

WHAT'S MISSING FROM MY LIGHTING CONSOLE?
The ENTECH Seminar tapes...

Connections

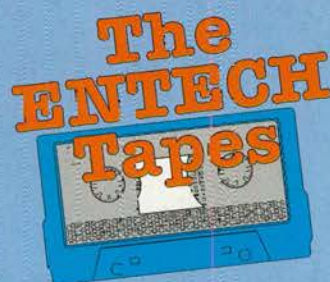
AUSTRALIA'S Entertainment & Technology MONTHLY

AUSTRALIA \$4.50 JULY 1996

DIGITAL AUDIO: A Pioneer's Perspective

Bruce Jackson on the tortured path, AES standards, and cinema standards confusion

**Sony Music Studio:
Refurbed, and looking for business!**



SMOKE
Toxic or safe?

LX CAD
LDs talk about what they
use and how it works

MIXING PUCCINI

Sound for the masses-
it may be opera, but it
needs more FOH elec-
tronics than Metallica!

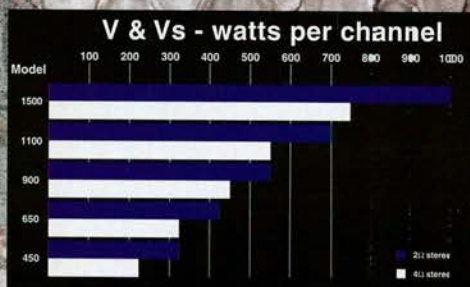


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ALWAYS full of NEWS

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News from the bunker

Welcome to the JULY Connections. It's new, and replaces our CONTACTS Yearbook, which we have shelved for the time being. This issue has some extra pages over our usual advertising / editorial mix, to clear some of our reader contribution backlog. This means more reading for you, and we hope you enjoy.

Because the change in schedule came about a bit late, our hard working Catriona Forcer is on holidays back in the UK, and Madeleine Murray is likewise back in her native Canada.

So our depleted team have used this *excellent* opportunity to run out some of the useful and interesting reader contributions on hand.

The usual layout is a little different this month too. Bear with us. The usual AV section is missing.

Thanks, readers, and keep those stories coming.

• Subscribers note, it's now 11 issues yearly for the price of 10!

4th Proud Year of Independent Publication

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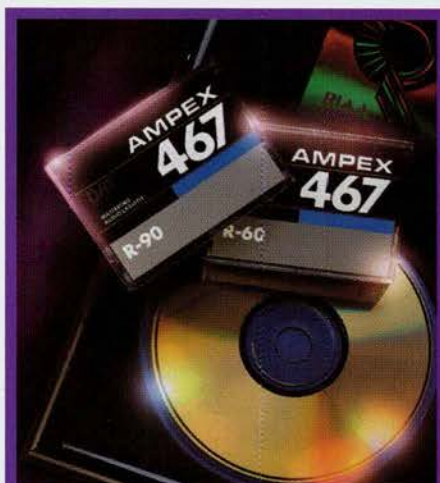
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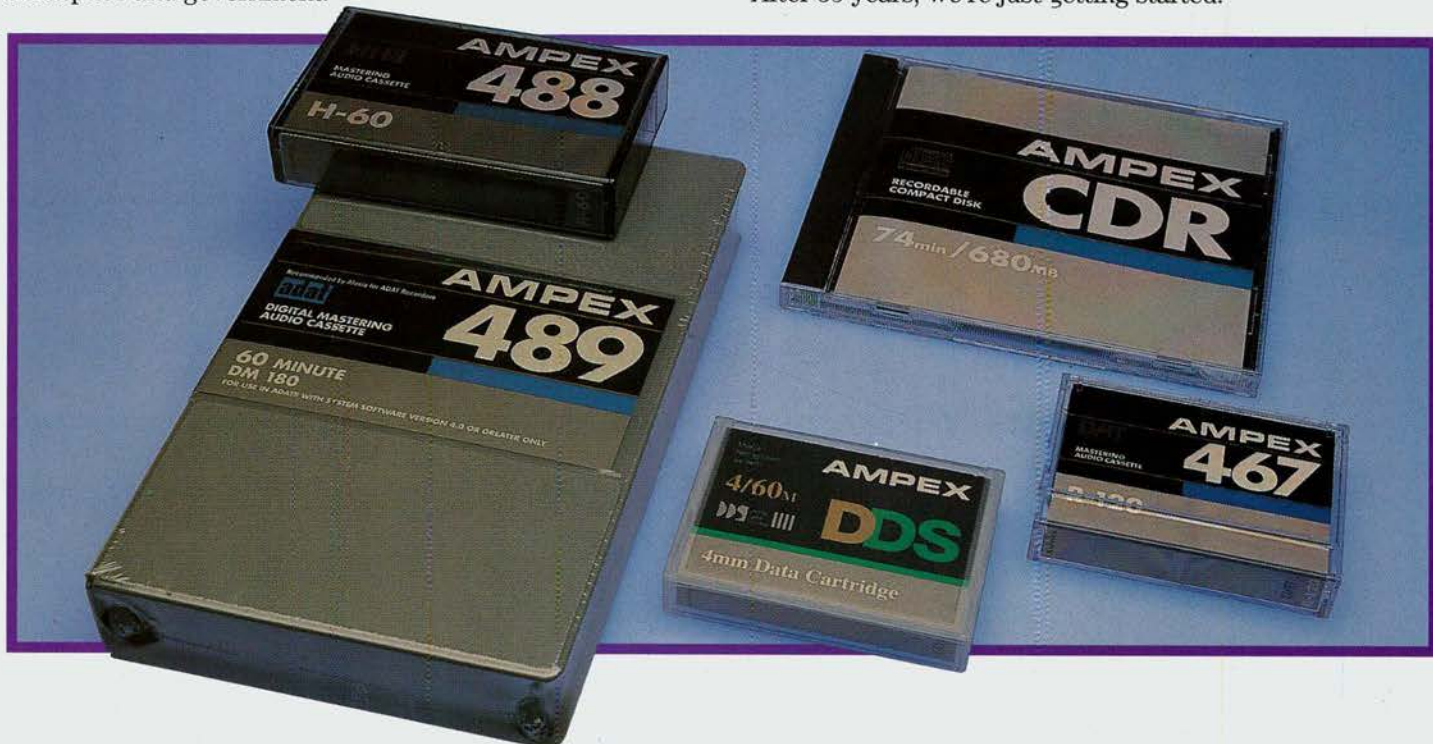
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Connections

JULY 1996



CASINO JACKPOT

Chips run wild in contracting boom

The permanent Crown Casino may be open first in Melbourne, but Sydney Casino is scheduled for handover not long after. Both establishments offer succour to the contracting trade, with two theatre spaces in Sydney and one in Melbourne for fittout.

If 1997 is the long year of the mega Casino, then 1998 will be the dawn of the Olympic boom, with infrastructure coming on line right through the following two

years.

At the Casino sites work is advanced, with contracts to be let for audio visual and stage electrical, and stage machinery. Glantre Engineering had won a contract for stage lifts in Sydney as we went to press.

• *Glantre chief Derek Gilbert is pictured at left with PLASA chief John Offord, atop a Spiralift on demo at ENTECH 1996 trade show recently.*

China Parks Boom

Australian contracting firms are in the box seat as Chinese youth discover disposable income. Sydney firm Trevan Johns and Associates have just shipped a container load of pro audio equipment to Sozhou, one of four theme parks the firm is handling.

Trevan Johns says Australian firms are better placed to win the work due to a slight cringe towards the USA. "The lower profile of Australia helps. You go over there, have countless dinners, and get the work. The Americans are desperate to get in".

EMI EXITS 301

Recording Industry Changes Gear

SYDNEY: The announcement in April that EMI was to close Studios 301 came as a major shock to many people, although perhaps less so to industry insiders. As events have turned out, 301 were taken over in a 'management buyout' led by studio manager Jim Taig and will continue to operate one main recording room, the MIDI suite and the full complement of mastering suites. The fact, however, that EMI were prepared to abandon the studios on very short notice speaks volumes about the changing nature of the high

end recording market.

It had been clear for some years that the senior management at EMI were not sympathetic to the studios' operations. With a reduced roster of local artists signed to the label, EMI themselves were putting hardly any work through the place. It is not known how far back EMI had taken the decision to get out, but it is known that Jim Taig was given only two weeks to take up an option to take over the facilities and equipment. This he was able to do successfully and

(continued over page)

Mal has a Greater Union

Install chain expands, 200+ screens to fittout

By Julius Grafton

SYDNEY: **Greater Union Village Technology** has acquired the business activities of well regarded Sydney audio contracting firm Austrasound. The deal includes Austrasound owner Mal Barnes taking up the position of Group Technical Manager with GUVT.

GUVT operate in all states of Australia, as well as New Zealand and Singapore. They outfit cinemas, 205 in the current year alone, and operate general contracting and wholesale distribution activities. This extends to resale of pro audio and lighting equipment. They also operate a theatre lighting hire arm in Adelaide, and import and distribute lighting products through their Brisbane office.

Austrasound were successful in the Sydney market, but Barnes says he found himself spending 80% of his time on administra-

tion, instead of design and implementation.

GUVT is headed by Russell Scott, and last year acquired the Sydney contracting and installation firm Freedman Electronics. Under this arrangement Freedman maintained their own Rydalmere operation, and operate their import and assembly business separately. Peter Freedman remains a consultant to GUVT.

In the next quarter GUVT will install multi-plexes at Liverpool in Sydney, a 12 cinema complex for opening in September. The new Crown Casino in Melbourne has a 14 screen plex planned, and at Marina Bay in Singapore the firm have a six plex under way for opening in September.

General contracting work for GUVT includes background and video foreground music systems, & paging systems.



Missing!

LDs talk about what their consoles

ZAP!

Bruce Liebau has a negative experience

In our 26 page lighting section, from page 64

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301 (continued)

the new management has moved to rationalise the operations.

This has involved selling the two Neve consoles to Mercenary Audio in the US and closing all the rooms on the eighth floor. What were previously administrative offices adjacent to Studio M have been gutted to allow the creation of a recording space attached to M. The SSL console will then be installed in M, allowing this studio to be used in future as both a tracking and mixing room. All other operations on the seventh floor have continued uninterrupted.

The new management has retained all three Mitsubishi 32 track digital recorders - this ensures full access to all back catalogue recorded on this format. At press time, Connections had not been able to secure further details from Jim Taig as to who is behind the new management and what their business plans might be. It is clear, though, that freed from the shackles imposed by EMI the new venture has every chance of being able to move much more quickly to adapt to the changing marketplace. It is also clear that the marketplace is now a more variable creature than ever before.

It has become a commonplace to say that the advent of affordable (cheap?) consoles, both analogue and digital, modular digital multitracks etc has put pressure on the major recording studios.

This has been evidenced by the exit of EMI from the Sydney recording scene, together with similar closures in Melbourne. The new scene, however, is not all beer and skittles.

Now, a successful artist, engineer or producer can afford to set up a very well equipped studio and cut down on the amount of time spent in one of the major recording houses. This will increasingly see less well prepared people having access to very good quality equipment. So, this new scene offers immense possibilities for quality recording in home and project studios. The caution is that people will have to take care to learn their basics and avoid producing superbly recorded rubbish or, even worse, great music badly recorded.

-By Jason Argo

INDUSTRY NEWS

Neville Thiele to be honoured by IREE

Neville Thiele's contribution to the field of audio engineering is to be honoured by a newly resurgent IREE - the Institution of Radio and Electronics Engineers.

The IREE Society Award of Honour is rarely presented, and then only to those who have given long standing and meritorious service to the promotion of the institutions aims and objectives.

IREE's Sydney Audio Group will present the award at a meeting to be held July 23rd at The Australian Film Television and Radio School in North Ryde.

The Audio Group is open to those who have a serious interest in audio, and membership of the group is drawn from people belonging to both professional and technical fields.

IREE Audio Group Info: Call (02) 9599-2620 or (02) 9498-5059.

ENTECH upgraded

Thanks to a synergy with the Venue Management Association (VMA), the forthcoming ENTECH 1997 trade show and convention in Melbourne has been upgraded to the Crown Casino end of the new Melbourne Exhibition Centre. The move improves facilities for visitors, putting the show directly next to meeting rooms and the Auditorium. At presstime ENTECH was over 65% sold. **-JG**

Guns & Technicians

National gun laws are underway, so is spirited debate from gun owners who wish to keep theirs. A technician I worked with and knew well 10 years ago loved his guns with passion. I lost touch with him shortly after the funeral of his wife and new born baby, so I don't know if he still loves his guns. His stepson used them to murder the rest of the family. **-JG**

● Music & Recording Industry Quietly Gathers

\$324,000 at lunch

BY CAROLINE GRAFTON

Saturday the 22nd of June was recovery day for the survivors of the 18th Annual Golden Stave Luncheon, held in Sydney.

Industry networking besides, the funds raised at the Golden Stave Luncheon are critical to many children and adolescents, who require special care for various reasons.

Past recipients of the funds include: The Sydney Children's Hospital Foundation; The Shepherd Centre and Canteen.

The theme for 1996 was VIVA 'OZ' VEGAS. The audience including myself were treated to a bottom, breasts and feathers performance by the Di Heaton Dancers from the Sydney Showboat, a Tom Jones Show, comedian Johnny Garfield and finally- I SAW ELVIS.

Between the performances were the fund raisers, MC'd by the one and only Barry Chapman.

Firstly we had a fictitious horse race, ridden by well known industry jockeys. Then a 48 lot auction

saw everything from the American Presidents Surfboard to \$21,000 worth of Radio Air Time go under the hammer. This was followed by a 45 prize raffle (at \$5 per ticket). And then there was the big OZ VEGAS raffle at \$50 per ticket - the prizes - trips to Las Vegas, Hong Kong or the Birdwood Casino in Perth. Add to this the luncheon tickets and they had raised funds to the tune of \$324,000.

Congratulations to the Golden Stave Committee and all their supporters, of which I am now proud to be one, for their stupendous efforts. I know there are thousands of children and teenagers who feel the same.

Syntec International

Last month we put a 'h' on the end - to misspell it as 'Syntech'. Sorry about that, no 'h' on the end in the future, and the new spell checker is now adjusted!



Mine is Definitely Bigger Than Yours

The biggest screen in the world

BY MADELEINE MURRAY

Sydney's first giant screen cinema is almost open.

The 540 seat Imax theatre will burst into life in late September. The screen will be approximately 30m, or eight storeys high, and 40m wide, the biggest in the world.

The main game will be Imax, 70mm/15perf surround cinema. Which films will be shown is still a secret. Imax films have been made of the Serengeti Plain in Africa, the Grand Canyon, the Rolling Stones, and the Antarctic, as well as other subjects. The Imax equipment was originally meant for the '85 Sydney Expo, which never happened. It has come out of storage, and been updated.

The venue will also be equipped with a 70/35mm projector which shows both 70mm and 35mm film. Smaller format gear is provided by GUVT. There will also be AV equipment such as data projectors and video.

6-8 more Imax cinemas are planned across Australia and New Zealand over the next ten years. The only confirmed sighting is in Melbourne, which will open in '97 in conjunction with the new Museum of Victoria (which doesn't open until '99.)

Cinema Plus, a private Australian company, is behind the project, with Imax supplying the equipment. One of the shareholders is John Wiley, producer and director of *The Edge*, a giant screen film about the Blue Mountains, and the Imax Antarctic film.

The technical supervisor is Pe-

ter Kehr. Mr Kehr began his career as a projectionist with Greater Union. Following three years at Futuroscope, the largest theme park in Europe, he joined Cinema Plus.

WHAT'S INSIDE:

The Projector: Movement type: Horizontal rolling loop film transport with fixed pin registration at the aperture

Film: 70mm Estar-base motion picture print stock with 4.75mm perforation pitch

Format: 49.8mm x 69.6mm projection aperture, 15 perforations per frame, 24 frames per second

Registration accuracy: Typically .04% of picture dimension, both for jump and weave

Shutter: Double shutter arrangement integral with rotors; shutter efficiency greater than 67%

Illumination system: 15kW xenon short-arc lamp light source lamphouse. Water-cooling to lamp electrodes and the two beam-folding dielectric-coated cold mirrors.

Field lens: A self cleaning, continuous element quartz field lens assembly allows continuous cleaning of field lens during projection, without interruption of picture.

Sound system interface: An interlock drive transmitter is provided to synchronise picture with sound.

Sound System

The sound system will be by Sonics, an American company based in Alabama, with Imax experience. As well as analogue sound, there will be a six-track digital disc player (Sonics DDP).

DISTRIBUTION NEWS

STRAND LIGHTING and **MARTIN PROFESSIONAL** have terminated their arrangement whereby Martin were manufacturing automated luminaires under the Hyperbeam label for Strand. This is due to conflicts in their respective distribution networks.

SHURE BROTHERS have announced a new distributor for New Zealand, one Jands Electronics (NZ) Ltd, the sister company to the firms Australian distributor. 'Given the success we have achieved with Jands Australia we are confident that Jands NZ will provide the same level of support'.

MARANTZ PROFESSIONAL audio products are now distributed in Australia by AR Audio Engineering. Call (02) 9810-5300.

JEM PYROTECHNICS have a new distributor, Stagecraft Pty Ltd of Perth. Having worked closely with JEM SMOKE MACHINE Distributors Show Technology Pty Ltd, Stagecraft will do the Pyro while Show Technology will maintain the distribution of JEM SMOKE MACHINES - they are one of JEMs top three o/s distributors. **Details: Stagecraft, (09) 227-9000.**

AWA Limited has appointed The P.A. People as principal distributor for TOA and AWA Jeil sound reinforcement products to the contractor market in NSW. 'The P.A. People's industry expertise, trained staff and financial stability make them the ideal choice' said Adrian Wackwitz, Group Sales and Marketing Manager for AWA. Trade discounts will be available for bona fide trade holders of The P.A. People's Trade Card. For more info call The P.A. People on (02) 9746-2400.

Ray Walsh's COMPLEX Sound and Communications in rural Albury

recently outfitted the Commercial Club. Ray is seen at right instructing Amanda Kimball in the operation of an audio rack. The system was designed by Shane Spinks of Bose Australia and Ray. It comprises the first Crown IQ Drone installed in Australia. *Ray W: call (060) 41-2999.*



STAFF, PEOPLE:

Richard Meggitt joins GUVT in Perth, **Mal Barnes** in NSW, **Gary Adams** in SA, **Maurice Greenough** is the new NZ branch manager, and **Geoff Melrose** completes a busy series of new hires at the conglomerate.

Tim Kennard joins Jands Electronics as Professional Lighting Account Manager. Tim has spent the last 9 years in the industry, having worked at Herkes Electrical and at Graftons as general manager.

SEND NEWS TO CONNECTIONS, FAX (02) 9876-5715, CALL (02) 9876-3530.

BIRTHS!

Congratulations to lighting man, Geoff Squires and his lady Louisa Laing who have just released their new production - a baby girl, Caitlin Megan, 3.5kg, at the Mater Hospital Brisbane on May 1st, 1996. Can we say she is now "the light of their life"?

Michael & Margaret Orland are pleased to announce the expansion of family business, with the addition of one William Gerald born June 10, 1996 and weighing 7lb 9oz. All well, nay, perfect!

Babyline: Elaine (02) 9876-3530

PreSonus ..the only dynamics processors you will ever need.

ACP-8 \$1995



If you have a recording studio, project studio, PA system, church, school hall or installation, then you need the new **PreSonus ACP-8**.

The PreSonus ACP-8 is an eight channel compressor/gate, housed in a steel, 2 rack case. It's made in the USA, and was designed using state-of-the-art, surface mounted technology. The ACP-8 shatters the price/performance barrier!

- Complete analog control
- 8 full-featured compressor/limiters
- 8 full-featured noise gates
- Side chain on every channel
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- Comprehensive linking via unique power summing buss
- All the dynamics processing you will ever need in 2 rack spaces

- Selectable operating level
- Crystal-clear compression & gating for multi-tracking & live sound
- One master control for all eight channels via linking
- Front panel includes hard/soft knee compression, peak/auto compression, bypass and link
- Rugged steel construction
- Made in the USA

DGP-8 \$2395



The **PreSonus DGP-8** was specifically designed to enhance your console with features that, yesterday, only the big boys could afford. The PreSonus DGP-8 is an eight channel, digitally controlled, analog dynamics processor. Plug the DGP-8 into your inserts before or after your multitrack. You'll have a compressor/limiter, and noise gate on every channel...PLUS automated faders (level), automated mutes, and snap mix automation.

- 8 channel, digitally controlled, analog dynamics processor
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- 8 automated gates
- 8 automated faders (level)
- 8 automated mutes
- Total MIDI automation
- Ultra low noise
- Ultra high-quality VCA's
- Compact one rack space design

- Send changes in level, compression ratio, gate and mute via MIDI messages to any MIDI sequencer and "real time" automate your mix
- Built-in software features full MIDI control, pro to line level conversion, loading & storing of 100 audio scenes, stereo linking
- Store different 'audio scenes' for a performance or mix down and recall them instantly for 'snapshot automation'



The **PreSonus MB-8** is a compact, one rack space eight-channel meterbridge, that provides complete metering for the DGP-8 and ACP-8.

- Displays 50dB range of input level
- Displays 30dB of gain reduction
- 16 individual 10-element bar graphs
- All in a single rack
- Complete metering for the PreSonus DGP-8 and ACP-8
- Suggested retail price \$995

Australian Audio
SUPPLIERS

For more information & the location of your nearest PreSonus Dealer, contact:
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PreSonus
Audio Electronics

Technology

WHAT'S NEW, HAPPENING & IMPORTANT FOR THIS MONTH

Random Access Video Recorder

The V1 is a high-quality Video Disk Recorder/Player designed to record and playback video and audio using hard disks or optical cartridges. It is more of a video tool than you would first think, and has an eager customer base in broadcast and AV applications where instant video is needed.

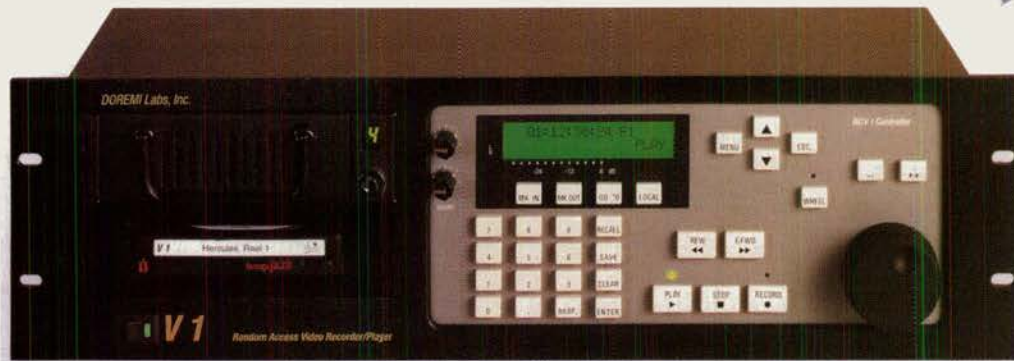
Made by Doremi Labs in Los Angeles, the V1 can be whatever

you want it to be. The key is random access: where digital audio and video wins hands down over tape based 'linear' systems.

Possible uses we can think of include AV playback in exhibitions, layoff recorder for video post, video source deck for audio recording, video surveillance systems, and running instant commercials or replays for broadcast.

The V1 records 1 video and 2 audio channels and time code. It can be controlled on standard 9 pin RS 422, and has 2 serial ports built in - one for remote and the other to slave the V1 to an edit controller or workstation.

Hard disk can be internal / external via SCSI. • Around \$10k from **Syncrotech Systems Design, Call (02) 417-5088.**



Write in 401 on Reader Service Card for info.



Digital Betacam

The release of BASF's Digital Betacam cassettes completes the evolution from Betacam and Betacam SP. Expected to be as popular as Betacam SP, BASF Market Manager John Benfield said great emphasis was put on quality, stability and compliance with system requirements in formulating the new tape. The new cassettes can be supplied in the following playing times: D6 to D40 for Electronic News gathering (ENG) and D34 to D124L for studio production.

• **Info: BASF, (03) 9212-1500.**

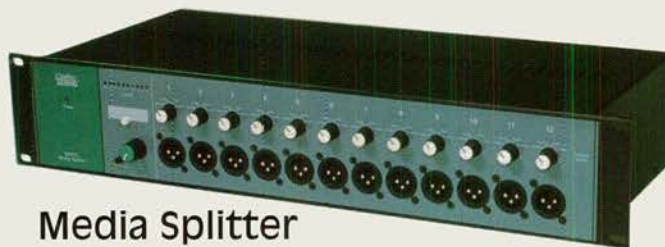
Write in 402 on R.Service Card

Anti Feedback Workstation

ARX have a new way to solve an old problem - feedback in monitor systems and PAs. The AFW-1 is a 30 band, one third octave equaliser, with an FBX automatic feedback exterminator with nine filters which are about a tenth of an octave wide. They can be knocked down by up to 40dB each. It has an output limiter too, in a 2 R/U package. Price \$1876 inc tax.

• **ARX: (03) 9555-7859.**

Write in 403 on R.Service Card



Media Splitter

Creative Audio, the Sydney manufacturing arm of the PA People, announce the MS112 media splitter. It overcomes the problem of multiple microphones at a press conference, by taking one input and splitting it off to twelve sepa-

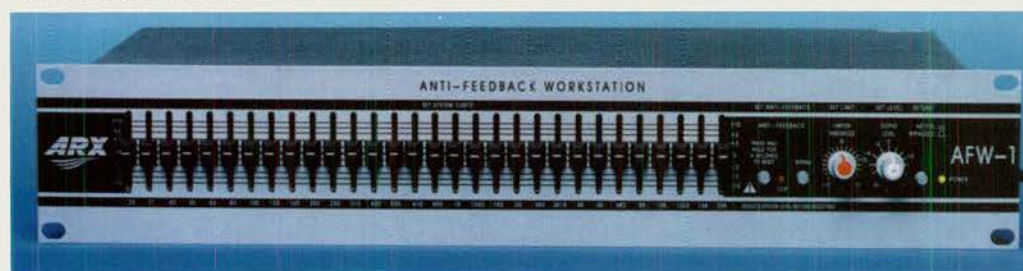
rate and independent outputs. Extra modules are available for extra inputs and peak limiting. A good tool for conference / meeting venues. List price \$2995 inc tax.

• **Creative Audio, (02) 9746-1199.**

Write in 404 on R.Service Card

Low Cost Flying

Faders, that is. Uptown Automation announce the System One, a low cost self contained moving fader box which plugs into your mixer's insert points. Good idea yeah? Then you use your 486 PC and Uptowns software to automate your mixer or your special application! 8, 16, 24 and 32 channel packages are available. **Group One Ltd, (USA) dial +1 (310) 656-2521, fax +1 (310) 656-2524.**



VOCAL
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TO IT!



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Write in Reader Service Number: 137

CX6T amps from QSC

QSC have added a new series of amplifiers, the CX range, for permanent installation.

Based on the MX series amplifier, a top seller in the touring market, the CX differs in that it is available with a toroidal output transformer for distributed audio installations on 25/70/100v lines.

The models include the CX4, at

\$1495, or with transformer (CX4T) at \$1795. The CX6 (pictured) costs \$1995 or \$2195 with tranny.

The CX6 delivers 300 watts per channel at 4Ω, and has speed automatic fan cooling, rear panel volume controls, and multiple input options. A CX12 completes the range at \$2795 or \$3095 /T.

• **AR Audio, (02) 9810-5300.**



Write in 408 on Reader Service Card

The Monkeys Are Wired!

The PA people have been awarded the contract to supply and install an ongoing series of sound systems for Sydney's Taronga Park Zoo. The Zoo aims to increase visitor interaction and have completed six new enclosures, each set up for interactive and informative talks by the respective keepers. Along with **Keeper Talks** is **Night Zoo**, offering nighttime viewing of nocturnal animals.

Each enclosure has a fully integrated sound reinforcement system featuring **Bose 151 Environmental loudspeakers**. The equipment had to match the surroundings, be weather resilient, positioned to reduce audio spill, and be safe for the animals. For this reason **Shure SC wireless systems** were preferred (so cabling would not be eaten). Each keeper can now conduct an information session hands-free. The Shure systems were also chosen for their frequency flexibility and ability to avoid interference when operating a large number of systems in close proximity.

• **The P.A. People, (02)9642 5344**

Fairlight OMF

At NAB '96 Fairlight demonstrated OMF capacity and are included by Avid Technology in the OMF list of registered manufactures who have implemented OMF support in their products.

"OMF support," said Fairlight CEO David Hannay, "is in line with Fairlight's policy to work and cooperate to establish open communication between Fairlight products and other manufactures. We now read OMF files and are committed to writing OMF this year." Complete information about the Fairlight MFX3 is available on the Web, <http://www.fairlightesp.com>

SSL 9000J in Hong Kong

Avon Studio in the Kowloon district of Hong Kong is the first studio in the bustling metropolis to install an SL 9000 J Series Total Studio System. Previously a part of the CBS Sony empire, AVON will use the SL 9000 purely for 48 track Sony DASH digital recording, using Sony PCM 3348 machines. Their Tom Hodley designed room will be open in June.

Mackie Concert Mixer Released

The Mackie SR40/8 has been released. It is a large-format, full mute automation, centre master section-style mixing console pitched at the high-end market, where people usually pay more than \$30,000 for a console with similar features.

The price is \$17,995, which upsets most other manufacturers of live mixing consoles.

The SR40/8 is a FOH sound reinforcement console suitable for either auditorium, church or other large venues.

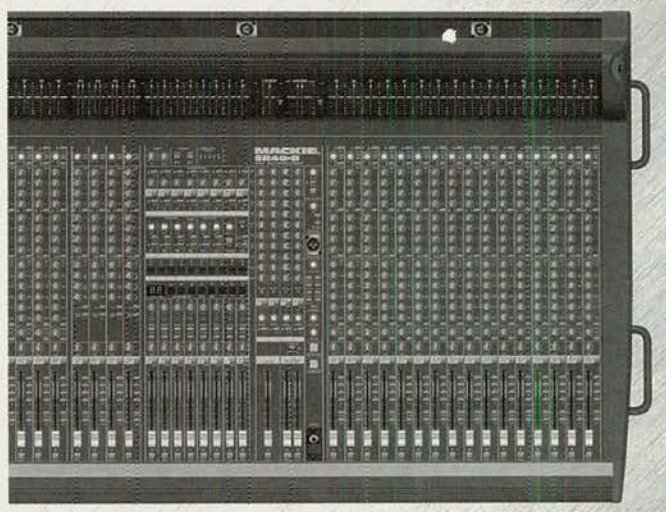
Features include: 40 mic line inputs, 4 stereo line inputs, 8 sub groups, 12x4 matrix mixer built-in, sophisticated group muting.

Other features include: 8 aux sends, 4 band EQ, aux send section with Flip Switches (allows aux sends to be controlled by 8 sub faders while subs are controlled

by aux send knobs), Ultra Mute Section with Store/Preview/Snapshot/Clear/Enable Switches and status LEDs, Master Section with

Fader Link switch, Talkback section.

• Contact: Australian Audio Supplies, (043) 291 711.



Write in 407 on Reader Service Card

Moore MIDI Bible

Music Wholesaler Moore Music have transformed themselves in recent years towards distribution of computer music peripherals, software and MIDI products. They have just released a 64 page catalogue / 'bible', which has some useful and instructional parts too. It details the world of music and MIDI, and costs \$3.

Along the way Mac and PC MIDI setups are explained, and there are product descriptions for a bewildering array of sound cards, modules, interfaces, midifiles and more.

• Call Moore Music on (03) 9419-0344 to find out where to buy The Bible.

PEAVEY

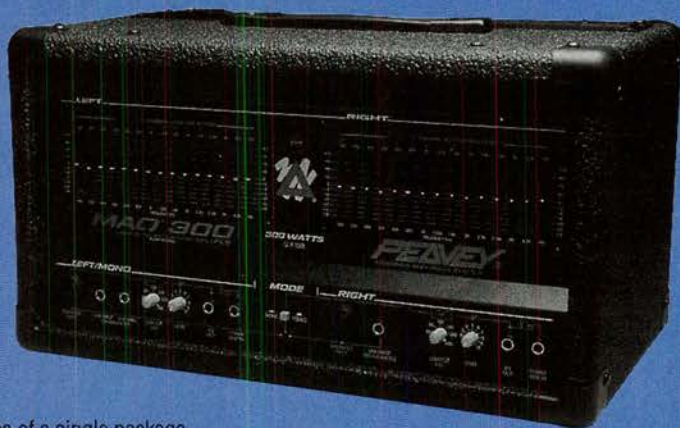
INTRODUCES NEW MAQ™ 300 & MAQ™ 600

Peavey Electronics is pleased to introduce the MAQ™ Series of graphic-equalized power amplifiers. Optimized for feedback suppression, the equalizers provide 12 dB of boost and 18 dB of cut at 1/3 octave spacing between 500 Hz and 4 kHz, with 2/3 octave spacing above and below. Peavey's unique and novel FLST™, "Feedback Locating System," (patent pending) causes an LED indicator to glow red above the EQ slider controlling the feedback frequency. When feedback occurs, the operator simply pulls down the indicated slider.

A low-cut filter, front-panel adjustable from 25 Hz to 300 Hz, allows the removal of muddying low bass in monitor applications while still providing full bandwidth for front-of-house use. Balanced XLR & 1/4" inputs, independent volume controls, insert patch points and a mono/stereo switch provide all the flexibility of separate units with the economy and convenience of a single package.

The MAQ 300 combines two channels at 150 W RMS of DDT™ protected power, whereas the MAQ 600 features two channels of 300 W RMS DDT protected power. Both amplifiers are equipped with dual 15-band, FLS-equipped, graphic equalizers.

While the MAQ 300 is available in a road-worthy top-box package, the MAQ 600 is available in a 5u x 19" steel rack-mount chassis. These unique monitor EQ/amplifiers are yet another indication of Peavey's ongoing commitment to solving audio problems through an unmatched R & D effort.



Australis Australia: PO Box 601 or
88 Bourke Road Alexandria NSW 2015
Ph: (02) 698 4444 Fax: (02) 698 4545

Australis Music NZ:
5 Amokura Street Henderson Auckland
Ph: (09) 837 3230 Fax: (09) 837 3232

Write in Reader Service Number: 177

Allen & Heath Identity Crisis

A new console from Allen & Heath is the GL2000 is a 24 input frame with 32 inputs to the mix: a 24 desk that thinks it is a 32. The GL2000 is a 4 group console with an interesting feature of two full featured Stereo Input

control on all subgroups.

There are three models; a 12 input frame (20 inputs to mix), 16 input frame (24 inputs to mix) and 24 input frame (32 inputs to mix). The GL2000 also includes the companies proprietary SYS-LINK technology, allowing end us-

channels coupled with two stereo FX returns. These four additional channels give the user another 8 inputs for the mix. The Stereo FX returns also come with EQ and fader control.

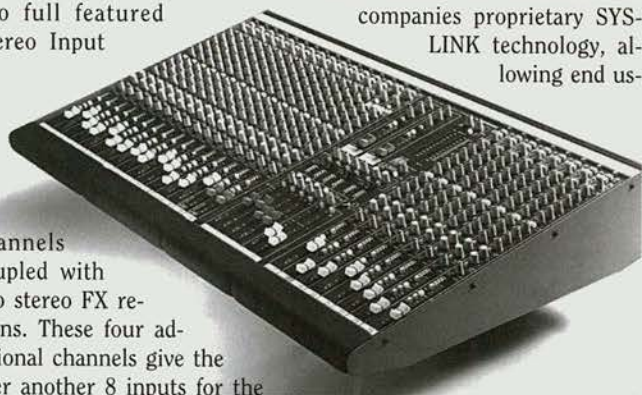
Other features include dual functionality with FOH or On Stage, 6 Aux sends, 4 band mid sweep EQ, input meters on every channel and individual pan con-

ers to expand their console with any other in the A&H range.

The price range for the series: GL2000/12 \$3,995, GL2000/16 \$4,995, GL2000/24 \$6,595.

• **A.R. Audio Engineering, (02) 810 5300**

Write in 405 on Reader Service Card for info.



The Multicore Comes Of Age

From Otari comes the **Lightwinder Series Optical Cable System**. It is a multi-channel audio cable system that provides an optical digital link between the stage and mixing console. It replaces conventional analogue multi-channel cables.

Lightwinder consists of two units: the **Stage Master** and the **Console Master** which are connected by a single optical fibre cable (up to 3000 mtrs). A single system has a capacity for 48 microphone or line signals with 16 channels of return signals.

The **Stage Master** unit converts up to 48 analogue channels into

20-bit digital audio and sends to the **Control Master** via an optical transmitter. The **Control Master** then converts the signal back to analogue. Both units are fitted with 16-channel Canare multi-pin connectors for analogue I/O, permitting rapid connection to Canare stage boxes and fantails.

Each audio input is equipped with a high quality head amplifier, phantom supply and mic/line trim control; and signal can be distributed to other digital equipment using its 'through' function.

• **Details from Amber Technology, (02) 9975 1211.**



Write in 406 on Reader Service Card for info.

ENTECH 1997

THE MELBOURNE EDITION

HELD ALONGSIDE THE V.M.A. CONVENTION & TRADE SHOW

Our Theme: **SYNERGY ~ and ~ CO-OPERATION**

Now held each April, ENTECH is the largest Trade Show of its kind, here. ENTECH features the very best in Entertainment Technology and Services for the Performance Industry. For 1997 ENTECH shows in Melbourne, where it will be run alongside the Venue Management Association

Convention and Trade Show. The venue is the new Exhibition Centre, with ENTECH now upgraded to the Casino end of the centre.

PUT your firm in front of more industry professionals than any other show can deliver. To find out more, call Caroline Grafton for a prospectus.

But hurry, because space at ENTECH 1997 is already selling fast. *And sadly you may miss out.*

Call (02) 876-3530. Dates: April 23, 24 and 25, 1997.



WITHOUT DIGITECH'S VOCALIST, YOUR 5-PART HARMONY MAY SOUND ANIMATED.



STUDIO VOCALIST

Now there's a vocal processor that doesn't make the human voice sound so inhuman. Our Studio Vocalist's patented technology lets you easily create harmonies with human characteristics like random pitch fluctuation, timing imperfections and Gender Bender™. Gender Bender™ allows you to make your background singers sound like a mixed group and not just you. Recording those harmonies won't take multiple passes, either—just lay down a track, then play it back in 2, 3, 4 or 5 part harmony. In a variety of styles. Ideas get from your brain to your ears sooner. And the design is just as human as the sound, with controls, jacks and features suggested by thousands of original Digitech Vocalist owners. So choose a vocal processor that doesn't sound so processed. Visit a DigiTech dealer today.

- Natural harmonies and pitch correction
- XLR and 1/4" ins and outs; separate outs for each voice
- 48V phantom power
- Intuitive operation
- Bright, easy-to-read display

- Full frequency response (20 Hz - 20 kHz)
- VHM-5 and Vocalist II download feature
- Keystroke MIDI out for automation

NEW



Digital I/O for the Studio Vocalist

The SV-I/O card is designed for Studio Vocalist owners who require the sonic purity derived from transferring signals into the digital domain and keeping them there. It offers AES/EBU & S/PDIF formats with multiple sampling rates and it's easy to install.

WITH THE NEW MIDI VOCALIST, GREAT HARMONIES ARE A SIMPLE TOUCH AWAY.



MIDI VOCALIST

The MIDI Vocalist makes it easier than ever before to achieve soaring vocal harmonies from a single voice. Now even the novice can connect a microphone and MIDI keyboard and be making fuller sounding music right now! All controls have been placed within easy reach so that with the touch of a front panel button, a foot switch or a MIDI controller, arranging vocal accompaniments can be performed when the creative urge strikes.



- Easier to use than ever before
- Vocal arrangements can be created instantly from the front panel
- 4 harmony voices
- Vocoder, Chordal, Scalic, and Detune harmony modes

- Front panel buttons transmit MIDI for sequencer control
- Choice of line or mic inputs
- All parameters accessible via MIDI
- Footswitch controllable with optional FS-300

H A Harman International Company

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Distributed in Australia by: C.M.I. Pty Ltd P.O. Box 232, Yarraville, VIC 3013
Phone (03) 9315-2244 Fax (03) 9315-2115

Write in Reader Service Number: 107

VAC

On February 7 the Victorian Government announced a grant of **\$2.5 million to the Victorian College of Art's School of Film and Television**. The allocation is for the purchase of digital and multimedia equipment. The VCA have also approached casino developers Crown for possible use of the theatre and gallery facilities by students and teachers. The Victorian Government has also **increased funding for new multimedia projects** under the scheme Multimedia 21 Investment Fund. It has contributed a further \$286,695 taking the total funding contribution to \$491,183.

SMPTE

The Society of Motion Pictures & Television Engineers (Australia North) have announced a **new awards package** including a Creative Technology Award (\$5000) and an Encouragement Award (\$1000). SMPTE will also fund two scholarships worth \$5000 for final year students from the TAFE Advanced Diploma in Electronic Engineering course who plan to join the film and television industry.

Details: (02) 9977 0888.

FUNDING TIPS

Do you know the latest on **how to finance your film**, documentary, television series or multimedia project? On the 10th July at 6pm there will be an evening session at the NSW Writers' Centre discussing issues such as tax concessions, raising private investment, new sources of funding. The forum will be conducted by Rob Garton Smith, who has represented Barron Films on various projects. Cost: \$20/10. Ph. (02) 554 4554.

RADIO SALE

Seven Network's two radio stations 2GO and Coast Rock FM (Gosford) are **for sale** — price tag: \$30 million. Bidders include London's *Daily Mail*, Austereo and Reg Grundy's RG Capitol. Grundy has also secured control of Queensland regional station SEA-FM

COMMUNITY TV

The Australian Broadcasting Authority has **extended a transmis-**

sion licence for community television group CTS for a further 90 days from early June.

EMAIL SUPERIOR

"Bits have not shape, colour or mass and they can travel at the speed of light. Bits also don't get stopped in customs." says Nicholas Negroponte in e-mail discussion with the ABA responding to a question: 'are bits like atoms?'

WEBSITE

The Australian Community Information Network's web site can be accessed through the AFC. <http://www.afc.gov.au>

OLDEST RADIO

2KY is the **only** Sydney radio station still in the hands of the original owners: the NSW Labor Council. 2KY was launched in 1925.

TV COURSE

Metro TV will be running an **8 week certificate course** in TV and Video Production in the second half of the year. Contact Julie Wiggins, (02) 361 5318.

PROPOSALS

The NSW film and TV office **invite proposals** from organisations and individuals who contribute to film culture in NSW, such as writers, publishers and associations. Apply by August 31.

MORE FUNDING

New funding for multimedia can now be sought from the Australia Council via their **Media Art Fund**. As well, the Australia Council has offered support to this sector by topping up ANAT by \$90,000 to boost Arts Research in the area. ANAT will also be allocated 30,000 for artists/professionals to attend conferences in new media. The fund will be called Quick Response, and will be what it is: a quick turnaround from application to allocation.

AIR VISION

In-flight audio vision services is an ever growing industry, with all air carriers providing monthly radio, music, vision material for patrons on international and local flights. Replay equipment is spe-

cialised, mostly made by Japanese firm Matsushita and *they are not standard*: they must be designed in accordance to engineering specifications and must run on aircraft power, **at 115 volts**. All equipment must be G-tested and fireproofed.

MPEG 4

After sorting out data compression standards with MPEG-1 and MPEG-2, the International Standards Organisation (ISO) is working on MPEG-4, due for completion in 1998. It is an **emerging coding standard** that supports new content-based ways of communicating and manipulating digital audio and visual data. MPEG provides, "high compression for efficient use of storage and transmission bandwidth." says one tech source. MPEG stands for Motion Pictures Experts Group.

AGE CD ROM

The Age newspaper has taken all news from the past three years and stored it on a **single CD-ROM** that is either MAC or IBM compatible. It features every article, feature and every letter published in The AGE and The Sunday Age.

BUZZ WORDS

New titles: **Texecutive** — Professional executives/managers responsible for purchasing communications related technology. They make up 25 of US adult population.

Techthusiasts — These are well educated, affluent early adopters of new technology. They number 37.6 million in the US.

ARCHIVE WANTS IT

The National Film and Sound Archive's **Contemporary Radio Project** invites stations around Australia to donate 24 hours of program material on a roster basis. They say the response has been good with 2UE and 3AW among others contributing.

ARTS FISCAL AID

The Australian Arts and Media Diary is allegedly a means of **organising professional arts groups financial records**. The diary is a pathway to tax deduction land and includes a system for recording

transactions that meet all criteria posted by the Tax Office. Published by the Queensland Artworkers Alliance (a non profit arts organisation) and Gadfly Media. Suitable for all manner of arts professionals. \$33 Contact: (02) 281 7523

GALLERY FUNDING

Also published by the Regional Galleries Association, *The Sky is the Limit*, a thorough listing of **funding sources** for galleries, museums, professional arts organisations and arts workers. \$20. Other useful titles available.

MAGAZINES LIVE! (PHEW...!)

A quotable quote from the first **Annual Magazine Publishers of Australia Conference in Sydney**. Don Blackey, Principal, Blackey Advertising on the status of the magazine: "The only form of literature that is holding its own in the mass market is magazines. What other medium is capable of preserving the written word into the next century? Certainly not the internet, the CB radio of the nineties... the abbreviations and slang they use mean cyberspeak is to the English language what the screenplay for *Convoy* is to Shakespeare."

MMA & STYLE

The Australian music and entertainment company MMA International has changed its name to **MMA Communications** to encompass its expanding media interests. They plan to incorporate more print and electronic media assets after announcing a 50% shareholding in Australian Style magazine.

NSW NOISE LAWS

There is a forthcoming new law in NSW called the **Occupational Health and Safety (Noise) Regulation**. It sets the maximum exposure level for noise in the workplace at the noise equivalent of 85dB (A) over 8 hours. It applies to all workplaces. To reduce noise exposure and meet the new requirements, employers need to consult the Code of Practice: Noise Management and Hearing Protection at Work. Available from WorkCover NSW, 131 050

Ausmusic Continues Operation Regardless

Government cuts \$1.2 million, but organisation vows to continue

By Dan Cole

Rather than succumb to the siege Ausmusic have stated that they intend to continue operation after Government funding ceases. They have announced secured funds to continue throughout 1996 and have strategies in place to ensure the company's survival into the next century.

Ausmusic Board Director, Barry Chapman said Ausmusic was determined to continue, but in a "re-structured form". Chapman points to a contradiction in the new governments policy of supporting small business yet cutting Ausmusic — also a small business — off completely.

He continues, "The contemporary music industry is made up of hundreds of small businesses, many of whom are trying to crack the export market and employing young people, yet the government has chosen not just to cut the funds of the only national organisation but to withdraw financial support totally." Said Chapman.

Most recently Ausmusic has been consistent in re-stating its role in the Australian Music Industry as one that is necessary and progressive. Chapman continues,

"Ausmusic has achieved many significant results during the past eight years and there are literally thousands of projects which Ausmusic has supported, either through resources, grants or advice."

Ausmusic was set up in 1988 and lists as its achievements;

- the set up of a national network of offices providing State and Territory contact points from the community and co-ordination bases for national campaigns

- the creation of Australian Music Day when all Australian radio stations play Australian music, providing exposure for up-and-coming bands. This initiative has led to international exposure through MTV. Concerts and events in metropolitan and rural Australia also co-incide with the day showcasing local talent to audiences across the country.

- the development of the Music Industry Skills course, used by more than 1000 schools and TAFE's with a total of 45,000 students participating. This program is also being exported to New Zealand, with Canada, South Africa, Papua New Guinea also expressing interest.

- the launch of Fresh Tracks, a program designed to generate radio air play for new, unsigned bands which has resulted in several bands being signed to record labels.

ARIA REPORT

The new Australian Record Industry Association 1996 yearbook is on the loose! It covers events in the record industry during 1995 up to March 1996. Some bits: in 1995 the industry grew by 11.8% with sales totalling \$500 million.

The CD format accounted for 83% of all sound recordings purchased in this period. Other specific and detailed graphs, figures and activity reports are within.

* The report is available from ARIA, (02) 267 7996.

**AES
preview
next
month in
Connections**

Women Rock Together

WA conference

By Madeleine Murray

Everybody knows that it helps to have a hot bod, and big lips if you want to make it as a female singer in the video era. Or a heavily backlit set, and a good airbrusher. Singing is often secondary, as overproduced dancers like Paula Abdul prove.

Anyhow.....

100 women went to the Women in Rock forum, held in Perth in March. The speakers advised women in the music industry to try to be multi-skilled, to stand up for themselves, and not to be intimidated by technical jargon.

Geraldine Thomas wrote to Connections that, "The old adage that knowledge is power is one way women can advance their position in the music industry. And women must have confidence in their abilities and a strong sense of self worth".

Western Australian Musicians (WAM) is currently considering a mentor system where experienced performers and technicians take women under their wings and shoe them the ropes.

If anyone is interested, or wants to know more about the Women in Rock forums, please call Kerry Benbow at WAM on 09 227 7962"

Music Centre **Pro Audio Division**

TURRAMURRA

NOW YOU CAN HAVE IT ALL

ALL AT THE ONE STORE WITH THE LARGEST RANGE OF DIGITAL HARD DISK RECORDERS, MIXING CONSOLES, COMPUTER SOFTWARE, KEYBOARDS, MICROPHONES.

GIVE US A CALL FOR ALL YOUR STUDIO REQUIREMENTS

TURRAMURRA MUSIC CENTRE 1267 PACIFIC HWY. TURRAMURRA Ph.449 8487 Fax.449 3293

BUYERS GUIDES

Each month we list available representative equipment from all distributors. **Distributors: to get listed CALL ELAINE on (02) 876-3530.**

Deadline 15th of the month prior.

Feb Studio Monitors. *Truss, Flying systems, rigging*

March Wireless Microphones, Video Projectors, *Moving Lights*

April EQ's, Crossovers, Limiters, Signal Processors, *Film & TV Studio lighting*

May Effectors, Reverbs, delays. *Effects Lighting*

June Live Mixing Consoles. *Profile, PC Spots*

July Buyers Guide TBA

August Studio Mixing Consoles. *Lighting control & dimmers*

September Microphones. *Fresnel spots, Floodlights*

October Amplifiers, Samplers. *Followspots*

November Loudspeakers. *Fog Machines*

Dec/Jan Recorders & software. *Scrollers, colour changers.*

*** TO GET A BACK COPY OF ANY ONE CATEGORY:** Check our Internet site first, (www.conpub.com.au) and if not there or if you are not online, send \$5 plus a stamped self addressed envelope to BG, PO Box 439, Epping NSW 2121.

DOLLAR HISTORY

HOW the A\$ has fared over time.

One Australian dollar would/will buy:

	\$US	Yen	£	DM	\$\$in
1965	1.14	403	0.39	4.46	3.25
1970	1.12	400	0.46	4.05	3.22
1975	1.33	392	0.59	3.11	3.15
1980	1.16	251	0.49	2.03	2.52
1985	0.66	165	0.51	2.02	2.10
1990	0.77	98	0.39	1.18	1.45
NOW*	0.78	85	0.51	1.20	1.11

30 day trend ▼ ● ▲
Trendline: fall means A\$ weakens, imports cost MORE, while exports earn less. And vice-versa. It takes TIME to take effect.

NZ\$ at publication: \$1.16 ●

*At 21/6/96. All rates indicative only. Check with your bank.



MAJOR TRADE SHOWS

- **PALA '96 Singapore**, 10 - 12 July. Call +65-227-0688
- **NAMM Summer Session**, Nashville July 12-14. Call + (619) 438-8001
- **PLASA London** Sept 8-11 1996 and includes British Music Fair. A world-great tradeshow! Call +44-1323-642-639
- **AES Melbourne:** "Australia's Only Specialist Audio Exhibition". September 10-12, World Congress Centre. Call (03) 9687-0244.
- **Photokina**, Cologne Germany, Sept 18-23. +49-221-8210
- **AES 101st**, Los Angeles Convention Centre, Nov. 8-11, 1996. (New dates!) Call +1-415-558-0391.
- **41st IES Convention**, Perth November 18-21. Fax (09) 322-1734.
- **LDI 1996**, Orlando, 21 - 24 Nov. Call +1-212-229-2965
- **NAMM 1997:** January 17 - 20, Anaheim LA. Call + (619) 438-8001
- **ENTECH '97:** Melbourne Exhibition Centre, April 23 - 25, 1997. Annual show, at Sydney Exhibition Centre on even years.
- **SHOWLIGHT '97**, Flemish Opera House, Ghent, April 28 - 30. Details from PLASA, +44 1 323 642-639.
- **Venue Management Association Conference**, Melbourne Exhibition Centre, April 23 - 25, 1997. Held in association with ENTECH. Call (02) 876-3530 for details.
- **SMPTA**, Sydney Exhibition Centre. *Dates changed*, now July 1 - 4. Biannual TV/Film equipment trade show and convention.
- **AIMS '97** - Aust. International Music Show 1997, Sept/Oct 1997.

Shows we will cover soon ...

- **PLASA**. London in September is quite nice. This is a big show, and has a lot of attraction. Sadly run at the same time as our local AES. Caroline Grafton will cover this show.
- **AES 101st** in L.A. - a great chance to see Pro Audio at work, and much easier to attend than when it is held in New York. November. Howard Jones will cover this show for Connections.
- **LDI** in Orlando, November. Caroline Grafton will cover this show.



World Weather trend, JULY

*NOT a forecast!

Where?	Temp °C	Rain mm			
Auckland	13/8	145	Manila	31/24	414
Bangkok	32/24	178	New York	28/20	102
Beijing	32/22	243	Paris	25/15	59
Chicago	29/20	86	Perth	17/9	183
Dubai	38/28	0	Rome	30/20	15
Frankfurt	25/15	70	San Francisco	22/12	1
HoChiMinhCity	31/24	314	Seoul	29/21	358
Hong Kong	32/26	317	Shanghai	32/23	148
Jakarta	31/23	64	Singapore	31/25	167
Kuala Lumpur	32/22	102	Sydney	16/8	117
London	22/14	57	Taipei	33/24	269
Los Angeles	24/17	1	Tokyo	28/21	146
			Toronto	27/17	74

CASH!

Business Column

By Caroline Grafton

The definition of a hotel by star rating is a mysterious thing.

Who defines the stars to begin with?

What do you really want from a hotel when you are travelling on business and what qualifies an hotel for five stars?

When I'm travelling I want facilities which enhance my business activities and basically make what is usually a trial as easy as possible.

Do you know that the average hotel doesn't supply a desk in the room and if it does the phone is beside the bed and the power point is located in a position, in which if you try to connect a power plug, you could crack a vertebrae? You know, the wall socket is under and behind the chest of drawers on which is the largest heaviest television from hell.

I mean wow, I get so much time to watch the idiot box when I'm away and the cartage of a heavy extension cord is always on the top of a ladies travel list.

This is what I like:

A quiet room that can be blacked out.

Easy access to the convention I may be attending or central location to the my clients.

A room with a desk with two power points under it, the first for the computer the second for the mobile phone charger.

And a phone on the desk as well. Not too much to ask?



GOING to PLASA in London?

Just call Rhonda: SYDNEY 237-2905

Trade Show dates September 8 - 11, Earls Court, London.

STAGE & SCREEN

TRAVEL & FREIGHT SERVICES PTY LTD

LETTERS

*#//@%XX -?!

Courage

Why do you persist in printing letters like last month? Truly, I get so depressed at the dissent in your Letters pages that sometimes I contemplate not buying Connections, which is my favourite magazine. But then I think, and come to realise that often (and especially last month) the views are narrow and not representative. They are usually certainly not my opinions. I hold that your magazine displays great courage in being so accountable as to print those letters. BTW, my friends run a project studio, in which I am lucky enough to get downtime for my music. How about some suggestions about adding video editing cheaply?

-**Leonne Farrer**. (Email)

•*Thanks Leonne, your blood is worth bottling. We are always open to criticism. Will research the video topic for you.*

Reader Comments

We got **such a hiding** in these pages last month we all thought it would be nice to relay some of the diversity and kind comments from our dear readers, as written on Reader Service cards and subscription renewals recently

R. Anderson, of Wangaretta, a Student and Lighting Hire Agent says: *"No offence but does Duncan Fry have to give lighting guys the shits all the time? Although most of his articles are OK and Michael Orland's articles are bloody legendary, so keep up the good work."*

Alan Maurant, of Novar Gardens, a Sound Engineer says: *"Great magazine, more live stuff thanks."*

Corey Tobin, of Raglan, a DJ says: *"Very informative magazine."*

T. Gault of Round Corner, a LX OP says: *"Don't change a thing."*

Simon Job, from Old Toongabbie,

an Electrical Engineering Student says *"Entech was great. Need more articles like 'The PA Page'."*

Bobbi McGill from South Melbourne, a Lighting Technician says: *"More, more, more, more, more, more and more lighting."*

Alex Hofner of Brushgrove, an Instrument Maker would like: *"More of The PA Page."*

Mike Bundett, Penrith, Operator: *"FANTASTIC!"*

Matthew Mallon, Brisbane, Musician/Engineer: *"Great!"*

P.R. Hughes, Tomerong, who is a Teacher wants: *"More educational articles."*

Andrew Williamson of Mooroolbark, who is in sales, says: *"This is the first issue I have seen of your magazine. I have put a lot of effort into obtaining contacts and this mag has done the job for me. Very Good."*

David Taylor, of Wagga Wagga, a Lighting Operator/Designer says:

"Most robotic lighting fixtures show their features in their ads but it is very difficult to compare their reliability and usability. It would be good to have a series of comparative articles."

Mick Arnold, from Pt Pirie is an Environment Officer: *"I need the Tech detail, but sometimes I get lost on the abbreviations and jargon your writers use."*

David Duncombe, from Bellata: *"Top Mag. Reader Service is a cool idea."*

Anthony Bowe, Nathan Audio Visual: *"Do you think Entech will ever come to Brisbane? (Don't laugh!)"*

Leon Smith of Goonellabah, a Teacher: *"Great reading. Most informative! Duncan Fry sure spins a great yarn!"*

John Kuipers, Kings Cross, Technician: *"Keep up the good work!"*

Paul Ochsner, Hobart, Senior Audio Operator: *"Only one small dif-*

Hire Company with a FUTURE

"I wanted a system for the 1990's and beyond. What's the use of buying 70 & 80's technology, it's just going backwards and gives you *no future!*

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ESM
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Write in Reader Service Number: 178

ficulty: Articles which are continued on other pages can cause some confusion. Otherwise very good. There was some script missing in the Digital Recorders article, talking about minidisk recorders, which I am fond of."

Ian Bofinger, of Mackay, a Lecturer: "Couldn't do without it."

Donnacha Aran, Prahan, Manager "More clubland and DJ news. eg buyers guide for clubs (reviews), sound equipment - mixers, cd's, record players etc would be good. Otherwise great mag!"

Ray Ghanem, from Ingleburn, A/V Installation: "Keep it up."

Glenn Waller, Grange: "Great mag, can't wait for each issue. Thanks."

Doug Watkins, Cranbourne, Audio Engineer: "The Mag just gets better!"

Ryan Phillips, Sth Penrith, School Lighting person: "The school initiative you have got going is a fantastic idea. It will help train members of my light and sound crew. Great magazine, good to see you're not forgetting us learners."

David Bourke, Ayr, Stage Manager: "Thanks for a great read. Lifeline to us who live and work in remote areas. Keep up the good work."

Jason Callander, from Nowra, a Musician: *EXCELLENT! Your mag is great.*

Peter Kent, Bundaberg, Music Writer/DJ: "Brilliant to have a good Australian industry mag of such high calibre."

Barrie Clissold, Sale, Studio Owner/Operator: "Great mag. Keep up the good work!"

Jamie White, Ringwood, Audio Visual Tech: "Great mag. I love it."

Jamie Sanson, Bundamba, a Cinema Projectionist: "Good work with Cinema editorials. Keep up the good work!"

Andrew Broadhead, St Kilda, an Audio Engineer: "More studios and Post info!"

Chris King, Southport, Lighting Operator: "Definitely no complaints, more on TV Lighting. I look forward to Connections."

The Dee Cameron Company

Your article "Shifting Cloudscapes in Asia" (May 1996) about the mega-roadshow I produced in association with Dreamscapes DCD for R.J. Reynolds, neglected to mention my role as Executive Producer and producer of that show, for reasons which I find mysterious.

The article featured certain support staff on that show, and clearly implied that they had produced this entire event, which they most definitely did not. This event and the elements produced for it, were a collaboration between The Dee Cameron Company, Dreamscapes DCD with a support team of some ten dedicated individuals.

I'm sure your reporter, Madeline Murray wrote the article in good faith, but unfortunately, it seems she was not told the whole story.

To feature only the design/technical members instead of the team as a whole is misleading.

As is the implication "...in March he brought a show for R.J. Reynolds to three Asia cities..."

The Dee Cameron Company has an enviable reputation both in Australia and particularly now in several Asian countries for its capacity to mount events on every scale. Over the past 5 years it has developed a solid track record for its cultural sensitivity and knowledge of the region, and the creative excellence of its output. To have our name summarily erased from one of our biggest and most successful international events, and supplanted by others, is at best unpleasant, and at worst, insidious.

Due credit in such cases is critical in a close knit industry such as ours and that's why I'll appreciate your decision to publish this correction.

Dee Cameron, Executive Producer - R.J. Reynolds Event

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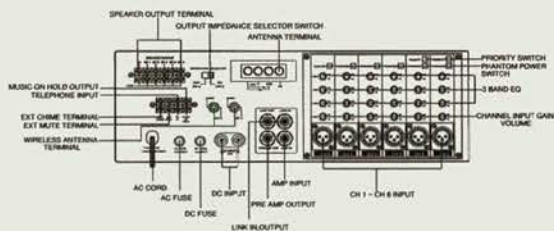
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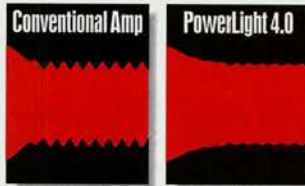
The 4.0 achieves remarkable audio quality because **voltage supply to the output section is powerful and stiff**. There are virtually no sags following transients or long peak power demands. You won't hear typical modulation from AC ripple or garbling during clipping. The bass is ultra-clean and fat. Highs are pure and unstressed.

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Write in Reader Service Number: 129



PUCCINI PA - THE SHAPE AND DIMENSION SPECTACLE

System Sound make a complex design to overcome the problems of time and space in a massive production

By Julius Grafton

If System Sound owner John Scandrett thought I understood every word, he was wrong. His description of the audio design for the Puccini Spectacular was thorough and enthusiastic, but the complexity of the system got the better of me. We reverted to drawings.

Like many of the mega musicals that System Sound do, the audio needs complexity because of the need to get the voices and the orchestra mix to each seat, where each audience member is increasingly critical and aware of quality and deficiency alike.

The Puccini Spectacular added to the task a hundredfold, because the show was done in the round, or in the case of Sydney, with the audience on three sides. The stage is the whole floor of the Entertainment Centre, and with the orchestra at one end serious time delay considerations become apparent.

If a performer sings from the end furthest from the orchestra, a time delay of some 100 milliseconds must be factored into the equation, and the singer must follow the conductor visually, not the music. Because the music is arriving at the singers ears after it is created.

The other big task is to get gain, because like all musicals, the performers are not close mic'ed. They wear a small condenser mic somewhere, usually in the hairline.

MAIN APPROACH

The design called for a separate orchestra

PA, to distribute from the position where the orchestra was located. So two clusters to each cover about 180° were flown each side of the orchestra pit.

Vocal reinforcement was two separate rings of loudspeakers. One of these was octagonal in shape, so the speakers all radiated out from the same centre point. This was positioned above a round stage, which had all manner of movement and action built in.

Beyond this round stage were walkways and other round stages, all located within the rectangular area which was the flat floor of the 'Centre. It was the performance area.

A rectangular grid was flown above this, so the speakers positioned around this were all at un-equal distances from the middle point. Thus each speaker position needed separate time aligning.

TIME ALIGNING

The theory is really easy. Draw a circle and put yourself in the middle. Draw a second circle 10m out, so it is 20m in diameter. Then draw another one 20m out, to make a 40m diameter circle. If you sit a speaker in the middle of your circle and stand on top talking into a microphone, the sound will take time to travel to points distant. This is OK if you just have a PA system at the exact centre of the circle.

Now imagine you need to reinforce the centre PA with a speaker at the edge of the out-

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most circle. This will reproduce signal instantly, at the same time as the speaker in the centre. But the sound from the centre will now arrive at the outside of the circle after the sound from the speaker on the outside! The ear will hear the same thing twice.

The time difference at 20 meters is about 57 milliseconds, which in itself is noticeable. Get a delay unit and try it for yourself! If the circle is made larger, the delay from source to the outside increases - obviously!

The rectangular grid had its furthest speaker some 50m from the inner octagonal grid. Thus time delay was used.

TIME TAPS

System Sound used Yamaha's D1030 digital delay, which has one input for three separate outputs, each of which can be delayed as much as you like. 6 of these units were used, for a possible 18 outputs, although 11 were used for this show.

SPEAKERS

"We had a lot of truss meetings" says John Scandrett. There were three main speaker systems utilised for the performances, two of these were circles of speakers hung on truss. The orchestra system comprised two arrays of Meyer speakers hung either side of the orchestra.

The reason so many speakers were placed around the octagon and rectangle has to do with dispersing sound to the seats in the house, while keeping it away from the performance areas where feedback is a real risk.

New Meyer MSL 4's were used around the octagon, 12 in all, with a dispersion of 40° horizontal and 35° vertical. These could be positioned to cover the first (lower) half of the raked seats in the Centre.

The seats further up in the arena got their sound from the rectangle, which had 16 pairs of Meyer UPA's on board. Each pair were located together, one atop the other for vertical direction control.

If you were seated fairly low, a trick was used to 'locate' the sound from the central circular stage. It was ringed with tiny Bose AM5 speakers. Introducing them at a certain

gain level 'pulled down' the sound from the air for people up close.

The two orchestra clusters were each made up of 5 x MSL3A and 3 x DS-2 boxes. The DS-2 is a hi-bass box, operating from 60hz to 160hz, and it fills in where the 12" speakers in the MSL-3 give up. Its horn loaded and arrayable like its cousin MSL-3. Two Meyer PSW4 subs were placed on the floor, to which some string bass and bass drum program was sent.

There were just four monitor boxes, flown in the grid to send a mix down the end of the performance area furthest from the orchestra. These carried orchestra mix only.

MONITORS

There are no stage monitors used in opera, indeed nor are they used in typical mega musicals. Performers work from house sound, and the orchestra mix is carefully directed at the audience.

REVERB

It was weird standing at the mix area in Sydney. The Entertainment Centre has been nicely draped in recent times to cure what was one of the more reverberant environments around. Thus it is deader than Flinders Park, which had a nice natural reverb for Puccini.

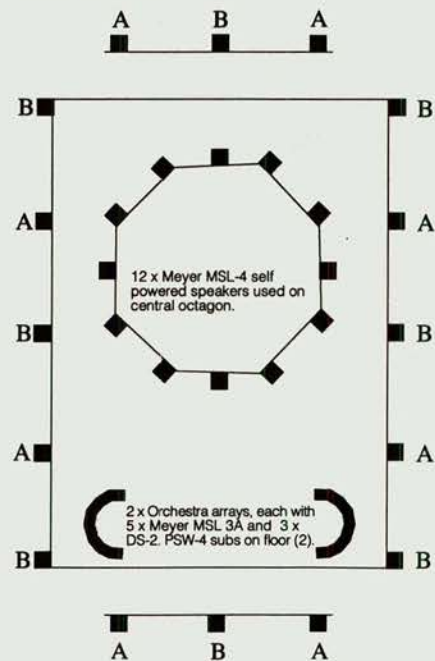
John Scandrett has a lot of time for reverb, which must be introduced -dialled in- to the correct level where house reverb doesn't exist. But using reverb units through PA systems doesn't make natural sounding reverb, which is after all 3D reflections from everywhere. An orchestra relies on natural reflections from all kinds of directions in the makeup of its sound.

"I thought it would be harder in Melbourne whereas the reverse is the case. I've eaten my

Puccini

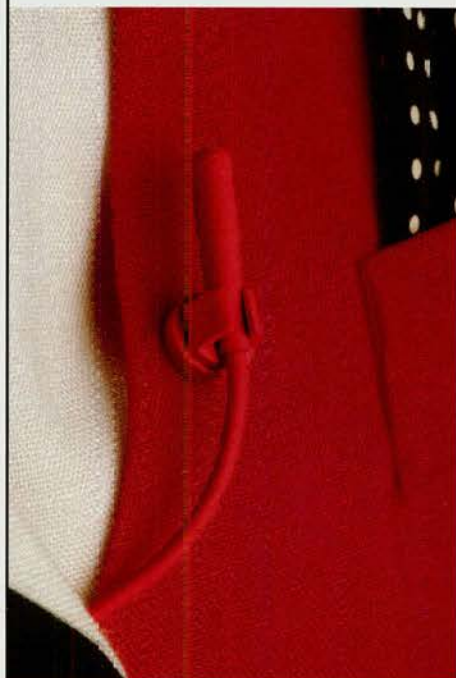
The Speaker placement.

Drawing by Connections.



16 x pairs of Meyer UPA used on rectangle.

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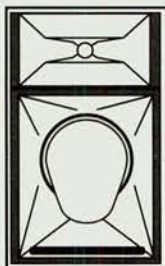
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Meyer MSL 4

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Puccini sound crew Jo Sapir, Nicholas Reich, Kelvin Gedge & John Scandrett



FOH racks, Midas matrix mixer (centre) and SIMM 5 system atop.

words" said John Scandrett in reference to the Entertainment Centre's new found acoustic deadness.

The Puccini Spectacular had multiple reverb returns, the reverb return from the orchestra did not return to the same orchestra speakers where the orchestra sound originates rather they were routed around the rectangle!

MATRIX ON MATRIX

To feed the multiple speakers, the 8 x 8 matrix on the Yamaha PM4000 was used. Each matrix went into a Midas XL88 matrix mixer to provide further mixed outputs for the speakers on the rectangle. Reason? So orchestra reverb returns could be sent to some of these, and to allow custom mixes where required.

Then before going off the amplifier/speaker combination, each signal went to a D1030 delay for multiple delay outputs, then each delay output went to a parametric equaliser for tweaking. This was the parametric section of a Yamaha EQ-5 digital equaliser. Why parametric? "I don't like the algorithms on a digital graphic - 31 bands of curves on current horse and cart digital you can hear." As it is,

John raves about the flat response out of the new MSL 4's, where a small cut of -4dB at 300hz was required, at about .7 of an octave in width ('Q'). "Correction factor for the array", he says.

AMPLIFIERS

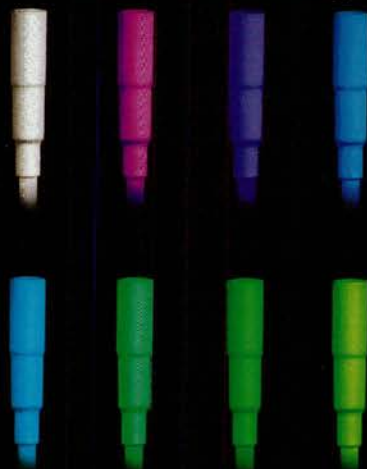
The MSL-4 has inbuilt amplifiers. The MSL3 and DS2 orchestra clusters draw power from CyberLogic NC800 amplifiers which were on the grid above. The UPAs and Eose AM5s were fed by Yamaha PC2002 amps, located on the floor each side of the arena. From these the gain of each UPA could be adjusted, and in Sydney the top UPA of each pair ran louder than the bottom, by some 10dB.

MIXERS & WIRELESS

Two Yamaha PM 4000s were loaded full, one had mostly stereo input channels where orchestra mics could be used together. These were either Schoeps MK4 or Neuman KM84 condensers. A total of 35 were used, plus some IsoMax bugs inside basses and harps.

Console two had 24 chorus track mic inputs, the chorus wore MKE-2 Sennheiser mic's and in fact only each second chorus member

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(there were 48) was mic'ed. They acted as 'human mic stands' for those without a mic.

The major soloists each wore two separate MKE-2 mics, with 2 transmitters. For redundancy.

The wireless system thus comprised 47 channels, of which 7 were spare. They were made up of the new Sennhieser 1046 UHF system (29 channels) and the existing 1036 UHF system (18 channels). System say they could get a total of 70 channels working as a combination of UHF and VHF.

MIXING THE SHOW

There were six people at work on the mix. Sound excessive, yes, but it gives an idea of the complexity of the show. Working from left to right, Kelvin Gedye handled the 24 chorus channels, Mark Benson worked the VCA masters and right side of that PM4000. Then John Scandrett sat between the two consoles, doing EQ on the radio mic's and special cues. Nicholas Reich handled the main console masters and thus had control over the main mix. Jo Sapir read the score and advised the mix engineers before a soloist would need a channel opened.

This was done with a custom alert box, which flashed a LED above the VCA master on the consoles. So if soloist number 6 was about to sing, the LED above VCA 6 would light. Jo also monitored the 'viscomm' video communica-

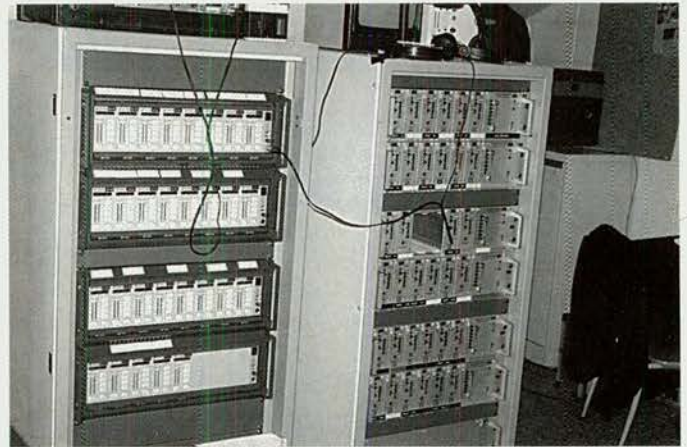
tion screen which sent text messages from the four radio mic crew when needed.

Finally Peter Grubb monitored the SIMM 5 room analysis system to read what was happening in audio theory at the time.

\$2,380,000

is what the sound equipment was worth, but of course you need the expertise to make it all happen. System worked through several evolutions of the design, and got it the point where the setup occurred at 8am on Monday morning in Melbourne, for a press call at 2pm Wednesday. In Sydney two normal working days saw the sound installed and ready. No one missed any sleep. •

Racks, Lexicon processors centre.

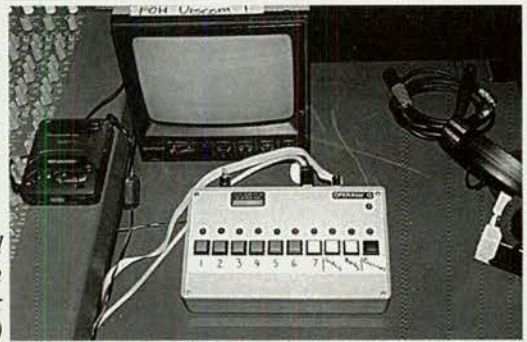


Sennhieser 800 meg wireless receivers, new (left) old (right)



Just a few! Sennhieser wireless transmitters (above). The battery bill is \$\$\$\$ big!

Video Q and custom operator Q box (right)



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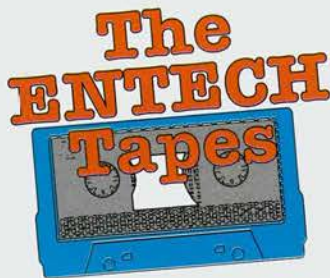
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DIGITAL AUDIO:

FROM THEN UNTIL NOW

If you work in Audio, then Bruce Jackson should be a famous name. He has had a 'dual' career if you are living with the idea that one is 'either' involved in live audio OR in studio audio. Fortunately Bruce demolishes the myth that the two disciplines are separate, his background took him from live to digital audio, and as a pioneer he detailed the tortured path the technology has taken at one of 20 ENTECH seminars recently.

The Fairlight Connection

My initial experience with digital audio started in Sydney (in the 1970's), where I lived next door to Kim Ryrie.

Kim and Peter Vogel started up Fairlight. They couldn't think of a name for their company, they were doing these analogue synthesisers and the ferry went by called the *Fairlight*, and that was it. They didn't have any contacts in the music business, so I represented them overseas because we'd been friends for years.

So in between Springsteen tours (*Bruce did live sound for Sprignsteen, and Elvis before*) I loaded up the Fairlight, flying is my obsession, I have a small plane and flew it around all over the place promoting Fairlight. At the time this was the first sampling machine in the world, yet the industry was pretty slow to accept it; everyone thought it was very interesting but too weird.

I took it to universities and took it to New York where a friend of mine, Tony Bonjovi (who owns Powerstation) let me set up in a new studio there and give demos for different people. One of the guys that came by and saw it was named Larry Fast, who is a synthesiser player. He was going over to do a Peter Gabriel album and so he asked if he could use it and was so taken with it that he got his cousin to actually distrib-

ute the product.

They set up a company called Cycal and that was the history of a company specialising in that side of things and over in the States.

Stevie Wonder and the Fairlight

I spent about a year trying to sell things between Springsteen tours, until finally I got a call from California.

One was from Herbie Hancock who said he knew this guy that would buy two. I hadn't sold any at this point, and Stevie Wonder also called up and he was very interested. So I put the Fairlight in the back of my plane that afternoon and took off for California. In a small plane it's like a 15 hour flight, so took off, flew into Los Angeles, went up to Herbie's house and he shows it to all these Hollywood people; Quincy Jones and all these other people then this guy Jordi Hormell turns up. You've probably heard of Spam, well, Hormell is the same guy. He owns the Village Recorder, he said, "that's just what I've been looking for. I'll buy two". And I said that's \$27,500 and he said "Yep, that's

it. I'll buy two". He then got involved with it and became a dis-



tributor for it in the U.S.

At the same time I showed it to Stevie Wonder- and everyone kind of joked, "how can you show it to him?" In actual fact he was amazing because I could put my hands up on the screen and show the limits and he was there with a light pen inputting information. He would remember the little matrices on the keyboard and stuff like that. He was amazing and he could come up with things; I would make a sound that would be very technical and boring and he would just play it and make it sound just right.

I got some very good experience from working with the Fairlight; how digital shouldn't sound because, in those days it

was the beginning of digital audio and it was very expensive. The concept of doing 16 bits of digital audio wasn't even thought of; you could pretend to do it but the reality was it was many times less.

The Fairlight was only 8 bits of digital audio with 8 bits of gain and another 8 bits of gain to kind of mask the problem. But when you listened to it — when you're dealing with 8 bits of audio, even in an ideal world — you get 8 times 6.

I was aware all the different limitations and that's why I was very disappointed when the CD came along and really just didn't come that close.

Apogee Electronics- the innovations.....

From a history of running around the road and seeing a whole different variety of technology, I finally tired of being on the road after Bruce Springsteen's 1985 big stadium tour. I decided, that's it: I want to do something in the one place so my girlfriend at the time, Betty Bennett and I decided to start up Apogee Electronics.

We started with the intention of improving digital audio which, in hindsight, was a pretty bold project. When I was in Japan on the Springsteen tour, I was given a CD player. I remember playing it through the PA system and be-

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ing so excited about this new digital technology and the fact that you could buy it so cheaply, but I was very disappointed with how it sounded. It sounded hard and harsh and in many cases, the CD was inferior even to the cassette that I'd been using.

I had a friend at Zurich Polytechnic doing some playing in the area and we got together and did a bunch of experimenting. We found at the time the most sensitive area that really affected the way things sound is a little area called an **anti aliasing, anti imaging filter**. When sound comes into a digital audio machine, it has to turn sound (which is a nice varying analogue voltage) into a bunch of numbers. It has to do it very quickly and very accurately. To do it, you have to limit the bandwidth, so it could only go to 20kHz in these early filters and cut off very steeply.

We found that if you didn't cut it off very steeply the consequences are that what is beyond 20kHz gets very confused in the process in being turned from analogue to digital. You end up with all these weird inharmonic sounds. Usually with analogue audio the harmonics and distortion are related to the original sounds but with digital when you get this problem it's all this nasty stuff which just has no correlation and so it tends to sound much worse.

In the process of chopping off higher frequencies (and making sure they can't get through) all the early Japanese mastering machines were messing up the sound at the same time. We found that their filters had a very big phase shift and the general wisdom of the time that phase doesn't matter. That was contradicted by people like Uri with their time aligned speakers; they took a lot of trouble to bring the woofer in

line with the tweeter.

With these early filters they were actually hundreds and hundreds of degrees out of phase at very high frequencies. Then we looked at all the various problems that were with them in terms of different forms of distortion and they used poor quality amplifiers and poor quality components to meet the price. These were very complicated little modules and they had to be made relatively cheaply even though the digital multi-tracks they were going into at the time were \$150,000, \$200,000. By the time you add up lots and lots of these it becomes a significant factor.

Creative thinking, digital solutions.

So we went in there with the help of George Massenburg, a friend of mine who is well into the analogue side of things. He's been recording for years and years and he owned some Mitsubishi digital multi-tracks and also

Jordi Hormell owned the Village recorder. He let us use his Sony digital multi track. We basically experimented, put these little modules in, made several evolutions, and found that it made an amazing difference. People were very impressed.

Many people were very disappointed with digital when it first came out, some used it just to be different and to be trendy but a lot of people said, "I listen to my 24 track and it sounds so much better. I don't know why you want to make this so called advancement".

So then all the right people listened to the difference and endorsed what we had done. They were asking first of all, "I want to retro-fit my machine". We would replace all these little filtered modules in the Sony machines and the Mitsubishis' and then they said "well why aren't the manufactur-

ers doing it?" It was resisted because they didn't like the idea of someone coming along and pointing out that what they were presenting as perfection. In fact, people were acknowledging that it wasn't.

Then Mitsubishi seized on the idea. Mitsubishi fitted them on an OEM basis at the factory and then they took out ads; they were out best promotion. We were just a tiny little company and Mitsubishi ran these ads for over a year in all the magazines showing our product. We thought we'd sell, maybe 5000 of these things; we sold about 25,000 filters to Otari and Mitsubishi.

Sony put them in and at the same time they found that they could replace the filters inside the (U-matic) two track mastering machines which, back in those days

were the 1600s, 1610s and 1630s. Of the 1000 or so out there, we would have replaced well over half with these filters.

Another Apogee Innovation

The filters were our first product and then "well, what next?" The first thing we found was that it was a pain being inside someone else's product. They just don't like it and what happens in warranty situations if it blows up? We decided that our next project would be a stand-alone product.

One of the most noticeable problems is in digital to analogue playback. When you take digital off the tape and you run it or want to turn it back to analogue — the theory tells you there's ways to do it — but in the process there are trade-offs, even today.

The consequences are like the

People think that because it's digital it's got to be fantastic, but in reality you're dealing with an analogue source, whether it's from a couple of microphones or whether it's from a high quality master of Pink Floyd



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Over the years I've done lots and lots of listening tests with the mastering guys who are our worst critics because they're just very picky—and they are always right, unfortunately. The best way to do the comparisons is you'll listen to the source and you listen to what you can do digitally to try and be as faithful to the source as possible.

imaging. When you listen to the analogue, an analogue really is the reference. A lot of people think that because it's digital it's got to be fantastic, but in reality you're dealing with an analogue source, whether it's from a couple of microphones or whether it's from a high quality master of Pink Floyd or whatever; it's the analogue that you have to live up to.

Over the years I've done lots and lots of listening tests with the mastering guys who are our worst critics because they're just very picky—and they are always right, unfortunately. The best way to do the comparisons is you'll listen to the source and you listen to what you can do digitally to try and be as faithful to the source as possible. The first thing we used to hear was the imaging would shut down; always becoming narrower and

then if you would listen to the vocal you'd hear the tonality change. The sibilance would be bitey and spitty in very high quality systems and so we set about to find what the reasons were.

The biggest thing was these filters and technology developed by Phillips which was over-sampling, making the filters not so important. The main reason that you hear about over-sampling is you can turn an analogue problem into a digital problem and when you do something analogue to these very high performance filters, it's nowhere as easy as doing it using digital chips. And the manufacturing costs are much much lower.

A question of timing...

We looked at the next thing which everyone talks about at the

hi-end side of things which is the timing. One way to look at Digital audio: it is like a cartoon, where you've got these cartoon images coming by, and when you flip them by fast enough, like in a cartoon book, you'll see the image flowing and moving. To make digital audio sound good you're taking little slices of the analogue audio and turning them into numbers. To sound natural it's got to be doing about 40,000 of these samples or more, ideally a lot more — every second. If you don't take those samples on a very regular basis, the timing can cause similar problems to what you hear with the filters. You hear tonality change, you hear it pick up imaging problems. The aim is to make things time very accurately. But with digital audio you need to synchronise to the rest of the

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world. In a mastering or recording studio you'll have a master synch source and you need to distribute that synch source to various pieces of equipment. In the process of locking up in synch with the master, you can pick up little timing problems and so rather than little slices on a very regular basis, you pick up errors and that's called jitter. We developed this low jitter clock technology in response to this. The result is that the timing is accurate within a matter of picoseconds. A nanosecond is a thousandth of a millionth of a second and pico is the next thousandth along. So it's very tiny and its amazing how much your ear is sensitive to these things.

In digital audio testing it's very important to always listen to the analogue source and then you can hear all the various things that happen. We found that running through cable — you wouldn't

think that a piece of cable would make any difference — but unfortunately it does.

AES & digital cable standard

The AES (Audio Engineering Society) are a bunch of audio guys, they don't really understand digital and shouldn't really be doing digital. They decided that they did know what was going on, and came up with this AES format using microphone cable for some crazy reason. There is a lot of benefits in that as it's a balanced signal and it's transformer isolated, but in the process of sticking your digital audio down this AES hose, a lot of things get messed up that you try and preserve.

Now, the initial way of moving digital audio around the place, was to use the most common format from Sony called SDIF. This takes the synch. information (which gives you the regular timing that you want) and it takes that as a

separate signal and then takes the audio left and audio right. The AES format takes a regular mic cable and puts all those things together. So it encodes the synch information (in the little bunch of bits that are dancing around the place) and then adds the left data and the right data. When you run this into an AES and it runs through a patch bay or runs through various connections and things; it picks up little interactions of these things. So if you've got 1kHz digital audio — believe it or not — it can actually induce 1kHz timing errors into this timing information that goes along with it. By the time you actually run things around the place and run in and out of a few bits of digital audio equipment you've picked up this timing madness and the aim is to try and clean that up.

Cable problems

At Apogee we found that the ca-

ble has a lot to do with it, so we worked with a very large cable manufacturer and went through and looked at these various problems of what happens as the digital audio goes in and comes out the other end. We came up with a new cable and it's been selling very well into high end installations and mastering.

So we took this same timing problem and developed an extensive patent on this low jitter clock technology which we then sold to a lot of other manufacturers such as DigiDesign and AMS and console manufacturers. We developed some very low noise synchronised power supplies and we put all those products together into our first stand alone product which was the Apogee Digital to Analogue Converter. When people listened to it they were really quite surprised at the difference between what comes with a standard DAT machine and what it can really

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M.I. 8 and M.I. 12

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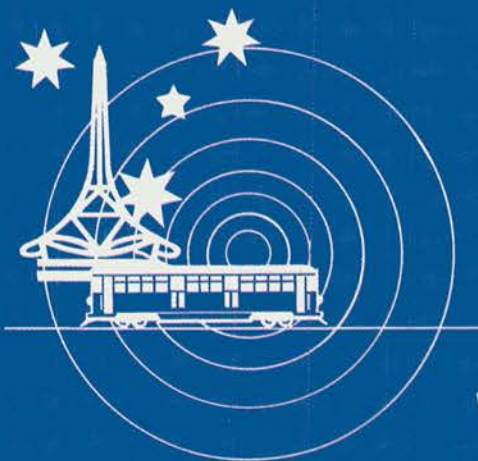
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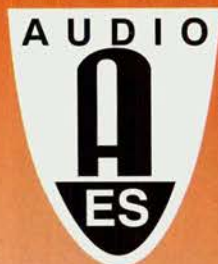
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sound like.

So these D to A's got used in all sorts of reference applications. A guy in the hi-fi business, Mark Levenson (he is from the real tweaky high end hi-fi) approached Apogee and wanted to put his private label on the Apogee product - so he then sold it as Cello. He sells these very, very high end systems; something that we sell for \$2500, he changed it around cosmetically (and some other little bits and pieces) and sold it for like \$7500 to the consumers. It's a very tweaky high end world out there in the consumer world and it wasn't really Apogee's specialty, so we let Mark Levenson take care of that side of things while we focussed on all the other professional applications from mastering, even all the way down to various sound companies.

Showco used our products inside their digital audio products and Audio Analysts too, because all these guys are friends of mine from the days on the road.

New Business Partnerships In Film Sound

Apogee was just a very small company, started in my garage. I used to put these filters together. Then we would sub-contract them out and have them made in Switzer-

land, then we would encapsulate them. We slowly grew and got involved with a company called Cinema Digital Sound. CDS was a partnership between Kodak and a company called Optical Radiation.

Their aim was to replace the analogue optical sound tracks on 35mm film (and also the magnetic sound track on 70mm film) with a digital equivalent. The project was divided into five different sections and we had all the conversion side of things. They worked with this guy named Burlekamp at a company called Cyclotronics; he had a bunch of mathematicians working for him — about 50 of them — and they did all his special projects.

They were actually owned by Kodak and they developed all the error code. Burlekamp's specialty was previously doing all that deep space NASA stuff that you see from JBL where they've got to bring back the data through all sorts of noise, so what they do is send lots of extra redundant data along with it, so when you have different drop outs and noise and problems, you can actually cover it. It's a technique pioneered by Reid Solomon and the unfortunate thing is the compact disc format is nowhere near as strong in error correction as some of these other things are.

For some reason they decided to go with a technique that was weaker, but it still obviously works very well.

So Burlekamp came up with a way of putting data on film in tiny little dots, and there's no synch information in there. All the synch information in the data is embedded: if you look at it it just looks like this strip of purple and if you look at it under a microscope there's just these little purple dots. Kodak had to develop this very special red sensitive film to be able to even write dots that were relatively small on the film.

The end result being the error correction was so strong you could actually punch holes in the audio track and it was able to just ride right over them and recover it. The way they do that is they take the audio data and they shuffle it around the place and so if it drops out, there is enough extra data that they can recover and actually do a perfect job. In other words nothing is lost at all.

Dolby Moves In

It was great experience for Apogee, because we got to deal with a different area of technology. They got into about 80 theatres and were doing really well but they didn't really have the savvy in Hollywood. Dolby came along and said well "what if the digital goes wrong? You've got to have the regular analogue track to be able to recover it".

If you think about any new technology, that's a crazy idea but for the insecure

Hollywood community, which is not very technology driven, they're much more conservative. Only now are they going digital in any substance.

Before, they used mechanical dubbers and it appealed to them to be able to see the analogue audio running backwards and forwards. So, Cinema Digital Sound actually pulled the plug after spending \$4M or \$5M on it and being in 80 theatres and it seemed like Dolby would take over. Now, what Dolby did was put the digital

Cinema Digital Sound actually pulled the plug after spending \$4M or \$5M and being in 80 theatres. It seemed like Dolby would take over. What Dolby did was put the digital audio in between the sprockets on the film.

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audio in between the sprockets on the film. This is a very 'hostile area' as far as I'm concerned because the film is getting scratched and scraped. They also use their compression system; the Cinema Digital Sound was very very mild (it was almost 100% data), it was compressed maybe 25%. Systems such as Dolby (and you might be familiar with the AC3 now), compress 5 or 6 times, some of them do even more so they can reduce the data rate and change the number of dots they have to put on the film so that they can cut it down substantially.

In this compression process they throw away a lot of data and they also, in a lot of situations, throw away a lot of sound quality. When you listen to, even just one generation of these compression systems, you hear all these similar things like I talked about as far as the imaging changing, tonality changing and depending on what the material is, you'll either not notice it or it can be quite surprising as to how much it can degrade.

Film Sound's Inspired Past

So, when it seemed like Dolby was going to take over the digital audio on film side of things, along came another company with a great idea backed by Universal. The company is called DTS and they went backwards even further. In the beginning of the movie days a 78 used to play along in synch with the movie. Well, they took that idea and they developed a regular old IBM PC compatible and they had a CD-ROM drive in it, so what they do is distribute the movie and along with the movie comes this CD-ROM which runs in sync. with the movie. It's got your 5 channels and sub woofer and all the other various information on it.

They made it affordable because the movie community will spend on a new popcorn machine or something but they are reluctant to spend on new technology for their theatre because it doesn't seem to effect things that much. So, DTS came up with a system that was \$3500 compared to Dolby's \$20,000 (CDS's was somewhere up in the same area) the

consequence is the DTS system has taken over and I think they've got over 5000 theatres. I'm sure there's probably a bunch of them over here. It's interesting to see how technology goes around and in fact goes backwards.

We worked with another guy named Tom McCormack. His theme was to half speed master movies; he wanted to make the optical track of the existing release prints much better. Together we developed special variations on our filter technology because with the regular analogue track to a movie you use a light modulator which has a peaking problem in there, a resonance. The idea is to try and sidestep the resonance problem so we developed a special filter that chopped it off before it hit that resonance frequency. This guy went from being considered a crackpot in Hollywood to now mastering about 70% of the movies.

In the meantime, Sony came

along with a system — they've got about 2000 theatres. So now, when you make a movie for release they'll [the cinema] have the original analogue tracks, the Dolby information sitting between the sprockets, the Sony information sitting outside the sprockets and they'll have the DTS disc. So it essentially meets with Dolby's recommendation in that you've basically got everything there, so if something goes wrong you can switch to whatever you need to. We are involved with DTS in that all the DTS movies are mastered through Apogee equipment on the front end before it goes into their various compression systems to reduce it down to the compact disc.

The Dither Solution

As we looked further at the digital audio problem, we looked at the cable, we looked at the timing, we developed various products and used the products for our-

selves and also used the products to sell on an OEM basis to justify the technology that goes into it. One of the things we read papers about and used to hear all these people rattling on with is what's called 'dither'. In an article in *Connections* (April 1996), I decried what it's about. On a 16-bit CD, you can actually fool it into seeming like there is actually more resolution than there really is with that 16-bit. You do that by making the last few bits dance around and those dancing bits can actually carry a lot more information than you can fit on a regular CD. The initial wisdom with this was called 'dithering technology'.

I saw someone described it, it goes back to the War time for instance with a bomb site, and they were flying over to bomb somewhere and they found that the bomb site worked much better in the plane when the engine was running than sitting on the ground. And the reason was as the

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plane was vibrating around, all the gears and things were able to just vibrate and they wouldn't stick in one position and they got more accuracy. So this is kind of what happens with dithering - they found that if you added a wide band noise to the audio — a very very low level — you could actually improve the resolution. Well it seemed to me when we first started looking at the problem that dither would be very inefficient because if it's a wide band noise it means that there is low frequencies, and there's high frequencies, but you are not very efficiently modulating that extra information into the digital audio.

We looked at the problem and it seemed to me that if you took a high frequency you would be able to carry more information. A friend of mine designed all those original JBL speakers and he worked with James Lansing and also worked on the Manhattan Project. He was a very very bright guy and he would always be building my character; I would come up with something new and send it over to him and he would send back tests with about 20 things wrong, building my character by showing me all the things I had done wrong!

He had developed this process where they took regular dither —

wide band noise, and filtered it. They took this information and they used this filtered energy to get this extra audio on there. When we started to look at the problem, it soon became apparent that getting there was beyond me. I knew how I wanted to get there, so we got this maths professor from Berkley and we spent a couple of years. He was on the payroll, which was pretty ballsy for a little company — I think we were about 4 or 5 people at the time and this mathematician on payroll. We looked at the problem and our aim was to efficiently take this extra audio detail and get it onto the standard CD. We developed all these computer tests and what is called *fast fourier transforms*, and things that let you look at the spectrum of the audio, and we developed this optimisation routine.

You give [the computer] criteria that you want to work towards and it will churn away and then come up with a result that slowly works its way towards the end result. We would run multiple computers for many days — actually weeks, and finally we came up with things that were much better.

Dither, Superbit Mapping, Noise Shaping

So, we developed this technology but really didn't have the

money to do anything with it. This was in the late '80s and then Sony came along in the early '90s and announced their technique called 'super bit mapping'. Now, the president of Sony got up and said 'on one hand we're going to give you the mini disc and on the hand we've improved the sound of the regular CD with this new technique called super bit mapping'. I knew, just from what I had read about the super bit mapping and how it worked, that our technique would be much better than their technique. They had spent a lot of money developing it and promoting it, and in the meantime a whole bunch of other companies had also developed similar technology of what Sony call, noise shaping.

Noise shaping was developed by two guys from Oxford, Michael Gerzan and his partner Craven. Michael Gerzan is a great guy; very, very bright. He's responsible for Ambersonic microphones and all sorts of other stuff. But I didn't really agree with him as far as noise shaping goes, which we would have conversations on the phone about. What noise shaping does is, the first thing, it says is that a compact disc isn't quite enough. To me, this is just bullshit, because a compact disc has a dynamic range of about

96dB; you show me any master and by the time you've gone through a mixing console, and any sort of processing, you are not going to come anywhere close to that.

The basic premise is, it says that the 16-bit CD noise floor isn't good enough and we need to fix it. What they do is make the noise floor sink down around where your ear is most sensitive, which is like in the 3kHz area, and in the process of pushing it down (it's kind of like a bowl of jelly) you push down the middle, it's going to pop up at the sides. So what happens is that you push the noise down at 3kHz and it pops up at high frequencies and a little bit at low frequencies.

What they're doing is saying, first of all, "we can make a recording where it matters", and I've only heard a handful where you take ideal microphones into an ideal pre-amp into an ideal converter — none of which exists — and you can even maybe come close to get in to this noise floor. But in the process of fixing something that isn't broken (they are shaping the noise as far as they are concerned), they're pushing the noise down to 3kHz, popping it up, and making the apparent noise floor lower. What they don't realise is that they're shaping the music that's actually sitting within

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the noise floor and so what happens is when you run it through any of these noise shaping systems you again hear these same problems I've been talking about from the beginning; the imaging, collapses, the tonality changes; all very subtle but to me it's like, 'why not focus on what you really want to do', which is getting extra, detailed information onto the 16-bit format.

CD Technology Comes of Age

When they made the 16-bit format it seemed that was all anyone would need. When you listen to so called 20-bit, (there is no real 20-bit, everyone has the same exaggerations), you do hear improvement. The idea is to take this high resolution and get it on to a regular CD and that's the process we developed with this mathematician. When Sony came out and started promoting their system, I threw together two demo boxes using one of our D to A converters, and chased around after them saying to my friends in the mastering industry "hey, you should listen to this at the same time". Well the end result was these mastering guys, like the Bob Ludwigs and Bernie Grundmands and Doug Sachs — all these guys that are really hi-end — they all listened agreed with me and said "yes, you are right. The Apogee process is much better".

These guys overwhelmingly adopted our process and so I scrambled and we built a mastering box that was designed as the final step in making a CD. So when you go through all the processes (and you do, whether you do it analogue and it's surprising in this digital world), a lot of these mastering guys still run analogue. They'll take the Apogee D to A converter. Steve Markeson, he does the Rolling Stones and REM; Bernie Grundman who does from old jazz to Michael Jackson; Doug Sachs who masters the Eagles and Pink Floyd: the who's who. If a tape comes in digital, for instance you'll send him a DAT master, these guys will run it through an analogue D to A and do all his work analogue. He'll add his little bits of compression and his little EQ bump at 80Hz and do what-

ever he needs to do and de-ess and whatever — all analogue. He'll make the conversion back into digital which is quite surprising in this era when you hear all this wonderful stuff. What happens though is a lot of these new digital EQs and things, there's a lot of subtle things going on there that can make them inferior to the analogues.

Rethinking Mastering

We chased around and got all these guys on side when it came to the Apogee process and we called it UV22. You'll see it on a Cream re-master or the Rolling Stones; they re-mastered their entire catalogue and on the back they talk about the fact that they've done it using the Apogee UV22 and that it's a revolutionary new process. Many labels, such as Polygram and Telarc and lots of tweaky hi-end hi-fi labels, (some will call it their own process), are using this technique and the majority of CDs coming out today would be Apogee

encoded even though it doesn't necessarily show you. Because these guys all took the time and really questioned the marketing hype of 'here's God's gift to audio - you should use this', they looked at it, listened to it and said well 'we don't believe you - we're going to go with the Apogee process'.

I mentioned that a lot of these guys will do analogue, well what we noticed was that the industry was starting to master on to DAT. We listened to it and found that you could actually hear differences between DATs, and there is a lot of weird stuff that goes on that these mastering guys will all swear by. The latest one is even though many of these CDs will have exactly the same data, depending upon how they are mastered will actually effect the way they sound. Even to the point where clones of the mastering format, (like when they had to develop a mastering format), had to be compatible with all the plants around the world.

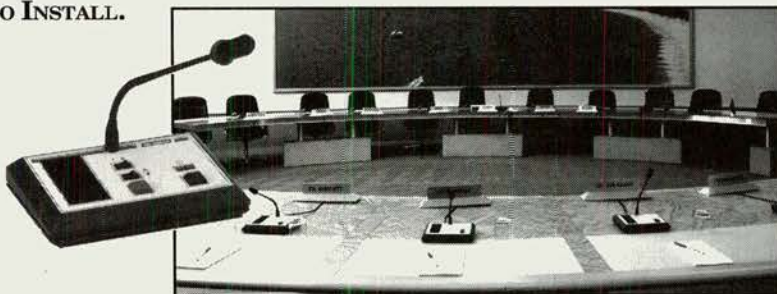
So, when you made a CD master you'd send it off initially, still the overwhelming standard is the Sony 1630 umatic tape, and they send it off as the standard currency around the world.

Well since then it has come along and there is fair bit of mastering going to compact disc — CDRs, but what these mastering guys noticed when you make dubs they don't necessarily sound as good as the master. The weird thing is that when you analyse the data, it's exactly the same data and everyone says "it's digital, how can this possibly be?", well what it is, again it goes back to this timing stuff. It's due to mechanical problems within the video deck, it's due to all these different other little bits and pieces that influence, that you would never think would be a factor. You'd think they'd be so far below your threshold of hearing, but it turns out the threshold of being able to be sensitive to this stuff is much lower and more sensitive than anyone

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Digital Audio: from then 'till now

gives it credit for.

When Bruce Wodeen decided to do the Michael Jackson release he wanted to make sure he didn't have this problem so he had Bernie Grundman actually make masters for everybody — he didn't clone them, so to send to the plants around the world he had to make 70 of these masters.

A similar thing to this cloning of the 1630, the umatic masters, is something that has been found — I think Steve Markeson was first to point it out. He was working on a very large project and noticed that, he listened to the CDR and he sent the CDR off to the artist and they were very happy with it, but when the first pressings came back they didn't sound anywhere near as good. So we started to track down and see what the problem was. This was a couple of years ago.

Apogee has a relationship with a company called Cowell, they make the digital audio tapes for Apogee and they have extensive analysis for optical. We looked into the problem and it turns out that to be more efficient when they make a compact disc, you send your master in and what they have to do is cut a glass master, (the machine they cut the glass master costs \$1M). So, if you can make more efficient use of that machine, you've saved having to buy more of these machines. This company came along and developed a tech-

nique of taking the master and do it first of all two times and then four times faster. So, for your one hour CD, you can do it in 15 minutes as opposed to one hour, and crank the thing through. In the process, it's quite surprising, you can actually check the data, the data is the same, but when you play the CD back on different systems, (and it's more pronounced on some than others), it picks up all these little subtle errors of timing etc. that actually get passed on to what you hear. There's a reaction in the industry to this efficiency. These mastering guys have become good friends of mine, just after a while you get beaten up so much, but the end result is that they come in and complain and bitch and moan and you adjust things and make things better and they really appreciate it.

These guys have become my friends and they're asking, "how do you deal with this problem" because what they want is the best product for their client, yet the industry is pushing towards more and more efficiency. So they're even talking about even making their own tweaky mastering facilities to make the glass master for the CDs so that they can control the thing all the way. There are enough crazy clients with enough money out there that they may in fact happen.

DAT Tape Investigations

We were looking at the problem and one thing I noticed that DAT is really on the edge if you look at the amount of data that you've got to get and the way a DAT works. It's just amazing that it works as well as it does. The density is quite scary, so at Apogee we decided that if we can make a difference to something — and I like to delve into all these different areas — we can do something with it and we felt that we could make a difference with DATs.

I looked at one from this company Cowell, that we got involved with. Cowell are a multi-national firm, they own Jergens lotion and make baby nappies and Kleenex type tissues and all that sort of stuff in Japan. A very very big company. They agreed to work with me to improve their DAT tape because they had just jumped into this area. They're the biggest manufacturer of floppy discs in the world and they wanted to be big in the DAT world. I don't think it was so much from an audio point of view but more from a back-up for computers.

We looked at the problems with DATs and one of the most obvious problems is the error rate. At the time, DATs were pretty ragged and you could get pretty bad ones and drop-out problems and other things. The other thing is that it's metal tape; it's just tiny little metal particles coated as evenly as possible onto tape: the tape comes

through a wire and it runs through these splitters which load it into the cartridges. The problem is that the metal actually rusts away and what you can do is you can actually accelerate this aging process by putting it in very high humidity like 90% humidity and you elevate the temperature and what happens is you can simulate many years of archiving.

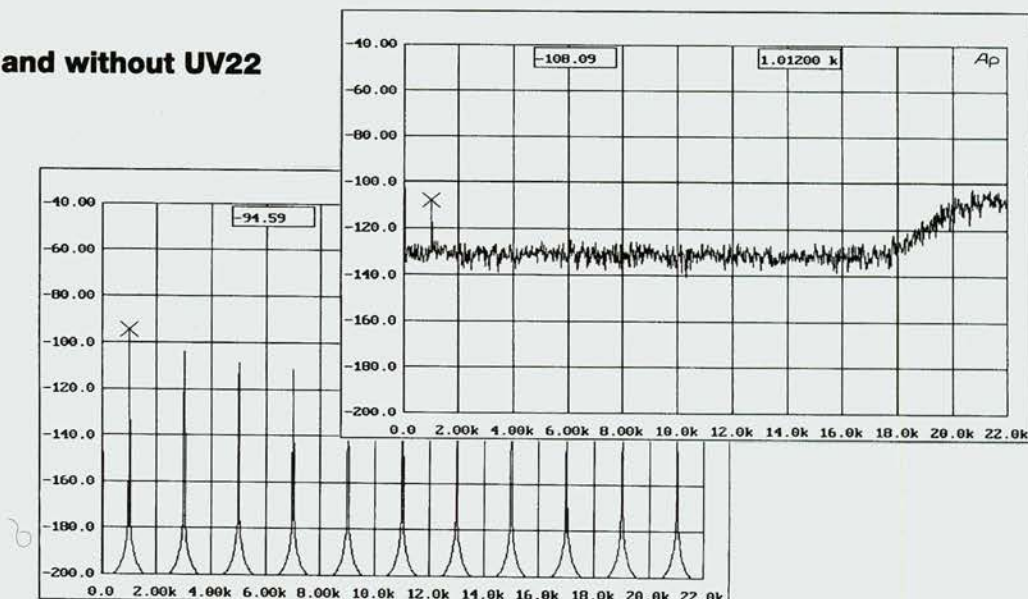
The scary thing is nearly all DATs will show heavy corrosion and you'll actually have trouble playing them back after a period time, which actually gives you an idea of how you should be careful storing these things. I think people were probably aware of that back when metal analogue tape first came along.

So we worked with Cowell and the engineers there developed a way of actually passivating and wrapping up the little bits of metal in a coating that cuts this corrosion down so it lasts much longer. We worked with them on the case and various other mechanical problems, like if you drop it it actually becomes slack you can cause trouble with it when you load it and it can break and all that sort of thing.

We went through and looked at the various problems with digital audio. A lot of people will say 'you are dealing with minutia' but the reality is, when you start adding up all these little bits and pieces from the filters and timing — and

A tone at -108dB, with and without UV22

You are looking at 16-bit CD-quality digital audio with a pure 1kHz tone hiding in the noise (above, right). If you listen to it, the noise is 12dB louder than the tone, yet the low level, silent UV22 information carrier sitting around 22kHz delivers the tone with no measurable distortion and is accompanied by a low, constant white noise floor. Turning the UV22 off and simply truncating the high resolution digital input to 16 bits produces the nasty set of distortion products in the lower graph.





Duncan Fry

Drummertime Blues

all these different elements — it starts to become quite significant.

We developed a stand-alone A to D converter and that being the most important stage when you've done all your work and you've run through your console and you want to make it the best possible because the step that you make when you go from analogue to digital is the only chance that you have for doing it right. We developed these stand-alone A to D converters with all the basic Apogee technology of filters and timing and special power supplies and UV22 process. Then we added some things which also make people cringe because one of the things that these mastering guys have to do is compete with the guy across the street.

Quite often you'll have a situation where the artist wants to make sure that he's got the best possible product so he'll send it off to a few different people and these guys will have a shoot out between themselves to do the best possible job.

So we added this process called 'soft limit'. It's unfortunate that it's gone this way because I'm kind of old fashioned and I like to listen to material from many years ago because it's got the dynamics, but the big thing today is to have it right in your face and have it playing loud. So if you're tuning across the radio and its playing this product will jump out at you yet still sound good. What we did was develop this process called Soft Limit, which in the analogue domain, it allows you to surgically remove these little peaks and things which would drive your average level down and so you can pick up one, two, as much as three dB of extra level so that you can make your product much more competitive. Putting that in made our products very popular and they outsell the competition many many times to one because you've got this kind of combination of all these features including the ability to be able to link to video which is also very important. •

At ENTECH Bruce told us he was leaving APOGEE to concentrate on research into a medical electronics product.

Judging by the number of generations that rediscover Eddie Cochrane's 'Summertime Blues,' it's obviously still an immensely catchy and popular song, the quintessential Rock 'n' Roll song, you might say.

Cover versions of it have recently been on a Diet Pepsi or Coke commercial, on the soundtrack of the Home Alone II movie, and on the playlist of most cover bands. Still, somehow all the cover versions of it seem wrong - the all important correct feel is missing. Ask any record producer; they'll tell you that if the feel isn't there, you won't have a hit.

(I must point out that I'm not

including The Who's powerhouse version of the song, from the 'Live at Leeds' album. This is a total reworking of the song to a more modern idiom, although their version on the Woodstock movie is my favourite. For some reason or other it didn't make it onto any of the Woodstock albums, but if you have a quick hand with the cassette recorder you can dub it off the movie next time it comes on late night TV.)

Anyway, back to Eddie Cochrane. Listening to the original track, it is amazing what a minimalist recording it is. Put together on equipment most people wouldn't use for a demo these days (2 track), it goes to show that what engineers have been saying for years is true: If it doesn't sound good on 2 tracks, it won't sound any better on 48.

Single vocal, some slap echo and reverb, handclapping, acoustic guitar, electric bass, and a brilliant, tightly compressed mix. That's all. Notice something missing? Yep, you got it...No drums!

How can this be? Isn't a solid Kick drum the foundation of a good rock mix? Hmm - yes and no; it's probably truer to say that a solid bottom end should be the foundation. And Eddie Cochrane's Summertime Blues has got that, and it's supplied by the Bass. Has to be a Precision, by the sound of it, and played as a musical instrument rather than just something loud to keep the drummer in time. Solid, lots of low frequency but modulated by a percussive edged click, from judicious use of compression and EQ.

Of course, all the bands who do cover versions of the song these

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Duncan Fry

days have got drummers, and that's what makes the difference. We apply established modern music ways of doing things, and it doesn't sound right. Nowadays it would have to be a very courageous decision indeed (Yes, Minister) to record a hit rock record without a drummer. Yes, I know we had Things of Stone and Wood, with a drummer playing his heart out on the video but inaudible on the record, but they're the exception that proves the rule, as one of my teachers used to say.

Back in Eddie Cochrane's day they didn't have any such established ways of doing things - they just made it up as they went along.

Now don't think that I'm against drummers, because I'm not. I love loud music, and I like a big fat Kick drum sound with a bottom end that will really rip the crutch right out of your undies! For me, it's what makes a gig worthwhile. Still, having said that, one of the first things you learn about mix-

ing is that you can always learn.

The first time I mixed a rockabilly band, they gave me a stage layout when I picked up their stage gear, and said they would be at the gig as soon as they could for a sound check. So, I set up vocal mics in front of everyone, a mic on each amp, and one on each drum. Satisfied that I had done the right thing, I sat back and waited for the band.

The band arrived, looked over the set up, and then the drummer came over and had a few words.

"You've done the drums all wrong," he said.

"How do you mean?" I asked. It was a basic kit, and I had set the drum microphones up as I would normally: Kick, Snare, Hi Hat, Rack tom.

"All I want is a mic on the snare, and an overhead," he said.

"What, nothing on the kick drum?" I asked in amazement.

"No, that gives it the wrong sound," he explained. "I want it heavy on the off beat, to keep it

sounding jumpy. The overhead will pick up just enough of everything else to stop things sounding empty"

Crazy bastard, I muttered to myself as I changed the setup; it's going to sound like shit and I'll get the blame.

Fortunately, when the gig started, it turned out that I was wrong and he was right. (*Good to have this admission in writing, Dunk. Ed*) The whole band had just the right feel; heavy on the off beat, with the drums and bass working together on opposite beats. Best of all, set up this way, the drums mixed themselves. A little bit of reverb, some slap delay on the vocals, and the gig was a cruise. The band was happy; I got paid.

So what it boils down to is that you can always learn something. And before old rock purists deluge me with letters, yes, there are some drums somewhere on Summertime Blues. You just can't hear them!

McLean

Richard Bolinski immediately gives the impression of being calm and well reasoned in his approach to running his business McLean Audio Services Pty Ltd.

Formed in 1987 with Hugh McLean as a partner, who has since returned to the family business of McLean Sound, the company has earned a solid reputation in a wide variety of areas from music to providing audio production on the Dalai Lama's first tour.

The company's involvement in corporate and theatre work is the most significant. The whole operation is run with a full time staff of seven, with a large pool of casuals called upon as required. Plans are in place to increase the work load. Richard feels that the best area of growth for his company is further into the corporate/theatre

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Audio Services

areas. He considers the very large venue touring market to be "already saturated" with companies trying to outbid each other to get work.

Richard is quite happy to limit his music industry involvement to venues of approximately 2000 in capacity. Venues such as The Palace in Melbourne or The Victorian Art Centre's Concert Hall, where they are currently supplying equipment for the bulk of productions held there, are good examples of the size of room they are most comfortable working in. The scope of the shows at the Concert Hall has been from Alexi Sayle to the indigenous music celebration Sing Sing which featured the reformed Not Drowning, Waving and the Papua New Guinean musicians who played on the Taberan album.

The core of the business is corporate work, some of it on surprisingly short notice. A great deal of the work is in supplying other companies such as Haycom and Staging Connections. Richard rightly considers that the scale of the



work is "not relevant to the quality" achieved. The company has provided sound reinforcement for jobs as small as one mic and lectern to large flown systems in the Grand Hyatt Ballroom.

This type of work accounts for approximately 75% of the company's business. With so much work in this field it is critical that the equipment is maintained externally as well as internally. To this end a set of sixty Shure mics is only used for corporate events. This prevents the typical problem of the equipment looking second hand quickly when it is used for contemporary music production.

All the effects units are kept in racks dedicated to each system. If something extra is needed a complete rack is used, not just a single component. This ensures that the appearance of the equipment is maintained.

McLean's involvement with festivals/theatre is significant as they provide sound for Moomba, this year including the surround system used in conjunction with the Aqua Screen projection system. This installation utilised all the 32 cabinets of their JBL modular system in a left/centre/right configuration with pairs of

wedges mounted to lamp posts on the southern bank of the Yarra for surround.

McLean's are also supplying for the Next Wave festival and the Melbourne International Festival. In December they will again be working on the three day Hells Angels' Broadford music festival. Richard views this event as more a test of the crew than the equipment. "When they say its not loud enough, you don't argue." The company has relied on 'word of mouth' or referrals to gain work, this has also lead them to providing production for Channel 7's Good Friday Appeal and this year, Channel 9's Logies telecast. The Logies presented quite a challenge, because the band generated a 100dB level on their side of the stage. This had to be balanced around the room and controlled so that it did not spill into the mikes for the live to air sound. Richard added "the room mix had to appear as a concert." This was achieved by splitting the room into three zones with appropriate delay of 50ms set on a BSS Varicurve and level balances to make the sound appear to be coming from the centre stage.

The singers for the main music productions,

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by Chris Steller

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If you are setting up an 8-track studio with ADAT, DA-88, DR-8, or analogue reel-to-reel the RM800 would make a dynamite (and extremely affordable) recording partner!

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John Farnham and Kate Ceberano both used hand held radio mics, while the main presenters had lapel mics. These were augmented by a custom made mic stand fitted with a Schoeps mic. To aid the balance in a left/centre/right configuration, 12 JBL control 1s were designed into the T.V. set prop, which extended 13.5 metres into the room.

This whole process is typical of the constrictions that T.V. work places on all areas concerned, namely audio; stage, F.O.H., broadcast mix, lighting, vision and staging. The venue for this year's awards was the new Sky-line room behind the Tennis Centre at Melbourne Park. This room has a fairly low ceiling which didn't permit much tolerance for placing the flown equipment out of camera shot. The room has been designed primarily as a convention/presentation venue, so with a production as big as the Logies the access was found to be a little lacking.

The unsolicited testimonials written by clients congratulating the crew on their work has encouraged Richard and his crew to get as much corporate and theatre work as they can handle. "If the crew is good the equipment is not the prime consideration." If the enthusiasm for corporate work is at the expense of the allegedly 'glamorous' and 'prestigious' rock 'n' roll work, then Richard is prepared to support it. "The music work is to up and down to rely on it by itself, the industry isn't the same as ten years ago."

Their careful attention to detail and a priority on the quality of the crew have bought solid rewards to McLean Audio and with significant bookings until the end of the year, they look set to prosper further.

EQUIPMENT HIGHLIGHTS:

EAW speakers: "high efficiency, 60kg weight, good Q, small size, easily flown" Amps: Yamaha, Carver, Crest,

FX: BSS, Drawmer, Yamaha.

Mics: SM99, Countryman, Shure 'L' series wireless, WL94, Beta 58.

Mixers: Yamaha PM3000/40, PM1800/40, M1516; excellent for broadcast work all in/out transformer coupled, EMX; used for small corporate work.

Cat Forcer caught up with live sound engineer Robbie McGrath in Sydney recently. He has just discovered some new products....

Simply Robbie

Sound Engineer Robbie McGrath was back in Sydney sporting a radical hair cut. Apparently it was the result of a drunken night when Robbie decided to show his monitor engineer, Flaky, how well his new beard trimmer worked.

"I thought I had it on number 4 but it was on number one and it zipped up leaving a big streak across my head," he told me. "The only way out was to go the whole hog. I frightened myself in the morning when I saw myself in the mirror! Mind you it's got nothing to do with sound, you can't hear any better."

Robbie was very pleased to see that the Turbosound Flashlight / Floodlight system was now available in Australia.

"It's a great box and the closest you can get to mixing in a studio environment," he said. "The way you layer all your sounds and effects is similar to in a studio. A lot of boxes don't allow you to do that, you have to tackle it from a different angle. I'm driving it with a Midas XL4 console (another Midas XL4 was used as a monitor desk).

Robbie said that the Midas desk sounded great and 'very musical'. He also had two small Yamaha ProMix 01 16 channel desks for doing the recall on the samples, effects and reverbs. Robbie was using the new Klark Teknik programmable graphics, the DN3600, which he thought was brilliant. It was particularly good when the tour returned to a venue because Robbie could just hit the recall button and the system would be EQ-ed automatically.

"It makes the day shorter because you're not spending two hours EQ-ing," said Robbie. "Production managers like them. Stage guys like it too because they don't have to listen to silly music all day long. I like it because I don't have to work. This room at the Sydney Enter-

tainment Centre is difficult and I've died here a few times in the past. It's got a real strange low end and to try get the sound right to the back is nearly impossible. They've put in a small delay rig, I think it's an EAW - I'm not sure, as long as sound's coming out of it. The only time I really got a good bass sound in here was with AC/DC but that's because the whole thing was so f---g loud, it was wonderful! There was no space left, the doors were flapping!

"When you're mixing something like Simply Red, you've got to be careful as they are perfectionists. They want it done right with everything clear and clean. They're a great band to work with because what they deliver down the microphones is easy to work with. It's not like having to polish the turd, as they say. You know, the shit in, shit out routine."

Robbie groaned when I asked him about the European gigs with the two connected stages playing in the round.

"God, we had fourteen different zones to be EQ-ed everyday. I used the RTA4000 analyser which is great because you can photograph your curve and then you can put your mic anywhere in the hall and reproduce that curve. You can give the whole system the curve and then instead of having to walk around the system, you can make adjustments from where you're sitting at the desk with the Varicurve. I

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ON TOUR

get the Klark Teknik to look after the system and make sure all the zones are the same and then I put the Varicurve in, putting your own attitude towards it. It's basically a more complicated way of putting a bit of treble and bass to your hi-fi!"

With the fourteen zones in Europe, there were six full stereo zones whilst the rest were in-fills, side-fills and underhangs. The first day Robbie turned it all on, he couldn't believe the reflections he was getting from the other side of the hall.

"There was sound everywhere and I thought my career was down the drain," he said. "But within two days of lots of worry and beating the system up, we found a way round it. We had to find a curve, we had to find a certain volume that worked and we time aligned the whole thing into a centre point. It was a huge learning curve. It definitely moved the boredom threshold although I don't know if I'm looking forward to going back to it as I'm really getting off on the end on system here. I'm really enjoying mixing again as I don't have to concentrate on reflections. You can imagine all the EQ's we had for all the different zones, we used to call it EQ alley. If you went out there late at night with lots of expensive EQ, you'd get mugged."

Australian Concert Productions provided all

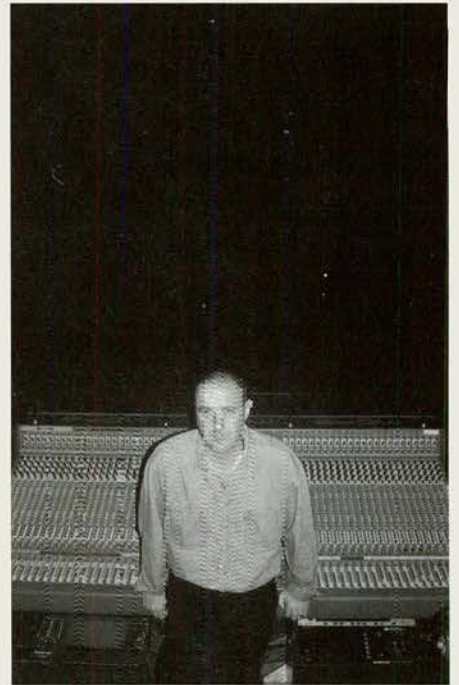
the sound gear for this Australian tour except for the wedges which came from Jands.

"Mick Hucknell is very used to the sound of the Meyer wedge which has a hi-fi kind of feel and he's a kind of a hi-fi dude," explained Robbie. "So we had to hire some Meyer wedges from Jands and they stung us! They had us by the short and curlies. I'm sure we didn't get them for the normal price but that's just business. I've never had any problem with Jands and in fact over the years they became quite pleasant to work with. In the early days they were very militant in their attitude. It's got nothing to do with the companies ability to do the job, it's the choice of box and I really do like the Flashlight. Jands should have seen the writing on the wall with the S4 box a few years ago. I think they might have been a bit slow off the mark but then Clair Brothers are the biggest PA company in the world, so you can't slag the box off. I don't think Jands will lose any money though, you won't starve lads!"

The Midas desks and all the control gear came with the tour, a luxury which Robbie appreciated as it gave him a reference point and again cut the day down.

"You can get to where you want really quick and I think that's what it should be about these days as time is money," said Robbie. "As well as being good at doing your gig, you have

to find quick and efficient ways around it. There are only 24 hours in a day and the productions are getting bigger. You've got to look at your game plan and up it. Try cut off minutes here and there as it helps the whole day. •



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RED, HOT AND LOUD

MARTY WILLIAMS MEETS DAVE RAT - RED HOT CHILLI PEPPERS' FOH LIVE AUDIO ENGINEER

"I had a real problem with the phone system here, it wouldn't recognise the dial tone from my laptop, so I had to call America through the normal phone system and then get on a server to read my mail."

The perils of being an international jet-setting audio operator with a platinum selling band. Radiating the confidence of someone in control of their situation, it was very easy to warm to his openness and casual style.

Having been the Peppers' operator for years this band is his number one priority, but not his only business interest. Showing a great deal of initiative when he was eighteen, Dave started his own P.A. hire company. This was at the time of the very active L.A. punk scene where he became involved in the live recording of bands. While this scene was growing Dave got to meet more bands through his hiring of equipment to them. His main challenge at this time was to acquire as much equipment as possible and learn how everything worked, while developing his own style. He was also building his own speaker inclosures, something he still does a bit of. To help pay the rent and to satisfy his hunger for knowledge he was mixing an eighteen piece big band on Sundays. The culmination of this was working with a sixty piece big band. This contrasted heavily with the rise in his other work.

Dave completed three years touring as P.A. tech with Black Flag, the seminal L.A. punk band which made many of us aware of Henry Rollins and Mike Watt. Dave appeared as the 'Ratman' in Rollins' books. Rollins has gone onto to be a significant influence on the indie music scene, giving spoken word performances, recording with his own band, producing, writing and running his own record label. Mike Watt is currently the bass player with Perry Farrell's innovative Porno For Pyros and a close friend of Dave's. They spend much of their time communicating on the Net, as they are rarely in the same city.

After Black Flag disbanded Dave has since worked with a variety of bands many of which are consid-

ered leaders in their field. This selection has included Sonic Youth, Fugazzi, L7, Offspring and prior to their first tour, Perry Farrell's first major band, Jane's Addiction. One of his two partners, Brian, ended up being the permanent operator for them. One act he has worked with, which comes a pleasant surprise amongst all the somewhat noisy guitar bands, is Thomas Dolby. In spite of the impression his records give of a complex technical sound, Dave said there was "not a lot goin' on" to reproduce this. His overriding principle with all the bands he works with is to leave "no finger print on the mix." This translates to him taking the lowest possible profile by allowing the band's sound to be their's, not turning it into his idea of what they should sound like. He also tries to blend into the darkened space of an arena as much as is practicle by turning off the majority of lighting fitted to the equipment racks.

For the Peppers Dave runs the mix very straight with little demand to embellish the sound generated from the stage. At the core of the FOH equipment supplied by Audio and Recording in Sydney is a brand new Ramsa WR-SX1 mixing console. Dave is the owner of one of these consoles and requested to use one on this tour. He says that it has the 'best sounding EQ' and places its specification between a Midas XL3 and Yamaha PM4000. An unusual way he has of working is to insert compression on the sub-groups enabling him to control the threshold point by bringing the channels up and the sub-groups down. Dave has found this easier than altering the controls on the compressors directly. He uses this threshold change between the faster songs - more compression, and the slower songs - less compression. The threshold of the gates used on the drums is also varied in this manner to allow the



slower songs to breathe and have more 'feel'

Two other requests of note that Dave made were to have a lot of sub woofers and an Eventide 3500. He said that most of the bands he works with "use a lot of subs." The configuration of these was a twelve metre wide by two boxes high stack of Meyer DS2s placed on the floor in front of the stage. These complimented the MSL3s and 10s flown overhead. This set-up allows dave to change the 'feel' and tension throughout the show. As this band produces a lot of bass detail and energy the large number of subs is needed to clearly punch this through the audience.

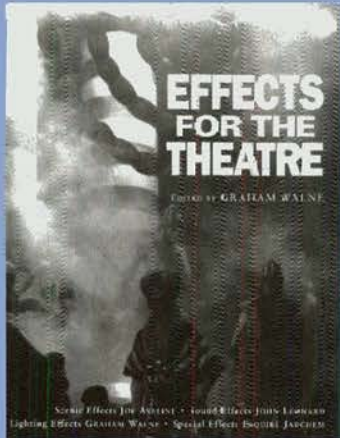
The stage equipment and monitors for this tour were bought out from America. The vocal mics were Audix, with Shures generally used on the instruments. Monitors ran from a Yamaha PM2800M monitor console and then to Dave's own design of monitor wedges. The main focal point of these were two

boxes flown over the centre stage position angled at 45 degrees, facing towards each other. These wedges contained a 15 inch, a 10 inch and a 2 inch horn and are tri-amped. Dave has found this combination to work very successfully in dealing with high level on stage while giving a better than normal frequency reproduction. The vocal part of the bandwidth considered critical and with this combination of drivers he feels that he has been able to gain more control than with conventional two-way systems. This also keeps Anthony Kiedis, the band's lead singer happy, as "he won't go anywhere without his monitors."

Dave's business in Sun Valley has a collection of equipment, including 160 speaker boxes divided between three P.A.s, three 40 channel FOH consoles and two 40 channel monitor desks. This allows them to provide sound for a 15-20000 seat stadium, a 5000 seat venue and a theatre all at once.

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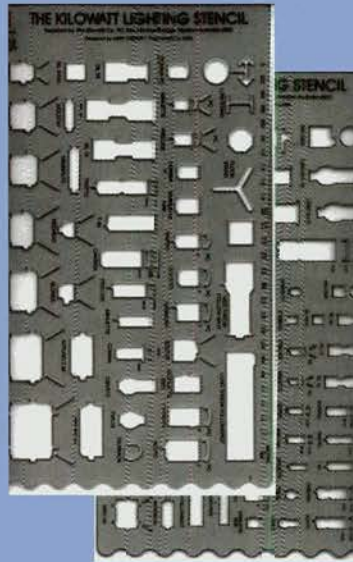
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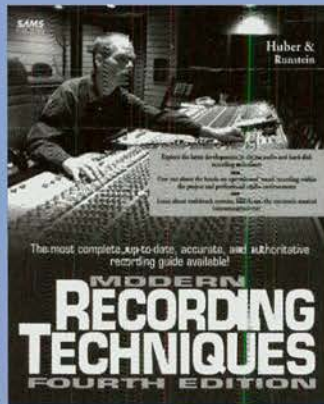
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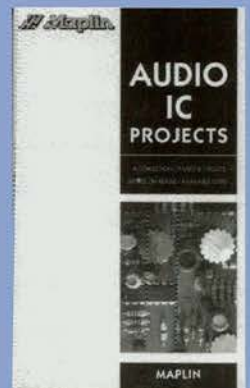
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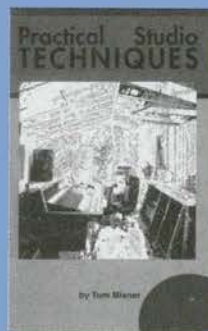


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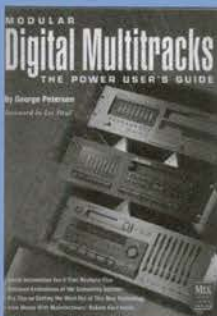


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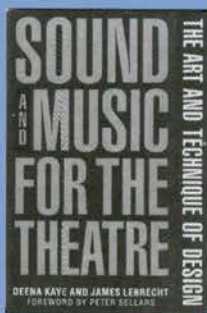
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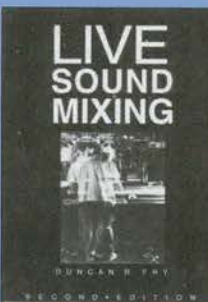


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By Kaye and LeBrecht.
Contemporary guide to theatrical sound, detailing the creative opportunities and practical considerations for composers, technicians and sound designers. Features chapters on researching and selecting sound materials, developing the 'sound plot', building audio cues and working with theatre co's. 196pp, 1992.



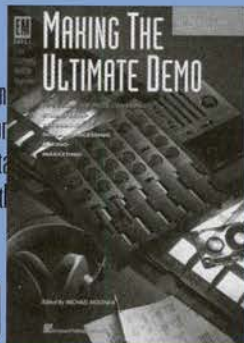
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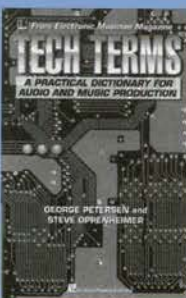
From the editors of MIX. 134 pages, 1993. An inside look at audio production for film and TV, with audio post. Details many recent productions. Includes a special section on sound effects, with case studies. 134 pages. Large format book, illustrated.



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By David (Ruby) Trubitt, 166p, written 1993.
This is a very useful book, Connections say that if you are interested in, or work in, the live sound field, get it! details touring sound

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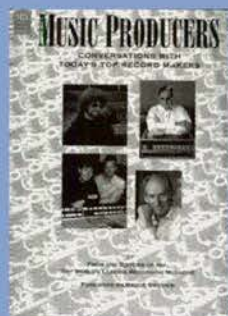
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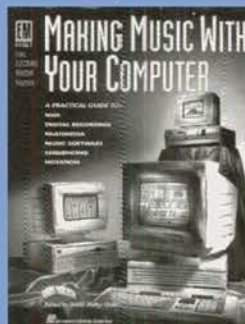
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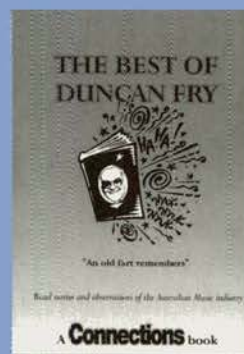
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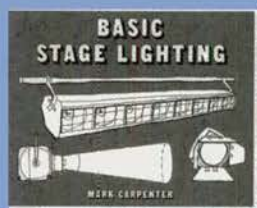


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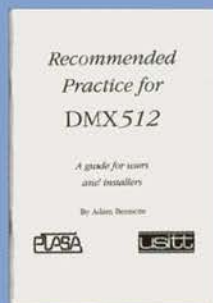


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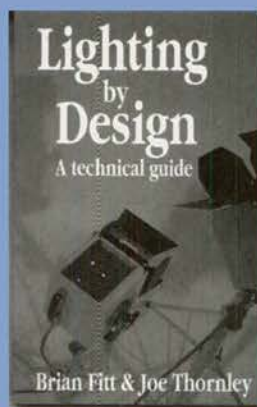
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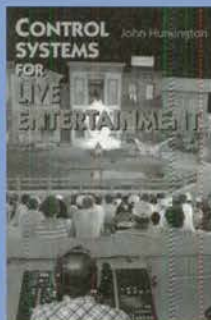
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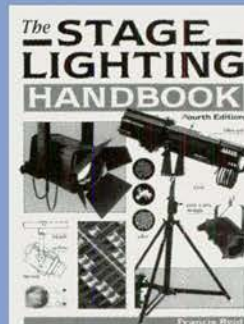
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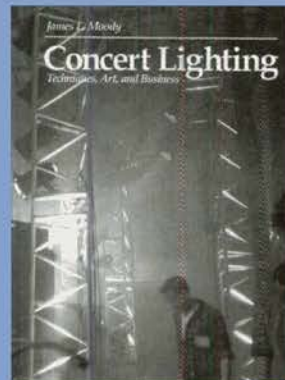
Walk into most large shows today and you see computers at work. All too often systems for lighting, sound, staging and machinery are not connected. This book discusses how different systems can be integrated, and details most different protocols in use today. Invaluable, says Connections editor. 292 pages, illustrated. By John Huntington.



Stage Lighting Handbook \$39

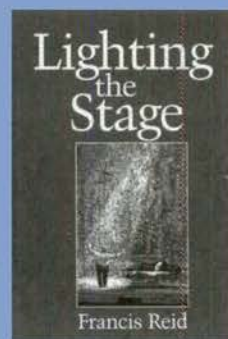
Fourth Edition, by Francis Reid. The Standard guide to stage lighting. The book appeals to beginner and pro alike, and in this fourth edition incorporates recent advances in technology. The material on the process of designing and implementing the lighting for a production has been completely revised. In 1974, Connections editor Julius Grafton read the first version of this book and went out to light a professional stage play. It's true, it can be done, and this book will help you do it! 208 pages. Plenty of helpful drawings.

Concert Lighting Techniques, Art & Business. \$94



This hard back, large format book is a quality item, the first book we have seen to deal solely with large scale concert lighting. Author James Moody is the ideal person to write this, he goes beyond the tour and discusses applications of concert lighting equipment, techniques to other fields including film, theatre broadcast TV and corporate theatre. Some quotes: "down to earth, honest, easy to understand, information not found in today's books on lighting. This man KNOWS concert lighting!" This book has colour pix, sections on overseas touring, pre production, business, stage design, dealing with problems and much more. 'Highly recommended by Connections'. 190 pages, large format, quality reproduction throughout!

Lighting The Stage \$36



Previous books on stage lighting have tended to concentrate on the factual aspects of design and technology. But for young lighting designers and all those concerned with lighting - directors, choreographers, set designers, costume designers, stage managers and specialist technicians - the equipment and the design processes are only the start. It approaches stage lighting from the human angle. 114 pages, 1995. By Francis Reid.

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THEATRE

Strictly Jo Mercurio

On tour with Bangarra

By Madeleine Murray

Bangarra Dance Theatre is one of the phenomenon of Australia. Their work is a brilliant fusion of traditional Aboriginal dance, and modern genius.

Ochres is so popular that Bangarra has been touring it for two and a half years. *Ochres* has been to every Australian capital city as well as Berlin, Tokyo, Noumea, Griffith, Dubbo, Moree, Armidale, Newcastle, and remote Aboriginal communities. They are going to Cairns, Townsville, Mount Isa, Warrnambool, Ararat, Mount Gambier, Ballarat, Geelong, and more. Also Bombay, Delhi, Madras in September, and Singapore, and China in November.

The production manager/lighting designer is Jo Mercurio. He probably knows the assets, liabilities, and idiosyncracies of most theatres in this country. Until recently, Mercurio was the production manager, lighting designer, set designer, stage manager on all

the touring Bangarra did. Now he has five people doing his job.

Yes, he is Paul's brother. And there is another brother: Michael who was second Assistant Director on *Island of Doctor Moreau*, and a sister, Connie who was personal assistant to the producer of *Nell*.

Originally from Perth, Mercurio was head tech at the University of Western Australia, and did lighting design for independent productions, mainly dance.

"I much prefer dance to drama," Mercurio says. "I trained in dance for six years when I was a kid. In dance you have the freedom to explore, rather than putting the light through the north facing window at three o'clock in the afternoon. I was doing rock and roll lighting for my cousin's PA company gigs when I was 17. Just being able to

mix colours and play with light was fantastic. So I continued that when I moved into dance. The show we're doing now, *Ochres*, shows that. It works, but there's a lot of different colour in there."

Mercurio started out with Bangarra as lighting designer for *Praying Mantis Dreaming*, and Ninni. He joined the company full-time two and a half years ago.

Bangarra first performed *Ochres* in '94 at the Nambundah Festival, at Belvoir Street Theatre. "It was done very much as a work in progress, and Nambundah kind of decided to feature Bangarra," says Mercurio. "The lighting design had to be multi purpose, so other groups could use it. Stephen Page,

continued page 51



Short Acts

THEATRE & CINEMA BITS

From Madeleine Murray and Dan Cole

The **Salamanca Arts Centre, Hobart**, is 20 years old this year. The President, Phil Mason, left recently to concentrate on his work as a jeweller. The new President is Annette Downs, who was elected to the position unopposed. Downs is also artistic director of the Terrapin Puppet Theatre.

The NSW Government has pledged \$4m over two years to build a **new 300 seat performance space** in the Boardwalk Studio of the Sydney Opera House. The space is intended primarily for music, rather than theatre. Also at the Opera House, the Playhouse space has been **converted into a practical theatre space**. The Playhouse was originally known as The Music Room and was also used as a Cinema. By the time it became a theatre space it was an ad hoc jumble of leads and scaffolding. Its first console was a 'portable' Seimens number, through to a Tempus M24 to, finally, a Galaxy Control with a J5 program. There are 120, 5kw Bytecraft IDS Ultra Quad Dimmers that all appear at a central path panel. A new F.O.H. bar has 36 outlets and there is now a flying system which incorporates 20 motorised battens. The Bell Shakespeare Company is the first to stage a production there with *Much Ado About Nothing*

The Gods are smiling on Sydney. Yet another venue. This time, it's a **15000 seat indoor concert hall at the Homebush Olympic site**. The stadium will cost \$188m, partly private sector money, and is supposed to be finished by the end of 1999.

Adelaide Festival : the action behind the scenery

Trevor Connell spoke to Adelaide Festival's Production Manager, Geoff Cobham about the Festival and some of its outstanding productions. Geoff Cobham started working on the festival in April 1995, and supervised 30 venues and sixty performance groups. Approximately 400 crew persons provided technical support for the festival. The after hours alternate venue **Red Square** received good press, featuring 110 shipping containers as staging, with 750 seats for the evening shows and 2,000 for afterwards smoozing and much frivolity. About the containers:

GC: They cost \$5 each a day, the same price as hiring a chair. The containers came straight off the truck and bang, they're in place,

locked together. Originally the design was five high for the whole venue, with nine for the centre tower, but the engineer wouldn't quite come at that.

TC: The lighting system?

GC: Control is a Precept 60 to 120 [manual] with a linklight and so:patch. There's also a Melange desk that I've been zooming round the country; it's running 32 scrollers (on Par 64s) There's 6 Martin Roboscans the rest is all 1200w profiles and Follow Spots. There's four Performers, and there's four 2K Selecons.



Geoff Cobham

Each spot operator is responsible to re-focus the lamps in each of the four open containers assigned to lighting.

I designed the lighting with a secondment from NIDA, Damien Cooper, who's fabulous. The audio was designed by Dave Arbon and operated by Nigel St John.

Short Acts

THEATRE & CINEMA BITS

From Madeleine Murray and Dan Cole

Montreal Community Theatre Inc, based in the Tumut shire are set to buy the historic theatre, where they work. The building is currently leased to the MCTI, and over the last year more than 25,000 people have attended functions there, with ticket sales of \$65,000.

The formal plan for the **Walsh Bay development** has been submitted to the Sydney City council. The plans include a home/rehearsal space for the Bangarra Dance Theatre, and a 1000 seat theatre for the Sydney Theatre Company.

Recently 800 cyclists turned up from the Hunter and Newcastle region for the 63km Hunter Bike Run. The event was to raise money to rebuild the **Young People's Theatre in Newcastle** which burnt down last year. The YPT was presented with a \$20,000 cheque raised from the event.

David Marinner could be turning into Melbourne's answer to Donald Trump. Not only does he own three theatres, and lease the Regent, he has just unveiled his plan for redeveloping neglected areas of Melbourne's CBD.

And also in Melbourne, Crown will build a **1800 seat Lyric theatre** near its new casino complex in Stage Two. Plans will take 6 months to draw up. When built the \$100 million theatre will be part of the 1.6 billion costed for the total complex, a blow out of \$630 million on the original complex estimates. Although the proposal is generally welcomed there are fears that the casino's ability to subsidise ticket prices will undermine other theatres in Melbourne. Also, Melbourne already has a number of large theatres which seat more than 1000 people. It is expected to be completed by 1999.

Adfest

Sweeting from All Production Services

TC: The staging seems to work well.

GC: That's called Pro-stage. The Venue Manager invented it and comes in 3.6 x 2.4 modules, but it breaks down [folds up]

TC: You remove the stage with a fork-lift with the audience up dancing while it's happening?

GC: I know, and the mechanists hate that.

Geoff Cobhan was quizzed about working with European theatre practitioners such as The Maly Theatre from St Petersburg, on 'Claustrophobia'.

GC: Their freight was an absolute nightmare. They'd just tell you things that were just not happening. I'd say, 'If your freight doesn't get on this boat in Rotterdam by this day your show will not be on'. 'Oh, it's on the truck'. It wasn't on the truck.

TC: So they brought the set over? Wouldn't it have been easier to have had it made in Adelaide?

GC: I got a quote of \$48,000 but I container'ed it in for about seven. And they can build it for less than \$6,000.

TC: Lighting on that show was all white...

GC: Yeah, well, I don't think they've ever seen a profile spot. They didn't seem to know what they were, they wanted a lot of light from front of house but the subtitles... I don't know if you noticed how high they were?

TC: ...to get away from all that light...

GC: Yeah, couldn't read 'em. The people in the front row could forget it. They brought with them an operator and a computer [for the subtitles]

TC: How do you get on with translation of technical terms when dealing with so many people from other countries?

GC: Most of the big company's technical directors spoke English. If you have a normal translator you can forget it; they're just used to doing diplomatic stuff. If you tell a translator you're cross with the artist you know they're

not translating what you say.

Sound gear seems to be more international, but here we have so many zoom spots. In Europe they don't seem to have many profiles at all. They use PCs. Our lamps stocks are much more flexible.

Much of the Festivals images were of a Danish production called Orfeo by the Pro Forma group, you know, the one with the steps... The show was designed by Mils Jarsperson.

GC: It was probably one of our easiest shows. It was so contained. He is a complete speed freak and he had the whole thing up in literally hours. Some lamps were built into the set, their positions were all pretty easy to find 'cause they were either on the set or they flew on bars. The sound was the hard thing; it had to be very pure and they'd complain about any noise, you know the air conditioning and other things.

TC: What is it about the lighting that makes it so spectacular?

GC: The lighting designer's a clever bastard; one direction at a time, one effect at a time, leave it for ages, change it quickly to another effect, from another direction. Very simple. The sort of lighting you go, 'I could do that'.

• *Trevor Cornell is a Sydney based Lighting Designer, Event and Production Manager.*



Composer Nigel Butterley officially opened the Hunter Valley Grammar School's **new performance theatre** in May. The opening coincided with the schools arts festival long-week-end which raised \$50,000.

Showlight is an quadrennial **international colloquium** focussing on lighting for the performing arts, principally television, theatre, concert and cinema. The first *Showlight* was held in 1981, and will be held next in 1997 in Ghent, Belgium. Anyone wishing to offer contributions for the lecture programme of *Showlight '97* should do so by August 1st. Abstracts can be sent to either the Australian contact (055) 92 2043 or, Bob Anderson, c/o *Showlight*, 7 Highlight House, St Leonard's Road, Eastbourne, East Sussex, BN 21 3UH. Internet <http://www.plasa.org.uk/plasa/>

The Melbourne University Union is planning to refurbish their theatre, **upgrading the space to a 500 seat auditorium**. They expect the refurbishment to cost between 1-2 million. The space has always been the University's in-house theatre space but also available for outside groups. Entertech's Denis Irving is the consultant. Entertech also consulted for the Empire Theatre restoration in Toowoomba. Jands will supply stage machinery and drapes whilst Premier Lighting will supply the stage lighting, audio and communications.

Canberra Theatre Trust's Playhouse theatre has been stripped in preparation for demolition. It will be replaced by a 600 seat auditorium with \$7.3 million allocated from the Casino premium. Tenders will go out next month for **demolition and construction**. It is hoped that new facilities such as art galleries, restaurants and performance spaces will provide new revenue sources for the Canberra Theatre.

Bangara

the artistic director gave me free rein to do whatever I wanted, without really constricting me."

Lighting

Ochres is broken into four parts. Yellow, women's business; black, men's business; red, relationships; and white, spirituality. "We decided I would echo some of the colour in the lighting, but not necessarily be literal. I got my design idea watching the choreography. Originally Stephen and Bernadette were talking about slide projectors, which I vehemently fought against, not being a great believer in slide projectors, and having seen them used on far too many occasions inappropriately. It's so rare that I've actually seen them used really well. So I managed to talk them out of that, and do it with lighting, using gobos, which is what opens the show. It is washes of yellows and ambers, projected by ten Selecon 1.2K profiles.

"I cut the gobos at each venue.

I don't use standard bought ones. It covers the stage with very fine jagged lines. You see limbs moving through the light very quickly, and you're just grasping at what you're seeing. You're never quite seeing it fully.

"Apart from the gobo wash, there's my use of 5Ks as backlight. I have a preference for a single source backlight that only creates one shadow. The gels I choose are quite deep colour, so I need the punch to get the colour down onto the floor with intensity. Apart from that, it's very simple, basically a three colour wash. But really each colour is four colours. I have a FOH blue, the overhead blue, the backlight blue, and the sidelight blue. They're all of a similar hue, but a different saturation. So I can define the body, and give it a lift from the sidelight. And the show is very heavily sidelit.

"Strong colour blends are very much part of *Ochres*. I guess when I did it, I thought it was kind of a risk, with so many varied colours. But it's really paid off. It gives a

stunning look to the show. I use a 180 from the side, the Lee180, which does wonderful things on black colour skin. It really gives an incredible sheen and lustre.

"And during the show, the cast paint up with white clay, and cover their naked bodies totally. I start a particular scene with very heavy backlight, and it almost looks black and white. Very stark and strong. It's the first time you see them naked. They step forward from the very strong backlight, and go into these 180s from the side. They just glow like some spirit. It really gets me going. It's a fantastic moment when they step out of that black and white image into that glowing ethereal state."

Like everyone I've ever talked to, Mercurio admires Page. "We have a great ability to communicate. He has a lot of trust and faith in me, as I do in his work. He's a genius, I admit that quite freely."

Touring

"Right from the start, I was very keen to see the show as tourable

Union Opposes Threatened Parramatta Theatre Closure

The Media Entertainment & Arts Alliance is to campaign against the threatened closure or sell off of the Parramatta Riverside Theatre Complex to commercial operators.

The Alliance understands the Parramatta Riverside Board is considering a proposal to sell the business to a private operator which may mean shedding the existing staff and charging full venue hire rates to community groups who are currently subsidised.

NSW Assistant Secretary Don Gunn said, "Without a fully functioning theatre venue the aim of developing a professional theatre culture outside the Sydney CBD area will suffer a major setback."

The Parramatta Riverside has operated as a largely self funded operation with only a small maintenance grant from the council.

For more information contact Don Gunn (02) 333 0961.

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Bangara (continued)

as possible. I saw the potential for *Ochres* to be a hit, and tour, but not to the extent that it has. We've been constantly on the road with it for the past two and a half years.

"It really has been touring a lot, and by keeping it simple, we've been able to tour it, to take it up to Yirkala, in Arnheim Land, and take it back to the people whose dances we use. And put it into Germany or Tokyo without any big traumas.

"We normally hire everything when we get to a city. But we're in the middle of the regional tour now, and we bring most of our own equipment. We're carrying 24 Selecon 1.2K profiles, which are the side lights, and the gobo wash. And 4 Selecon 2K fresnels, and a Cuemaster 48 channel desk. Every venue has some gear. The whole idea of this regional tour is to try to make the show affordable.

"It goes to Aboriginal people, outside the main cities, and allows them to see their culture continuing. Stephen is very much forging that new cultural combination. We're not doing the melting pot. We're a fruit salad, where each element retains flavour.

"Stephen sees a way, and has a vision of continuing the oldest culture on earth, and letting it grow into a new style. This show, his choreography, and his vision are very important. It's great to show the kids in the community their culture is still alive, and vibrant, and growing. And it's good to show white areas a very positive image of aboriginal culture."

The soundtrack, by David Page, is recorded on a DAT tape, and is played on a Sony DATman portable which Mercurio brings on the regional tour.

At the moment Mercurio operates the lighting, and Bangarra's truck driver called Pos, is operating sound.

Bangarra are dying to do a new work. "Unfortunately, we have a brilliant show, and everyone wants a piece of it. Another show is on its way. It's just finding the time to take 3 months off, and create a new work."

Mercurio is getting tired of touring. "I just bought a flat with my girlfriend. I come back to Sydney on Monday, get the key to the new flat, paint it, then leave for three weeks." •

It's All Right, They're Only Sprocket Holes!

A Doctor saves the Avoca Beach Cinema

By Madeleine Murray

Why can't doctors stick to stitching lacerations and inserting catheters? Instead they have to go off making films, like George Miller, or running cinemas, like Rod Gibbs, making the rest of us feeling inadequate. Gibbs was a doctor for ten years, working in accident emergency, before changing his lifestyle.

"It's been a great change for me," says Gibbs. "It's fantastic when people come in, you don't have to give them some horrible news, and tell them that their son has just had a car accident. Everyone that comes in is looking to be entertained, and to have fun for the night."

Gibbs was living next door to the Avoca Beach Cinema when it came up for sale four years. "I thought it would be a shame if this place was changed. It would either just close down, or someone would change it into a modern twin cinema. That would spoil its whole feeling. I preferred to upgrade the equipment, and keep the atmosphere."

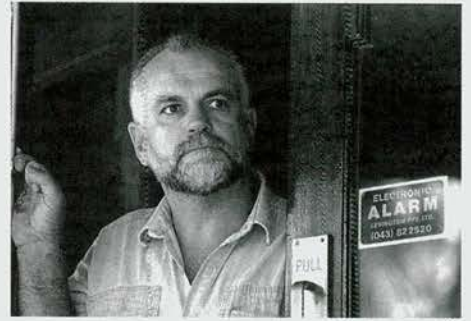
Gibbs' great grandfather would have approved. Harry Gibbs was the first person to travel around country Victoria and show silent films. He would arrive in town, hire a hall and a pianist who played honky tonk, and show his movies.

The Avoca Beach is a small, beautiful, period place, evoking that sweet nostalgia for the days when cinema really mattered. Those halcyon days before television, when people talked to each other, or went out to the pictures for entertainment.

Avoca is a small town on the central NSW coast, near Gosford. It has a beach bounded by two

striking headlands, and at the south end of the beach is a park with big pine trees. The Avoca Beach cinema sits in this park, a one story building with a charming foyer. Coffee in an urn on an oregon counter, armchairs and books in a side room, and old photos on the walls make the place feel like a country cottage. Outside, you can sit and drink your coffee in a garden overlooking the beach.

Norman Hunter, the founder is now 92 years old, and still lives in the area. He had an open air cin-



Dr. Rod Gibbs

in by Raidek industries. The amps are Australian Monitor 350 watts per channel. "Very good amps, that don't burn out. Even if they get overheated, they keep pumping on, very good sound," says Gibbs. They installed digital sound, DTS digital.

The seats are from a classic cinema in Florida, that was being pulled down. They are 30 years old, recline slightly, and are "the Rolls Royce of seats." Gibbs brought them over in a container, and then restored them. They were stripped back, reupholstered, and put into position.

About \$300,000 went into the project, including re-vamping the building, and carpeting the floor, because the bare boards echoed too much.

"It's quaint, it still has that heritage feeling. It's a very laid back beach theatre. There's lots of memorabilia around, on the walls. It's got character."

Gibbs will probably go back and practise third world med cine at some point, but meanwhile, he is happy at his cinema. "It's a great occupation, I love it. It's a simple business to run, because if you don't like your product, you can get rid of it, unlike retail. It's fun, because people are there to have fun. I didn't know how good it was until I did it."

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ema, but that was so popular that he built an enclosed venue in 1951.

Gibbs took it over four years ago, rundown and about to close. "Before I bought it, they were screening the image just onto the back wall, which they had painted white. There was a speaker on either side, and a couple of speakers up the back, only one of which partially worked. They were using arc lamps in the projectors. They had to keep winding up the arcs to keep them close together so that they'd burn well."

Gibbs upgraded the projectors, and put in Xenon lamps. He installed a new sound system, using JBL speakers. Jands did the screen, curtaining, masking, and supplied the speakers. The amps were put

Facility a possible alternative to ADAT studios. Profile by Julius Grafton

SONY MUSIC LEAN & KEEN

Sony Music Studios is the in-house facility for the record company, right? Not entirely!

It's in East Sydney where the terrace houses are over 150 years old, where cappuccino almost flows down the gutters, and where the cultural heart of the South Pacific is located. Go to the headquarters of the record company and enter the spacious foyer with trendy furniture, non stop video clips and designer receptionist.

Beyond the closed door is the studio complex, which suddenly stops you in your tracks. It isn't lavish, it isn't full of A & R people and mega bands, and it isn't just used by Sony. Most crucially, it isn't expensive to rent - at around \$85 an hour for the main 24 track studio.

This follows the extensive re-

build on the place, which we reported upon back in February when we looked at the modular studio products which Richard Priddle and Bob Cronin make, trading as International Technology and Communications.

Studio Manager Ross A'Hern originally planned to upgrade the place while still working, starting last July and finishing at the end of October. The work happened amongst sessions, and with things getting moved and delayed the plan was changed. The whole complex was closed to get the job finished. This happened, and the whole thing was completed in February this year, bar a bit of paint here and there.

The result now is a versatile working complex, based around the 24 track studio which boasts

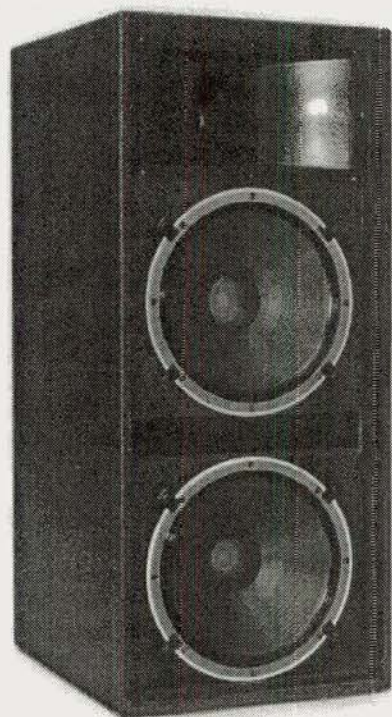


New AVID suite

possibly the best main monitor installation in the land, with ATC SCM-300s fitted in the walls. The control room has been treated and finessed around the ATC's.

New for Sony is the Video Edit

Suite with an AVID Media Composer 4000 online edit system. This grew out of a more basic linear U-matic editing system previously located in the dubbing room, where it was increasingly used for company promotions and projects.



Thunderbolts Are Go!

Wouldn't it be great if you had a speaker cabinet that was easily changed from passive 2 way to active 2 way with the flick of a switch? One with bottom end to spare, and a top end that's sweet enough to listen to all day without scrambling your brains? Well, wait no more because it's here! The exciting new Thunderbolt speakers from ARX.

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In active 2 way mode it can either be used with an active 24dB per octave 2 way crossover, or with an ARX 2 way ISC speaker processor. It's your choice.

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With rugged all ply construction, dual 15" (380 mm) Low frequency drivers, a fibreglass horn flare with a 2" (50mm) throat aluminium diaphragm compression driver, handles, heavy duty steel mesh, and optional wheel kit, the Thunderbolt can take it as well as dish it out. Like to know more?

Your nearest ARX person has full details on the new Thunderbolt speaker systems. Call them for a brochure.

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Sony Staff: Refit something to smile about! Ross A'Hern, Todd Deeley, Louise Taylor and Simon Tonx

Demand for broadcast quality results including computer graphics, resulted in the new system being housed in its own dedicated room.

The Dubbing Room is always in use too, where duplication is done between CD, DAT, cassette and video dubbing from and to SP Betacam, lowband U-matic and VHS. They make dupes in here, non stop.

Up the other end is the Audio Production Studio where a vintage Neve 8034 console takes pride of place. This studio is for voice over work, digital audio editing and CD pre mastering. It has a recording booth attached, and is like all studios in the place, with digital, audio and video tie lines run to a central patching point in the machine room.

Ross A'Hern says that while Sony provides the facilities of a major studio it is competitive with a project studio where you might find 3 ADAT machines. The outcome in terms of technical recording techniques may be very similar, but the difference will be the expertise. A 12 hour session at Sony would cost around \$850 plus tape, and this includes available outboard effects and an engineer. The culture at Sony is well adjusted towards getting things done quickly and they know how to put musicians at ease.

A typical day in Sony will see various projects run around the main studio, which could be used for recording music singles or demos.

The studio staff number four, Ross is the manager and part time engineer, while Simon Tonx is the chief engineer. Todd Deeley and

Louise Taylor work everywhere, proving yet again that the old job specific has given way to the true multi-tasking technician.

It's something we see on the exhibition floor at ENTECH, where AV people who have Avid experience also know how to program lighting desks, while Pro Tools operators often mix live sound. This is a pet issue with your writer, who argues when some people from the distribution side of technology claim that a recording engineer is just that - a recording engineer. Tosh we say, everyone is surfing the technology wave and the people on the coalface are getting ahead if they are open to learning and if they are versatile. Anyway, I digress. Back to Sony.

One thing they don't need to do at Sony Music Studios is mastering, because Sony operate one of the major CD plants in Australia out at Huntington, about 40 minutes west of the studio HQ. Over there is a major Mastering facility run by Daniel Segal.

WHAT'S INSIDE

The Multitrack Recording Studio:
24 track MCI JH24 2" analogue recorder

2 x 12 track Akai ADAM digital recorders

Sony PCM 7030 DAT recorder

40 input Neotek Elite console

ATM SCM-300 monitors

.... and a lot of outboard, which is included in the hire rate.

The Audio Production Studio:

{A control room with recording booth attached}

Vintage Neve 8034 console with 20 x 1073 pre-amps,

SONY DAT,

Apogee AD500 and DA1000E converters,
ProTools digital recording and editing,
various compressors and equalisers.

The Video Edit Suite

AVID Media Composer 4000 online editing system with 3D-DVE, latest video board option giving constant PAL output; and Digital Linear Tape backup system.

SP Betacam and VHS decks, DAT,

a CD Player and graphics support from a Power Mac 8100 with software and scanner.

The **Dubbing Room** is described in our story.

Most Importantly, there is also a nice lounge and kitchen area with..... *<warning to all muso's>* Natural Light!

Contact: SONY MUSIC STUDIO, dial (02) 9332-0320.

A Night at the Central Club

Unsigned Bands on Video



By Marty Williams

Optus Vision has established an alternative/experimental channel called *Local*. It has been set up as an outlet for community groups, experimental artists and programmers. Optus will supply some equipment and production facilities to those it considers deserving of extra support.

Bevan Quelhurst, the director of Stray Alien publicity, put forward a proposal to Optus Vision for the use of their equipment to record unsigned bands at the Central Club, in Melbourne. After having a similar proposal appear and then disappear from an opposition



source, Optus saw merit in Bevan's proposal. Three bands will perform each Monday and each band will perform for half an hour in front of a close group of friends (and crew).

The bands do have to pay for the audio and LX operators but the video crew are free and sourced from an Optus Vision list of potential trainees. There was a very positive attitude and excellent team work on the night I went. To obtain a good audio mix on the video tape, freelance audio engineer Stuart Day gave initial assistance. He works at Studio RBX, who, with BASF is a sponsor of this project. BASF are supplying the S-VHS tape.

Four channels of audio are fed to a Hiace O.B. van, two of these are a stereo feed from the FOH desk, the other two are from microphones placed on the back wall of the room. A twelve channel

Tascam desk is then used to mix and EQ the four channels to the two stereo channels of the Panasonic professional S-VHS VCR. Vision is gathered using three Sony 325 3 CCD cameras. The composite video signal is then fed to a Panasonic vision switcher before going to the VCR. There are four Sony 25cm monitors, one for each camera and one for master output. There is also a roving Panasonic MS4 domestic S-VHS camera. All camera operators are in contact with the director via a simple but effective cordless two-way radio system.

Bevan has ownership of the copyright of the final product the primary objective of the exercise is to find a band or two that he can work into a successful broadcast package. Optus' generosity will hopefully be paid for in contributing to the continued success of the live music industry.

EXTRACK/Studio News

Velvet Sound Recording Studios new address is Lower Ground Floor, 363 Pitt St, Sydney 2000.

Dimension 3 Records and Publishing are an independent production studio, recording and distribution label working in the Pro Tools/Power Mac midi realm. They have a wide range of analogue synth gear and various toys and trickery available too. Their forte is dance/remix but are open to other styles and can record CD quality product. Their national distribution network is now on-line. (09) 325 8707

ABC Radio in Adelaide have installed a Mackie 32/8 console in their main production studio.

The Victorian College of the Arts have recently installed 5 Hafler P-3000 studio reference amplifiers.

Regeneration Culture have a small rehearsal studio in Central Sydney, 'The Tea Room'. DAT/instruments also for hire. This is a community run arts initiative. (02) 9310 7240.

Witzend Studio (WA) have just installed a 32 channel Tascam 3700 series automated console.

Studio 52 is about to turn 10 years old and the release of the next Nu-Music Series (12) is part of festivities. Studio 52 have closed their rehearsal rooms and are upgrading Studio B to a16 track ADAT and doubling the recording space. Two new staff members: Kerry Loorham (Graphics) and Sean Gottschalk (Sales/Distribution).

Megaphon Recording Studios (Syd) have a TG Series NEVE console available for use/hire. The TG 1234/Mk4 is a 16 input/16 bus output number with limiting and compression on each mic input. \$150 per day/\$600 per week. (02) 9550 6576.

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ARTIST	PRODUCER	ENGINEER	PROJECT
New South Wales			
#Sharp Jeff Cripps (02) 534 4440 24 Track 1'			
Real Gone Cats	Jeff Cripps	Jeff Cripps	CD
The Bellhops	Jeff Cripps	Jeff Cripps	CD
N.D.L.	Jeff Cripps	Jeff Cripps	Italian Song Festival
Riven	Jeff Cripps	Jeff Cripps	Demo
Just Two	Jeff Cripps	Jeff Cripps	CD Single
Audioscapes Jim Blackfoot (02) 564 0099 16 Trk. Dig./Post			
Greedy Smith	Greedy & Jim	J. Blackfoot	Album
Calvin De Grey	Rod Lee	J. Blackfoot	Album
Shane Bourne	Shane & Jim	J. Blackfoot	Album
Jodie Gillies	D. Lotherington	J. Blackfoot	Demo
Max Lambert	Nick Enright	J. Blackfoot	"Miracle City"
Rob du Rose	Rob du Rose	J. Blackfoot	RTA cassette
Bush Tracks Ruth Miller (066) 891 290 Track Recording and Multimedia			
The Bourkenbacks	Band/D. Highet	Dave Highet	Single
Kym Pitman	Kirm/D. Highet	Dave Highet	Album
Coolangubbra		Dave Highet	Live Recording
David Reeve	David	Dave Highet	Album Tracks
Charing Cross Studio David Sykes (02)387 8362 - 24 Trk Neve 800 Series			
Mental As Anything	Martin White	P.Jones/M.White	Album Tracking
Velveteen	Martin White	P.Jones/M.White	EP Track & Mix
Smashing Pumpkins	Martin White	P.Jones/K.Cooper	EP & Album Trk.
Tom Thumb	Justin Stanley	Anthony Brown	Demos
Welcome Mat	Dave Trump	D.Trump/P.Jones	EP Mixing
Supagroup	Greg Wales	G.Wales/P.Jones	Album Trk. & Mix
Cloud Studios Parris Macleod (043) 532429 72 Track Digital/Analogue			
Alan Jones	Parris/Alan	Bruce Waite	Mastering
Love & Rebellion	Parris/Band	Dracoulis/Tozer/Parris	Mix/Mast.
Scott Leece	Parris Macleod	Bruce Waite	Mastering
Lawrence Backer	Parris Macleod	Parris Macleod	EP
Soul Kitchen	Band	Parris/Dracoulis	Demo
Doug Williams	Parris Macleod	Parris Macleod	Dance Mix
Crystal Clear Studios Dave Tozer (02) 684 1152 24 Tk. Dig.			
Aust.Blues Bros Show	Dave Tozer	Adats & BRC, 32 Ch. (66input)	Console
Love & Rebellion	Dave/Band	Dave Tozer	TV Demo
Eternity	Dave/Don	Dave Tozer	Album Mixing
Cyanide For Xmas	Dave	Dave Tozer	Album
Terrestrial	Dave	Dave Tozer	EP
Myriad	Dave	Dave Tozer	Demo
Damien Gerard Studios Contact Marshall (02) 660-8776 2 x 32/2' 24 Track			
Celibate Rifles	Band	Russ Pilling	Album Mixing
Once Upon A Time	Elia/Marshall	Marshall Cullen	Album Tracks
Zibrus	Craig Calhoun	Russ Pilling	Demos
Duster	Band	Jordan	Tracks
Finiscad	Band	Jamie Carter	Demos for Album
Mosquito	Band	Russell Pilling	Demos
Darling Harbour Studios Malcom Burn (02) 211 1474 24 Track A80 Studer, D88 Sony			
Midnight Oil	Malcom Burn	Mal/Grant Pudig	Album Tracking
Festival Studios Catherine Knapman (02) 660 4022 2 x Analogue Multi-Tracks or Digital Multi-Track			
Divynils	Charlie Drayton	Adrian Boland	1 Track
Baby Sugar Loud	Daniel Denholm	Daniel Denholm	Remixes
Optus Vision	Peter Kaidor	Mike Duffy	Corp.Launch Prog.
Silverchair	Nick Launay	Nick Launay	Album Tracking
JMF Studios Fran Esther (02) 790 4097			
Nomad Theatre	Ralph Ester	Ralph Ester	Theatrical Score
Craig Byrne & The New Frontiers	Band	Ralph Ester	Demo
Ken Grimston	Paul Gray	Ralph Ester	CD
Main Street Studio Rob Specogna 042 834 515 16 Track			
Remana	Rimana	Christin/Rob	CD Album
Gairden Cooke	Gairden	Rob Specogna	CD Album
John Spittal	John Spittal	Jeremy Thomas	Demo
Paul Coombes	Paul	Rob Specogna	Jingles
Darren Buschma	Darren	Damon	Demo
Megaphon Studios Guy Dickerson (02) 550 6576 24 Track & 48 Trk Analog.			
Dragon	Band	Keith Walker	Single
Robyn St.Claire	Jeremy Allom	Jeremy Allom	
Troy Newman	Greg	Greg	
Adrian Lee		Guy Gray	Album
Jim Denley		Shane Fahey	Album
Paradise Studio Ed Hughes (02) 357 1599 24 Track Analogue			
Blitz Babies	Band/Lien	Lien Chew	Album
Ian McNamara	Ian McNamara	Glen Phimister	Tracking
Whitlams	Tim Freedman	Rob Taylor	Album Tracks
Mitchell Shadlow	Colin Watson	Ted Howard	Album Tracking
Clint Beaty	Mark Moffat	Brent Clarke	Album Tracking
Adrian Keating	Adrian Keating	Lien Chew	Tracking
Pathways Studio (02) 212 3101 Frank Keresteshjian 24 Trk 2' Anal. & CD Mast.			
Gang gajang	Band	Frank K	Album
Waldo Fabian	Frank & Waldo	Frank K.	Album
Calligula	Band	Frank K.	Drum Tracks
Coral Box	Mark Callaghan	Frank K.	Album
James Blundell	James	Frank K/Greg H.	Demos
Ashok Roy	Band	Frank K.	Demos
Paul Bryant Mastering Paul Bryant (02) 874 3133 Mastering Suite			
Dearly Beloved	Leeno	Paul Bryant	CD Mini Album



BASF

YOUR MUSIC IS SAFE WITH US

Jim Blackfoot's studio profiled by Dan Cole

The Sound of Experience at Audioscapes

Throw a rock indiscriminately in inner-city Sydney and you'll probably hit a recording studio. There are at least 50 in a five km radius from the city.

So it is, in this competitive environment Audioscapes has built up a solid industry profile.

Audioscapes is located in Leichhardt and specialises in post-sync, voice-over and sound effects recording. "We offer current digital technology with 20 years industry experience," says owner and manager Jim Blackfoot, "We can record and mix wild or locked-to-image and transfer to almost any format." He describes the facility as 'a Swiss army knife post production house' and continues, "I have hardware and software for most editing and sequencing requirements, including non linear or linear."

With an open technical approach and design, Audioscapes has attracted a diverse range of clientele in its 2 years of operation. The current workbench item is the editing of a children's animation project for an Australian animation company. Other recent projects include a Chinese action film; Emerald films; theatre work with Nick Enright, David Atkins productions (Sound effects and thematic sounds). Corporate post production work has included NRMA, RTA, Coke.

Jim Blackfoot emphasises the ease of recording can straight music projects at Audioscapes. Some previous clients include Mental As Anything, Wendy Mathews, Tina Arena, Monica Trapoga;

"I'm happy to run the facility as a Sketch pad studio as required by artists; Wendy Mathews will come in for a couple of weeks; Greedy Smith's solo album was done here."

Audioscapes can negotiate by project or hourly rate,

"Someone will come in with a concept or voice work — we can do 90% of the music through to re-syncing with images and final striping. The studio is not that expensive to exclude more experimental projects too, such as radio documentaries or experimental film soundtracks which are fun."

Jim Blackfoot started in the industry at EMI's 301 studio as assistant engineer. From there he moved into the film business with Amalgamated Pictures Australasia in Neutral Bay for 6 years,

"At that time we were producing the final sound masters, or sound negs., for major films such as *Picnic At Hanging Rock*, some Disney films for Universal. From there I moved to live audio production.

"About two years ago I stopped touring and

started here. I just wanted to stay in one place for at least a year. I had always enjoyed post sync and foley work and would work on projects as a freelancer between Mental As Anything tours. I had been collecting equipment so I decided to pull it all together with some extra bits and pieces"

There is a clear philosophy at Audioscapes re: work practice, especially in recording,

"I run a DAT back up with everything I do during recording as a safety. You can never have too many backups. I did a post sync job on a Chinese action film which, by the time you get down to recording the final voices, what you have on your tapes, backups and hard disk(s) is probably worth fifty, sixty grand in artists' time alone. If you lose that, you're in a suable position."

Audioscapes can offer location recording for specific sound effects and production work, with a well selected range of microphones,

"It's so much quicker to go out and get a real spot effect; nine times out of ten it takes less time to set that up than sorting through sound effects. [For location recording] I use a Sony PCM 2000 (with time code) and a pair of Schoeps. They are my workhorse mics, not hyper cardioid; the pattern is tight enough that with placement you can recreate shot material and doesn't sound like your on a studio mic. I also have a crown SASS for background: big yet transparent spread and Sennheiser 417s short shotguns."

The question arises: what makes this facility appealing to people considering the number of now well equipped (and cheap) project studios out there. Jim Blackfoot explains,

"It is incredibly competitive, but if someone is advertising at \$25 per hour and someone else at \$125! — there's something missing somewhere and its probably experience. These studios are popping up every week. From

the start I made a decision not to compete. That's why I'm gearing myself towards A/V post production. I charge \$75 an hour including engineer (mixing, recording, editing).

"For this you get a service with someone who knows what they are doing; as well, I have over 80 hours in my sound effect library collected over 20 years in sound work. Knowledge of the library and what it can be used for is the most telling skill of the sound editor; it can be disappointing frustrating and a waste of time for everybody if you don't know your library.

"It's really coming down to experience. At the end of the day when all the gear is the same price — virtually everyone can afford it — it's the people who are experienced that will make the project a pleasurable one to do rather than a nightmare. That's where it can come unstuck."

Studio Highlights:

Console: Quad 8 24x8

Record/Play: Tascam DA-88, Sony 9600 U-matic SP recorder, Sony DAT recorders (4), Yamaha CDR 100 CD recorder, Yamaha CD/Dual Cassette machines.

Digital: Roland DM-80 8trk Editing System, Digital Audio Labs/Wavelab Editing, DART audio restoration, Cubase, Trackmanager, Vision and Cue software

Processors: Roland SRV/SDE 330 delay/reverb, Yamaha SPX-90II, HOF comp/limiter, Behringer noise reduction

Monitors: Tannoy SRM-10B, JBL Control 1

Backline: Kurzweil K-250, Roland U-220 Sound Module, various backline available.

Mics: Schoeps CMC Mk 4 (2), Rode NT 2 (2), Shure mics, Crown SASS

Contact: Audioscapes, 15B Cromwell St. Leichhardt, Tel/fax (02) 9564 0099.

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Digital Editing

HOWARD JONES WORKBENCH

GET DOWN AND DIGITAL

In last month's column I introduced some of the most common types of digital audio interface standards. There are, of course, others covering both stereo and multi-channel audio. One of the other stereo interfaces you might encounter is SDIF2, not to be confused with S/PDIF. SDIF2 is a proprietary Sony protocol and, as such, is found on their high end equipment such as 7000 series DAT recorders, DASH machines and 1630 mastering gear. The release of the Tascam DA-88 saw the introduction of TDIF, or Tascam Digital Interface. This standard has acquired extra significance because it has been taken up by other manufacturers, such as Yamaha. TDIF allows for the transfer of 8 channels of digital audio simultaneously to or from, say, a digital workstation or console.

Most of the commonly encountered standards for the exchange of digital audio data are centred on a serial data stream. This means that the audio bytes or words are transferred one bit after the other, in a sequential flow. However, these interfaces are designed to transfer data at bit rates higher than those required simply to transfer the audio data. Because of this, it is possible to include a great deal of non-audio information in this serial stream. Besides the audio, there are various sub-codes, as well as synchronising codes designed to allow the transmitting and receiving devices to figure out where each block of data starts and stops. This sync information is critical and functions

rather like punctuation and spacing in written language - it serves to break long chunks up into recognisable pieces.

Trying to send data without this sync information would be rather like trying to read this sentence!

Obviously, you would not persist for long in trying to read a whole page of something like that. Similarly, the sync data is vital in establishing the basic 'handshaking' between the transmitting and receiving devices. Most pieces of equipment, unless they can decode the essential clock pulses from the incoming data stream, will refuse to perform any other functions - this leads to error messages such as 'no carrier detected'.

As already mentioned, the third element of the data carried on a digital audio interface comprises the sub-codes. This extra information is used to describe whether the data being carried is valid, what the originating device was, whether the receiving device is allowed to copy the data and is also used to provide error correction codes. Sub-codes are inserted into an interface as follows...Let's use the AES/IEC958 format as an example.

The IEC958 standard defines each block of data as a group of 192 consecutive 'frames'. Each frame contains two sub-frames 32 bits long. One sub-frame is used for left channel data and the other for right channel and each sub-frame embodies one audio sample - usually known as a 'word'. The standard allows for

(continued over)

ARTIST	PRODUCER	ENGINEER	PROJECT
38 Express	Jeff Cripps	Paul Bryant	Album
Ray Lemon	Ray Lemon	Paul Bryant	CD Album
Wayne Horsburgh	Wayne	Paul Bryant	CD Album
Wendy Jackson	Outback Music	Paul Bryant	CD Single
Powerhouse Studios Doug Henderson (02) 318 1220 32 Input Neve Console 24 Trk. Studer A800			
Psychrist	Band	John Darwish	CD Album
Jay Alldis	Powerplay Prod.	Doug Henderson	CD Album
Leah Wilson	Powerplay Prod.	Doug Henderson	CD
Sacret Hearts	Band	Gavin Duffield	CD
Dark Order	Raul Alvarez	John Darwish	CD Album
Armoured Angel	Band	Boyde Moore	CD Album
R. & R. Recording Robert Zimola (02) 672 4494 13 Track 1*			
Chris Turner	Mike Kerin	Robert Zimola	Album C/JM
Kerri McInerney	Mike Kerin	Rob Zimola	Album C/JM
Plumbing Ind. Update	L. McIntosh	Rob Zimola	Corp. Message
Raine & Horne		Rob Zimola	Message On-Hold
Rocking Horse Grant Hilton (066) 884131 A) 48 Trk. Analogue B) 24 Trk. Analogue			
Dr. Seuss' Signature	Leigh Ivin	Leigh Ivin	EP
Screamfeeder	Paul McKercher	Paul McKercher	Album
Kalidavibe	Leigh Ivin	Leigh Ivin	EP
Carmella			Demo

ARTIST	PRODUCER	ENGINEER	PROJECT
Sony Music Studios Ross A'Hearne (02) 332 0320 24 Track/Pro-tools			
Tim Rollinson Quartet	Tim Rollinson	Ross Ahern	Album/Tracks
The Angels	The Angels	Mike Duffy	Single/MMM
Robert Vincencio	Robert	Louise Taylor	Demos
Tim Finn/Catholics	Catholics	Ross Ahern	Album Tracks
Leon Dennis	Leon Dennis	Tod Deeley	Demos
The Poor	Brent Eccles	Simon Tonx	Demos/Album
Soundwarp Meredith Brooks (02) 9905 7144 Mastering			
93-D	Ray Vanderby	Meredith Brooks	CD Master
Night Zoo	Robert Nobilia	Meredith Brooks	CD Master
P.J. Ayre	Peter Ayre	Meredith Brooks	CD Master
Sugar Moth	Jamie Carter	Meredith Brooks	CD Master
Fred Stard	Fred Moss	Meredith Brooks	Compilation
Mama Bird	Mama Bird	Meredith Brooks	CD Master
Studio Arts Productions (042) 849128 Ed Lee. Independent Recording Studio			
Slob Plant		Ed Lee	Demo
Beaten Favourites		Ed Lee	Demo
Inscape		Ed Lee	Album Tracks
Fifth Sun	Ed/Band	Ed Lee	CD
Mushroom in a Keyhole		Ed Lee	Demo
P'Harness	Ed/Band	Ed Lee	EP
Trackdown Digital Marcus Leadley (02) 550 6890 24 Track A-DAT/2" Analogue. Protocols in Main Studio			
Robyn Dunn		Katrina Schiller	Album
Ian Purdie		Katrina Schiller	Album
Freight Fox			Files - Film S/Tk
Exploding Happiness		Michelle Barry	Album Track
Aboriginal Nations	Keith Salvat	Leon Horrocks	TV Series
Samuel	YGFS	Tim Ryan/Leon Horrocks	TV Series
Troy Horse Michael Levis (02) 319 1799 24 Track 2*			
Simpletons	Band/D.Trump	Dave Trump	Album
Aisling	Peter Kennard	Colin Wright	EP
Lawnsmell	Glen Smith	John Vittorio	EP
Sludgefest	Band	Russell Kilbey	EP
One Of Us Is Groovy	Band	Remesh Sathiah	EP
Kristies Boogie Zone	Kristie Clemow	Emma	Dance Tracks
Velvet Sound Dave McCann 0414 227 325 24 Track/32 Ch/2" Analogue			
Wrecking Crew	Craig Portells	Craig	Tracking
Lisa Maxwell	Groove Terminator	Tony Wall	Single
Swoop	Ashley Cadel	Ashley	Tracking
Skunkhour	Band	Andrew Smith	Single Demo
Cactus Child	Band	Tony Wall	Demos
Gashammer	Greg Clark	Greg	Album
Woolly Mammoth Nik Sanning (02) 557 2721 16 Trk. 32 Ch. Digital			
Mockingbird	Mockingbird	Brett Sullivan	Single
The Hunchbacks	The Hunchbacks	Nik Sanning	Demos
Radio RDS	Vaughan Walker	Gavin Drew	Radio Show
Red Cordial	Red Cordial	Phil Roberts	Demos
Queensland			
Studio 19 Allen Castleton (077) 757 375 16 Track			
Alexia Gray	Alexia Gray	Allan Castleton	CD Single
Cathedral H/School	Richard Lobwein		Cassette Album
Natalie Marshall	Natalie/Allan		Relaxation Album
Sunshine Studios Leon Prascott (07) 844 6844 36 Channel Neve			
In Stereo	Kelju Tonuma	Kelju Tonuma	EP
Erebus	Leon Prascott	Leon Prascott	Demos
Sister Sister	Leon Prascott	Leon Prascott	Demos
Rat	Leroy	Leroy	Single
South Australia			
John Reynolds Rec. Studio Nick Love (08) 410 3044 24 Trk. Dig/16 Trk. Analogue.			
Eric Bogle	Brian McNeil	Tony Elliott	CD Album
Fuse	Nick Love	Eddie Sikorski/Nick	CD Album
Streamliners	N.Love Prod/Band	Eddie Sikorski	CD Album
The eleveneth hour	Band	Eddie Sikorski	CD Single
Kate Ceberano	Ashley Cadel	Ashley Cadel	Movie S/Track
Chunky Custard	Band	Band	Commercials & Movie S/Tracks
Mixmaster Productions Mick Wordley (018) 822 986 24 Track 2*			
J.Lang/C.Finnen	Lang/Finnen/Wordley	Mick Wordley	Mix Live Album
Snapper Head	Band/Wordley	Mick Wordley	Track EP
Nick Vall	Nick	Mick Wordley	Mix
Big Brother	Band	Mick Wordley	Tracking
Force Field	Gerry/Mick	Mick Wordley	Mix EP
Superjesus	Band/Mick	Mick Wordley	EP
Victoria			
Allen Eaton Studio Robin Grey (03) 9534 0752 48 Track			
Under the Lighthouse Dancing	Nerida Tyson-Chew	Robin Grey	Film Score
ACRI	Japanese	Robin Grey	Filmscore
Dance of Delusion	Scott Tinkler Trio	Robin Grey	Album
Big Beat Studios (03) 9898 5815 John 'Shadow' Toth 16 Trk. Analog. 1", 32 Trk. Auto Session 8 Hard Disk			
Incline	Toth/Borgeest	Dave Borgeest	CD EP
Grayce	Toth/Williams	Ben Williams	Demo
Taylor Made	John Toth/DJC	Ben Williams	Demo
Leen	Toth/Borgeest	Dave Borgeest	Demo
Dave Close	Toth/Borgeest	Dave Borgeest	Demo
Course ov Dialect	Toth/C.O.D.	Ben Williams	CD
C'est Ca Norman (03) 9419 1506 Automated 24 Track			
Gillian	Gillian/Bizzi/Siiri	Siiri Metsar	Girl Zone Album
Linn Van Hek	Siiri/Linn	Siiri Metsar	Girl Zone Album
Penelope Swales	Penelope/Siiri	Siiri Metsar	EP/Album
Misguided Angels	Siiri	Siiri Metsar	Demo



BASF

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Howard Jones (continued)

a word of up to 24 bits whereas most current applications like DAT and CD use a 16 bit sample length. This means that 24 of the 32 bits in each sub-frame are dedicated for exclusive use of the audio data, but that perhaps not all 24 bits may carry meaningful information.

Of the remaining 8 bits in each sub-frame, 4 are given over to timing information. This leaves 4 bits which appear at the end of each sub-frame. In order, these are known as the Validity bit, the User bit, the Channel Status bit and the Parity bit. The Parity bit is used to ensure that the transmission line is kept free of DC and need not concern us here. The Validity flag is used to indicate whether the transmitting device considers the audio sample associated with that sub-frame to be reliable. If set to a logical 0, the audio is considered to OK.

You'll notice that the Validity bit is used to indicate the status of the audio on a sub-frame by sub-frame basis. This means that a receiving device which is programmed to react to the condition of the Validity flag may mute for a period of one audio word if it sees $V=1$. If the Validity bit associated with the next sub-frame is set to 0, then the receiver would unmute. The User and Channel Status bits, however, are handled very differently. The User and Channel Status bits contained within each sub-frame are each regarded as one bit within two overall chunks of data, each of which is 192 bits long.

Because the User bits are completely dedicated to any custom application which the user cares to create, there is no structure defined within IEC958 for the user bits. It would be quite possible to handle the 192 User bits within each block as 12 x 16 bit words, 24 x 8 bit words or any other scheme which the user desired. Naturally, in a receiving device which is not programmed to respond to user bits, this data is simply ignored.

The 192 bits which define the Channel Status in each block are tightly defined by the standard and it is within the Channel Status data that much of the power of the standard resides. The Channel Status block is assembled bit by bit from each CS bit in 192 consecutive sub-frames. Each byte within the Channel Status block has basically been

assigned a meaning by the standard, although some bytes, and some bits within other bytes, are not currently defined as having any meaning. These undefined areas will be assigned meanings as needs grow.

If you're still with me at this point, I'll point out that we're nearly at the end of the dry stuff. Next month, I'll give you lots of real world examples of how these standards affect the work which most of us do. There's just one more technical bit to get through! The most important byte in the CS block is the first, byte 0. This is because, according to IEC958, the interface can be applied to either broadcasting studio use or consumer use. The choice between these two applications is indicated by the data in the CS block - if the first bit of byte 0 is set to a 1, then the interpretation of the Channel Status data is for professional use. If set to a 0, then the CS data is interpreted as being for consumer use.

These interpretations carry many ramifications. If the receiving device decides that the CS block is to be decoded for professional application, then it assembles the block into 24 x 8 bit words. If the receiver decodes the CS block for consumer application, then it assembles the data into 12 x 16 bit words. Furthermore, the meaning of each word is different depending on whether the decoding is for pro or consumer use. For instance, in consumer use, if bit 2 of byte 0 = 0, then copy prohibit is invoked. The same bit interpreted for professional use forms part of the emphasis flag. Clearly, the reaction of the receiving device to the incoming data matters a great deal - if your DAT decides that it won't come out of record pause mode, then chances are that it has checked the copy prohibit bit and found it set to 0. However, this is not always true - much depends on the programming which has been used in the receiving device. And of that, I'll have more to say next month.

Food for thought: 'The sound isn't as good as it used to be and it's getting worse. I correlate that with the double speed mastering method'. Bob Ludwig in January's One To One.

Howard runs Studio Solutions, call him on (02) 9906-4363.

ARTIST	PRODUCER	ENGINEER	PROJECT
Eleanor Rayner	Siiri	Siiri	Album/CD
Gotham Audio	Tom Kehoe (03) 987 99400	SSL Console/Sony 48 Track Digital	
John Farnham	Ross Fraser	Doug Brady	Additional Mixes
Boom Crash Opera		Kalyn Tonuma	Album Rec.
H.P.F.	Larry de Zoete	Aaron Humphries	Singles
Motional	Dean Jones	Aaron Humphries	Singles
Steve Johnson	Steve/A.Sorenson	Aaron Humphries	Album Mix
RB-X (Aust) P/L	Bevan Quelhurst (03) 9429 6199	24/48 Track SSL Cons.	
Chris Copping	Chris Copping	Adam Quaife	Jingles
David Drew	David Drew	Martin Pullen	Songs
Greg Champion	James Black	Mark McDougall	Album
B18 Productions	Mike Brady	Mark McDougall	Commercials
Sing Sing	Kaj Dahlstrom (03) 9428 4622	SSL, Neve 24/43 Trk. Dig. & An.	
Auto Haze	Victor Van Vugt	Victor Van Vugt	
Atlas Strings	Victor Van Vugt	Victor Van Vugt	
Chocolate Cake	D.Bridie/J.Allom	Jeremy Allom	
Brown Hornet	Kaj Dahlstrom	Kaj/Adam Rhodes	
Bigger Than Jesus	Band	Stuart Day	
Mark Seymour	Barry Palmer	Kalju	
Sound Around	Trevor Cronin (03) 9531 3891	Mobile Sound Studio	
Fat Cat's Revenge	Band	Trevor Cronin	CD
Died Pretty	Trevor Cronin	Trevor Cronin	Live Tracks
Gavin Campbell	Winterdaze	Trevor Cronin	Live DJ Recording
Studio 52	Paul Higgins (03) 9417 7707	Studio A - 32 Tk. Studio B Adat 16 Tk	
Curtis Late	Trevor/D.Knight	Trevor Carter	Track for Nu-Music #12
Funk & Wagnells	Trevor/Band	Trevor Carter	Track for Nu-Music #12
Carols by Candlelight	Peter Cupples	Trevor Carter	Mastering 'Carols' CD
Creature Seed	Simon Segal	Simon Segal	Track for Nu-Music #12
Indian	Trevor/Kevin	Trevor Carter	Album Mixes
Will Cole	Will Cole	Rowan Jarl	Jazz Demos
Wombat Road Studio	(051) 454204	Barry Clissold 24 Trk. Plus full Midi Facilities	
Gidgee Rock	Band/Clissold	Barrie Clissold	Album Tracking
John Ablett	J. Ablett	Barrie Clissold	Album Tracking
Robyn Munro	Band	Barrie Clissold	Demo Tracks
Robert Fox	R. Fox	Barrie Clissold	Demo Tracks
Salvation Army	P. Roberts	Barrie Clissold	Sound Check
Maffra Sec. Co.	P. Bartlett	Barrie Clissold	Video Sound Check
Western Australia			
Bonsai Recording Studio	Tom Thorpe (09) 246 4408	24 Track	
PMFM Morn. Crew	Tom Thorpe	Tom Thorpe	Suburban Songs Comp.
Andrew Carter	Tom Thorpe	Tom Thorpe	Demos
Weather Vane	Tom Thorpe	Tom Thorpe	Demos
Studio Trax	Tom Thorpe	Tom Thorpe	Demos
Cliff McShane	Tom Thorpe	Tom Thorpe	Tutorial CD
Andrew Breen	Tom Thorpe	Tom Thorpe	Demos
Dimension 3 Records	David Ward (09) 325 8707	32 Trk., Protocols, Akai Sampler, Power Macs, 25 Analog	
Synth, Also Indep. Record Label			
Slipmatt VS 3D	David Ward	Dean Pearson	5000 Vinyl Sold UK/Aust.
DJ SS	DJ SS/3D	Dean Pearson	Vinyl
Team D3	David Ward	Dean Pearson	CD
Powerlines	David Ward	Dean Pearson	Various CDs
Prophets of Boom	David Ward/Tribly	Dean Pearson	CD Single
Metropolis One	David Ward	Dean Pearson	CD Single (Pumpkin)
Planet Sound Studios	Denise Preston (09) 382 2211	48 & 32 Trk. Dig/24 Trk. Analog.	
Don Gomez	Don Gomez	Villani/Williams	Album
Lyndsay Hammond	John/G. Goldsmith	John Villani	Single/Mix
Gary Edmonds	John/Nunzio Mondia	John Villani	EP
Beth Hutt	John/Peter Hutt	Villani/Williams	Album Mix
Poons Head	Rob Grant (09) 339 4791		
Elysium	Rob Grant/Band	Rob Grant	Album
Beaverloop	Rob Grant/Band	Rob Grant	Album
Alton Tibbutt	Rob Grant/Band	Rob Grant	Album
Franger	Rob Grant/Band	Rob Grant	Demos
John Barnard	John Barnard	Rob Grant	Mastering
Atomic	John Barnard	Rob Grant	Album
Tropo Sound	Mick Connolly (091) 922 394	24 Track Dolby	
Mark Bin Bakar	Ben Raja	Mick Connolly	Jack Davis Project
Jimmi Chi	Duncan Campbell	Bret Lyons	Corrugation Road
Witzend Recording Studio	Alan Dawson (09) 3311818	16 Track	
Mardi Picassos	Band/Alan	Alan Dawson	Album
Taxi Cathedral	Band/Alan	Alan Dawson	Album
Valiant	Band/Alan	Alan Dawson	Album
Northern Territory			
Kakadu Studios	Ken Hutton (089) 411 344	02R Digital Mixer, 24 Track Dig. DA88s B1 Tascam	
Josh Thomas	Tom Colley	Tom Colley	Album
Cryosphrase	Stan Satour	Stan Satour	Comp. Album
Wakulyari	Stan Satour	Stan Satour	Comp. Album

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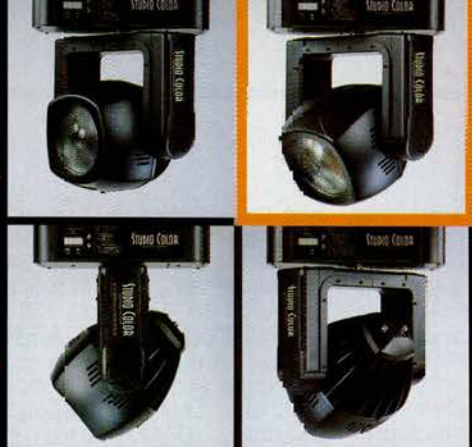
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LIGHTING

MONTHLY

July 1996

Edited by Julius Grafton (Cat Forcer on holidays!)

Vari*Lite Inc meet match in court

High End cleared to sell Studio Colour

Legal stoushes are financially debilitating and often very difficult to write about. Vari*Lite in Texas have a battle running against High End Systems which has until recently resulted in High End being unable to sell their new Studio Colour luminaire.

The action saw Vari*Lite accuse High End of 'misappropriating trade secrets embodied within the VL5 wash luminaire'.

A judge has now ruled that 'most of the trade secrets claimed by Vari*Lite were, in fact, commonly used and well known engineering techniques'. High End say that if the information was subject to trade secret protection Vari*Lite did not treat the information as confidential, negating any potential trade secret protection.

High End say they experienced

record first quarter sales this year, despite not being able to ship the Studio Colour because of the legal action.

Vari*Lite have used the courts before, and have restrained other firms.

The Vari*Lite product is mainly available for hire only, whereas High End and other firms seek to sell their products, possibly potentially limiting eventual rental demand.

• An observation from the editor is that Vari*Lite have some powerful features in their system, but they fail to workshop and educate up-and-coming lighting designers as to their virtues. If the magic of Vari*Lite remains a secret, new users will never know.

LDs don't care about courts, they want to get their hands on the best technology.

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The same situation would occur if customers are using non approved control systems. Approval is in writing from Le Maitre.

Safety Officers are being appraised of this situation and in all probability will not allow pyrotechnics to be used without the correct firing systems as specified by the manufacturer, say Le Maitre. This could result in the Safety Officer refusing permission to use pyrotechnics.

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What's Missing On My Lighting Console?

The Brief was simple. What's missing from our lighting consoles, the way we use them and the way we get support from the people who build them - and hopefully engineer them to our requirements. Our ENTECH Seminar Panel set about defining their hopes and detailing their experiences.

The Panel was chaired by Andy Ciddor, from The Kilowatt Company in West Australia. It comprised:

Rohan Thornton from *The Nine Network* talking about *Jands Hog, Wholehog and LSC*.

Rob Coia who is the *Lighting Supervisor at Channel Seven Melbourne*, talking about some of the desks they have there, mostly *Strand* models of a previous generation, and the way they struggle on with those there.

Michael Schell a *Galaxy* person from the *Sydney Opera House*, who has probably spent more hours behind the *Galaxy* than he has sitting at the dinner table.

Kurt Wagner who is an independent lighting director, talking about the *Status Q* desk, which he has had some joy with recently, and the operation or the perspective of the live operator and how the live operator deals with what the desk offers them, flying by the seat of your pants. (Editor's note: We don't have a photo of Kurt)

Francesco Calvi, is a *Jands/Vari*lite* person who has done rock'n'roll, cabaret and corporate work. He looked at the way new desks come out, what we get when we get a new desk, what we get in the way of support and manuals and just exactly how that affects us as users of the desk.

Rohan: Basically at GTV Nine we have gone through a myriad of desks. We probably commenced from getting the automated style of things, we had a *Strand MMS Console* for a long period of time and that was a very good console.

When we decided to upgrade the studio we looked around and decided that the straight memory playback consoles, which were very much the *Strand* style, weren't quite what we wanted in a variety-based studio. So we actually started looking at going back to a preset style console with the computer playback functions.

We eventually decided on the *LSC Focal* which we had custom
(continued over)



WHAT'S MISSING?

Rohan Thornton (continued)

made. This particular one was 252 channels single preset and 48 scene masters. We have found the desk and LSC to be very helpful and very efficient.

In television we find very often you need to access channels very quickly and to be able to grab a fader and control. It is certainly a lot more ergonomic than having to type in channel numbers and having to rely on your memory of different numbers.

When we got the console we went through quite an extensive training session because it was, at that stage, quite a difficult thing. I think, particularly in Melbourne, we were the first studio to go back or what a lot of people saw was a technical regression of going away from your Galaxies, your Geminis and consoles like that.

I have a personal preference to manual/automated consoles. I think they are a lot more versatile and generally a lot more user friendly, and you can do a lot more with them. They are much less restrictive, particularly in situations where you don't have a lot of time to do what you're trying to do.

The other console we've had of late is Jands Hog 600. The Hogs have received a variety of good and bad reports. Again personally I really like the console. We received a Hog 250 about 8 months ago as a beta test site. We understood that it was experimental console and they needed the console to go out on the road in order to find out the problems with it and



Andy Ciddor



Rob Coia

admittedly when it first came out there were plenty of problems. As regards the performance, at 8 o'clock, when we're going live to 8.30, the Hog crashed and we couldn't get it back. At that stage, whenever it crashed it also corrupted the disks, and what we were going to do to solve that before was to actually save to two disks but we forgot. So, we ended up pulling in two Axioms, splitting the rig in half and patching them in and adlibbing a moving light show with the truss-spot operators calling in the focus behind the curtain. Not a good way to do a show, we felt incredibly old and had drunk a considerable amount at the end of it.

But as a result of that we went back to Jands and Andrew Cartright. Those who had dealt with the Hog and I would quite easily elevate him to legend status. He has been a great help in software development and solving problems and sorting out bugs and that.

We are still running on Version 1.14D at the moment. We are about to put in 1.18, I think it is. The software upgrades are coming quite rapidly and as a moving light console we particularly find it very good. Having delved in most moving light consoles - Status Q, the various forms of controls that High End have brought out, the Scanc Commander, small dabbling in the Icon console, the Artisan - I have had a fair bit of

use with, and even using the Axiom as a moving light console, it is a very good console.

This brings me to my next point, and it is one I am very adamant about, is that console manufacturers should have a responsibility to those of us who are purchasing consoles. To those of us who have actually bought a piece of electronics, it is a large amount of money. The Hog 600 is \$20,000 and not any of us have \$20,000 in our back pocket. I think a mistake a lot of console manufacturers make is not supporting their product in terms of being consultative with the end operators. Again with the exception of Andrew Cartright, I don't know of a console developer who still goes out, does gigs, shows and goes through the grief and the time-frames of operating, particularly new bits of electronics. I think before they do put things on the markets they do need to again consult

with people, solve the problems probably a little bit more than they do.

Again the Hog is a good example. The market was screaming for a good DMX based moving light console. There wasn't one in this country, particularly in the price range of the Hog. So they

(continued on page 68)



Michael Schell



Francesco Calvi



Rohan Thornton

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KRUNCH

Madeleine Murray chats to Naughty By Nature's LD

Naughty by Nature put on a great show in Sydney. Treach, the main man, is the quintessential rapper, performer, and sex fantasy. Beautifully muscled bare chest, huge silver chain around his neck, and loose trousers almost falling off, held up by white boxer shorts. This guy has power, and you could get into it. The lighting was precise, and exciting. Follow spots on the rappers and EJ, sweeping, pulsing moving lights, across the stage, and big banks of floodlights bursting at the audience.

Naughty brought their own sound tech, and lighting designer, Krunch, with them from the States, and it showed.

The headlining act, Coolio, didn't bring crew with them, and it showed too. When Coolio came on, I left after ten minutes. The lighting was all over the place, and the sound was disjointed and confusing.

Krunch is a gentle, modest guy who has been LD for Public Enemy, Ice T, and Queen Latiffa. Only 29, he has been on the rap scene for ten years. He did security, and staging, until he got his first gig in '89 with Public Enemy.

"I really don't have a technical background," he said. "I started at the top, and have been learning backwards, as I go. Actually for this trip, I didn't prepare as much as usual. My mother just passed, and I wasn't able to get everything done that I needed to.



der Public enemy, Run DMC, the best. They pay the people to bring them out, make sure everything happens.

"This is my tenth year. I've calmed my life down. But, yeah, you have the groupies wanting to get with the guys and everything. It could be wild if you let it, but I've learned to do my thing, come back to my room."

"I don't have no wild stories for you."

Chameleon did the plot. It was a struggle getting everything programmed, but it all worked out.

"Jamie, from Chameleon, was working the tiger scans, and the moving lights. We worked pretty good together. I was using a 50 channel board. Those big floodlights were colour changers, but I use them like audience abuse. I do rap like rock and roll.

"I learned under Rick Downe, from Anthrax. One of my first gigs was going out with Public Enemy on tour with Anthrax. Rap is like rock. Both move the crowd. The crowd comes with a lot of energy. I try to



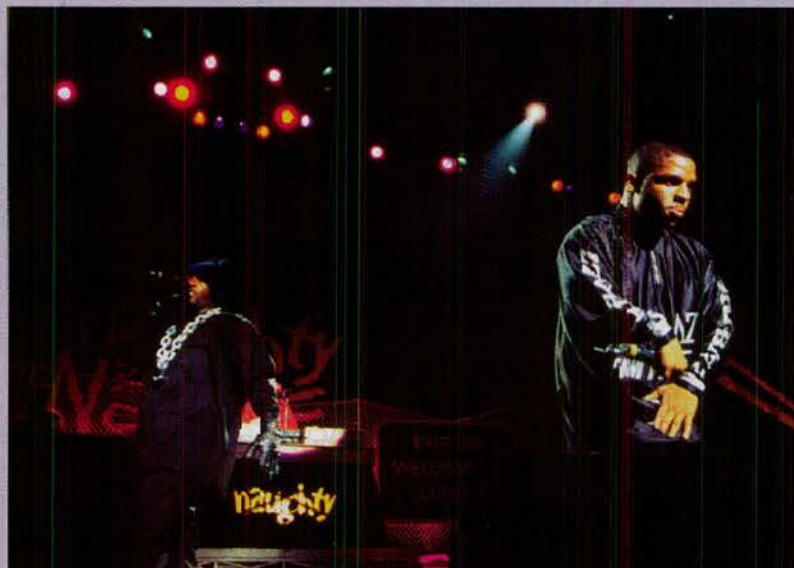
light rappers like rock groups get lit.

"Treach is one of the few rappers who realise they have to have a total package when they travel. Naughty understand that they have to look good and sound good at the same time. They came up un-

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- 1 x Scarcommard
- 2 x Gerie Lifters

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What's Missing?

Rohan Thornton (continued)

shunted it out the door possibly a little earlier than they should have. But, on the other hand, not telling us that it was not quite ready. I think most of us would agree that if you know what you are dealing with than you cope with it. And what console manufacturers seem to be doing is not telling us the full story.

I remember when we got the LSC Focal we sent all the guys down to LSC and they spent at least two days, if not more, training the console and that was a pretty simple operational procedure.

There are consoles coming out which again personally I think if the head who thought (them) up is not in an institution now I will be very surprised. They are handling these things out in the market and you need to be a rocket scientist to figure them out.

There are consoles coming out without manuals. You have a console for three months before you get a manual and it is all a bit too much and we don't have the time to sit down and figure out how something works particularly if you just paid \$20,000 for the privilege of having it.

In short, I feel console manufacturers need to look at their responsibility to the marketplace and to their clients and maybe remember more that we are clients, we are customers and from an educational point of view they need to service us a lot better than possibly they are at the moment. That is a fairly general statement.

There are certainly companies, again LSC I will quote, as being very supportive with our consoles and Andrew has been very supportive of the Jands Hog. But that's basically what I have to say.

In short, I think we as console buyers we need to lobby the manufacturers to -say- put out a video or do something to support the product from a training point of view, because the technology in consoles is changing just a bit too rapidly for all of us to keep up with.

Robert Coia: I have been at Channel Seven now for seventeen years and I have been the supervisor there for two years. I will just give you a bit of background - TV drama, sport, variety, game shows, commercials, music for TV and corporate exhibitions.

I've worked on programs such as Full Frontal and Fast Forward. The current types of productions we are doing at the moment are news, Blue Heelers, sport - football and tennis, Full Frontal and others where we bring in our consoles for what we require for those.

The current consoles we've got

"Many of us here today are employed in this industry to light productions creatively. What we demand of these consoles varies as much as our individual tastes vary"

are all Strands. Studio 1 has an MMS - yes, we've still got ours. In our Studio 2 we got a Duet, much to my displeasure, but it's there. In Studio 7 and 8, our two largest studios, we've got Galaxy 2's. We recently just purchased another two Galaxy's, so we will be going Galaxy's throughout the station. We have got a Scan Commander for our moving lights as we own 8 Golden Scan 3's.

As far as effects lighting, if we doing anything that requires more than that, we usually bring it in on a hire.

Many of us here today are employed in this industry to light productions creatively. We usually do this via a console of some description. What we demand of these consoles varies as much as our individual tastes vary and generally I find the simplest and less

complicated methods to obtain my looks is what I lean towards.

At Channel Seven we find the Galaxy's is a bit of a work horse. We've worked it pretty solidly, especially on Full Frontal and those sorts of shows. It tends to be just adequate for our needs, although it has probably had its use-by-date. But it is still doing what it's required to do.

What I would like to see on it is probably more preset masters because we only have the ten. Something like forty, which is probably more in line with what Rohan is saying. I suppose the way television has gone, anything can happen at any time and you just have to access it really quickly. So, gone are the days of a good solid rehearsal.

Electronic display, LED identification across the bottom of those preset masters would be good rather than writing it on tape. A layout memory would be good too. On the group masters you can actually record a bunch of memories and you can call back a layout memory and it will lay that back out in the order that you wanted. It would be really good if the Galaxy could do that, not necessarily numerically. But, say that if you had memory 10, memory 3, memory 4 so you could just bring that back if you got a particular show set up.

The Channel flash function - that would be good if it was more elaborate. It would be good if you could select the channel and it could automatically flash itself so you could leave the console and look out the window. I know there are other boards that do this know but along this style of board it would be really good if that was there.

Also if you could switch to another function where it could actually take your scene down to 50% and just leave that one up flashing, so you could actually get a really good look at what that dressing or key light is doing.

Also a proper wireless, full func-

tion riggers control would be good. Something that you would just walk around without being attached to a cord with a LCD or similar display so you could have a display of states like your memory list or your channel levels so that you don't have to keep running back to a monitor in a large studio. As you get older your legs tend to get a bit more weary.

The independent section on a Galaxy where you can actually tell a playback to stay still and not be affected. That's a good function but it would be better if it was more like a store where you could dump a bunch of channels and say that it was never to be touched again unless I say so and not tie up a playback or a channel controller. Just the channel and dimmer profile changes should maybe be recorded in individual memories rather than change the profile of a dimmer right across the board. It would be good if you could just record it in memory 1 and say channel 1 was to put out 12 volts, it would be good if it just did it in memory 1 and the board then just behaved normally for all your other stuff unless you told it to do otherwise.

The alarm on the desk drives me crazy, I think I would prefer it to have a sexy woman's voice or a man's depending on your gender to say, "Wrong button Rob, try again". That would be really nice.

Michael Schell: Having worked some 25 years in the theatre, most of my experience would happen to be on a Galaxy and recently the Nova which is Galaxy 3 as they call it. I must say that I am particularly biased towards Strand and for operating theatre I very much doubt that there would be a better board on the market. Albeit I do have a few problems with it. I think it is far too big, too long a desk and also it is a bit too pricey.

Minor problems include printing out channel to dimmer patch. We can't do that. We can print dimmers to channels, not the

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What's Missing?

Michael Schell: (continued)

other way round. There are a few other minor bugs that are there which I won't really go into at the moment.

But the way desks are, or the way I would like them to go, is a bit like what Strand is currently doing with the 430, 530 and 550. The desk is laid out the way the manufacturer wants it. But then, to a certain degree, it leaves it up to the operator with macros to actually work out what you want to do and how you want to do it and assign it to a particular key and through the use of LCD screen. Then you can give it some text to tell yourself what it is or to another operator what that particular function does. I must say that I am particularly impressed with that and I'm impressed as a result with those 3 boards and what they're doing and how they do it.

I also think the way to go is the way that Strand is going with the desk, that it is a software-driven board as opposed to a hardware. So that every time there is an upgrade, for instance with the Galaxy, to go from a Galaxy 2 to Galaxy 3 you couldn't just buy a few panels and a few electronic cards and throw it in a crate and off you go. You actually had to get rid of the Galaxy 2 and get a whole new desk the Nova Galaxy 3 and a new crate as a result. I much prefer the fact that if there is any upgrade that you just get a little disk and throw it into your computer and you're up and running.

Kurt Wagner: First of all the Status Q. I am not a rocket scientist and I don't plan to ever be one. I was just doing a show over in Korea where they had a Status Q because they eventually planned to run this whole system through an ADAT so they could run the whole show, the lasers, 70mm projections, the sound system, everything.

So the reason the Status Q was

in there was actually just to take the console itself home and leave the computer there running the whole show.

The problem with the Status Q, as an LD myself and mostly in touring situations, you get thrown into a lot of one-off situations and you will have a console you have never seen before. Within about an hour you're expected to learn it and program a show and that's basically it. So you have to be able to adapt as quickly as possible. With the Status Q, no matter what, I looked in the manual and just from every aspect it was a very confusing console.

LD's have to change their approach to the way they look at consoles. I don't like a computer hooked up to a console like the Status Q. I don't mind, in regards to storing in the memory, but to actually integrate the console with the computer makes it very confusing. Because too many times you're looking at whatever you are trying to program at the time and then you're programming at the desk, then you're going back to the computer, back to the desk. You just tend to lose yourself while you're in programming mode.

There were too many times I would have to look back to my cue sheet and find out what lamp I was at, what program was I on because you have got so advanced in trying to program that one scene. I was getting to the point with the Status Q though, I found that it was close to 15 buttons to program the scene.

I had not had the course on the board, there are probably a lot more shortcuts. But the problem with the console is that it is very sort of....., its not scary, but when you look at it there are 3 or 4

buttons that are named the same but they are in different blocks.

Unless you have been able to take down the course and they explain this whole thing out to you, you look at that and wonder what mode you are in.

There are just too many different things that make it too confusing for you. I just found it got to a point where what were you were doing was concentrating too much on programming the board instead of looking at what you were actually doing. For a lighting director or designer programming his own show you want to actually be able to concentrate on what you job is, not have to learn a console. To a certain degree you are going to have to learn the console to understand it but at the same time you want to be able to still concentrate on you own job and not get confused with the console all the time.

High End was talking to me and with the Status Q they do have quite a bit of work they are doing with it at present. I was on a software of 2.5 at the time and the reason that was there is because the show was all run off time code.

More and more as budgets get tighter and, especially doing a lot of corporate and one offs, you may have 3 days spec for programming but when it comes down to it you may get 6 hours.

they said they have got some other things in the game plan and we will see in maybe 3 or 4 months they might have some changes.

But to me I still don't like the fact that the console itself could not run without the computer.

The other difficult thing was

that you have a software program designed by a software designer and the lighting console designed by lighting company and the two just don't seem to come together too often. So in regards to Status Q, I like High End and I think a lot of High End products especially since I have been in Australia, I've used a lot of it. All their other consoles are very exceptional. I can go in and say I have 24 Intellabeams and with an LCD, if I am in a pressure situation I could load the whole thing up in an hour with 20 preset focuses and dump in 40 programs because it is accessible.

A lot of the new consoles I find you are pushing too many buttons to program a scene and again for myself I want to be able to do 2 or 3 buttons to program a scene. I don't want to get into multiple buttons, multiple modes. I just want to be able to get into live function and program it as quickly as possible. Because too many times for me personally I am under the gun and I have an hour to program a show so to me I want a console that is as quick and accessible as possible.

I would like to mention one thing that I thought in regards to boards and their design - I still think Avolites is probably one of the best operating consoles for an LD. Just because when they designed the console they went to some of the top lighting directors in the world and these guys expressed what they wanted to see in a console. So it is one of the few consoles that you sit at and everything essentially allocated towards you. You don't have to do a lot of movement even though it is a big console.

So I think the companies themselves have to progress a little bit more. On the development they need to come to LD's a little bit more and also look at simplifying a lot of the tasks so that when LD's are in quick program mode there are features that they can

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What's Missing?

Kurt Wagner: (continued)

just get a basic show in .

More and more as budgets get tighter and, especially doing a lot of corporate and one offs, you may have 3 days spec for programming but when it comes down to it you may get 6 hours. So you also want a console that you can get in accessibly, quickly and program it very quickly. Another key thing for me is that with a lot of the consoles these days, it is very hard to change things when you are in live mode.

I find that too many of the consoles now have taken away a lot of the live edit features and so when you are using a lot moving lights, you know you have an artist and you tell them that for the last 3 weeks to stand downstage right chances are they will not hit that spot. So you want to be able to have access to those lights that are programmed for that position to be able to quickly move them.

With some of the new moving light consoles you just sort of look up and shake your head and go 'the musician or the artist is an idiot' and you don't worry about it. But if you are a perfectionist, you want to be able to get into the

console and sort of adjust that cue as quickly as possible. But too many of the consoles, by the time you have gotten in and gotten access to those lights that cues over.

Francesco Calvi: Having been to a lot of seminars I realised early on that if you don't know what you're talking about you are better off bringing some pictures. Which is what I have done.

Just a few things I want to talk about. As everyone is saying here, new technology is a whole new way of thinking. If your manual isn't together you are behind the 8-ball right from the word go. So, your manual is your first line of attack and what I want to show you is something we came across at Jands.

A team of experts got together. This is an Avo Diamond : a \$40 or \$50,000 desk. We got together and we were trying to figure out how this desk worked and to program it. That was on page 4 of the manual. Press this key, press that key, that's great. We did it about 5 times - the desk locked up.

We are doing something wrong obviously, so we read it again. As

you know whenever you have a problem, a panel of 20 people, all experts, had gathered by this stage. Still didn't do it. So someone decided we go to look at the last page of the manual. And it worked.

This is my point. You are talking about quite an expensive desk, a desk that is supposed to do a lot of things. It's a good desk but they obviously know how you're supposed to program this function, they are telling us how to do it but it doesn't work. I would get really worried that how they wrote this manual to tell us how to do it when it doesn't work. I've got some gems out of manuals:

Do not use.....

Not available in this console.....

Coming soon - sounds like a movie coming out.....

Not with this software version now this is what I found really funny. The manual specified the software version, it was a manual for that specific software version yet it had all these functions in it and these keys weren't applied.

A unique feature of this consolethat was great.

If more help was needed on a func-

tion press the help switch -that was what was written, that was all that was there.

Do not drop the console - I thought that was great.

Remove the console from the cardboard box - this was very helpful I found.

I will give this one to Celco-they were very good. First page: *At least read the section on electrical connection to avoid making any embarrassing or costly mistakes. That's a great help. Getting started is simple. Connect the cables, switch the console on and you are off and running.*

As far as manuals - you read the things, they are not in English, what do you do? I remember when I first got the Event console at the factory, I spent about an hour on it and decided it was a heap of shit and I didn't want to know about it. It actually turned out to be a great desk but of course the manual wasn't together enough at the time so it didn't convey to me what the desk was doing.

Now surprisingly enough I thought I would go back to some of these desks that I didn't like and check their manuals out and

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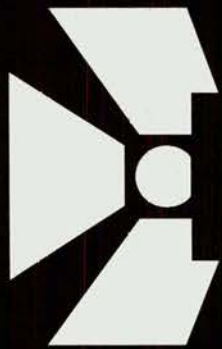
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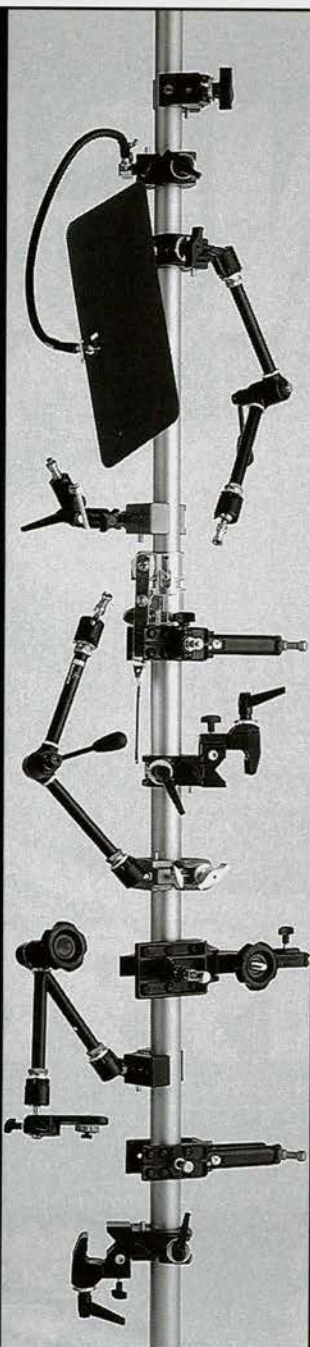
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What's Missing?

Francesco Calvi: (continued)

the Events actually got it together. This is what I thought was a better way of structuring a manual. It's laid it out for an idiot and that's what we all are when we get on a new desk. You start here, you press this, you go here and press that. I was really surprised that this was in a manual. A majority of manuals today are typed out - find this button, push this out, push that. By the time you can't find the button you already decided you don't like the desk.

I find today especially because I get to train a lot of guys on desks the biggest problem with new technology, new desks is that you are showing them a different way of thinking. Particularly with the Jands Hog is just getting the guys, who do a lot of Vari*lite and have worked off a Vari*lite for the past ten year, to jump on a new console and all you have got is this manual and a few lights you are trying to make move.

It works out now that I really like the desk and I have gotten used to it but what we have done with the Hog, I think should apply to a lot of desks. We came up with something called a cheat sheet. Most of what you see in a cheat sheet is conveyed in 30 pages of the manual. The thing is you have learnt the desk, you've gotten the grasp of it, you're at the gig and suddenly you have to update something, I've got to do this. It's back through the manual, look up the index, check this out, check that. Forget it. You are wasting your time and the client is saying: "give it to me now". Something like that I think should come with the actual unit - a summary of what you can do.

A classic example is the Theatrelight Showmaster. In the top right hand corner was a summary of how to actually record everything and do everything on the desk so no matter where you were it was with the desk. Something very simple, very basic but at least you were there and you had something to back you up.

Basically my point is we have come up with a lot of new technology, we have all these great desks and there is whole new way of thinking with all these desks. Yet the first thing we get is an incomprehensible manual. It's a worry that these desks are coming out this way. We are paying good money for them.

Andy Ciddor: There are going to be a number of people who will want to dispute some of this, ask further questions, raise some more issues. I think one of the things that's pretty clearly come up in our discussion before we came out here today is to do with support.

What we really want on our console is something behind the console, is some support from the manufacturers in terms of giving us timely manuals, up-to-date information, support for what we have currently got on the desk - not three software versions ago - and where there is something that is a completely new programming technique. I won't mention a number of desks that really do make us all turn around and have to think another way to program them. We ought to get something a little bit more than just a manual, some training and Rohan mentioned they got some of this from LSC.

This should perhaps be provided more widely. When something has to make you think in a very different way, like Status Q, then something should come with the desk that lets us find out how to use before we get stuck out there on the job. If you had a video that you could look at in your hotel room before you went out there and programmed, it might have been some help.

QUESTIONS FROM THE AUDIENCE:

I was just wondering why the certain television stations had a leaning towards pure memory disks? Obviously Rohan has gone memory manual. But to me I work in a live environment, repertory work and all the rest of it. Memory manual would be my first choice for any desk at any time. I was just wondering why Galaxies were chosen over something more memory manual?

Rob Coia: What I didn't get to say at the end was that at the moment, having seen a lot of the boards that are around, I've been a bit put off. I am actually waiting for them to settle because I reckon there is a settling period. The board I have seen at the moment that I really like, well what I think I like - is the Compulite. It's PC driven, memory based. That's what I getting at before, I would just prefer to have more preset masters on the Galaxy, have a couple of playbacks to run up your memories so if you do have a vaguely rehearsed show than you can do it that way and call up the same memory but have 40 odd faders there that you can grab in a hurry. This becomes a memory manual in a way anyway.

Rohan: I know for a fact the reason why Nine had straight computer consoles was when people were beginning to invest money in television studios particularly around the late seventies, early eighties. Frankly that was the only thing that existed in the markets. Jands had such a hold, particularly in Australia, on the



market. If you remember back to the mid eighties, how revolutionary was the LSC Precept 12 when it first came out? The simplest thing, yet it was the best thing since canned beer. So I think its a hangover from the days when that's all there was to have.

Andy Ciddor: As one of the people who specified that very system into that studio, that was all there was on the market. Back in '76, '77 when we put that MMS or designed that MMS to go in there, there was no such thing as a memory manual desk. The best you could do was get as many submasters as you could on the memory system because it was that or manage 400 channels with a manual desk which wasn't really a practical idea either. One of the main reasons was there's 400 dimmers and there was a softpatch system on there. I guess, it was the technology that was there at the time.

Everything you have spoken about today is mainly the higher end of the market. I run a smaller production company in Adelaide. We hire to pub bands and stuff like that, raves, nightclubs etc. I would really like to see a smaller desk that is easier to use by a lot of these idiots that think they are

lighting operators that don't know how to do it and often don't have the time. They just want to come in and spend \$500 and hire 24 cans and a desk but they want it to do more things and they want it to incorporate moving lights as well. As much as it looks confusing at least the Masterpiece -you can preprogram it and lock it out so that they can hire it and still the run the desk without corrupting it. That is the biggest problem I find is that you can't lock a desk out after programming it. What can we do, for the medium to lower end of the market, to get a desk for those people?

Francesco Calvi: I think there is a big problem when you talk about the lower end of the market and this gets back to technology again. The trouble I found at Jands, when we go along to jobs and they want to program it themselves. People who don't have a grip on a simple sort of desk anyway.

It is very hard because basically you have to train them from scratch which is probably the problem you have as well. By the time you end up showing them how to work the desk, you are showing them how to program moving lights, how to light a show, how to focus, what colours to

choose and everything. It's technology I think and unfortunately when you are talking about the things you want to do is really you are starting to talk dollars and that really takes it out of the lower middle range anyway. To lock out and do the things that you want to do and basically idiot-proof it, I think you need more technology for the stupider the person.

I will give you a classic example. I did a show, a rave party at the Hordern and I was told they had their own operator and this was a Vari*lite system, which was unusual because I didn't know the guy at all. He goes 'just give me a quick run through the desk' and I showed him how you change colour and how they move and he goes 'Oh wow, they move!'

So he was behind the 8-ball from scratch. So, having seen where he was at, I left him with the Vari*lite manual which, if you've seen it, is very thick now with all the updates. I left him alone basically to cry for three hours and then I came back and rescued him. I just programmed it for him. Or you get the other people who jump straight on the desk and start pushing all the buttons and then wonder why isn't anything moving. When you tell

them that you have to program it, it is a bit alien to them. Does that answer your question? Unfortunately, the way it is going now, it is not just cans anymore and to do all the things they want to do is dollars.

Andy Ciddor: And the technology is moving down too. The point is, what was on a Galaxy that was a really unique feature of a Galaxy ten years ago is something that is on every cheap desk today. And the technology these guys are talking about will be what we've got in small venues in 3, 4, 5 years time as the manufacturers move those features down the desk.

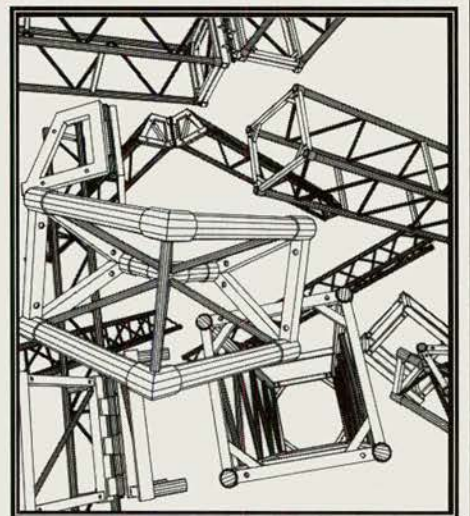
Rohan: There isn't a console manufacturer on earth that doesn't want to make money and I tend to actually agree with you. One of my favourite consoles of all times is the Jands Instinct .Instincts are fantastic. Anyone can pick up an Instinct but I think as LD's and hire company owners lobby the console manufacturers and say that we don't want a console that has a little hand underneath that scratches your bum. We just want to do something very simple and they will see the dollar signs and manufacture it. We have to lobby for those sorts of products to exist. •

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ADAM HOWE

Profile of a lighting designer by Jacqueline Molloy

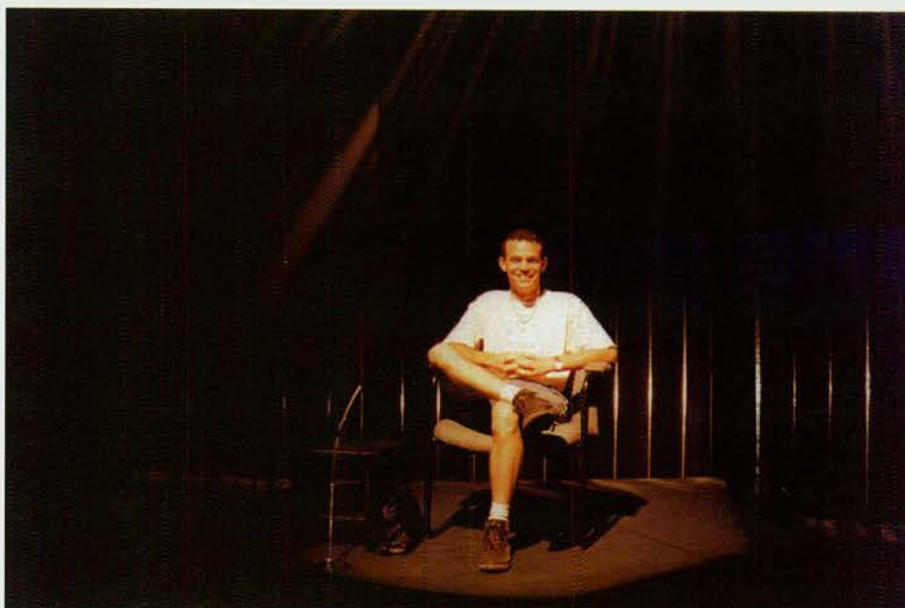
Adam J Howe is doing it his way: quietly, with style and spunk. This softly spoken lad from Williamstown (VIC) with the impish grin, wicked laugh and love of lavish musicals is hard at work carving out a lighting design career.

His passion and flair for lighting design have been opening doors since he graduated from the WA Academy of Performing Arts two years ago. He has designed shows in most of Perth's venues and forged a collaboration with Perth Theatre Company while freelancing for companies such as The Music Theatre Company of WA.

Late last year he toured to Singapore with Perth Theatre Company's production of "Cargo", while earlier this year he lit "The Sound Of Music" for a season at His Majesty's Theatre and "Shoehorn Sonata" for a Playhouse season.

He is currently designing a touring version of the play "Double Act", starring Garry McDonald and Diane Craig, which is playing 21 venues on a national tour. In August there is a national tour of "Lochie Leonard - Human Tornado" the play adapted from the Tim Winton novel of the same name, which he originally designed for a Festival of Perth season. And he is currently in pre production for "Communicating Doors" a Perth Theatre Company production going into the Playhouse.

Obsessed with lighting since his early teens he was Paisley High Schools lighting "tech" and had already decided to make lighting his career. He spent nights and weekends lighting productions for the Williamstown Light Opera Company where he cut his teeth on musicals such as "The Boyfriend" and "Guys and Dolls".



On finishing school he started working with the ABBA cover band "Bjorn Again". He toured with them for several years as their designer, rigger and operator learning on the job until he reached the stage where he lusted after new learning experiences.

By chance he saw an advertisement for Australia's only specialist lighting course at WAAPA. He applied, was accepted and headed West to devote the next three years to study. He thrived in the lively environment at WAAPA and the exposure to new ideas, practices and technology. "It was excellent training and came at the right time for me".

Since graduating he has designed a mixture of new works and traditional musicals and loves doing both for different reasons. "I find lighting new works exciting as there are no preconceptions about how it should look which is very liberating. My love for musicals started when I saw my first one at thirteen. I thrive on the energy and the bigness of them and the 'feel good' element of a lot of musicals."

When it comes to visual inspiration he gets it any way he can, from watching

television, looking through magazines or merely sitting in a restaurant and watching the way a beam of light spills through the door when it opens. "It's not hard to have new visual experiences when you're receptive to it and as a lighting designer I'm always filing stuff away for future reference".

He takes an approach to his work that is both emotional and intellectual. He likes to analyse things but also trusts his gut instinct to tell him when something isn't working. "When things get difficult I pray that my brain kicks in to tell me how to solve it, but I'm not always lucky", he laughs.

Howe realises that in an industry capable of eating its young, talent alone will not guarantee that he lasts the distance. He is conscious of the business and social skills that are needed to compliment his creativity, in order to survive and flourish as a lighting designer. "Theatre is a collaborative medium and being able to work in a team, communicate well and trust others are all essential assets."

He believes a healthy dose of courage is also useful - in order to stay sane. "The first time I was hired to design a mainstream show in a major venue I walked onto the stage filled with terror. Here was this electricians crew who had all been in the business a lot longer than me and I had to prove myself to them. I needed them a lot more than they needed to me. It was a terrifying baptism by fire, but I'm still here", he laughs.

Adam J Howe believes that being organised



Shoehorn Sonata produced by the Perth Theatre Company, Playhouse Theatre Perth. Designer: Sally Debortali.



is essential for a lighting designer and a tool that he relies on is AutoCAD. He finds it saves him precious time. "I tend to do a pretty detailed first draft on paper before transferring to the computer. Drafting the plan is not the fun part of designing for me so anything I can do to speed the process along I'll do". He also uses LightDoc, the documentation program created by Andy Ciddor* and finds the gel list facility useful.

"Plotting is the part I hang out for; physically creating the pictures that have been living in your head for a long time. Finally getting to see whether or not they'll work and figuring out ways to fix them when they don't. That's the exciting time for me."

He is keen to utilise some of the newer technology available, like robotics, but hasn't worked

on a show yet that could afford them. He's interested in the flexibility of having one moving light that can do the job of several conventional luminaires, but can't abide technological overkill where everything that shakes and wiggles does so, without any apparent motivation.

Something else Howe is committed to is raising the profile of lighting design as an art form. He is concerned that there is still a lack of understanding as to what lighting actually does for a performance. He has come up against the situation where people just think you "whack a few lights up" and that's it. An attitude that he finds frustrating.

"They don't comprehend the huge role that lighting plays in enhancing the mood as well as providing illumination. I've been

in situations where people come up to me at the opening night party, realising that I have something to do with the show but aren't sure quite what. When I tell them, they usually smile politely and go off to talk to a performer because it's easier to understand what they do. I'd like to feel that I can have a hand in changing this attitude because I think it's important to have lighting design recognised as the art form it is."

At only twenty-four he has plenty of time to realise his ambitions. He's keen to design some big musicals of the scale of *Beauty and the Beast* or *Miss Saigon* and to work nationally and internationally on a regular basis. Given that by the middle of the year he will have two shows touring nationally it probably won't be long before he's following them.

"Lighting fills me with passion, I can't ever see myself not doing it in some form or another. For me it's like breathing - pretty difficult to live without."

Jacqueline Molloy is a Perth based tech who feels, quite rightly, that Connections requires more input from Readers. So here we are!

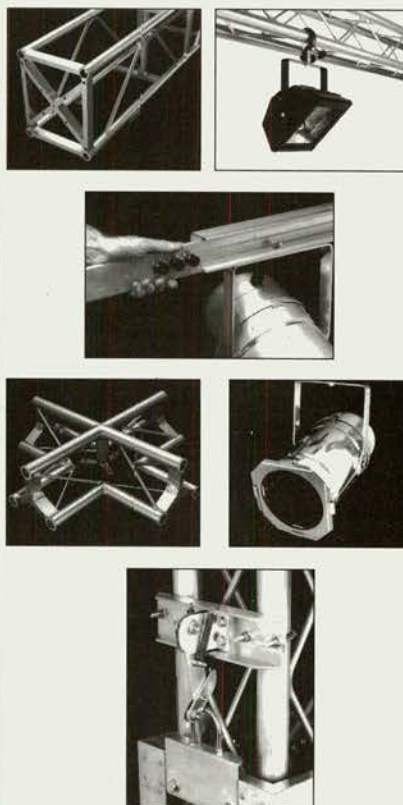
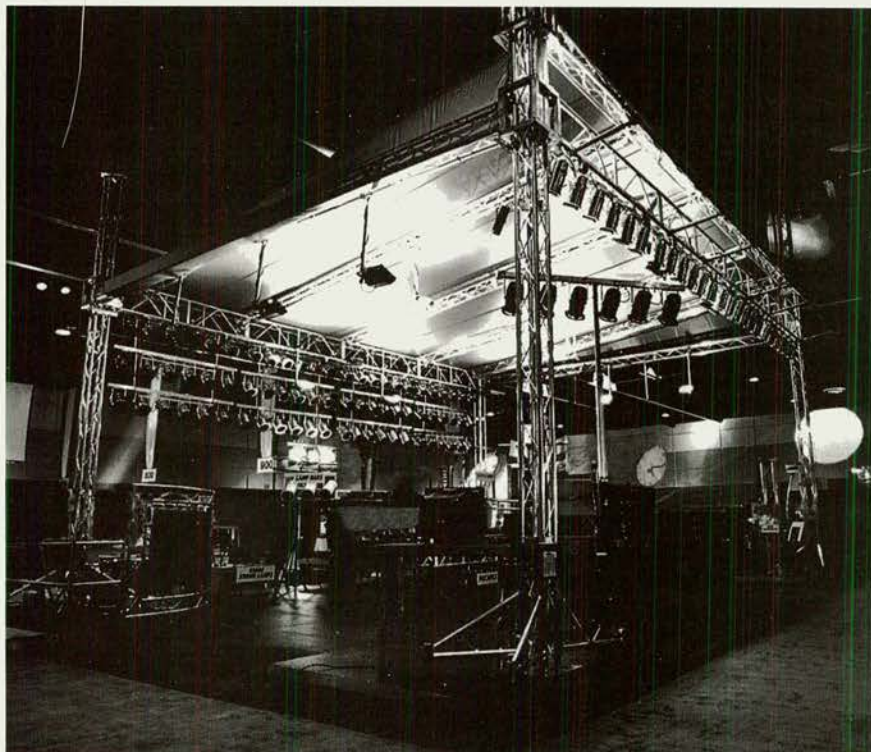
*Disclaimer: Molloy also knows A. Ciddor rather well.

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Write in Reader Service Number: 142



Use of fog or smoke in entertainment is very common now.
But what are the health implications?

Smoke. The Seminar Tapes

Our SMOKE Seminar keynote speaker was Karl Ruling, who has written articles for *Lighting Dimensions* for some years. Karl is also active in theatre as both a designer and a lighting designer. He has just recently been appointed Manager of Standards for ESTA in the USA. Also on hand was a representative from WorkCover Australia and Helen Finn, an occupational hygienist, was also on the panel. *All comments are from Karl Ruling unless noted.*

INTRODUCTION FROM KARL:

"As I understand it, the point of this Seminar is to talk about the various technologies and the needs for standards with these.

It just so happens that just before I was about to leave the States to come here anyway, ESTA came out with their *Introduction to Modern Atmospheric Effects*. People are concerned about the health effects of the various fogs or the various atmospheric effects. There is a fog and smoke working group in ESTA that is primarily made of fog manufacturers who, of course, believe that the stuff is safe. Nobody is interested in selling a product, even if they can make a lot of money, if it means they are going to be sued.

To a large extent fog production and the ways different machines work has been a mystery. I am sure you are all familiar with the material safety data sheet from a major fog manufacturer that says essentially that all the ingredients are proprietary, they are perfectly safe, they have been used in cosmetics and foods and you need not worry. That does not go over very well now, I think that most people are smart enough to realise that something that you can put in face powder or lipstick is not necessarily something which you can inhale.

The smoke and fog working group are in the process of engaging an industrial hygienist to do a survey of the literature on the various chemicals and inhalation and

stuff that are used in the various fog machines. The individual companies themselves have done their own research but as an industry group so far that study hasn't been done and this would be preparation for coming up with some kinds of standards or codes of practice of how to use the machine safely.

LOW FOG

Dry ice fog machines actually have a big tank of water, you get it hot, usually there is some kind of electrical emersion heater, and then when you need fog you dump a basket of dry ice in it. When the dry ice hits the hot water you end up with a lot of cold carbon dioxide coming off and that then causes the water vapour above the water to condense and gives you a very fine fog.

Newer technology is liquid nitrogen and it seems to be something new in Australia. It has been commercially available in the US for probably about five years. Instead of having solid carbon dioxide as the thing that condenses the water it uses liquid nitrogen. Liquid nitrogen is much colder in temperature than dry ice and the amount of cooling you get comes when the cold material changes state. That is when it goes from, in the case of dry ice, a solid to a gas, there is a lot of energy that is absorbed when it makes that transition. When something goes from a liquid to a gas there is much less energy that is absorbed. So, I think it winds up being roughly a toss up as to which one is more effective cooling agent.

Some of the advantages of liquid nitrogen machines would be since it is a liquid you can turn it on and off with a valve. You don't necessarily have to have a stagehand standing there dunking a bucket of dry ice into the machine.

GLYCOL

These are the machines that are about the size of a toaster and put out a real cloud of smoke. I think most people in the fog business don't like to say smoke because

what we are really dealing with here is not particles of soot but little droplets of water or mixture of glycol and water. What glycol is essentially, is an alcohol.

Regular ethyl alcohol, green alcohol, the stuff that is in vodka and beer is two carbon atoms, a hydroxyl group which is an oxygen and hydrogen atom connected to one of the carbon atoms and then some more hydrogen atoms added to it. A glycol has two hydroxyl groups and it may have 2 or 3 relatively short carbon chains but they mix very readily with water and what they do in the water they make it



Karl Ruling

so it doesn't evaporate so quickly. You can make fog by just spraying hot water into the air and you will get fog and it will be gone within one metre in front of the machine. If you add a bit of glycol to it, it doesn't evaporate so quickly, it hangs around. It also changes the refractive index of the little droplets a bit so they are a little more visible, they are easier to see. All

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these machines work essentially on a principle of taking this glycol and water mix, pumping them into a heat exchanger where they get them pretty hot. The temperature is generally in the range of 300 degrees C. It doesn't go any higher than 340 degrees C, at least not in a well-made fog machine. This is hot enough so the stuff vaporises, gets squirted out the front of the machine and as soon as it hits the colder air it condenses and then you have these little droplets hanging in the air.

OIL, AIR & HOT

Another way of making a nice fog is mechanical. There are actually about three different ways of doing it and they all have radically different effects. The way almost all of them work is that they take a highly refined, very light-weight mineral oil and they bubble air through them and you wind up with a lot of droplets splashing around. The bigger droplets fall right back into the oil, the very

fine droplets get blown out the front of the machine. So, you have little droplets of oil hanging in the air. They make a fog or a very light mist that hangs around for a very long time. You really don't put a whole lot of stuff in the air and it just stays there for just about forever. It gives you a very fine, light haze.

JEM has recently come out with a machine that works a little bit differently and it uses a glycol and water mix. They call it an ultrasonic machine. They have these little disks that sit underneath the surface of a liquid and vibrate at a very high frequency and it gives you this little bubbling and mist off the top. That is essentially what they are doing, but they are doing it with a glycol and water fog fluid. That's what their Hot Technology is. There are some other companies too that are starting to make glycol hazes which work more like the oil crackers but they use glycol and water rather than the us-

ing mineral oil.

There is one other mechanical method, I haven't seen it here in Australia. There is only one company that I know that does it in the US and it's called Mee Fog. It uses just simple water, pumps it through little dinky nozzles, extremely small at very higher pressure (1000 pounds per square inch). At the end of the nozzle there is a little pin that is bent over so this very fine jet of water goes smack right into the end of the pin. This gives you a very, very fine mist and it's nothing but water. One of the disadvantages of this fog is it tends to be rather wet.

All these technologies work. I think all of them if used properly are safe. All of them, if you're are stupid about them or if you don't follow the manufacturers instructions, can also be unhealthy and perhaps even lethal.

HOW TO KILL

Some of the obvious problems

with the cryogenic ones is that the water is hot. If you knock the fog machine over you could get scolded and also the cryogen is cold. It could also be a serious problem if you somehow did something like spill liquid nitrogen all over your pants. Immediately you will get a very bad case of frost-bite. Dry ice can also be a problem but at least if you handle it with gloves you're okay and if you drop it on your pants you stand up, it falls off. With both of these though oxygen depletion is the big issue. The atmosphere has about 20.9% oxygen in it. In the States the Occupational, Safety and Health administration will not allow you to expose a worker to an atmosphere where the oxygen has dropped below 19.5%. As a practical matter it seems to be rather difficult to actually use that much dry ice or liquid nitrogen so that in a theatre or a dance hall or something like that, that you will actually be diluting the oxygen that much,

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**SMOKE** (continued)

that you will get down to that level. But of course it can be done.

Just recently on television here, they had Bram Stoker's Dracula and there is a play version of this also. I did a production of it once and in the final scene they go to the crypt where Dracula's coffin is and they have to drive a stake through his heart and all of that. I just can imagine some amateur theatrical group deciding it would be really a neat effect if as the coffin opens all this fog comes out of it. Well if you duct a dry ice fog machine in a coffin with a live actor in it, you are likely to have a dead actor. That is the kind of confined space where you can very easily drive out too much of the oxygen and asphyxiate somebody.

There is an argument that carbon dioxide is more toxic than nitrogen. Nitrogen - 80% of the atmosphere is nitrogen, it has virtually no affect on you. Carbon dioxide though - the atmosphere normally has about 0.035% carbon dioxide. When you get up to about 0.5% it starts interfering with your blood's ability to get rid of carbon dioxide. So theoretically it should be more toxic although I could not find in any of the stuff I looked at something that address that.

Dry ice storage is a problem where you might have difficulties. If you are simply running off to a place everyday before a show and buying dry ice and throwing it in the trunk or the boot of the car you probably won't have any problem. But for some large shows what they will do is they will buy several hundred of kilos of dry ice and store it. They get a better price. Making a place to store dry ice is not all that tough, you can just use some kind of big box of plywood and foam styrene. You don't want to seal it up because the dry ice will turn into a gas and if you attempt to make a perfectly sealed container it will blow up on you. So you make this big box that has good insulation and stick it some place. Well where are you likely to put it? Maybe in the basement, some place out of the way. If the basement is a place that does have good ventilation you are going to wind up with a lot of car-

bon dioxide there. Its about half again as heavy as air is so it tends to collect in low lying areas. So you could very easily wind up with a situation if you start storing large amounts of dry ice where you send someone down to get some dry ice and he doesn't come back up.

ACTORS COMPLAIN (they do!)

Most of the heated fogs are glycol fogs and this is the area that is most hotly disputed right now. Back in around 1989, 1990 the musicians and the actors on some of the shows on Broadway where they are using a lot of fog started to complaining that they felt that the fog was making them sick. They couldn't sing, they were hoarse, they were wheezy, they had runny noses and so on. I don't think I want to re-hash all the stuff. It wound up with two visits from investigators from the National Institute of Occupational Safety and Health which is sort of the research wing, you might say, looking at industrial hygiene.

My own personal opinion, it is the opinion of the fog manufacturers also, is what we really have there is a case of being excessively worried about something. The chemicals that are actually used in the glycol fogs are for the most part fairly benign. The chemicals that are used are tryethylene glycol, monopropalene glycol, dypropalene glycol, butalene glycol and also glycerine or glycerol which technically is not a glycol because it has three hydroxyl units rather than two. But they are similar in low toxicity. The Rosco material data sheets talk about it being stuff you could eat and all that. It works out with tryethylene glycol, for example, a lethal dose is about 5g per kilogram. So you need about 350 grams for a 70kg person. That means drinking about a pint of pure tryethylene glycol. Propylene glycol - they feed rats 10% solutions in their drinking water and had essentially no ill effects at all. Of course, drinking this is one thing but breath-

ing it is another. It turns out that tryethylene glycol, one of the common chemicals in these glycol fogs, was used back in the 40's as an air steriliser. They used to use it in hospital air conditioning systems to help kill microbes and make sure tuberculocosis and things weren't spread.

Actor's Equity (USA) weren't happy with the report so they hired a guy to do his own report which is available from Actor's equity. I think it is rather poorly researched, badly written piece. Harry Herman, the author of it, is really against glycol fogs. Incidentally, one of the things you will hear every so often is that if you

In Miami there's a nightclub where they gave you a flashlight at the door. You walk in and you can't see anything. You shine a flashlight in people's face. It's a nice way to meet people!

heat the fog fluids you will wind up with all sorts of horrible things like phramaldehyde, acrolein and you will. The magic number using the old English system is 700 degrees Fahrenheit. When you heat the fog fluid above that, that is the point when you will wind up with significant decomposition products. If you buy a good fog machine it will be designed to keep the fog fluid well below that. You do not want to have phramaldehyde out there on stage, you do not want to breathe it.

In the UK, one report I looked at, had a exposure standard for propylene glycol vapour of 470mg per cubic metre. If you start thinking of these droplets as particulates they say that you shouldn't have any more than 10mg per cubic metre. Although that gets close to what people are already using on stage but still whatever is on stage is not passed that. Again in the UK there are no limits on tryethylene glycol but usually what they will do is say that it is similar to propylene so we will use that limit. There is the argument, this is what Actors Equity makes, that all these standards are developed with years of experience with workers in industry and that actors singing and dancing somehow working in the way that anybody else is working.

Mineral oil has also been ques-

tioned. The only place I know where anybody has really measured how much mineral oil in the air is on *Miss Saigon* on Broadway. That was one of the shows that people were concerned about and they are running about 1.3mg of mineral oil per cubic metre on that show. There are exposure limits for that, that are well recognised and it is 5mg per cubic metre. So they are well below that. Of course the problem is here is where we get into the thing with standards though. For example, on *Miss Saigon* we know that they are using 1.35mg per cubic metre of mineral oil. But if you walk into somebody's discotheque or something, what is the exposure level there? Is anybody monitoring it?

We have good evidence that it is not going to be a problem if you keep below a certain level. But there is no measurement and there is no procedure for measurement. That is a problem I see and I am sure that the fog and smoke working group of ESTA will be addressing this. What kinds of simple procedures can we adopt that people can use so they can monitor how much of the stuff is there? One of the guys I work with came back from holidays in Miami and he had gone to a nightclub where they gave you a flashlight at the door. You walk in and you couldn't see anything, I guess that was part of the fun of the thing, was walking up to people and shining a flashlight in their face as a way to meet people. About every hour and a half or so they would shut off the fog machine and turn the fans on and blow it out and I guess see if anybody was lying on the floor or something. This is great fun but I don't know if it is really responsible.

Chairman of the Occupational Health and Safety Committee at the Opera House, Simon Jenkins:

We require from people we buy equipment from, and any other companies that bring any smoke machines in, that we actually see a toxicology report. On that basis only 3 of the major smoke machine companies are allowed in. To this date we haven't seen a toxicology report that has been inappropriate. By inappropriate, what

(continued on page 83)



ELECTRICAL SAFETY A readers cautionary tale

By Bruce Liebau

"I just got a belt!"

The nightmare for those of us who work in that make-shift world of entertainment lighting had just become real. In a world where nothing is permanent a rat's nest of extension cords and patch boxes, sometimes drawing as much current as a small town, may be cobbled together one day then dismantled the next. A world torn between the immediate need for speed, versatility and economy on the one hand and the ever increasing demands of electrical safety on the other.

I had been dabbling into the vagaries of theatre electrics, being more at home in a television studio, and fighting a patch system that had grown like topsy when the shout rang across an empty stage. It was a small suburban venue, a local hall used on occasion by an amateur theatre group.

Lighting bars above the stage formed a grid of aluminium and steel scaffold-pipe. A maze of extension cables and semi-permanent wiring ran to 36 dimmers.

John, my assistant, was on an aluminium ladder patching a six-segment cyc batten. The ladder shook precariously but he balanced. He stood atop the ladder, frozen in time touching nothing.

"I think the grid's alive."

I suppose it's not surprising what effect these words have on a back-stage rigging crew. From everywhere else people emerged and crowded around the ladder. Painters, set builders, costume makers and actors, even the Director. John gingerly climbed down the ladder, and all eyes turned to me. What do you do in a situation like that? Race to the main-switch and kill the power? Reef out all the patching?

Nobody was immediately at risk and I knew that we had to track

down the source of the problem. Destroying the patching would certainly make it difficult to re-create the exact conditions again. So I elected to leave everything as it was for the moment".

From out of no-where some-

body handed me a multi-meter, as if it were a gold cross to wave at a vampire. I'm a Lighting Designer, not an exorcist. The ladder wasn't touching any metal part of the grid. I tapped it with a probe just in case, no voltage. Then, waving

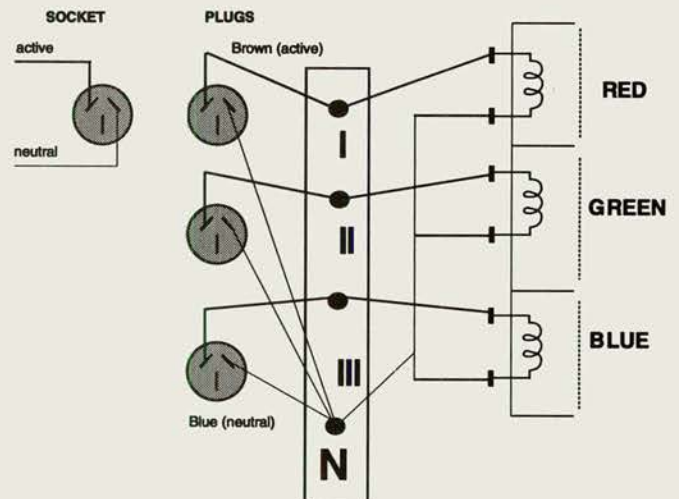


FIG 1. CONNECTIONS AS SUPPLIED BY MANUFACTURER

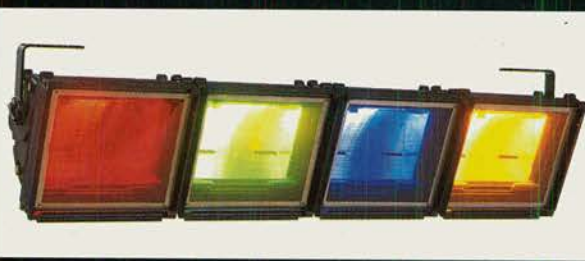


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the probe before me like a dragon slayer's sword, I ascended the ladder. Fighting the impulse to reach out and steady myself on the grid, I brought the red probe into contact with the aluminium pipe.

There was no voltage reading. I checked the settings on the multi-meter, 0 to 250 volt AC range, that was OK. I re-checked the pipe grid ten brushed the back of my hand against it to make sure. It was perfectly safe. I held the probe onto the case of the lamp we had been working on, then the cases of other lamps in the vicinity. Nothing alive, yet my rigging assistant had received a shock. Where had it come from.

"It might have been static built up from the carpet", offered one of my on-lookers.

"Not bloody likely". John had been in the business long enough to know the difference, "It was mains all right. Up this arm and down that".

"Well nothing's alive now". I climbed down the ladder but knew we must isolate the problem before anyone could confidently work on that grid again. What were we doing exactly at the time he got the belt?

As I said we were patching batten cyc-lights; a cheap and nasty unit consisting of six individual segments wired in three groups of two, definitely bottom of the range

but none-the-less carrying a well known brand name. I'd planned for a colour wash over the entire set so had rigged two such units on bars much farther down-stage than usual. They were gelled red, green and blue. Three leads came from each unit and each terminated in a piggy-back plug. (The new transparent "legal type" I might add). Corresponding colour pairs were piggy-backed together and I had run three extension cables to pick up permanent theatre wiring back to the patch panel and thence to dimmers. John, up the ladder, had connected the first of the extension cables to a piggy-back pair, I brought up the appropriate dimmer and all the red sections had come on, so far so good. He was about to connect the second set of piggy-backs when he got the belt.

Time to attack the grid again. Armed with my dragon-slaying multi-meter I once again mounted the ladder. The pipe-grid was still OK as were all the lamp housings I could reach. I tried the probe on every piece of bare metal I could see. Then bingo, the needle flicked to life. I was touching the protruding male pins of one of the piggy-back pairs. I checked the other, it also had voltage on the protruding pins. No wonder he got a shock, either he had brushed against one of these live pins when

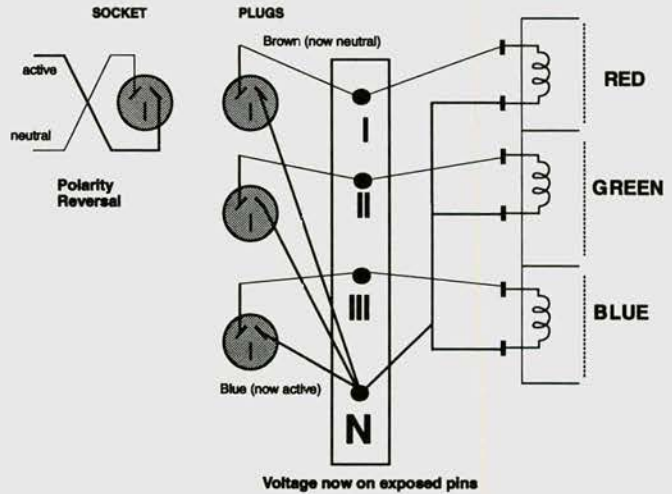


FIG 2. POLARITY REVERSAL IN SUPPLY SOCKET

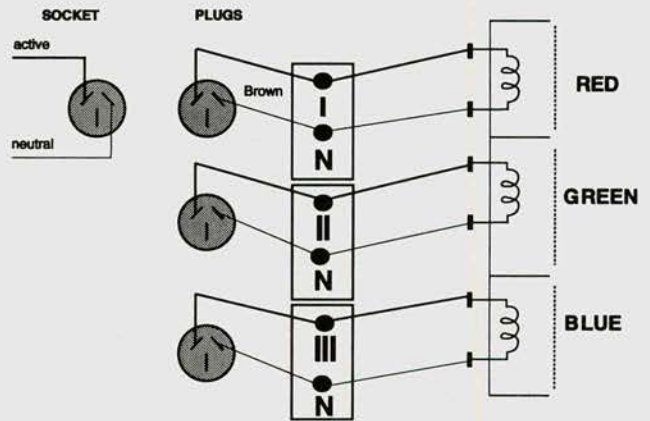


FIG 3. HOW IT SHOULD BE WIRED
Even if a polarity reversal occurs on one segment it does not affect the others

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picking up the plug or the pins had touched the grid pipes as the cable swung among them.

But how could this be? These cables were connected to the unlit green and blue segments.

Now was the time for jumping to conclusions: *One of the lamps is faulty - a massive internal short.* But which one? I carefully unplugged one of the offending piggy-back pairs. I expected only one plug to be alive, thus identifying the offending unit. To my dismay both plugs were still hot. *Both units are faulty.*

Remember the red segments were still piggy-backed together and powered up. I broke the connection from the extension cord to the red segment piggy-backs and no more hot plugs. At least I had identified the source of the problem and eliminated the danger. *Or so I thought.*

John and I begrudgingly derigged one of the cyc batters, they had been a pain to rig in the first place, and set about locating the short. But with the back off nothing seemed amiss. There was a terminal block with four connections labelled "I", "II", "III" and "N". The brown (active) wired from each of the three incoming power cords were connected to the terminal "N", the three green/yellow earth conductors were bolted securely to the metal case.

The common neutrals struck me as odd, I'd never seen that before on an appliance, but I paid no further attention to it. After all that was the way it had ben designed and there were more conclusions to jump to. We ran a lead from a domestic wall outlet and powered up the red segments.

There was no voltage on the other two plugs. *The problem must be in the dimmers. The dimmer neutrals are floating. It'll be OK when all three segments are plugged in.*

We re-mounted the batten in the grid and with the dimmers de-selected plugged in all three circuits. I then brought up dimmer power - and promptly blew up three dimmer channels. Oops! At this point I made perhaps my wisest decision of the whole episode. I called it quits. I had a show to light and three less dimmers to light it with, and we were running out of time. I quarantined the dimmers, all the wiring and extension cables we had been using and the offending cyc-batten units. We lit the show with what we had left, happily without incident. Yet in the back of my mind the concept of tied neutrals at he appliance end worried me. That just didn't seem healthy.

Of course in the cold light of hind sight all became clear. Industrial safety theory tells us that the combination of two unsafe conditions causes accidents. This was a classic example. Commoning of neutrals is not by itself dangerous, but combined with a polarity reversed power cable, it is. Somewhere in the theatre's wiring was an active/neutral polarity reversal and I had chosen that circuit. The active conductor appeared on the exposed pins of the other two unplugged power cables, and Bingo, John gets a bite. A quick whip around with a polarity checker confirmed the diagnoses and the problem was put right.

But this leaves us with the question of electrical safety standards.

Workers in the entertainment lighting industry deserve maximum protection from avoidable accidents. These seemingly trivial conditions, when combined, have potentially fatal results. Commoned neutrals, we are told, do not pose a problem. If we can guarantee that polarity reversal will never occur! But we can never make that guarantee. No matter how many times we check and re-check our rigs, one of the sub-clauses of Murphy's Law states that incorrect wiring will turn up sooner or later. a reverse polarity circuit could go unnoticed indefinitely as long as it was only used for a single appliance with proper double insulation.

So what is the situation with the regulations? WorkCover nearly hit the roof. They had never heard of this problem: No its probably not in contravention to the guidelines, But yes they do see the problem. So until something is done it's up to workers in the industry to look after ourselves. The manufacturing practice of joining neutrals in a multi-segmented lamp housing must be stopped. Lamps wired this way are a disaster waiting to happen.

TAKE THIS AS A SAFETY ALERT, check all lamps or appliances which have more than one power cord and separate the neutrals if necessary.

• **Bruce is an LD at the ABC. The manufacturer has offered to re-wire the batters (a current model unit, still available) at no cost. Thus Bruce declines to name them.**

smoke

we have looked at is the actual content of the smoke oil fluid and we have been cognisant of the contents. The most important thing is that you use the fluid that the manufacturers recommend. The machines are set up for the ideal heat exchange situation assuming a certain complex combination of different forms of glycol and I think it is the only safe thing to use the smoke fluid that the manufacturer recommends. One other thing that I think is really important is that you keep your machines clean and well maintained. At the Opera House we have a contract with the current company that we bought our smoke machines recently from. I understand that they go in about every three months.

Question from the audience to Karl R: "Do you know if smoke fluid affects asthma sufferers and have you heard of any examples where something has happened?" As a matter of fact I do. For the last two years I have been subscribing to the Australian Associated Press, a sort of wire service of all the news by Australian Associated Press and in those two years there was a story of a girl who was involved in a school production who suffered from asthma who wound up with an asthma attack, went to the hospital, recovered, went back into rehearsal and had another one. Two things to take away from this. First of all it is possible to give somebody an asthma attack with this. Second in Australia in two years we came up with a story of one person.



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Smoke

I can follow on with that. Most of the glycols are hygroscopic. When people breathe it in through their nose or mouth it can dry out any liquid in their throat and this can cause constriction and that is what really the asthma attack is. The girl, by the way, has recovered.

We have talked about on stage and stagehands but has there been any research done into the affects of being in an orchestra pit when this fairly heavy onstage particularly CO₂ flying off the front edge?

I don't know of any studies of the effects but that certainly is a concern. With carbon dioxide it is heavier than air. It also is cold which tends to make it heavier than air. So it tends to wind up in the orchestra pit. I have not heard of stories where people in an orchestra pit got dizzy or passed out because of the dry ice.

I have personally had a problem though when I had a heavy fog effect. The fog rolled off into the orchestra pit and the string section went silent. Their bows got wet.

I just heard reports, I don't know how true they are, about using oil crackers with intelligent lighting and have them affecting the cards and the electronics. Would that be through the oil or just through impurities through not cleaning?

You are saying that the cards are deteriorating. That is news to me. I am not saying that it is not happening. But the problem I have heard with intelligent lights, with robotic lights particularly with oil crackers is that they wind up collecting dirt all over everything and it will wind up with enough dirt on the gears and things, the gobo wheels and that kind of stuff won't move and you can wind up with some of the dirt bridging between the traces and stuff on the circuit cards. It is not so much the oil itself but it winds up being the adhesive for the dirt.

I have also heard some people

complain about glycol fogs. Glycol has the advantage that it at least will eventually evaporate, but the evaporation is slow. Glycol is hygroscopic, that is it does tend to pick up water. If you use a lot of glycol fog enough that you wind up starting to get a coating of that on things, then again you are going to have essentially moisture on the circuit cards which is not going to be particularly good for them.

As for the oil itself actually attacking them or the glycol attacking them that should not happen. The mineral oil is really, it is almost inert, it is just not going to do much of anything. and the glycol is pretty close to that also.

I suspect it is more going to be a problem of picking up dirt on these things. It is a concern with robotic instruments anyway, they need to be cleaned. If you use a lot of fog - particularly if its mineral oil - you are going to have to clean the things. If you are a technician it's great, it's job security.

With the crackers, is there any evidence of saturating the atmosphere with microscopic particles of oil and creating a potentially explosive atmosphere?

I think theoretically it is possible but it is not going to happen at the levels which these things are normally used and at levels that are okay to breathe. If you start getting above 5mg per cubic metre you probably can get into an area where it is going to be flammable but you shouldn't be breathing it either.

I would not stick a candle flame right in front of an oil cracker but you get a way away from it and it shouldn't be a problem. We had an interesting discussion whether glycol machines could somehow make the fluid coming out burn because the glycol is an alcohol.

It is mixed with water but you know you can set brandy on fire. We had someone in the fog and smoke working group try it. He couldn't do it, so they are not good blowtorches.

Computer Aided Design-CAD. A lighting tool?

This was another ENTECH Seminar, and as such these leading designers spoke their minds about what they use and what they like. And dislike!

Meet the Seminar Panel:

John Rayment - the resident lighting designer /Technical Director for Sydney Dance Company.

Gavin Swift - who is a freelance theatre lighting designer.

Nigel Levings - Freelance lighting designer, mainly in theatre.

Steve Wickham - Freelance lighting designer who is plugging a project called *Tech's Spec's* - which is a CAD project.

Rohan Thornton - television lighting director from Network Nine.

John Rayment: I come from a school of designers who were dragged belatedly to using CAD and I still find that it is quicker to draw it by hand than draw it on the computer.

I do a lot of touring so I am forever repairing and repeating plots and plans. One of the things that I first came across was ALD Pro or it is now called Lightright. I used to lovingly do up my plans in 1:25 scale and then I would go off and enter the instrument schedule data into Lightright, send that off and watch every head electrician throw the instrument schedules away and use their own paperwork.

It eventually made sense to just draw lighting plans over the top of our sets which would be installed over the top of the theatre structures.

I now use Micro Lux from a company out of Quebec. It is a very expensive program, astonishingly so, but it does everything. As fast as you draw it, it is pulling the data out and making an instrument schedule for you.

It speaks five languages which is handy if you are touring except into Asia where they don't speak any of them. It draws section, elevation and plan at the same time and can jump between them. It is not only a template drawing plan

program but a three dimensional drawing program. It takes a long time to refresh the drawing when jumping from one view to another.

You really need a very fast computer and a lot of RAM to make it not too annoying to use. .

It will do the instrument schedules, it will sort by gel, by lantern type, by lens type.

I can generate a shop order for instruments, I can generate it for colour as a specific function within the menus.

It also has an enormous library. There is almost 1 meg of library in just templates of all the known lanterns and you can add any you like. It will calculate accumulative weight on a particular truss, the truss library is very extensive. You tell it how much weight it is allowed to carry, it will tell you when you have rigged too many lights for the truss. It will take into account if you have got chain motors on it.

Here's the nice part about this program. Once you have entered the data in the drawing and then you go to your instrument schedule you can alter the drawing from the instrument schedule. So I can actually allocate channels and dimmers and it will work backwards. I can change colours if I want to and if it is late at night and you are getting bored you can pull up a default system which will turn the lights the colour of the gel that you have called them. So you can tell at a glance if your washers match up, if it is symmetrical.

It does a whole lot of things, calculates power. It has got things in it, if I am working in -say- a museum, where the amount of incident lux on any display or any particular piece is critical. I can run a set of lights, I know the instruments, I can enter the data about how high they are, how far



they are from the instrument. It will tell how many of them I need and at what spacing to give me the required lux incidents.

It has some shortcomings which I will just scan over. It has possibly the world's worst manual in that you can't look anything up. If you haven't read the manual from front to back in order and know what you are looking for at the time, it is useless. If I want to go in and find out why it is not doing something the manual doesn't tell me that. I have to know what I am doing wrong before the manual will tell me that I am doing it wrong. If you are downloading a big plot file to floppy and you have got something else on your floppy disk and there is not enough memory, it won't tell that there's not enough memory to load it. It will just load the file name and just sit there with no bytes until you get to the plotting service.

It also autosaves every fifteen minutes and you can't tell it not

to. If for some reason you are working on somebody's funny computer where you are somewhere and their hard drive is full and it is trying to download a very big file it will just lock up. This is because it can't autosave and it won't tell you that there is not enough memory, it will just go 'I don't know what to do now'.

Gavan Swift: I started off doing my drawings originally when I was back at theatre school on Autolights for AutoCAD which is a PC program. I found huge limitations on that so I stopped using it and drawing it by hand. From there I sort of scrounged a living drawing plans by hand for Roger Barratt and then, when I started working for him full time I upgraded him to Mac Lux Pro using a Power PC. I find that as a program it is probably the easiest one I have ever used. The problem is that it is probably too simple. The major problems with it are that

you are limited to a number of symbols. You don't have big symbol libraries like John is talking about. You do have symbol information but you have very fixed amount of symbols. You can change those symbols around but you end up with a grid of probably 30 or 40 symbols.

My theory behind using a computer to do lighting design is actually not to do lighting design, it is just to do lighting drafting. It is basically all about clarity and speed, especially doing commercial musicals which I seem to be doing at the moment. For me, the less time I spend at my computer drawing my new plans the better. At the moment I can get The Mikado down to under two hours for a total redraw for a new theatre, say if you are going from Sydney to Melbourne. But two hours is about the maximum I will spend doing it, and it is just a matter of changing over symbols and bars and whatever and printing it out.

John obviously plots out his paper at 1:50 and so you plot it out onto A1 sheets. I prefer to print mine out on A3 sheets of paper.

The advantage of Mac Lux Pro over Autolight is that it is just so neat. Everything just gets laid out on a single line and there is enough information, just basically channel and the colour and that is all that the crew generally need to know to hang a lamp because then they look after the paperwork themselves. I have never ever tried to do paperwork from the program to send to a specific theatre - especially not lantern schedules or anything like that.

I have a problem with my CAD program which is Blueprint, the 2 year old version of Minicad, in that I sometimes have line thickness problems importing across. I don't know whether that is to do with the fact that Blueprint is power PC based and my version of Mac Lux Pro is still 68040 based. So using it I find that I have to draw



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my set plans in Blueprint at 1:50, import them and then use another program like Claris Works or another power PC native program which supports a thicker line type and have to import that as well to keep all my line types consistent.

The one thing that I stress about using it, especially for other people who are asking, is that it is not the be-all and end-all. Every program which I have used has limitations and Mac Lux Pro has lots of them. But it is how you use them and how you get around the limitations of the program which actually makes the system work.

Nigel Levings: I also use Mac Lux Pro so I won't go into too much detail about the program because Gavin has given it a pretty good run down. Other than to say my Mac Lux Pro is a very earlier version and the current release is 1.5. I have to say that my dilemma about the programs is in terms of the quality of the drawings that they produce. The Mac Lux Pro I find a fantastic working tool and what I use it for is to prepare drawings and designs and more importantly to keep them up to date. I used to find that the big problem with hand drawings was making sure that when you came back to do the show later that you had actually kept up to date with all the bits and pieces of changes, little colour changes and the lantern changes and the position changes that you had made. That now happens as we light the show straight off my notebook computer.

It is a very small piece of software. The application is only 600k and so you can comfortably fit it and a couple of drawings on to a floppy so you can cart it around and print bits and pieces out from other machines if and when you need it. The other thing about the system that I work to is that I don't have very high printing standards. I just print it out to an inkjet printer and in some cases just tape bits together and take them down to the photocopy shop and blow them up. So the whole process for me is pretty cheap which if you are working on a lot of shows like I do where drafting costs are not necessarily recoverable from the production company.

I am very glad the Western Australian Academy encourage students to use sophisticated CAD programs, but I don't know a designer who could afford to buy a computer fast enough to drive Autocad - plus a plotter to print stuff out, plus the software. And pay for all that off what you earn as a designer when you are starting out. I can afford those sort of things now but I certainly couldn't when I was starting out as a lighting designer. So I think there are cost issues about these CAD programs.

Before I started using the CAD programs I would often, and I found it much cheaper, have a plan that I would just sketch up very roughly over a set plan and then would give to

somebody to draft for me, a young budding lighting designer or a student from NIDA. I would pay them and I could get nicely hand drawn drawings that I could then bill out to a production company for maybe \$150 or \$250, somewhere around that range. So it became hard to justify why you would want to go down that path in terms of any cost saving factors with CAD programs. But certainly in terms of updating the documentation and those sort of aspects I think it is fantastic.

Steve Wickham: I use Power Draw which is basically not a lighting program, it is just a fully fledged CAD program and I came across it several years ago. I come from the UK and I have done a lot of work over there and I have found people in the UK, and also colleagues in America, were using Power Draw. I was also doing a lot of research into CAD software generally. Originally I started looking for a program that would do everything for me. It is not that cheap, it is about \$15,000 and there are add-ons that go with that, that cost more. But it certainly does everything that I have ever needed.

I also have a symbol library of over 400 lamps and other libraries of those lamps in section view. It has a wonderful layering facility where you can just build layer upon layer, unlimited layers. Recently I just did a corporate show in Bangkok and sent the plan over there and I didn't get there until the day before the show actually opened and everything was hung absolutely spot on. I like having presentation very very clear so that there is no excuse for anyone to ever get it wrong. I tend to try to get more set designers to give me CAD files and I have built up a whole collection of Power Draw plans of venues throughout Australia. I have got about 30 and there is a lot of interest to build more.

The ideal way for me to work is just to get a DXF file from a set designer, put it straight into a Power Draw venue plan that I already have on a new layer and put each act on a separate layer. I then build up the lighting plan over the top of that. I usually use separate layers for colour information and circuit keys and anything else. I just split it down as much as I can and often I end up with sixty layers in the drawing because I just want it really convenient to be able to switch them on and off and print them and access that information. Also it speeds up the redraw time if you switch off layers that you are not interested in.

So when I get the final picture I set the layers to the way I want it to look. I save in the Macintosh Postscript format which allows me to plot exactly what I see on the screen. I don't have to worry about plot files which I had a lot of trouble with in the past. So I save in Postscript EPS. I then compress that, send it by modem to a plotting bureau.

The idea for Techs Specs came about from

files with drawing venues on them. I have a brochure that was sent out to about 150 venues to see if they would be interested in getting a database from one source where every single venue in the country could be supplied in any format, DXF, Power Draw will export and read and write most formats that are required.

It seemed to me a logical thing that if we could have a database like that it would be very, very handy, country venues included. That's what I am in the process of building up when I am not designing at the moment. There has been a lot of interest throughout the country in this.

Rohan Thornton: I was dragged into the computer age screaming and yelling. To a large extent I still believe that I could generally hand draw things a lot faster than computers. I also consider myself not computer literate. I know enough to get by, I can make things happen, I can work most of the programs but once we get into the DOS directory I am lost.

What fundamentally drew me into CAD drawing was the fact the Nine Network, although it is a communications industry, tends to spend very little money on communications. The design department even now still hand draws their plans and the only reason I went into the computer age is because they moved the design department to another building and they wouldn't buy me a drawing board! They would buy me a computer but not a drawing board. I had no choice.

Because my first computer was a PC I was shopping around for an IBM based program or PC based programs. In retrospect I don't know whether I quite made the right decision. I maybe then should have gone to Mac because they are a lot more user friendly for those who are computer bozos like myself. I ended up going with Microlux because it was the only product that I could find and I found it extraordinarily expensive but it wasn't my money, so did I care?

It was \$2500 and in retrospect I cannot believe I paid the money for that. I constantly slap myself across the back of the head about that. For what it does compared to other programs, it is a lot of money. The first couple of versions were very bad. I think ultimately the program was written in French and the manual was translated into English -and not very well.

To Coemar De Sisti's credit, they were extraordinarily helpful because I couldn't figure out the manual and I am also one of these people who avoids reading manuals because I know I know better and I can figure it out myself. Microlux did improve in leaps and bounds over a couple of years. Initially I found and I still find, which is why I shifted away from it, it was a lot more theatre orientated in terms of the fixture libraries and the way it constructed. The majority of my plans had to

be done quickly with very little forethought and were done in between doing other shows. If I had a meal break I would spend an hour on the computer trying to sort out next week's show. Version 2.4 and now 2.5 I really like, but after two or so years of using it I accepted the things that I didn't like about it.

Then last year when ENTECH was on I had a bit of a play with Star Draw 3D and that was pretty much my first foray into 3 dimensional CAD drawing. I quite liked it. You would probably define it predominantly as a presentation package and again in television where you spend 50% of your time selling a concept to someone as opposed to actually designing it, Star Draw 3D was very good because you show a producer pretty pictures and they understand what it is and they are very happy because they have some sort of visual idea of what it is going to look like. They will assign you your budget and you go away and plot your show.

But three months ago I picked up a copy of Star Draw 2D which is something I have only been using three months. I just recently designed the Logies with it and it has its problems but I find it very nice, I find it a lot more flexible than Microlux. I guess it combines being pretty as well as being quite an effective working program. The truss library and the fixture library at this stage are certainly no where as extensive as Microlux but it operates a little easier than Microlux does. There is an infinite amount of layers you can use, I used 18 layers for the Logies and I could have still typed more in. I find in my work we do a lot of sub hiring from a lot of different hire companies particularly in Melbourne.

There are not a lot of companies which possess every bit of gear you want so you are finding you have to go to a lot of different hire companies and the layers and printing out the respective layers and then sending them to different hire companies, sorting out cables is very handy. What was fantastic for this particular exercise was the element in Star Draw 2D that accumulates and calculates the cost of hiring lamps. I am one of these designers who just keeps on adding lamps and worries about the cost later - and I end up getting myself into all sorts of trouble when I finished a plot and I realise I can only afford half of it. So it was great to be able to cross reference the costings of fixtures.

Again the particular venue we did the Logies in had large weight loading and power problems which I could monitor as we went along and solve a few problems before they even existed. There are a couple of quick initial problems which admittedly Star Draw are addressing. I found that if I got to a file more than 2.2 meg it crashed and burned. So I found myself having to design two plots and printing them out and then just pasting them together.



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TOMCAT Trussing

Richard Hartmann talks to Cat Forcer

At Entech, Tomcat Inc. of the USA took a stand to display their aluminium trussing, staging, lighting and support systems. Established in 1987, Tomcat can supply a complete line of pre-rigged truss, box truss, triangle truss, folding varieties of box and triangle truss as well as a complete line of indoor ground support and outdoor roof systems.

Also on their stand were a variety of connection methods ranging from standard bolts and camlock connections to spigots. Columbus McKinnon theatrical hoists were also displayed.

Several members of the Tomcat team were available including Richard Hartmann who works as a freelance consultant and has had a fascinating career. For several years his service has been required by various bands and companies involved in the entertainment industry, one of which has been Tomcat.

"I work as an interface between designers and engineers with Tomcat in producing the material that goes into these productions," he told me.

"There are several other companies who I consult for, acting as a bridge between them and Tomcat."

Richard's career goes back to Woodstock where he was working on the structure and construction of areas such as the backstage artist's area. He has also worked as a camera grip in films, attended art school to study theatre design and worked as an assistant designer on and off Broadway.

"From there I went into the rock'n'roll touring market in Europe," said Richard. "I acted as an interface between American bands going into Europe and the European market. Over the years I've worked for bands such as The Grateful Dead and Santana as well as emerging British acts like The Stones, Pink Floyd, Genesis and Yes. My relationships with all those groups tended to continue down the years from tour to tour."

Eventually Richard became a consultant without equipment and not supporting an equipment base which is what he is doing now. In the last few months he has been working a lot with the Japanese market and their major pop groups like *Dream Come True* and *Mister Children*.

"The jobs tend to be for fairly long periods of time in terms of several months of preparation work and design," said Richard. "Often there's a six to eight month preparation period before the band hit the road. Then there's the execution of the thing, getting it delivered, set up and on the road which is when I tend to leave it and go on to the next job."



Richard Hartmann with Mich Clark, President of Tomcat

us about," he said. "It was one of the most bizarre times. There's a great deal of humour in this business because you wind up in situations where there's always tension because there's never enough time to really accomplish things. It has become more organised but you still run out of time."

"Tomcat trussing has developed over the years as a result of market pressure. The industry has been looking for structural material to use in larger and larger shows which has created a demand for a material to fill the gap. Tomcat's management are dedicated to making products which are highly engineered and well made, to solve those engineering problems. They've supported many facets of the industry to solve these technical problems."

Recently Tomcat have started building a market in both the Far East and Europe and now they are looking to Australia. Show Tech in Melbourne are looking to promote Tomcat in Australia.

"They see that Tomcat could benefit many of the Australian enterprises that want to go laterally and develop new forms of entertainment and that's why we are here now," said Richard. "The show has been overwhelming and we've talked to people from all types of entertainment - designers, specifiers, consultants, small theatre groups, casinos, discos. It's a new and exciting market for us. I've always found a great deal of vitality in the Australian market in terms of its design energy. Scope of plans don't seem to be limited in Australia as much as they might be in other parts of the world. Consequently we think it's time for a partnership between Tomcat products and the ideas and energies of the Australian market."

For further info call: Show Tech (03) 9682 2900.

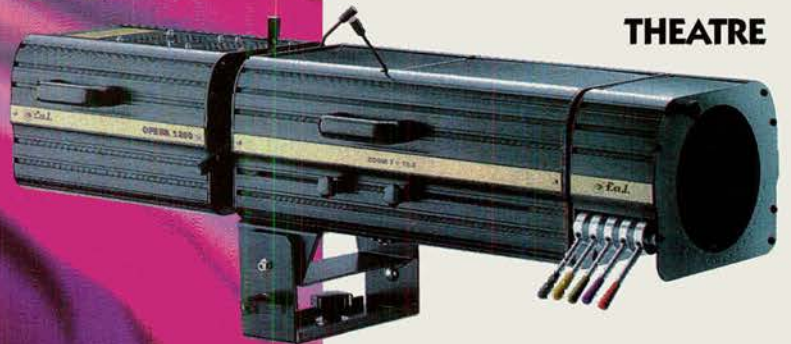


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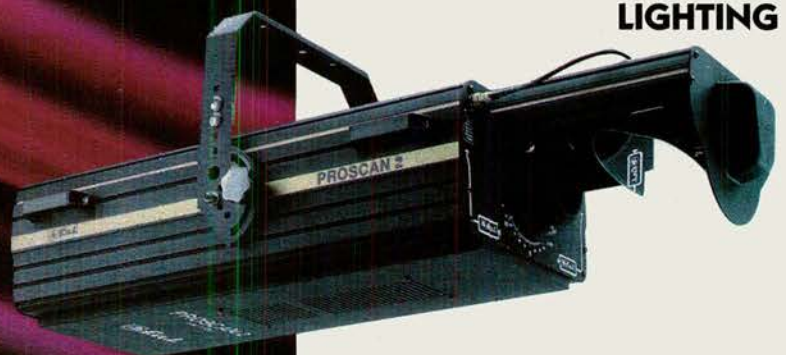
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THE PA PAGE

POWER TO THE PEOPLE

Your Body is a Toaster!? Part One in a series, by Michael Orland.

There is nothing like being present at the birth of your own child to reinforce the miracle of life. One is confronted with the biblical point of view: Your body is a temple. Likewise, in the world of P.A.s, one must never forget electricity's point of view: Your body is a toaster. You gotta respect electricity. Because it has not respect for you. You are just another appliance it is quite happy to power up. Bearing this in mind, let's venture forth.

Many beginners in the P.A. business, with one amplifier for FOH and one or two for foldback, are able to run their system successfully off one power point. Fine. If you have such a system, examine the choice of outlets around the performance area. Look for markings on them such as CB 12, CB 23, etc. Ask the duty manager to show you where the circuit breakers are. Find those that correspond to the markings on the outlets, and look for descriptions and ratings. Take power from the point with the highest rated breaker and make sure it isn't sharing that breaker with other high-draw equipment; refrigeration units, etc. A 10 amp circuit will offer only marginal "headroom" with a cluster of modern high power amplifiers. 15 amps is more like it, and 20 amps upwards is heaps. As any lighting guy will tell you, 10 amps at 240 volts is about 2,500 watts of power. If you add up the maximum power draw, NOT power output, of your amplifiers, you can easily work out just how "marginal" the available power is. Of course, a 15 or 20 amp breaker may be governing several power points, each with a rating of only 10 amps. The rating of each outlet is usually finely stamped on the outlet's switch, or indicated by the size of the earth socket. On a 10 amp outlet the earth socket looks like your average domestic size. On a 15 amp outlet the earth socket is enlarged, and on a 20 amp one, it's bigger still. So that a smaller rated plug will fit into an equal or larger rated socket, but a larger rated plug will not fit into a smaller rated socket. Anyroad, if the outlet supplied is only your average 10 amp outlet, despite the larger rated breaker, then chances are the internal contacts will dete-

riorate with prolonged over-usage. If jiggling your lead seems to make the power cut in and out, and you're sure it's not a faulty lead, then don't use the outlet. Alert the manager and seek out "cleaner" power.

Little round power point testers, available just about everywhere, are a great idea. Every P.A. owner's toolkit should include one. Try and get the three lamp type rather than the two lamp type, and tape the fault description chart to the inside lid of your toolbox. If the correct lamp combination does not appear when testing, then look for a source where it does, to confirm your tester is not at fault. If it isn't, you can confidently diagnose a faulty outlet. But be aware that the reverse is not necessarily true. The correct lamp combination is NOT a guarantee of perfect power.

By the time your system grows to three racks of amplifiers; left, right and foldback; you need to start spreading the load over separate circuits. If you are running a separate monitor system, i.e. separate control and monitor multicore, this may induce an earth loop "hum". Anyone using a monitor split system such as the one detailed in Connections December '95, should have no such problem, provided all stage signals are truly balanced. Likewise, earthloop hum between FOH amp racks can usually be avoided with the correct wiring of true balanced inputs. "Ground compensated" inputs do at a pinch. If such options are not available on your amps, then consider feeding the signal from XLR connectors on a rear input panel. Removing the pin one (ground) connection may break the loop, but will also leave the signal prone to RF interference. Such interference can be "dragged off to ground" by silencing capacitors, each say, .1 to .47 microfarad, to the rack's input connectors and wiring them between pin 1 and ground, as per fig. 1.

The other really nice way to prevent loops is with isolating transformers. I am not game to open any can of worms by even suggesting the removal of mains earths, although I must confess I have resorted to such vile practices over

the years.

The best method for powering three rack type systems is with three outlets rated at a minimum of 30 amps each, all sharing a common earth. Which is exactly what



you get using a three phase to 240 distribution board. It's easy for those of us in the business to forget that the standard 30 amp "Wilco" type plug/outlet was never meant for being broken down into its 240 volt components, so it's worth being aware of the compromises involved in using one. The system was of course designed for powering 415 volt equipment, usually heavy machinery. The older style opaque plugs often had screws attaching the common neutral wire to its pin which were smaller than those on the other pins. These were difficult to tighten without exactly the right size screwdriver. I remember seeing many of these brass screws butchered or the ceramic pin housing cracked from trying to force the wrong size driver. In extreme cases, a piece of the housing would break off, making it possible for the neutral pin to swivel and short its screws against an active pin. Thickheads would try and remedy this with bits of tape, etc. There is only one real fixit: replace it. Don't let me hear you moaning about the cost. This is serious stuff. Modern clear shell type plugs have even diameter, easier to tighten screws. Never use locktite adhesives, etc. on these. The strands of wire within the pins can compress over a period of time. The only way to maintain good contact is by regularly dismantling the plug, checking the screws, and tightening when necessary. Never overtighten. More on the subject next month.

Michael runs The Public Address Co in Sydney, call (02) 799-7219.

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