the northeastern entry to the stadium. This is a major innovation, which has made it easy to preset some of the larger musical elements, like the 32 piece Police Band who could be set up and miked behind the LED curtain while a smaller musical item happens in front. The stage also took away a major risk factor. In previous years most of the musical events had to be either on the ground, or they took place on a stage which was trucked onto the arena on demand and in sections, along with lights, audio distribution and generator power. As Addam pointed out, "it looked



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a bit naff, and always created a situation in which the potential for on-stage lighting to not work was quite high". Lynelle Smith said that the arrival of a full-size fixed stage allowed her to bring some serious stage management to that part of the programming, and the effort is rewarded in a series of seamless handovers.

Sound by PA People was excellent, with a team led by sound designer Ian Cooper, and delivered from a Digico desk through to the stadium's speaker system. Balance was right, arena microphones never went ffftttt, audio in the stadium seats was clear and clean, and nothing ever overshadowed anything else.

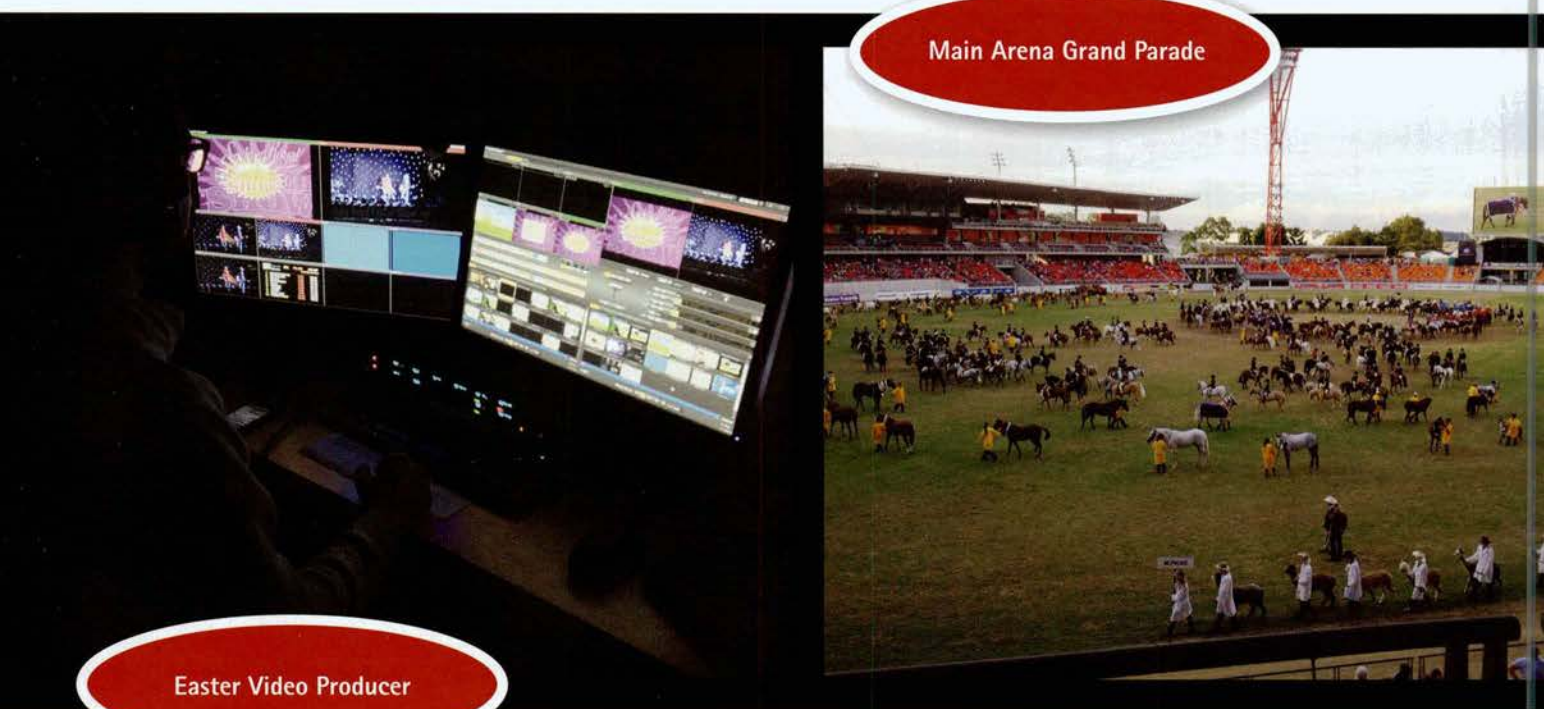
with enough brightness to handle daylight easily. How bright? 6000 nits at full burst, pulling a touch under 130kW from the power grid, is enough to deal with direct sunlight. At night the screen can be wound down to 200 nits, which is around double the brightness of a TV. Colour rendition is impressive, and I never had the feeling that the screen was too bright or too dark. Most of the processing happens in racks at the control point, with a fibre optic cable running back to the screen.

Screncorp provided the video, with producer Lucas Goldman at the controls of a Tricaster. Lucas told me that the Tricaster camera inputs came from two fixed location

delay. Great gobs of it, with some of the live performances appearing to be many frames late compared to the audio. It was incredibly noticeable on vocals, magnified by the excellent clarity and visibility that the video system delivered. Delay is a fact of life in the digital world. You need to expect a frame or so of delay for every device in the chain, and the delays add. While that's an adequate technical explanation, it was really obvious to the extent that non-technical punters noticed.

## Creating the show

Andrew Howard is a veteran of many



Main Arena Grand Parade

Easter Video Producer

## Screen and video

Totally new this year, and put in place to support the needs of the Greater Western Sydney AFL footy team, the Daktronics screen stands out. It's bright, sharp, and big; almost wide enough to show cinema-scope pictures in native form. For most of the arena day, the screen was split into two sections, with 16x9 video on the left and a strip of scores, schedule and other information on the right. But, as you might expect, it can be carved up almost any way that a production might need. This is the largest arena screen in Australia, and it uses LEDs,

cameras, plus two RF cameras using Giga-wave RF links, which gave good ability to get down and dirty with the action. Video segments were replayed from a Pandoras Box video server, which handled playback of incidental material, television commercials for sponsor breaks, support graphics during the rodeo, and the all-important video for Colours of the Outback. Vision output was fed as high definition 1080i to the screen and other inhouse systems.

For the shows I saw, video was clean and clear, with very few RF mishaps, despite some really nasty weather and very quick repositionings. The one problem I wish they'd been able to solve was video

Royal Easter Shows, and told me that the Show crowd is tough, because there are so many different people with so many different expectations. "We want to get the tightest connection between the show and the audience. We really want to take the audience on a journey, through lighting and pyros and the live band, and with colours telling the story".

The vast majority of firework shows have music with fireworks, but Colours of the Outback takes this many steps forward, adding programmed lighting and live musicians, and melding on-screen and additional audio elements. Rather than use narration, the screen is used to

display groups of words which appear and disappear ethereally and are intermingled with other graphic elements that create the mood which underpins the music and fireworks.

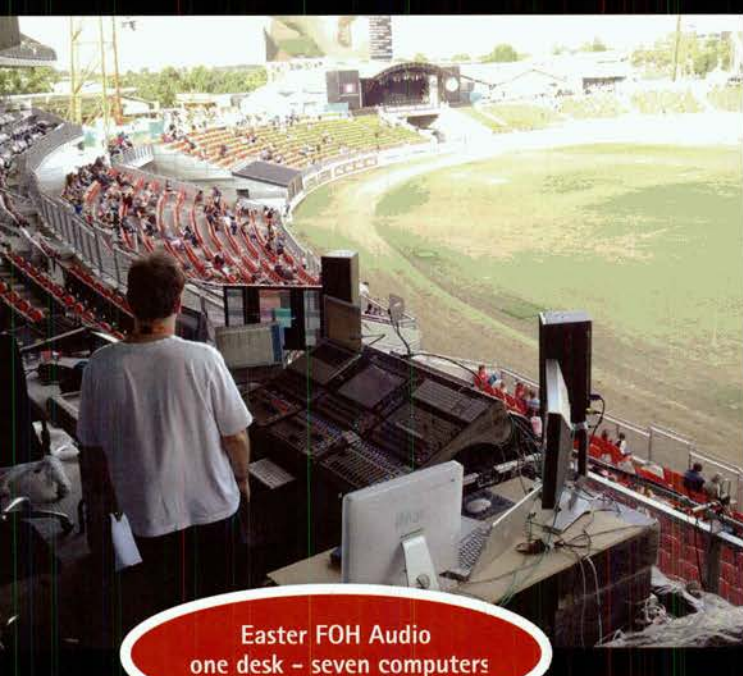
Cutting the fifteen minute audio track was eMDee's first step. They spent two days in the studio recording the music, followed by another day of performing it in front of a green screen for video capture. That was followed by further week of video production, before a cut could be handed over to Andrew Howard for integration with the firework programming, all performed offline and checked against the simulation. Sixty firing modules,

Josh Hyman, the show caller. Mostly, because it's an outdoor event and weather makes a difference. Sydney turned on major waterworks for the last two nights of this year's Show, which led to some of the segments being tweaked and recast in a way that still met audience expectation. Musical items were added, motocross was replaced with live interview and video overlay, with the team being managed to ensure a seamless and on-time entertainment for the people who filled the stands night after night.

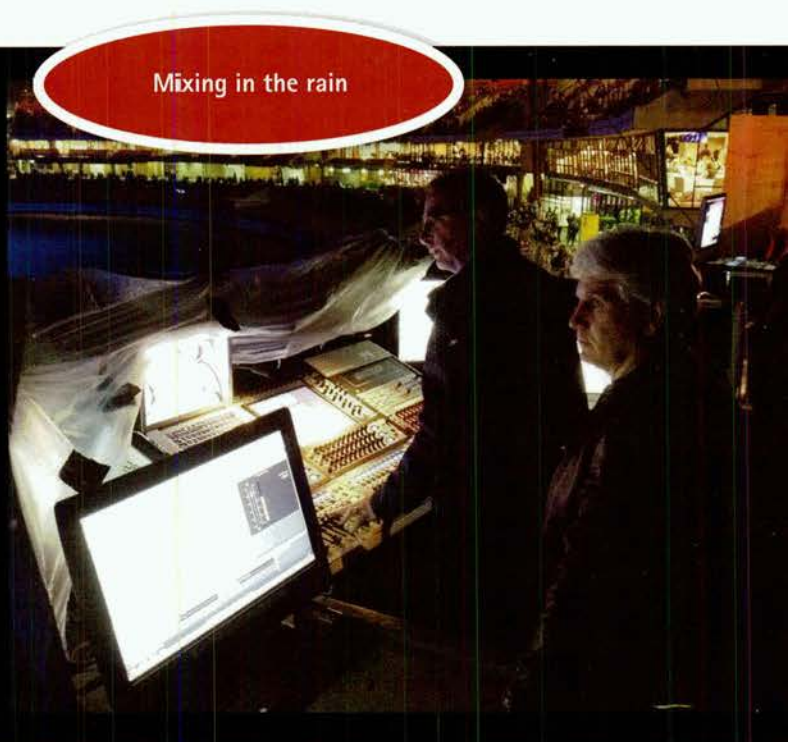
As it gets toward Colours time, the sixteen on-site Howard and Sons team members have fifteen minutes to set the

saw the show twice, and it was flawless. Andrew Howard told me that the pyros are highly predictable, with pre-fire calibrated to the millisecond.

The fireworks, didge and percussion pass beats back and forth with stunning musicality. It's even more impressive when you consider how much of the beatmatching comes from musos who are performing live. Time after time it's hard to tell whether a riffed beat has come from Lukas Bendell's drums, or a cascade of shells. Gerbs go whoosh at exactly the right moment to be a musical foil for the four didgeridoos that Mark Hoffman manages to play at once.



Easter FOH Audio  
one desk – seven computers



Mixing in the rain

each with 32 cues, are set up to run from the Fireone control system. Some of the fireworks ignite once and then deliver up to 90 shots. Nobody gets to see a single sparkle until the night before the Easter Show opens, when everything comes together for a full dress rehearsal with a full set of pyros.

## Showtime!

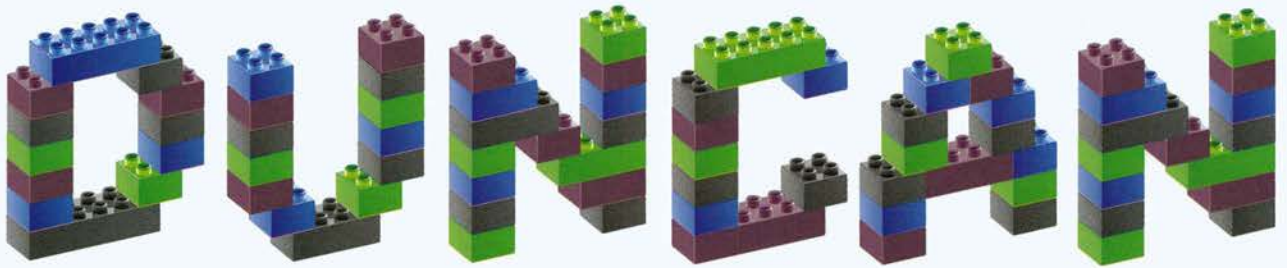
From 1700 each day, Lynelle and her crew take control of the arena, managing and calling every event until the spectacular ends at 2100. Mostly everything runs like clockwork, under the watchful eye of

fireworks. Twenty minutes max. It's a carefully rehearsed rigging process that takes place in the middle of the arena, where nobody notices due to the sleight-of-hand masking provided by motocross riders and a final live musical item. Comfortably ahead of deadline, the cars, arena firejets, and various distributed ground effects are in place and waiting.

Right on 2045 the go cue is given, and audio starts the playback. From that moment, the entire show is driven from SMPTE timecode which locks the lights, video playback and pyro firing. The music track has vocals and backing instrumentals, and a clicktrack fed to eMDee. I

The screen alternates between words that paint the story, abstract graphics and scenes of the outback. From time to time, curiously morphed pre-recorded images of Hoffman and Bendell echo exactly what the musos are doing live on stage. The moving lights provide additional fill, colour and flash from the outer edges of the stands. A false ending brings huge rounds of applause, and then the show picks up again and the audience is treated to a full-on coda of sound, light and pyros for another ninety seconds. Nicely done.

Every cracker night should be as exciting as this.



# FRY



## Why we exhibit at Frankfurt

### Small audio manufacturer from Highett – sell worldwide. How?

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**T**he email arrived on my computer from Julius the other day.

"Mate, it's deadline time" he wrote. "Why don't you do your normal story about the Frankfurt show, but from the point of view of an Aussie exporter like ARX? A little history of the company, and how you came to be doing this stuff 16,000 kilometres from home.

"Oh, and BTW I need it in a couple of days. With some pictures. OK?"

OK. That's my weekend gone, then! But here goes:

We formed ARX Systems P/L in Melbourne in 1983, and the same three of us still run the company today - Colin Park, his brother David Park, and me - Duncan Fry.

Many of the original products we introduced in the 80's have over the years become Industry Standards and we still manufacture them today, albeit in an updated form to take advantage of improved manufacturing processes and, most importantly, higher quality components. Someone with an original Sixgate six channel noise-gate from 1983 would find the 2012 version just as easy to use, but faster and even quieter.

ARX hadn't been established very long before we realised that we would have to sell the products overseas as well as

Australia, in order to make the production costs worthwhile. After all, we reasoned, if people in Australia liked ARX products and found them useful, then why wouldn't people in other countries? The same audio problems faced everyone around the world, so why wouldn't our unique solutions be accepted with the same enthusiasm as they were at home?

So, armed with this 'mission statement', we boldly set out on what we

We would enthusiastically go straight into the pitch when asked about the products, only to have to retell the whole story again when the visitor would say "I'm sorry, I lost you at 'Hello! Where are you guys from?"

Later that same evening, wandering around a supermarket looking for the next day's drinks and snacks for the stand, we saw some folding aluminium beach chairs on one of the shelves. "Hey, let's grab three of these for the stand," one of us said (we

**.....BUT LEANING BACK ON THE FLOOR OF THE STAND looking up at people's crotches all day didnt seem the right kind of impression to be giving, even for Australians!**

hoped would be the path to ... well, if not world domination, then at least international success!

The first overseas exhibition we did was the 1988 NAMM show. Flushed with national pride, the bicentennial of Federation seemed an appropriate international launch date for the ARX brand.

The first day of the show was eye-opening, to say the least. Flat out from go to whoa, we struggled with sore feet, the number of people, and language problems.

still argue over exactly who it was) "They'll be great to sit on and rest our feet during the show."

They were tightly wrapped in shrink-wrap, so we took them unopened to the show the next day.

When we did unwrap them, they unfortunately turned out to be beach chairs without any legs - the kind that are just a seat base and a back! We tried them out, but leaning back on the floor of the stand looking up at people's crotches all day

didn't seem the right kind of impression to be giving, even for Australians! So we left them folded up by one of the rubbish bins that night on our way out. I think I saw some security guards lounging in them the next morning!

Armed with what we had learnt from the show, we started doing more international exhibitions like PALA in Singapore, PLASA in the UK and many others, fine-tuning the setup and stand concept each time until we worked out a viable template to follow.

We first started doing the Frankfurt Pro Light and Sound / MusikMesse in the 90's, in conjunction with our UK distributor who were also European reps for EAW speakers and C Audio amplifiers. With what we learnt from doing that, we went on to have our own stand, but not too far from our German distributor's stand. This way, if we need any help in translating, then that help is close at hand!

At the moment the Frankfurt show is our major exhibition, as it attracts a truly comprehensive amount of international visitors. It enables us to see all our European



Col shows what 6 months of not eating meat will do for you, while Dunk shows the opposite

Continued Page 65

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# Audio Visual Events

## CX took a tour around AVE HQ to see how they get the job done

**CONTINUING OUR THEME** where we profile interesting firms across the wide and thin professional audio visual industry, we now introduce young Sydney firm, Audio Visual Events. The emphasis here is on efficiency and quality....

By Jimmy Den-Ouden

**A**udio Visual Events had a modest beginning in 2002, with an inventory of 2x Sony PX31 Projectors, a 10x7 screen, some 10" JBL Eons and a bunch of Par Cans. They've certainly grown a bit since then, and now hold an extensive hire inventory as well as around 13 full time staff.

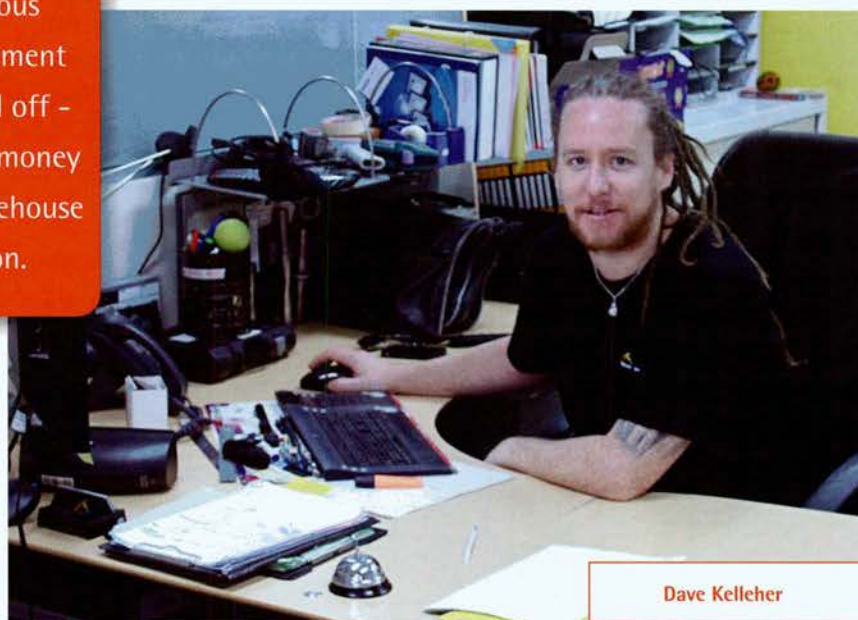
Walking into the Sydney North Shore premises we're greeted by Dave Kelleher, head storeman. Directed upstairs, we find "the business end" of the business housed in a nicely appointed office. Everyone has dual screen setups, and it's comfortable. We meet Director, David Campbell, who gives us the rundown on AVE. He originally started in the industry working for an AV company in the same area. When that company was bought out by Staging Connections for its in-house contracts there was an opportunity to fill the space in the market, and thus AVE was born.

AVE does two kinds of business - dry hire and full production. David tells us "a lot of production companies hire from us, as well



Daniel Bergan, David Campbell, David McNeil

**IT SEEMS LIKE** continuous improvement has paid off - for our money the warehouse is spot on.



Dave Kelleher



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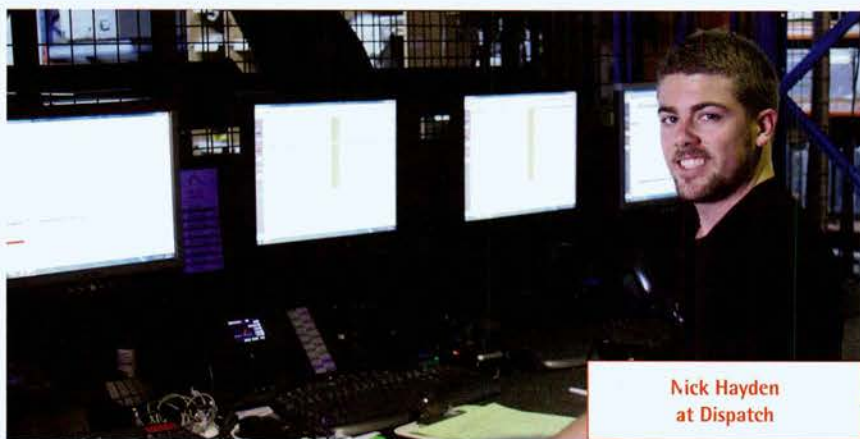




**Jacob Nakhla,  
Stephen Bolger**



**Matt Goodwin,  
Daniel Yip**



**Nick Hayden  
at Dispatch**



**Stephen Bolger  
in Edit Suite**

as the smaller "one man" type businesses who need more gear to do a show than they have in-house".

Outside the warehouse sits the AVE fleet; two pantechs, a large Iveco van as well as two smaller vans. Moving inside, the warehouse itself is extensive and well organized. Audio, video and lighting gear as well as rigging, staging and drapes all have dedicated spaces, with lots of shelving for storage. Assorted different sized prep bays in the dock make it easy to prep dry hires. There is good work lighting everywhere, and the space has been well utilized.

AVE has a big inventory of audio and lighting gear; Meyer and JBL speakers, Allen & Heath iLive and MA Lighting consoles, some 40 moving lights and a raft of DJ gear all feature. Still, I can't help but get the feeling that AVE is more about video. They've got a bunch of Christie 10K and Barco 8K projectors, a swag of Sony cameras, Lenses, Folsom and Roland switching gear as well as lots of converters and SDI gear. Adjacent to the management office is the video edit suite, which lets them do in-house video production.

## Keeping track

Everything in the building has a barcode on it – even cables. For dry hires, each item is scanned out as it leaves, and scanned back into the RentalPoint system on return. Dave K told us "we don't really lose a lot of gear because everything can be tracked". Nice. Staff clock in and out at the front door on a computerized system.

Upstairs on a mezzanine level a workshop area allows AVE to build their own roadcases in-house. David told us "We used to buy from Tuffa, but now we make our own. We just kept the same colour". Every case is stenciled and branded with the company logo. Absolutely everything is cased – even the smallest things like SDI converters travel in Pelican cases. Campbell explains that "Drapes are all colour coded so it's easy to find what we need". He also told us that it's taken a few goes to get the warehouse functioning exactly the way they want it, with at least one significant overhaul of the upstairs area – "It's been trial and error to an extent". It seems like continuous improvement has paid off – for our money the warehouse seems spot on.

The biggest challenge seems to be getting the space to keep up with the gear. "We've just taken a lease on another unit in the complex for more storage, and we can also park the vehicles in there at night if they're loaded". David is heavily focused on keeping gear up to date, figuring that having good equipment helps make AVE attractive to customers. Much of the money the business makes goes back into improving it. David feels that knowing the crew and condition of the gear you take to a gig is an important factor in its success. HD has been a big change for video, and necessitated purchase of a lot of new gear to stay current.

Asked what he thinks people get wrong, David replies "I think a lot of people fail to deliver on the small things – attention to detail is important, and planning helps!". This is a quality he looks for in crew too – believing that while technical skills can be learnt, it's much harder to adjust peoples attitudes. "Customer liaison, attention to detail, and fitting in with the team is important. They have to want to be here". David's not above pitching in to help load the truck – "it's not an upstairs and downstairs mentality, we're all here together". The vibe around the building supports this – crew is well presented and friendly.

Looking at the website, it seems like a lot of the work they do is corporate – this is often the case with organizations which experience the kind of exponential growth AVE has.



Drapes are all stored in colour coded bags



Even little things like converters are cased properly



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# Video Matters

BY RICHARD CADENA

## Video Makes Waves

**I**f you could see electromagnetic radiation, you would be surprised at just how much of it is around you. Everywhere you look, you would see pulsing waves of energy. Fortunately, our eyes can't see those frequencies, but they're there . . .

Magnetism and electricity are inextricably linked; when electricity flows, it radiates a magnetic field. Electromagnetic radiation (EMR) is produced by electrical and electronic gadgets like radio transmitters, microwave ovens, electric motors, and video displays.

If the radiation is strong enough and the frequency is between 3kHz and 300GHz -

**"EMC IS BEING enforced in Europe and it's likely to become a bigger issue in other parts of the world, including North America. Don't be caught with your shields down."**

which is the range of radio frequencies - then it can interfere with radio broadcasts and communications. If you want to see a vivid example, check out <http://plasa.me/emr>. In this short video you'll see a person keying a handheld radio next to a dimmer rack, and you'll hear the breakers on the dimmers tripping because of the electromagnetic interference (EMI) from the radio.

**Bring in 'da noise**

Pete Daniels, owner of Pete's Big TVs in Nashville, Tennessee ([www.petesbigtvs.com](http://www.petesbigtvs.com)), only recently learned of the issue

after working on a show for which he supplied an LED video display.

After the show, he was chatting with the line producer when she received a frantic call over the radio from the audio crew, who were having a problem.

"Can I help?" Peter asked.

"There's nothing you can do," she replied.

"The sound guys are dying, trying to find open frequencies in the spectrum to tune their wireless microphones."

So Daniels went to see what was going on, and what he saw appalled him. Looking at their spectrum analyser, he could see what he called 'trash' everywhere. But it was the source of the radio frequency interference (RFI) that surprised him. It was coming from his LED videowall.

"They were getting hits on this frequency and that frequency. The LED screen was spitting out all kinds of frequencies that everybody was trying to use."

It was not an isolated incident.

Scott Ingham, owner of Ingham Designs ([www.inghamdesigns.com](http://www.inghamdesigns.com)), has experienced similar problems. Ingham's com-

pany, which has offices in Austin, Texas and in Zhuhai, China, designs electronics for the entertainment industry, including low-EMI buffer boxes for video displays. He was called to rescue a large video installation at a power station cooling tower in Drogenbos, Brussels. The RFI generated by over 1000 LED tubes was jamming radio communications in the city.

"It took a while for the EMI police to find the source of the interference because the tubes weren't always on," Ingham said.

"But once they found it they shut it down. It turns out the manufacturer was pretty good at making antennas too."

### The spread solution

Ingham ended up solving the problem by building a new data distribution box to distribute the video content data from the

**THE SOUND GUYS ARE dying, trying to find open frequencies in the spectrum....**

controller to the displays.

"I used every trick in the book to reduce and spread out the noise," he said. He spread the noise by modulating the data with a range of frequencies instead of concentrating all of the energy in a single frequency or a few frequencies.

"It was a bit of a band aid because I was told to solve the problem without touch-

ing the tubes, but that's where the noise was coming from."

The noise in video displays, he says, comes mainly from the transfer of digital data to the display and within the display. Video data is usually synchronous by the time it gets to the printed circuit board within the display, meaning that it is timed by means of a clock signal which is on a separate data line than the video data.

Both the data and the clock signals are square waves with very fast rise and fall times, which cause harmonics to be gen-

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erated. Harmonics are whole number multiples of the frequency in question, so even if the data rate is not in the radio frequency range, the harmonics could be.

Also, Ingham says, the driver chips in LED displays typically have two sets of signals. These signals are pulse width modulated (PWM), meaning they are square waves with a fixed frequency but a variable duty cycle or a variable amount of 'on' time versus 'off' time within each single cycle.

"One PWM driver or buck regulator is used to set the peak current of the LED, and that can run in the 500kHz to 1MHz range," adds Ingham. "The other PWM signal can be used to dim the LEDs and is usually 300Hz to 400Hz."

Including harmonics, both of those signals can contribute to RFI emissions from the video display.

"The length of the PC board traces and the wires connecting them can start to become very effective antennas above 100MHz," Ingham continued. "A quarter wave antenna for a 300MHz waveform only needs to be about nine inches long."

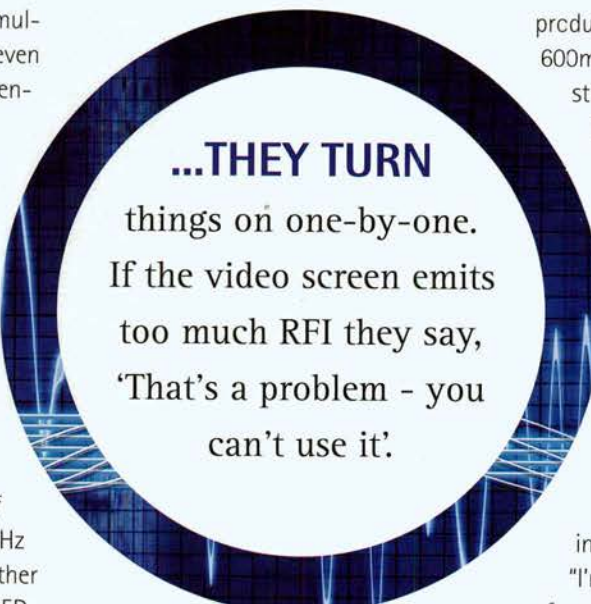
It might seem as if the power supply - where most of the electrical energy is concentrated in any system, including video display systems - would generate the most powerful EMI. But Ingham believes it's fairly easy to build a Faraday cage or a shield around a power supply to prevent the emissions from escaping.

"Power supplies can radiate," he comments, "but it's been my experience that most of the noise with video walls and tubes is from the transfer of digital data to and from the LED driver chips."

## The RF Police

Why does all of this matter to the live event production industry? Or does it matter? Daniels says it absolutely does matter. In May, 2011 he was visiting a video display manufacturer in China when he happened upon some Germans at the same factory.

While he was inspecting one batch of displays, the Germans were looking at another. Daniels was perfectly happy with the batch he was looking at but the other guys were in the process of telling the Chinese they were rejecting theirs. Puzzled, Daniels asked them



**...THEY TURN**  
things on one-by-one.  
If the video screen emits  
too much RFI they say,  
'That's a problem - you  
can't use it'.

why they rejected the video screens.

"They looked fine to me, but the Germans said they didn't meet the RF spec," Daniels said. "And then they showed me their spectrum analyser."

Daniels recalls how the Germans said that government representatives had been showing up at concerts with spectrum analysers, and if they didn't meet IEC standards, they would shut them down. "They turn everything off and take a background reading, and then they turn things on one-by-one. If the video screen emits too much RFI they say, 'That's a problem - you can't use it.'"

A light bulb went off over Daniel's head: "Maybe a year from now," he said, "I'll be getting a phone call from (Bruce Springsteen's video director) George Travis saying, 'I'm here in Düsseldorf and I have some Germans with a spectrum analyser saying I can't use the video screen. What am I going to tell Bruce?'"

## Customising for compliance

Daniels knew he had to get this problem under control, so immediately started searching for a solution. This involved finding a video display manufacturer that was small enough to cater for custom products but big enough to design and build products properly. The company found, InfoLED, already manufactured a 9mm pixel pitch display, but Daniels wanted a 7mm. The two parties decided to modify the existing

product and change the module size from 600mm x 600mm to 500mm x 500mm but still use 64 pixels x 64 pixels, resulting in a pixel pitch of 7.5mm.

"I told them I needed them to make this product meet the specs for FCC, ETL, UL, TÜV compliance for real," Daniels emphasises.

"Everyone in China claims they meet them, but they don't."

At the time of writing, Daniels had the finished product and was demo'ing 16 panels, with four in his warehouse in Delaware and four in Germany undergoing TÜV testing.

"I'm going to come away with a piece of paper written in German," he said, "so when the authorities show up and say the screen is a problem, George Travis will hand them the documents saying it's okay. The same goes for the American testing lab."

After the first run of 16 prototypes, Daniels approved them and ran a second batch of 250 production panels. "Two-hundred and fifty were sold to a Broadway show that closed in eight days," he said. "So we got them back, and we have been gigging them since September. We had them on the Soul Train Awards and said to the sound guys, 'when you get around to doing spectrum allocation, we'd love to have you check the screen!'"

A day later, the guy walked into the room with an analyser and there was nothing there. We just did the Latin Grammy's in Miami - this is where we had the problem - and it ran flawlessly."

According to Daniels, the new video panels have power supplies with toroidal transformers and lowloss capacitors. They also have very quiet driver chips running at 400Hz. "It cost twice or three times the price," Daniels said, "but in a matter of years, everybody's going to have to do this."

## Seals of quality

Ironically, Daniels said that before he did the Soul Train Awards show, he would have said his gear met the standard for EMC. Now the industry is taking notice and an organisation in Germany is focused on EMC compliance for videowalls.

HQ-Union ([www.hq-union.de](http://www.hq-union.de)) is a trade

organisation made up of manufacturers, landlords, users and designers of the LED video industry. According to their articles of association, their primary purpose is to support compliance with European statutory norms including CE and EMC through the assignment of 'quality seals' indicating compliance.

An article titled *Elektrosmog induced by LED-Videowalls?* By Helmut Gundermann says that "More and more LED videowalls don't comply with the allowed limits (of EMI) by CE, FCC or CCC."

He argues that the cause of the increasing non-compliance has to do with "the liberalisation of the goods traffic inside the European Union" when the CE mark was implemented.

The CE mark is designed to show compliance with European standards but there is no third party verification: it is strictly self-enforced. Further, he argues, the problem of EMC compliance is a growing one.

Early LED displays were "primitive" but the electromagnetic fields they generated were "only marginal," the article says. Over time, resolutions and refresh rates were increased without regard to the increased radiation. Further, by ignoring shielding requirements, manu-

facturers can gain "an immense price advantage at the expense of meeting compliance with regulations regarding safety, fire prevention, and valid VDE rules."

These products are marketed touting features like 'refresh rate', 'lower weight, and 'low price', making it hard for companies who obey the rules and produce only tested, safe and reliable products.

Gundermann offers these suggestions for making sure you are using compliant gear:

- Check in advance the competence of the provider and ask how CE is secured.
- Before you order, first have a look at a sample. Do not be scared to spend some money on an external specialist to check the sample - it's better to be safe than sorry.
- In some countries you have a money-back guarantee if the product is not compliant, even longer than the term of the warranty because the transfer of legal goods has not taken place.

Gundermann closes the article with an invitation to become a member of the HQ-Union. Membership is open to anyone over the age of 18 who accepts and promotes the purpose of the association. Although membership does not mean that the products you produce are EMC compliant, the association does offer its members support in measurement and shielding of equipment, and organises seminars and training events, among other benefits.

EMC is being enforced in Europe and it's likely to become a bigger issue in other parts of the world, including North America. Don't be caught with your shields down.

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• This article first appeared in **Light and Sound International.**

# C 414

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By Jimmy Den-Ouden

## **Allen & Heath GLD Mixing System**

### A digital mixing system, which hits a new price point

**A**llen & Heath entered the digital scene some time ago with the iLive range of consoles. The GLD80 represents their next generation of console, and sees the company target a new market at a lower price point.

The GLD80 is not just a surface – it's has the processing smarts inside the console, rather than in the stage rack. Onboard I/O is limited to 4x XLR in and out, plus some stereo line in and outs on RCA connectors. There are also AES3 and S/PDIF outputs. You use the GLD80 in conjunction with the GLD-AR2412 stage rack.

The stage rack links via the dSNAKE port using EtherCon connectors, and provides 24 mic/line inputs and 12 line outputs. If that's not enough, there's an 8 input 4



For video of this GEARBOX review, click here in the interactive CX-E version of the magazine. If reading print, please visit [cx-tv.com](http://cx-tv.com) to find this review.



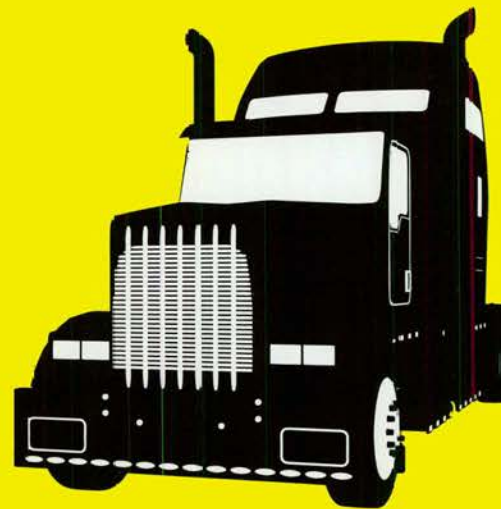


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output expander unit (GLD-AR84), which can be connected to the expander port on the main stage rack. You can connect a second expander to the console directly, providing a maximum of 48 inputs and 30 outputs. Not bad for a "small" system.

The dSNAKE protocol isn't the same as A&H ACEnet as used on the larger iLive systems, so to link into one of these systems you'd need to add the ACEnet expansion card into the console expansion

slot. Other cards are available including MADi, Ethersound, Dante, and Waves interfaces, as well as the MMO card which supplies ADAT, iDR, HearBus and Aviom interfaces. Only one card can be installed at a time.

The surface itself is quite compact. Wider but slightly less deep than the Allen & Heath T80, it weighs 16kg and is easily manageable as a one person lift. It features elements of the same "channel

strip" interface as the iLive consoles, but with fewer controls. Much of the operation is done via the touch screen interface, which sports a new generation of operating system. Assigning channels to strips is done as a drag and drop operation, and the touch screen actually feels really good. It's more responsive than previous generations, which is important considering you only have very basic console control without it.



Brand: Allen & Heath  
 Model: GLD80  
 RRP: GLD80 - \$9,995.  
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 GLD-AR0804 - \$1,495.  
 All prices inc GST.  
 Product Info:  
[www.allen-heath.com](http://www.allen-heath.com)  
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[www.tag.com.au](http://www.tag.com.au)



The surface has 20 motorised faders, split into a bank of 12 and another of 8. Each bank has 4 layers. The system samplerate is 48kHz +/-100PPM, with 24 bit delta-sigma bitdepth on the A2D and D2A converters. Latency from local XLR in to out is quoted at 1.49ms. A maximum of 44 input channels can be assigned to any of 30 assignable busses, and sent to any of 20 outputs. The 8 on-board stereo effects are reminiscent of those found on the iLive.

Realizing that USB slots are useful for lots of stuff, A&H have included a pair of these on the surface, of which one can be used to make a 2-track recording direct from the console. You can record in 44.1kHz 16 bit WAV, and the console can also playback other formats including MP3, M4A, and FLAC. Other useful features include 16 DCA/mute groups, inbuilt RTA and a signal generator. All inputs have phase reverse, HPF, insert, gate, 4 band PEQ, compressor, and even delay. Outputs are similarly equipped, with insert, PEQ, GEQ, compressor and delay. It's quite a lot of processing for the money.

The fader banks can be configured with anything you want in any order you like, so you could have a few channels, then an effect send, then a matrix, then a DCA, then a master, then more channels, then a return. It's very easy to customize, and you can leave blank spaces too which makes it possible to setup simply for untrained operators. Strips can be individually colour coded on the LCD displays for easy identification.

For the money, there's not a lot to dislike about the GLD80 system. It's easy to setup and use, and while it's got some limitations this is to be expected from a system in this market sector. The only major annoyance is the introduction of yet another digital audio networking protocol, but given the architecture of the iDR system I suppose it's unavoidable. It's not like you can't interface it with a card.


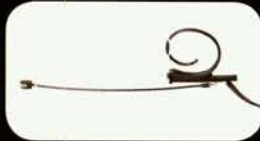
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## LSC Redback Patch Bay System

By Jimmy Den-Ouden

Having dimmer racks is one thing, but having a tidy cabling solution is another

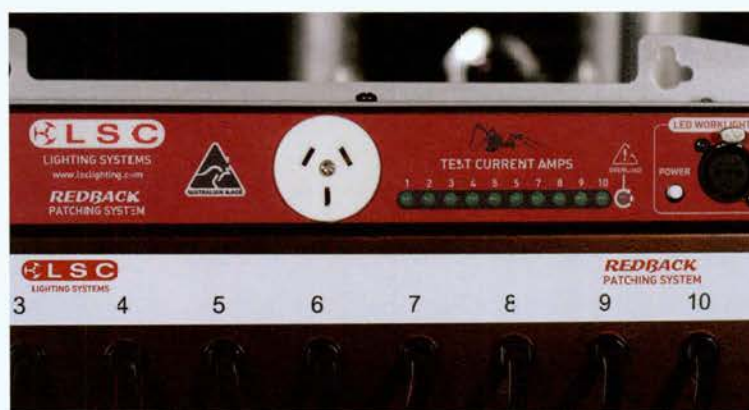
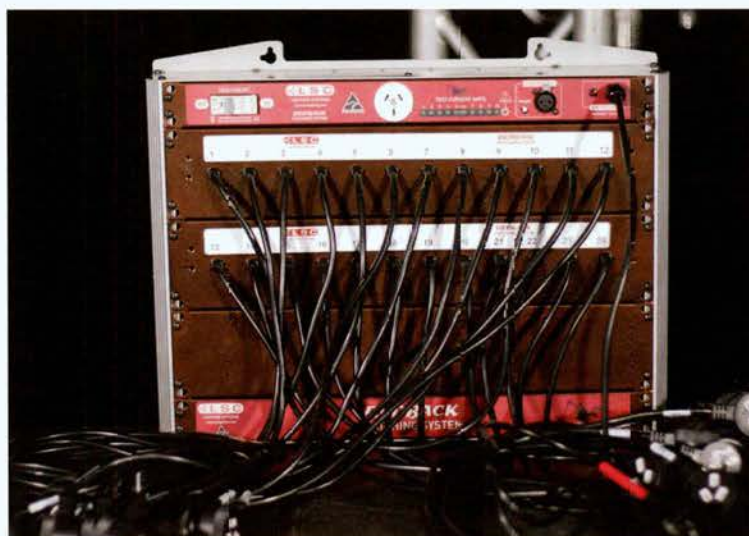
**D**immer racks pop up in one of two situations – touring and installed. Touring racks are easy to deal with, and once they're in a rack it's easy enough to run a weiland or socapex cable to them and patch in some tails. After all, the whole shambles will be back in the truck in 12 hours and on its way somewhere else.

Permanent installation requires a little more thought. Typically the electrical contractor responsible for an installation is required to terminate the lighting patch cables. The responsibility for supplying patch bays is not always clearly defined. So they are often one of the last things considered.

Indeed, there's something nice about walking into a venue with a tidy dimmer room, where cable management has been planned beforehand rather than just done as an afterthought.

It's no accident that Redback patch bays look very similar to the Redback wall mount dimmers – they are even made from the same extrusion. This is not only good by way of keeping styling consistent – using the same components across multiple products allows LSC to keep the cost down. Both the patch bays and wallmount dimmers are very shallow – less than 200mm. This means they occupy less real estate than traditional full size rack cabinet mounted units. The idea is that a patch bay mounts vertically with a dimmer unit either side. You can opt for a vertically stacked installation, but side by side mounting means the patch cables can't foul the circuit breakers. So it's safer. Tails on the Redback patch bay are appropriately long to allow patching to any dimmer point on either side without hanging on the floor.

Installation contractors will appreciate the ease of installation too. Starting with the lowest row of points, you can unscrew the panel and then hang it off the top of the one below. This provides a nice steady platform on which to terminate the outgoing feeds. Optional cable management hooks are available, allowing each panel's tails to be easily separated.



For video of this GEARBOX review, click here in the interactive CX-E version of the magazine. If reading print please visit [cx-tv.com](http://cx-tv.com) to find this review.

You can buy 12 way patch panels individually too, allowing for future expansion as well as mounting into traditional racks. Full systems including chassis are available with up to 120 points (10 panels of 12 tails).

The RBP-12 is a 1RU test module, and an option for all systems. It includes a 25W test load with its own fly lead, as well as a switched 3 pin XLR to power a gooseneck work light. Finally, there's a test outlet which is locally protected by a 10A breaker on the panel. The outlet has a digital ammeter adjacent, indicating current draw up to 10A in 1A increments. There's an overload indicator too.

Assembly of the system is easy to understand, as is the pricing of the various component options. Cable entry can be via the back, top or bottom of the enclosure. All up the Redback patch system is a neat little solution to installed lighting patching, and coupled with the Redback wallmount dimmers really does look good and saves on space.

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LSC Lighting  
Systems

Model: Redback  
Patchbays

RRP: RBP-12 –  
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RBP/24/T – \$1025  
plus GST

Product Info:

[www.lscighting.com](http://www.lscighting.com)

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## **Panasonic AG-HMX-100E Vision Mixer** It does HD, and it even does 3D!

By Jimmy Den-Ouden

**T**he AG-HMX100E is touted on the Panasonic website as an AV mixer, and in this capacity it definitely fits the bill. Physically it's pretty compact – and in design is very reminiscent of the MX-70. In fact, it looks almost identical. Difference is that the brain inside the HMX-100 is a newer generation. Whereas the MX-70 was designed for analogue video with an SDI input board option, the HMX-100 has really been built for digital signals.

The mixer is designed to take a range of different sources, convert them to a common format, and generate a switched output. The video inputs have onboard framestores, but you can also run genlock to the mixer and sources for situations where frame latency is a problem.

Video inputs include 4x SD/HD SDI, 2 HDMI (HDCP is not supported on these), 2x composite inputs for legacy sources, and a DVI-I input as well. The mixer can be put into a number of 3D modes, which allow it to switch between 2x 3D SDI sources.

Switching between 2 sources doesn't seem like a lot, and it's almost as though the 3D bit is there because it was easy to add in. Still it does have a number of 3D output modes, and for anyone needing this functionality it definitely works.

The switching operation is fairly standard, you can choose A/B or PST/PGM modes for the cut row buttons. There are about a gazillion different transition styles, including some nice scaling effects. Chroma and luminance keys can be done, as can downstream keys. The parameters for these are setup via the LCD screen using the rotary encoders below – it's not a touch screen. The screen is a monochrome backlit LCD affair – unchanged from previous generations.

What has changed is the preview output – the HMX-100E has an inbuilt 10 way multiview output (on DVI-D connector). This shows you all your sources, as well as a waveform monitor can be fed from any of the various inputs (I couldn't make it track

the PGM output). SDI outputs are provided for PGM, Preview, Aux and Multiview. There are also DVI-D outputs for PGM and multiview. In other words, you can feed a projector via DVI, your local monitor via DVI, and a record of the show on SDI. The HMX-100E supports 1080/59.94i, 1080/50i, 720/59.94p, 720/50p and 480/59.94i and 576/50i, and has 12 bit processing.

Being an AV mixer, the HMX-100E is designed to handle audio as well. There's an onboard mixer which has 6 input faders and a master fader. The first 5 faders are stereo, designed to adjust levels of input sources as well as an aux input. The last fader regulates mic input, and there's a master output fader too. Embedded audio on SDI signals can be routed to the internal audio mixer, with the option to choose which channels of the embedded audio you pick up. 4 stereo XLR inputs take care of analogue signals and are also routable to the mixer inputs. The multiviewer output displays audio levels from all source inputs as overlay on the picture, as well as the PGM audio output level. You can switch this overlay off if you're not using audio.

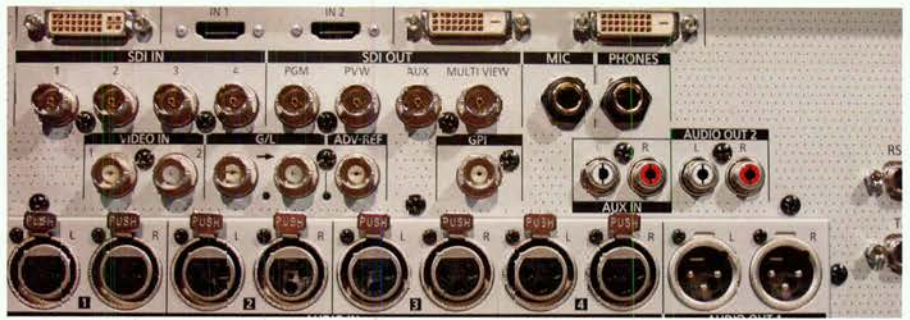
Up to 100 "Event" memories can be

**Brand:** Panasonic  
**Model:** AG-HMX-100E  
**RRP:** \$7334.00 inc GST  
**Product Info:**  
[www.panasonic.com.au](http://www.panasonic.com.au)  
**Distributor:**  
[www.panasonic.com.au](http://www.panasonic.com.au)

stored, allowing recall of mixer parameters just by punching in the memory number and hitting enter. Think of it like scenes on a digital mixer or E-MEMs for the broadcast types among us). A D-sub connector provides tally output, which you can presumably connect to a CCU or a custom interface for other tally setups. An RS-232 port allows the mixer to control Panasonic projector power and shutter functions, and there's a GPI interface too.

I couldn't find a nice way to show up which source was selected on the multiview - the overlay will move the words PGM and PST around as you switch, but the lack of borders on the multiviewer (in particular borders that change colour as you cut) bothered me. Also of concern was the frame latency, which on the preview multiview output seemed high enough to be noticeable. This would be a problem in IMAG situations, necessitating using an external Genlock signal.

The HMX-100E does do exactly what it says on the brochure, and competently at that. I still can't shake the feeling that it's another MX-70, but then considering the



functionality and price maybe it would be more appropriate to regard it as the next generation of mixer. It would work well in live production situations for switching

IMAG as well as some graphic and replay sources, but with the wipe and keying options it would work equally well when used as a broadcast switcher.

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# Find your way through...




## Bonked bonker banks bucks

**T**his magazine has a well earned reputation for being unafraid. We tackle important social and industry issues, and we report life as it is. So sooner or later, there was going to be a story in which we expose the danger of sex on the road. Duncan Fry's monthly CX column shows exactly how things work: anyone who has been in this industry for more than thirty seconds has either been in a compromising situation personally, or claims a first-hand story of a mate who came a cropper while in-flagrante.

But here's the thing: I've never seen anyone do a risk assessment on the dangers of such activity. To the best of my knowledge there's no question in my Professional Indemnity insurance application which allows the insurer to determine the risk that I (or something) might come unstuck while being... away on tour. This might be because AON consulted with Mrs TheMaiz about the wording of my policy, or it might be because the insurance industry has not fully assessed the ways in which workers in the live performance industry are at risk from hardware failures during consummation. Depending on who is reading this, I am/am not volunteering for the field research.

A recent Federal Court judgement provides a major clarification for employers in the Live Performance industry. We now have a quotable ruling which sets an important legal precedent in the case of a specific form of on-tour personal injury,

and it can only be minutes until some hapless Production Manager has to lay down the law for tour behaviour.

How did this come about? If you missed the detail, here's an instant replay. This case concerns Ms Public Servant, who can't be named for legal reasons, and because a large number of hot-blooded production types are clamouring for employment with the Commonwealth government as a result of her exploits. They all they want to know which department to join.

Ms Public Servant was travelling on a multi-day work trip, and therefore had to stay overnight in a country motel. Any job-related trip in the corporate world which requires an overnight stay also has a requirement for dinner, bed and breakfast. Generally speaking, in that order. And generally, following a sumptuous, per-diem-funded evening meal at, say, Maccas, your wind-down entertainment involves the pub, or a movie in your room, or a lengthy political discussion with the guy who collects the dinner tray from your room. Not this time.

After a hard day loaded with budget reviews, Ms PS, an employee in the human relations section of a Commonwealth government agency, arranged to meet up with

a friend who lived locally. Apparently he came over for a debrief, and to relieve the stress of the day. You shouldn't be shocked. Really, who cares what consenting adults do in a hotel room? Besides, I can name several mates who had a pleasant night of dalliance and then moved on to a serious relationship. And, in one or two cases, with the same dalliant. Just as you thought this would be like every other motel story, the unexpected happened.

According to reports, the earth moved for Ms PS. This was closely followed by movement of a piece of wall and a glass light fitting. The light fitting landed on Ms PS rather unexpectedly and at an unfortunate moment, but any moment when you have a light fitting land on your head would be unfortunate. It seems that Ms PS was significantly unimpressed. And injured enough to go to hospital to have the damage checked out. OK, this is simple enough: she's on a work trip, and

she's away from home, so she's covered by conditions of employment. She gets hurt, and then has the double whammy of being trashed by a hotel fitting AND the embarrassment of having to explain how this happened, probably in triplicate. So when she gets back to the office, she fills in a form and hands it to Comcare for a compo claim, citing "psychological and facial damage". If she'd asked me, I might have steered her away from the psychological bit, but I can see

how facial damage would be an outcome if one of you had just pulled a glass lamp out of the wall at a passionate moment. Yep, that must happen all the time.

The claims, counter-claims and paper-

### SHE MET UP

with a friend.  
He came over  
for a debrief  
and to relieve  
the stress of  
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gardless. His judgement reminds everyone that a bit of nookie is a lawful recreational activity, and that's good enough for me. If you're an employer, "safe sex" might now have a different meaning, especially if it involves cards.

This is a landmark judgement for the entertainment industry, one which provides important assurance that sex is an "ordinary incident of life" commonly undertaken in a motel room, just like sleeping or showering. Good decision. And I'm so glad to know that I'm covered by Workers Comp when I'm on the road.

Read the judgement, in all its glory: [bit.ly/cx70-corpo](http://bit.ly/cx70-corpo)

## !Camera

The pictures that come out of the thingy 45 continue to impress me. Some are completely crap, but some are stunning. Did you see the full page photo of the Rock Walk in CX-68? Thank the 45. But I'm way underimpressed with the default camera app, with which I fight daily. Have you found a fave thingy camera app that works better than the one that comes with the phone, is easy to use, allows reasonable and separate control over focus, white balance and iris, and which maybe has a self-timer? Bonus points if it makes coffee. Please drop me a line, because I'm going spare here in the darkroom.

## Training

By the time you read this, the industry consultation phase for the CUE training will be complete, and further rumination will be in process. There's still time to add your thoughts, and you can get to me any time via [TheMaiz@gmail.com](mailto:TheMaiz@gmail.com) hotline.

Submissions so far include the need to understand some quite different education and employment practises in each state, importance on cross-training front-of-house staff in basic technical skills at Certificate II level, potential for a specialisation unit in Communications seems not to have ever played cards on a tour bus, but his point was well made re-

work bobbed around departments for a bit, but eventually Comcare said "no way, because the Department didn't require you to have sex as part of the stay". Yipes. Not going there! However nobody disputes that her employer required her to stay overnight in the motel room, which they'd arranged. Ms PS challenged Comcare's position through the Administrative Appeals Tribunal. The AAT upheld a finding that sexual activity was "not an ordinary incident of an overnight stay, like showering, sleeping, eating or returning to the place of residence from a social occasion elsewhere in the vicinity. Rather she was involved in a recreational activity which her employer had not induced, encouraged or countenanced". They went on to suggest that while sexual activity was an ordinary incident, it was "not necessary";

Clearly Comcare and the AAT have never had to deal with a concert tour or theatre crew. What about those tour riders where requirements for sex is buried cleverly in the section which covers endless supply of chartreuse MtMts, the floral arrangement in the drummer's dressing room, a L47 for each backing vocalist, and an original Wuritzer juke box on the tour bus? OK, I'm making some of this up. You can't get chartreuse MtMts.

Anyway Ms PS was made of sterner stuff, and that's just as well for us. She went back to court, fought the decision and WON. She got costs, and other undisclosed compensation for her troubles. And how was the decision conveyed?

I could probably leave out the really juicy bits from the transcript but I know you're clamouring for strong fair reporting, so here's the vaguely sanitised version. Comcare and the AAT asserted that to qualify for compo, Ms PS had to be doing something sanctioned or required by her employer. Federal Court Justice Nicholas-employe. Federal Court Justice Nicholas- apparently sensible person, turned that around. As His Beakness said, "If the applicant had been injured while playing a game of cards in her motel room she would be entitled to compensation even though it could not be said that her employer induced or encouraged her to engage in such an activity". Justice Nicholas seems not to have ever played cards on a tour bus, but his point was well made re-

# One year on

# aceta



## Australian Commercial & Entertainment Technologies Association

**O**n 1 May ACETA holds its second annual general meeting. This meeting marks the start of ACETA's second year of operations. With that in mind it is time then to do a bit of a retrospective and to take a look at the year ahead.

The first achievement is that ACETA exists at all. With new members joining during the course of the year ACETA is increasingly coming to represent the interests of the sector at large. The 30 or so current members can genuinely claim to represent all divisions within the industry and while not all the businesses that could be members are members at this stage the level of participation is strong and continuing to increase. Of course every new member strengthens ACETA's position and adds value, depth and breadth to the industry and to what can be achieved collectively through the association.

The second achievement is the concise but focused agenda the ACETA board has developed on behalf of its members and the sector more broadly. Work has already begun on the following:

- Addressing the trade show calendar
- Developing industry guidelines
- Industry skills/skill shortage
- Compiling reliable industry statistics
- Liaising with Government (we are already working with Government and Government authorities on Electrical Emission Safety Standards (EESS) and wireless audio transition)

Longer term activities, such as supporting Australian manufacturing, R & D and design across our sector are underway though less advanced at this time.

The third achievement is the rolling out of a set of membership benefits that make

ACETA membership not just 'the right thing to do' for organisations involved in the sector but one that delivers compelling business benefits. A credit bureau deal only available to ACETA members is about to be announced.

So what are the items on ACETA's to do list for the next year?

Continuing items include:

▶ Liaison, negotiation and lobbying on the Electrical Emission Safety Standards (EESS) and wireless audio transition continue and will do for some time into the future as changes on each of these activities will not be completed until 2015.

▶ Trade show calendar – in the next few weeks ACETA will present some new options and new thinking on the role and place of trade show activities in the Australasian region and start a liaison group with stakeholders across the sector, trade show organisers, related associations and others to design a new industry friendly tradeshow framework.

▶ Industry statistics – with the broad sectoral economic impact now progressively being defined (currently our sector enables at least \$45 billion in domestic economic activity) more specific data on sales, employment and other business level benchmarks is being gathered and will be reported periodically.

▶ Industry skills and the skills shortage – while there is no short term fix for the skills shortage ACETA will soon provide resources for members and others to use to promote the sector as an employer-of-choice and the skills and pathways available to people through which they can participate and engage with our industry.

▶ New members benefits. The credit bureau benefit will be announced shortly to join a growing roster, which already includes travel and foreign exchange.

Of course there are many more things ACETA could do and we are ready to respond to members needs or requests, or changes in the environment in which we operate. In the meantime we believe that if we can make significant changes or improvements to the items listed above, at the same time advancing our longer term objectives, then ACETA will have served the industry well during the course of the year ahead.

The ACETA Annual General Meeting is being held on Tuesday May 1st 2012 and members are welcome.

For businesses involved in the sector but not yet members ACETA welcomes your involvement. It is, after all, your association and the more voices inside the tent then the stronger it is and the more it can do for everyone. It's that simple.

ACETA can be contacted on 03 9527 8133 or via email to [info@aceta.org.au](mailto:info@aceta.org.au) or visit the ACETA website for more information about members and activities.

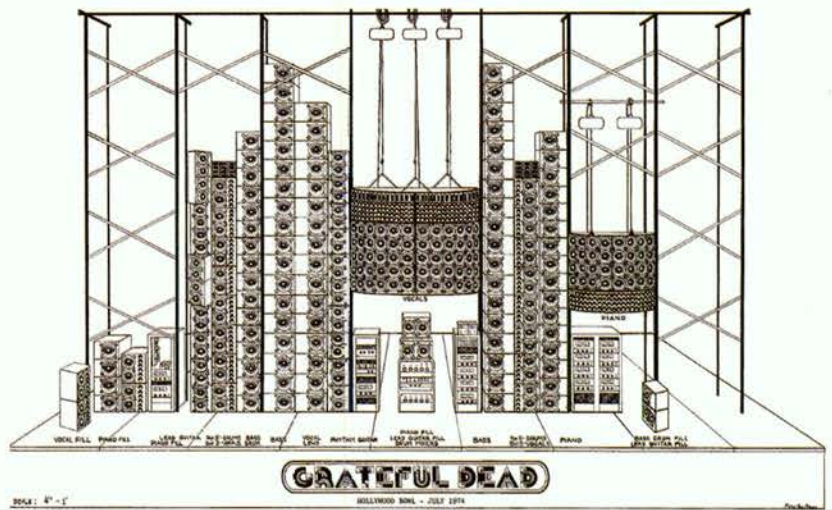
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and the need for core skills with digital systems. Ah yes, it's all becoming one big computer.

Good news: the understanding that higher qualifications – think Diploma and Advanced Diploma – must have entry prerequisites which don't lock out those of our senior industry players who have no formal qualifications. That would be most of the industry. And you can look forward to increased focus on qualification by RPL (Recognition of Prior Learning). Under the vocational system in this country, if you can prove that you have the skills and have demonstrated them in public, you can get a qualification via RPL without going back to school. All you need is evidence. Topic for the future.

## Wall!

In the mid seventies, a time when many believed that Voice of the Theatre was the ultimate in quality, some very big name bands took sound reinforcement



to great lengths. I've seen nothing more impressive than the Grateful Dead's "Wall of Sound". Unlike Phil Spector, whose wall was figurative, this was a real wall that reportedly took twenty one people and a whole day to put together. An inter-

esting read, and you can get to it here: [bit.ly/cx70-wall](http://bit.ly/cx70-wall)

Some of the description reads like an April Fool's joke. It's not, and a less technical (but better written) piece in Wikipedia adds credence.

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## *biz talk*

By Julius Grafton

# Pro Active: Plan to Fail

## Got a Business Plan? Not yet you haven't!

**O**ne marriage ago the relationship manager at the Commonwealth Bank had cause to discuss my business situation, as I wanted to extend my personal mortgage. The database at the bank showed me as director of several firms, so the bank relegated me into the self employed category.

"No I'm not, I am on salary", I told the young guy for whom English was a very second language. "Sorry sir, you are self employed".

This triggered an annoyance because at the time I was paying PAYG tax on a full weekly salary north of \$120,000 and drawing zero dividends. I was, and had been for several years, a normal employee of a company. Despite myself being a shareholder and director.

Eventually I impressed on the bank guy that he should and could consider my mortgage in isolation of the business. Unhappily he pushed on, and asked if I had a business plan.

The poor guy was following a script, asking me what my goals and objectives were. 'To find a nice steak and get drunk tonight' was slowly typed into his terminal. Long story short, I overcame this one-size-fits-all mentality at that wretched bank, and today can say they are long gone from my

dwindling list of financial providers.

My formal and written business plan did actually exist but only because at that time the regulators of our now-closed registered training organization required one. When I created the plan, and updated it each year, I would shake my head because there was always a big section missing. The section of every business plan that nobody wants to write.

The plan to fail.

A friend is just now struggling badly in a coffee shop franchise and stands to lose everything. His plan only went in one direction: make money, expand into more stores, retire. Failure was not an option.

Any accountant or advisor will tell you to put your home into a family trust if you can. Despite losing the capital gains tax concession on the family home, it is an excellent strategy provided you never, ever plan to mortgage the place against the business.

Write down what would happen if the business failed. Are you and your spouse both a director? If so, then you both probably signed guarantees against loans – whereas if only one of you is a director, then there is only one guarantee. This matters a lot if you fail.

But your spouse is very much equal in the business, you say. So make them a

half shareholder instead. Shareholders are never asked to guarantee loans. Imagine if Qantas asked its shareholders to help guarantee the lease on a new aircraft!

Have an escape plan – be creative, keep it legal. And get professional advice when you start or expand your business, not when it is too late.

Always ask yourself what can go wrong, and what will you do if it does go wrong? What if someone launches kamikaze legal action against you? Or your insurer does not pay out a claim based on a technicality.

Worst of all: what if your major customer fails, leaving you knowing in a few months you will certainly also fail?

I hate to say it, but what if your business partner walks out for a good, bad or no reason? Your backer – dad, uncle, brother – suddenly can't guarantee the overdraft for one more day? Your book keeper steals you into collapse, like what happened at Clive Peeters, the NSW retailer.

What if you just can't manage your business to the higher standards demanded every day, and meet the rising expectations of your increasingly informed and fussy clients. What if your entire industry is under margin stress, suffers deflation or the competition is simply cutting corners you cannot?

Plan to fail, so that you can move on.



# Independent Contractors and Employees and your Superannuation obligations

**D**uring the CX Roadshow earlier this year, there appeared to be some confusion with regard to whether persons undertaking work for employers were either employees or independent contractors.

Court Decisions are relied on to determine the status of the work relationship. One of the preferred cases to test the work relationship is that of *Stevens v Brodrigg Sawmilling Co.* This case outlined a number of factors to be taken into account.

A test to distinguish the work relationship is that employees work under a contract of service and an independent contractors work under a contract for service.

In our industry, the majority of work relationships will be that of employer/employee, where the employee will work under a contract of service. Where an

employer engages the services of an independent contractor, there should be a clearly defined contract clearly setting out the status as a contractor.

In accordance with the provisions of the Fair Work Act 2009 there are specific provisions prohibiting sham arrangements. These include that an employer must not misrepresent a contract of service and other measures. A breach of these provisions can result in significant penalties. To ensure compliance with the Act Employers are advised to seek advice from their employer association or legal representative.

Whether the work relationship is that of employee or independent contractor, the question of whether Superannuation

is payable arises. Under the Superannuation Guarantee (Administration) Act 1992 (the SG Act), all organisations are required to pay super contributions for all employees. The SG Act expands the usual definition of employee to include the majority of persons engaged in the entertainment industry including persons who are paid to provide services in connection with a performance or presentation of any music, play, dance, entertainment, sport or any similar activity.

This means that in the majority of cases, all employees and individual contractors performing services in the entertainment industry are required to be paid superannuation contributions.

• LPA provides specific advice to members on issues of WHS, Industrial Relations, Awards and other Live Performance workplace and industry issues. [www.liveperformance.com.au](http://www.liveperformance.com.au)

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# Those Weir Jobs!

By Paul Matthews



**L**ets face it, that's what we contractors live for. In a world of the mundane we get to the point where we secretly ache to do anything else than what we're doing now. Sometimes we luck out, a customer calls with that dream job and it's all at market rates. But most of the time those elusive passion coolers don't just happen. We have to

make them happen.

So the challenge is laid. To get a really interesting install we're going to have to either do it for cheap or worse, for free. All the really interesting stuff is always for non profit clients or start up companies with big dreams and limited cash. They're either risky, whopping overdraft types or "easy as we go" clients who could never dream of qualifying

for bank finance so instead use their meagre annual surplus as investment capital.

Invariably these jobs come our way through "my friends' second cousin thought you might be able to help us with" moments. You may as well rewrite this as "Someone told us that you were gullible and stupid". But in reality if you do the job right and keep the customer happy these weird jobs can open a whole new world of possibilities. Even if you take a calculated loss on your "first weird job", that loss can be a good investment when measured against other forms of advertising once word "gets around" that you have super powers far and above those of ordinary PA system contractors.

Our weird job of this quarter came about through a long involvement with heritage trains over the millennia. Vintage trains are as complex as state politics. In most cases the history of the people and groups involved is more colourful than the history of the trains themselves. But I digress. Let's get to the point of the Cockatoo Run, a heritage train that runs regularly from Sydney to the NSW Southern Highlands.

How do you install a PA system through a main line loco hauled train? "Oh that's easy." but IS IT? Many have tried, and failed! We're not talking a few AWA 4" plastic speakers and an old car radio here. We want clear, quality audio over multiple carriages in a high noise environment.

The train has no existing electrical connections between cars, only the standard century old Westinghouse air brake. Each car has a 50 year old 28vDC generator underneath, rotated by a huge rubber belt driven from one of the axles. This charges a bank of 24v batteries intended to run the lights in each



Jumper cables between cars



New gear, old train

ITEM NO: AH010  
COLOUR: BOTTLE/TAH  
MEAS: 54X20X18 CM

car when the train goes through tunnels.

In normal use any single car can be shunted anywhere in the train either forwards or backwards. The shunters and rail workers have absolutely no training in anything other than shunting. She's an old girl so any work has to naturally blend into the ornate woodwork and brass interiors and be rugged enough to withstand the constant movement and harsh railway environment.

The 21st Century temptation is to go wireless. That would invariably need an amplifier in each car and a radio system capable of broadcasting from one point to all cars. In a train which can easily exceed 200m in length. Hmm. It wasn't long before the cost, complexity and potential unreliability of wireless in such an application overtook any advantages – and that left us back with good old 20th Century 100v Line PA.

So.. jumper cables between cars was the only way to get that 100v line through the whole train. Temptation again was to go for a traditional railway solution: huge, rugged cast iron plugs and sockets, oversize cables and super heavy duty everything.

The solution chosen turned out to be far more effective and lightweight. Four cast aluminium boxes, two per end on each car each equipped with very low tech XLR's and hooks. The jumper itself has a round earth 3 pin Clipsal 439S extension socket and plug in line, deliberately unrestrained.

The jumpers are female each end and the car plugs all male so the jumpers can be swapped around and are directionless. The jumper can go either side of the car so there's no problem if a car is reversed. The 100v Line bus is all parallel so if two jumpers are accidentally left in the system still works.

The all important 439S socket is there in case of a breakaway or if the shunters forget to remove the jumpers before separating the train. It's strong enough to "stay together" during normal use but separates easily when gently tugged so that nothing gets broken when the inevitable happens.

The speakers are all polished wood, surface classroom boxes refitted with 100v, 15w Redback 8" drivers in order to give the system that extra power punch needed to get over the noise. It still looks like an unobtrusive ordinary box one might expect to see on a 1950's NSW Government vintage carriage.

The PA itself is a portable 3RU ABS rack with a 4 core tail and male 5 pin plug (two pins for power, two for the 100v line). Selected cars have a female socket installed along with a separate 24vDC supply from the existing battery bank. The PA rack car therefore be placed anywhere in the train where there is a 5 pin plug or taken out altogether when not required.

At the heart of the system is the frighteningly 21st century light weight Australian Monitor AMD100 Digital PA amplifier, coupled with a Redback CD/MP3 player and a Chiayo SDR radio mic package – all chosen because they can run on 24vDC. In the case of the AMD100 the advanced DSP capabilities allow for luxuries like parametric and shelving EQ and Compression on all channels – giving us the ability to fine tune the system for excellent sound quality.

Now there's no way we made any money on this job. But sure fire bets are on that within the next three years just about every decision maker who has anything to do with railways will ride in one or more of these carriages on a tour or two. Now isn't that slightly better value than a half page ad in a magazine?

(No disrespect to the publisher of CX.. of course!)

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# DUNCAN FRY

distributors, and 80% of the others, at the same time. This way they all get the same information about upcoming products, marketing plans and receive our unique form of encouragement to sell more!

It is also a golden opportunity to test product concepts with the distributors, to get their take on what additional features any product updates should have, what's working well, what products they need and can't buy. All this is extremely useful information that is hard to get any other way than a face-to-face chat with the people who are selling and using your product.

Originally we would have a meeting room with a table and chairs on the stand, but the tendency for people to burst in on what might be confidential meetings was always present. One year, we put a velvet rope across the doorway to the room, with yours truly as the 'door bitch'! This worked well, as we all know no-one will ever push their way past a velvet rope (!) but required continual attention.

Currently we have a much smaller room on the stand, containing a fridge for the essentials of life such as water, beer and wine, plus a small stove for warming up sausages. Oh, and a coffee machine for waking us up in the mornings and snapping those synapses into action!

All meetings now take place at a table and chairs in the centre of the stand, so walk-up visitors and potential distributors wanting a meeting can see that you're busy and then make a time to come back.

At a show the size of the Frankfurt one, planning is everything. In the months prior to the show all of our distributors, potential distributors and just people we want to talk to are contacted. We ask them whether they are planning on attending the show, and on which days, since not everyone can attend for the whole four days. If their answer is yes, they will be coming, then we offer them a choice of times based on the days they will be there. And confirm the one we agree on.

Then reconfirm it a week out from the show.



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Lemmy outta here – Motorhead shiraz! And made in Australia! Found by our distributors IAG for us to make us feel at home. A delicious drop it was, too



Can of foot long sausages.



Door bitch in training – surely no-one would dare to push their way past this velvet rope?



Hundreds of padlocks engraved with lovers' names adorn this footbridge over the river Main in Frankfurt. Does this mean that if you unlock one then you're divorced? Sounds like a very civilised idea



"Brother can you spare a Euro?" These guitar demonstrators from Hall 4 found accommodation a little expensive at the show.

This way we're assured of a steady stream of people coming to the stand, and it also means that when unexpected walk-ups do arrive, as they inevitably do, then we are usually able to fit them into a vacant slot. There is nothing more disheartening than to be besieged by a crowd of people and see the one person you really wanted to discuss things with arrive at the stand and then drift away when they see how many people are waiting.

This year we tried some giveaways too. We put an Audibox USB DI on the front counter display with a sign saying WIN ME, and a box in which people could put their business cards. The sign also said what time it was drawn, and that you had to be present to win.

Each evening at drawing time there was a sizeable crowd of audio folk eager to see if they would win. I asked the very attractive girl (more attractive than me, that's for sure!) on the adjacent stand to us if she would mind drawing out the winning card. She happily obliged, and that worked well, since she was obviously totally impartial and hence no-one could complain about the result.

The giveaway was very successful in collecting potential customer information, and the size of the crowd gave new distributors a good idea of the popularity of the products.

Accessibility of popular products can be a problem. You want people to touch and feel it, as this is a very tactile business, but you don't want it to disappear into the crowd, never to be seen again. When we first dis-

played our first DI box at the NAMM show, we attached one end of a long chain to the bottom of it, and the other end to the back of the stand. When the inevitable person seeking a 'five finger discount' tried to walk off with it, they were soon brought up short when the chair tightened and yanked it out of their hand or pocket, much to their embarrassment.

For this year's Frankfurt show though I was a little more trusting. I just glued the USB DI to the table with some super strength double-sided tape!

Our little corner of Hall 8 was quite a meeting point for Aussie companies exhibiting at the show. Across the aisle from us were Frank, ...and Guillaume from Quest Engineering with their speaker range; around the corner was John Penhallow from Fitness Audio with their sweat proof headset mics and pictures of girls in Lycra getting hot and steamy; in Hall 5.1 was Danny O'esh from SM Pro Audio and their range of signal processing and computer interfaces. Røde mics were also at the show, according to the catalogue, although I didn't manage to get to see them, and Peter Freedman didn't come wandering past our stand.

As with most exhibitions, the Frankfurt show is an opportunity to network with other manufacturers, both during the day

and especially after hours. Over a meal and a couple of drinks we can discuss similar issues, talk about who is working well as a distributor (and who's not!), and generally give and receive useful information.

It's hard work though. From the minute you wake up in the morning to the time your tired head hits the pillow that night, you're ON! A stranger in a strange land, trying to cope with different money, the trains, the taxis, the food, the language, ever conscious of how much you're paying to be there, all the while your brain telling you 'WTF? I'm supposed to be asleep now; come on, just a little nap, pleasee?'

Several times I've had a micro sleep while I've been standing talking to someone, while Col has fallen asleep at the dinner table at an overheated restaurant! It's not an overseas holiday doing these shows, despite what others may think.

At the end of the day though, is it worth it?

Of course it is. As a manufacturer, how else can you get a snapshot of the whole worldwide industry in one place at the one time? Australians are full of great ideas; at a show like Frankfurt you can see other people's ideas too - both good and bad! You can meet industry leaders, maybe become one yourself, and sell your product to people from every corner of the globe.

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