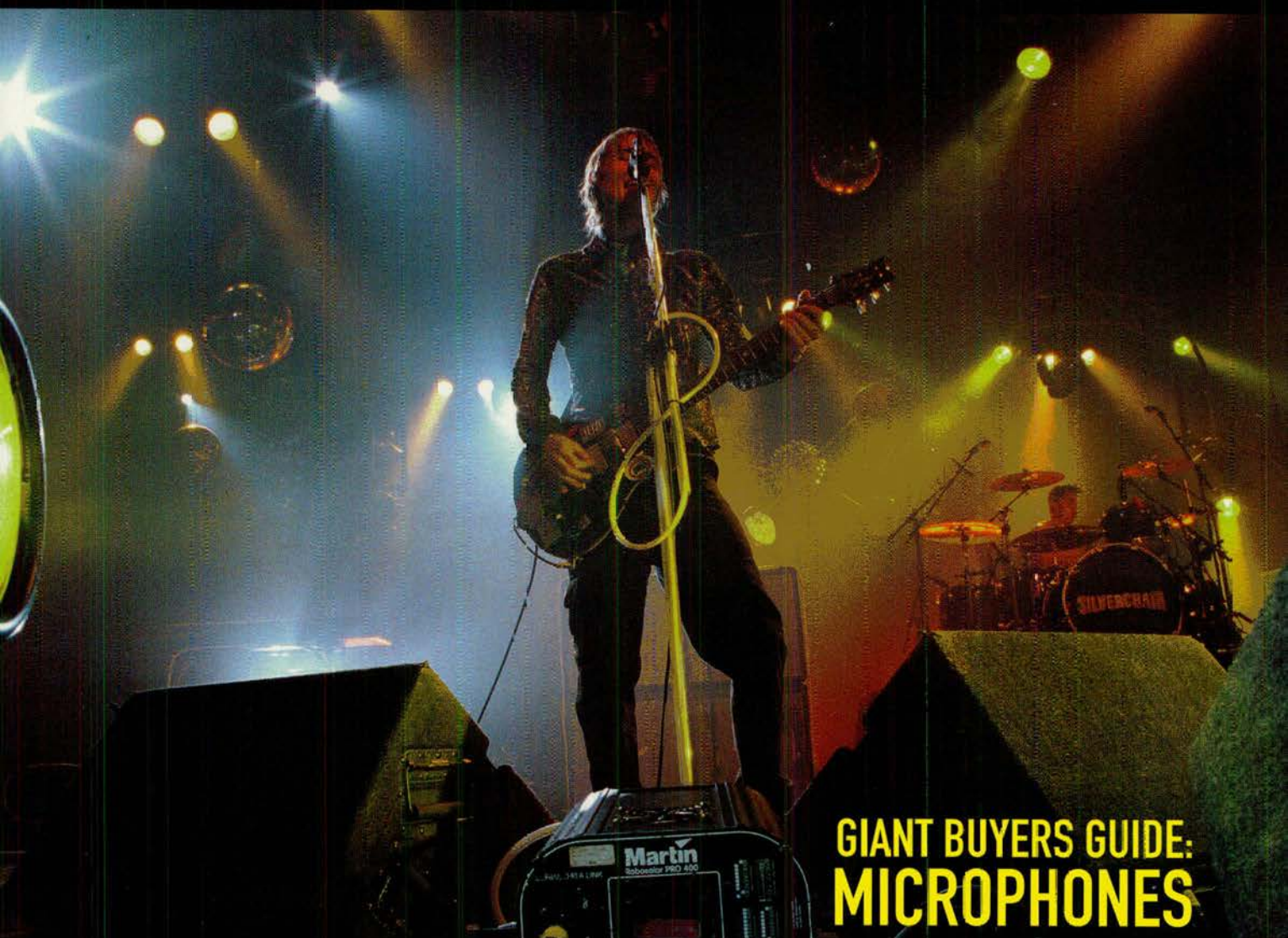


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FOLDBACK COMPACT MONITORS ON SILVERCHAIR



GIANT BUYERS GUIDE: MICROPHONES

BROADCAST AND SCREEN AUDIO NEWS • BASF STUDIO GUIDE • OODLES OF NEWS AND PRODUCTS

LIVE: Elvis Lives! Gyrating to the Max

Do you have fibre optics in your future?

Product Comparison: Small-ish Moving-Head Spots

Your MONTHLY Trade News

ISSN 1320-5595



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Published and printed in Australia



Crown CE Series

The Last Obstacle To Owning The Amplifier You've Always Wanted Has Just Been Removed.

If you've spent any time at all in professional audio, you know the name Crown and what it stands for—incredible performance and sound, the ultimate in reliability under harsh conditions and the best support in the business. These are just a few of the reasons why the world's largest tours and most prestigious installations have Crown amplifiers in their racks. And now, with the CE Series, we're bringing what sets Crown professional amplifiers apart from all others to a very affordable price range.

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	660W • 4 ohms
	400W • 8 ohms
Bridged	1950W • 4 ohms
	1320W • 8 ohms



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The MDS-E11 is a 1U (19-inch) rack mountable pro MiniDisc player/recorder, providing all the storage and processing power you could need in a super slim unit. Inputs and outputs include balanced XLR and unbalanced analogue I/O and RCA. Multiple MDS-E11's can be coupled for endless relay-play and relay-record. An assignable 9-pin parallel interface provides everything from simple user remote play - back to easy industrial equipment interface. Computer control is supported by an external RS232C port. As well as MiniDisc editing functions, recording options include Auto Pause, CD Sync, Music Sync. Playback options include Search, Auto Pause, Repeat and Shuffle.



SONY MDS-E52

The MDS-E52 is a 2U (19-inch) rack mountable pro MiniDisc player/recorder which features a variety of I/O connection options. An RS-232C serial port makes the MDS-E52 controllable from a personal computer or radio automation system. Features include IR Remote control (wired remote also available), and auto pause, CD sync, music sync and time-machine recording. As well as MiniDisc editing functions, playback options include Search, Auto Pause, Repeat, Shuffle and Program. Inputs and outputs include balanced XLR and unbalanced analogue I/O, as well as RCA coax and optical digital I/O.



SONY MDS-E58

The MDS-E58 is a 2U (19-inch) rack mountable pro MiniDisc player/recorder with an array of useful features and functions. It was introduced as an evolutionary step along Sony's MD development path and fitted with a rugged disc transport system and overall design at a realistic cost. The unit has unbalanced analogue I/O and RCA as well as optical digital I/O. As well as MiniDisc editing functions, recording options include Auto Pause, CD Sync, Music Sync. Playback options include Search, Auto Pause, Repeat, Shuffle and Program. Specs: Frequency Response 5Hz-20kHz +/-0.5dB, Signal to noise ratio: >92dB.

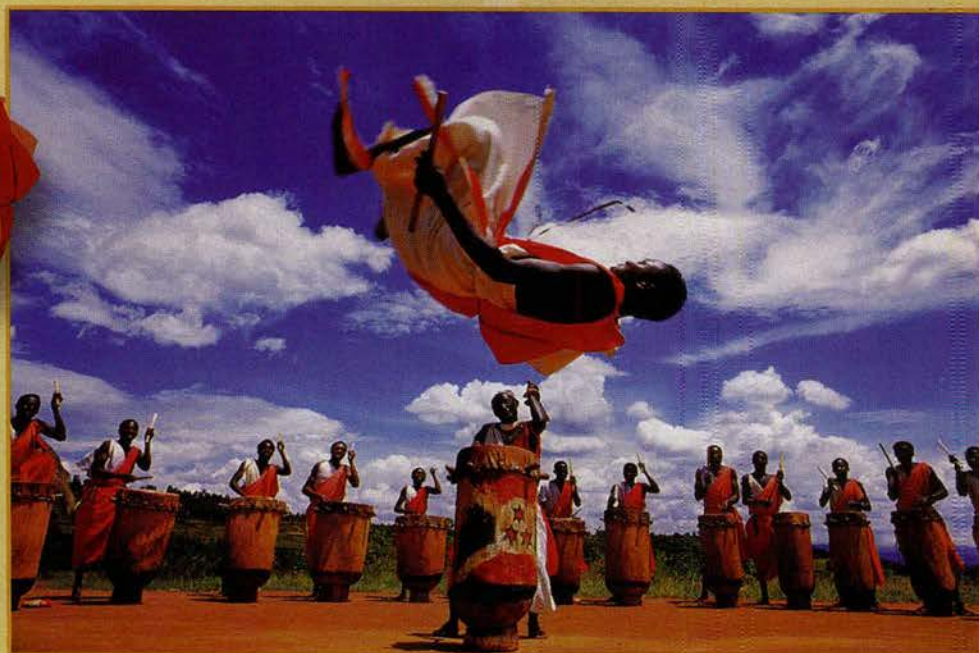


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The Meyer Sound Self-Powered Series

Since the 1995 introduction of the Self-Powered Series, over 13,000 units have been sold. With the advent of this new innovative series, Meyer Sound took a huge technological leap beyond all existing loudspeaker systems. Listen to what some of audio's top professionals have to say about these powerful, industry-defining tools...

"We really nailed it! Our new Self-Powered cabinets give us the flexibility to adapt to any environment on tour, and we now have the best stadium sound I've ever heard."

Jeff Thomas ◊ FOH Engineer, The Dave Matthews Band

"Self-Powered speakers mark a new beginning for both Meyer and the live sound industry."

Mark Frink ◊ MSL-4 Review ◊ Mix Magazine, August 1996

"Only Meyer Sound's Self-Powered Series guarantees us a world-class sound system preferred by most artists and producers."

Marcio, Nelson & Marcos Pilot ◊ Loudness Sonoriza, Brazil

"Setting up 18 stages in one week... we never could have done it without the Self-Powered Series. Nothing is easier to use, easier to maintain, or sounds as great."

Miguel Lourtie ◊ Systems Engineer - EXPO '98 ◊ Lisbon, Portugal

"The sound was amazing, incredible... the music almost came at you in 3-D! ...Simply, I have never experienced speakers like these before."

Mike Klasco ◊ UPA-IP Review ◊ DJ Times Magazine, May 1998

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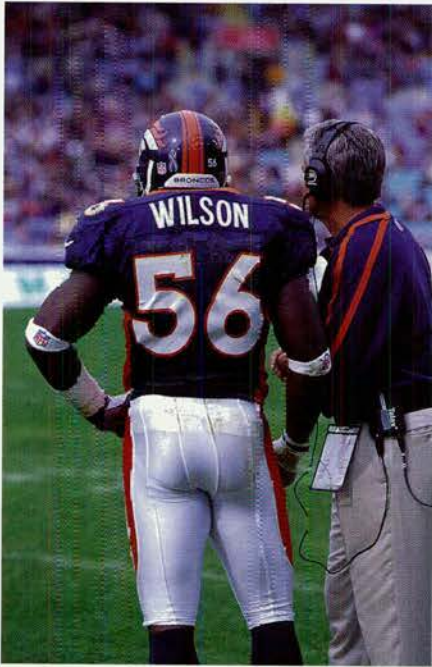
ENTER THE PRESENTATION PLAYOFFS: \$90,000 IN PRIZES

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COMING IN CONNECTIONS:

OCT: Post & Music Studio, Replication, Duplication, & Mastering directory

Buyer's Guides: Amplifiers. Follow spots. **Deadline** 15th September. **Onsale** October 13th.

NOV: Film & Broadcast Pro Audio Feature

Buyer's Guides: Loudspeakers (not studio monitors) and Fog machines. **Deadline** 15th October. **Onsale** November 10th.

DEC: Retailer and Pro Outlet Directory

Buyer's Guides: Recorders and Software. Scrollers and colour changers. **Deadline** 15th November. **Onsale** December 15th.

Call +61 2 9876-3530 for listings. Deadline for Directories and Buyer's Guide is two weeks EARLIER!

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ENTERTAINMENT TECHNOLOGY ~ SEPTEMBER 1999

Australian Monitor sold to A.T.C.

Australian Monitor, the Sydney based manufacturer of high powered amplifiers, has been sold to Audio Telex Communication Pty Ltd.

The brand rated well in a pre-purchase survey conducted by ATC, which showed that the market is very price sensitive. ATC Chairman Rod Craig told Connections that AM rated with Crown, Yamaha, QSC and EV in the top five brands.

"A disturbing number of dealers asked if we knew if Australian Monitor was still in business during our surreptitious survey" says Rod. "The perception was that it was a great product, but priced highly".

Audio Telex Communications already make their own branded amplifiers for the commercial market, indeed the firm will ship 5,000 of those units this year. Their assembly line is within their large Silverwater warehouse, and was just expandable to



accommodate AM.

The incorporation of AM assembly within the ATC plant makes the brand viable, says Rod. But

please turn the page

Icon's long trip

Australian Monitor was created to build a basic 800 + 800 watt power amp to replace unreliable units in our P.A. hire fleet. We went to Jands and asked them if they planned a big amp. Paul Mulholland said he doubted there was a large enough market.

Stuart McLean came along with a prototype in 1987 that we called the AM 1600- not a basic amp, more a handmade exotic.

About \$400,000 later we had an assembly line at the back of the hire department, but needed more money for production.

Enter Hymie Meyerson and Lionel Krupp. They bought half the business and for eighteen months we coexisted in uneasy disharmony.

We sold our half to them in 1989, once the bank made it clear someone needed to inject more money. By this time AM had made and sold several hundred amplifiers - but not enough to get the business cash flow positive.

We'd been to the AES show in New York with Hymie and exhibited the amp, we won orders in Europe, and knew it was an export possibility.

But A.M. never had the capital it needed, nor the management skills. At least early on.

The amplifiers were unbelievably reliable. We often run into old customers who say the amps we sold them are still going.

Along the way the Meyerson/Krupp team did all they could, and forged some successes and some failures, hampered by lack of understanding of the pro audio business. They'd never admit it, but we guess that A.M. has accumulated several million in losses over time. We alone lost \$1m+ on it before we exited.

But if anyone can make A.M. work it will be Audio Telex Communications. We hope they do.

- Caroline & Julius Grafton

COMMS: Telex at the gridiron

Stadium Australia was packed with 73000 supporters and curious onlookers for a different style of football- American NFL. It was a 'Grid Iron' exhibition game featuring the Denver Broncos and San Diego Chargers (including the Aussie punter Darren Bennett).

Amongst the 3 jumbo jet loads of players, cheerleaders and entourage imported especially for the game was the technical support crew Tom Hansen & Gary Bosiacki from Telex Communications headquarters in Minnesota. Tom and Gary could be classed as being 'Old Hats' at NFL communications, having operated communications for the last 12 SuperBowls.

The Cheerleaders, who entertained the crowd for hours, & Chris Issak provided good 'ol USA razzmatazz. However, for many it became quickly apparent that the American style of football was a much slower pace than the Australian versions.

The NFL game is quite intricate as it relies on strategy. In the NFL there is constant communication between the coach and players numbering as high as 20. Communications take place from the coaches and strategists who are positioned high above the field, to the coaches who are on the field with the players.

please turn to page 30 >



Digidesign launch in West Australia

To coincide with the appointment of Kospro International to exclusively distribute ProTools in Western Australia, Digidesign will officially launch their new products (including Pro Tools V), in Australasia, at the new Kospro International suites in Perth.

The launch is on 12th October. Prior to the launch, a fully equipped Pro Tools Suite will be permanently installed at Kospro for demonstrations.

Adding Pro Tools to their stable of products is a big step forward for Kospro International, who also distribute, and have played a key role, in establishing the successful Australian DSP Workstations.

"We are very satisfied with this development, and also by the recognition by Digidesign, of the emerging influence of Kospro International, both locally and overseas," says Vice President of Kospro, Rob Scott. "I think it is highly significant that Digidesign have chosen us for this launch, and we shall accordingly, do everything possible to justify this decision."

8 ch remote preamp

Aphex's new 1788 Eight Channel Remote Controlled Mic Preamp (below) is ideal for location near to microphones.

The 1788 acts as a preamp for up to eight microphones, splits the signal of each allowing for long cable runs at line level. Each of the 8 channels can be controlled hundreds of meters away by PC or remote.

• Info: (Au) East Coast Audio +61 3 9821-4747 or www.apexsys.com



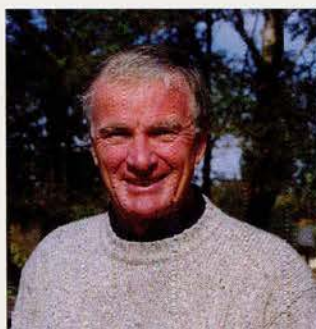
ATC takes AM, new amps online

(continued from previous page)

it is an unusual and innovative deal that AM forged with an Indian firm in Mumbai that signals the potential resurgence of AM.

"Stuart McLean (AM designer) beat a track to India", explains Rod. "They found a company who built cheap amplifiers there, and managed to get them to make a new AM line - but to make them the 'AM way'. So they've got this line going in Mumbai where every amp is hand assembled, 100% soak tested, and quality assured, just like the K series and the AM series are here. It took them three years to get it happening".

The Indian facility take some components from AM in Australia, but can build a product, called P series (pictured on previous page) which can be sold on



Audio Telex Communications Chairman Rod Craig

price in any market. "They're already selling into export markets. We have to be competitive on price" says Rod.

The P800, (400 + 400w) for example, retails at A\$1,459 - against a (current) industry average for 800 watt models of around \$1,699.

Bluetooth may be future AV link

By Gary Kaye, CTS

Bluetooth is about to invade the consumer electronics world and kill IR (infrared) - while giving virtually anything the ability to communicate via direct connectivity or

COMING?

the Internet. Bluetooth is the codename for a new technology specification for small form factor, low-cost, short-range radio links between mobile PCs, mobile phones and other portable devices. Bluetooth can transmit through solid, non-metal objects. Its nominal link range is from 10cm to 10m, but can be extended to 100m by increasing the transmit power. If all goes well, Bluetooth will enable users to connect a wide range of computing and telecommunications devices easily and

simply, without the need to buy, carry, or connect cables. It delivers opportunities for rapid ad hoc connections, and the possibility of automatic, unconscious, connections between devices. The Bluetooth Special Interest Group claims it will virtually eliminate the need to purchase proprietary cabling to connect individual devices.

Since Bluetooth is a bi-directional RF type signal, it's logical that professional electronics gear stands to gain quite a bit from Bluetooth. In fact, if you look at a list of over 1000 members of the Bluetooth SIG, you see prominent ProAV manufacturers like Telex, Mitsubishi, Philips, InFocus, Sanyo, Sony, Sharp, and NEC. Interesting huh? •

Gadgets & Gizmos With Dr G

And the gadgets keep on coming. Gadgets, hints and tricks are what continue make this industry interesting to work for. We all come across them periodically - but very rarely at the time when we actually needed to know about them. **John Grimshaw** continues on his merry way through the gadget list...



Audio Isolation Transformer

I have mentioned a cheap, domestic version of this before (March 99), but this one is a balanced audio item, and a must for those people doing the odd temporary sound installation around the place. There is not enough space here to really discuss the causes of earth loops and various other hums in audio systems, but some of these problems could be solved by using this gadget. Particularly useful when connecting two systems together (e.g. comms and PA) so that neither effects the audio quality of the other.

If you are unsure as to whether this may solve your problem, you should seek some pro audio advice (or try and borrow a version of this gadget) from your local pro audio installer.

■ PA People +61 (0)2 9642 5344

■ ProCo IT-1 Isolation Transformer - A\$246

Audio Restoration

Diamond Cut ART is a Windows-based program that gives you a comprehensive set of tools which will allow the user to remove extraneous noise and also enhance the sound contained on old audio sources without degrading the content contained on the original.

Diamond Cut Productions designed DC-ART primarily to be used for the restoration of old phonograph recordings (before CD's). These recordings often contain priceless performances which are marred by the effects of age, wear, and the limitations of the media on which they were originally recorded.

Diamond Cut Millennium contains three major feature areas - Audio Restoration, Audio Enhancement and now, Forensics.

The program is packaged in a retail box with 300-page manual.

List price is A\$499.

• **BTS Sales & Marketing**
AUSTRALIA, call +613 9587 5657.



Funky gear, right? George Clinton ponders a rack full of QSC PLX amps at a recent gig. He says they are 'da bomb'.



MIX 'n' SCRATCH draws DJs

MELBOURNE: Mix 'n' Scratch was Melbourne's Inaugural DJ & Turntablist expo- where over 200 rolled up to see the latest in club and DJ technology.

The majority of people were there to gather information about DJ equipment and techniques with a view to purchase within the next few months, say the organisers, CC's Light & Sound.

95% of surveyed attendees rated the event very good to excellent in an exit survey, says CC's. A typical comment:

"It's excellent! The atmosphere is non-intimidating - you can check out all the equipment at your own pace".

In particular, the Numark

products were very highly regarded. Some comments included: "The Pro-TT1's are excellent. They're the first real alternative to the SL1200", "I really like the crossfader on the SMC-1, it feels a lot better than similarly priced scratch mixers" and "The Numark CDN 34 is just awesome!"

CC's say that the event has given them a clearer picture of the target market for DJ/Turntablist products which will be of great value in future promotional events.

They are currently planning Mix 'n' Scratch 2 with greater product ranges, more hands-on facilities and more activities for expo attendees.

DRAWMER MASTERFLOW

Drawmer debut three new products- the Masterflow Series. The DC 2476 Digital Mastering processor (top) is a programmable mastering tool with a lot of bells and whistles. It sells at A\$4,578 including sales tax. Other models: the DC2486 Twin Screen Digital Processor is a dual model of the above, and the DC2496 is a high resolution A/D converter.

• Info: (Au) +61 3 9874-7222.



APPOINTMENTS

Sydney Entertainment Centre is pleased to announce the appointment of **David Druery** as Operations Supervisor. David has come off the road as a tour manager to join the team backstage at the S.E.C.

Kospro (PERTH) welcomes another staff member, Mr **Nick Hassall**, a Digi and studio specialist, to add to their expanding list of qualified personnel.

Birkart Group announce appointments- **Chris Millane** is now Branch Manager, Sydney. **Michael Barrett** joins as tour logistics manager (based in Melbourne) and **Melissa Sultana** joins as manager of exhibition services.

Connections welcomes **Barbara Randell** to the cyber cottage, in charge of things not done by others.

MOVED

Music Box & The Speaker Hospital are now at 451-455 Liverpool Rd Ashfield 2131 NSW, call +61 2 9797-1800.

NEW AGENCY

Radian Audio Engineering have appointed Acoustic Technologies as their exclusive distributor for Australia. According to AT's Harry-Lloyd Williams "At has been using Radian components on an OEM basis since 1988. We look forward to providing a new level of service for Radian in Australia. Radian also do a range of replacement diaphragms for popular high frequency drivers by other manufacturers. Call AT on +61 7 3376-4122.

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We were VERY enlightened by Jacques Derrida, a most famous philosopher who toured the region last month.

This is a revelation that we would like to share with our readers:

"What makes light visible, its visibility, is not visible. The visibility of the visible is not visible".

Is that clear now?

Spark Audio

SPARK is the new stand-alone integrated Audio Editing and Mastering Solution for the MAC OS. It boasts Off-line editing, Crossfades, Project File Database, Scrub and realtime time-compressor/Expansion, Comprehensive effect routing with up to 4 parallel streams each with up to 5 plug-ins, Batch conversion and Dither.

It includes 11 24/96 VST effects: TC Native CL Compressor/Limiter, Reverb, Parametric EQ, Notch Filter, Hi/Low Cut EQ, Bandpass EQ, 3 Band EQ, Resonance Filter FuzzSat, and Delay. CD burning facilities include Toast Pro.

There is Digidesign Direct I/O support, Quicktime and WAV support and sampler support for AKAI, Kurzweil, EMU, Roland, YAMAHA and SMDI.

RRP \$699

Electric Factory Australia
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SHURE REDESIGNS DRUM MICS

Shure has added two new drum mics to its acclaimed Beta Series: the miniature Beta 98D/S and the low profile Beta 91. Both models feature all-new designs to provide the very best performance in live and recording applications.

The Beta 98D/S condenser mic is designed specifically for toms. With a tailored frequency response and a maximum SPL rating of 160db, its ultra uniform pickup pattern ensures rejection of unwanted noise and maximum gain-before-feedback. The interchangeable cardioid/supercardioid cartridge means the 98D/S can be adapted to different applications. The model also comes with Shure's new A98D drum mount which is equipped with a flexible gooseneck and can be mounted horizontally or vertically on just about any stage hardware.



The Beta 91 is Shure's successor to the SM91, the mic that popularised the use of condenser boundary mics in kick drums. Fitted with a cardioid capsule which supplies formidable attack and low-end punch, the Beta 91 provides good gain before feedback and isolation. It is best used without hardware, simply resting on a pillow or blanket within the kick drum.



• Details: (Au) Jands, +61 2 9582 0909.

Gadgets & Gizmos With Dr G

Baby Strobes

I am not a big fan of strobe lighting at the best of times, however I bought these little guys to use as a spot effect in a show I did about a year ago, and they worked a treat.

They are small and cheap - and about the size of a "birdie" (Par16).

Unfortunately, they have a bit of a "disposable" feel about them due to their plastic construction. So they would be unlikely to last very long in a rugged situation. Despite this, they have been quite useful.

- Lightsounds +61 (0) 2 9560 0300
- 15W Ministrobe (SP-106S) \$39 rrp



Apple Mac G3 update

Our new Blue G3 is still crash city, even with a new hard drive - but Apple have now decided to take it back for serious analysis. After deadline they've promised a loaner Blue G3 so we can see if our machine is a dog alone, or if something more sinister is afoot. We'll keep you posted. -Ed



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PM-640 "Chrome" Mixer



PM-524 "Unique" Mixer



CM-740 PRO "Ozone" Mixer



BX-524 "Beat" Mixer



DJ-50 "Space" Mixer



DD-2220 Direct-drive Turntable



DD-2250 Direct-drive Turntable



FX-120 "Spider" Mixer



OH-P-400 Stereo Headphones



FX-280 "Fire" Mixer



FX-524 "Bat" Mixer



CDP-744 Dual CD Player



CDT-550 Top-loading CD Player



CDP-450 Dual CD Player

OMNITRONIC DJ PRO TOOLS

"The Ozone has quality faders and excellent output, great for production and all types of club work". Pete Farris, DJ/Manager, Bump Productions
"I use the Ozone at Palladium every Friday. This mixer ROCKS. The signal is loud, the kills are total kills, best of all it makes today's digital music sound even more digital." Stephan, DJ/Promoter, BPM Records/Palladium

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dmc city: 613A Elizabeth Street, Surry Hills, ph: (02) 9319 7177

dmc west: 12 Bridge Street, Rydalmere, ph: (02) 9898 3336

Unidisc Entertainment: 154 Canterbury Road, Canterbury, ph: (02) 9718 5112



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ETHICS: We operate under the journalists code of ethics, as detailed by the Australian Media Entertainment and Arts Alliance. Respect for truth and the public's right to information are over-riding principles for all at this publication.

In pursuance of this principle we have always committed ourselves to these ethical and professional standards:

1. We shall report and interpret the news with scrupulous honesty by striving to disclose all essential facts and by not suppressing relevant, available facts or by distorting by wrong or improper emphasis;
2. We shall not place unnecessary emphasis on gender, race, sexual preference, religious belief, marital status or physical or mental disability;
3. In all circumstances we shall respect all confidences received in the course of their calling;
4. We shall not allow personal interests to influence us in our professional duties;
5. We shall not allow our professional duties to be influenced by any consideration, gift or advantage offered and, where appropriate, shall disclose any such offer;
6. We shall not allow advertising or commercial considerations to influence us in our professional duties;
7. We shall use fair and honest means to obtain news and documents;
8. We shall identify ourselves before obtaining any interview for publication;
9. We shall respect private grief and personal privacy and shall resist the compulsion to intrude;
10. We shall do our utmost to correct any published information found to be harmfully inaccurate.

Mackie's SRM450 Active Live Sound Speaker

Australian Audio Supplies is pleased to announce the release of the Mackie SRM450 Active Live Sound Speaker in Australia. Using the combined resources of Mackie Designs and RCF, Mackie started out to make the best active, composite speaker on the market.

Here's what they say about what they ended up with. "It has such amazingly-flat frequency response and wide dispersion. It can be called a studio monitor. The high end is crisp and airy. Midrange is detailed and natural without a trace of harshness. And the SRM450's tight, steel fisted bass simply blows away anything remotely close to its size or price range (RRP \$1995 each)".

"Small PA loudspeakers tend to beam mid and high frequencies out in a narrow "spotlight" of sound that "drills a hole" in the heads of listeners sitting directly in front of the speakers... but sound dull and indistinct to listeners at the edges and back of the room. SRM450's even dispersion means you hear the same sound whether you're in front of the monitor— or far to one side or the other".

The SRM450 employs a damped titanium compression



driver that has linear response out to 20,000Hz. Mackie couple it to a unique logarithmic multi-cell aperture with dispersion fins that distribute high frequencies far more evenly than 'Constant Directivity' horns, they say.

A final comment from Mackie: "To hear is to believe. It will forever change your opinion of active composite speakers".

• **The Mackie SRM450 has an Australian Retail Price of \$1995 and is distributed by Australian Audio Supplies, Call +61 2 4388 4666.**

MAJOR TRADE EVENTS

- PLASA, Sept 5-8, 1999. London, Earls Court. www.plasa.org.uk
- INFOCOMM ASIA, Sept 15-17, 1999. Singapore. Ph. +65 297-2822. www.icia.org
- AES 107th, Sept 24-27, 1999. New York. Fax +1 212 682-0477. web www.aes.org
- REPLITECH ASIA, Nov 10-12, 1999. Hong Kong. www.kipinet.com
- LDI Nov 19 - 21st, 1999. Orlando. Ph +1 212 229-2965 web: www.e.ecync.net
- NAMM, 3 - 6 Feb 2000. LA. www.namm.com
- AES 108th. Feb 19-22 2000. Paris. Fax +1 212 682-0477. web: www.aes.org
- ENTECH 2000, March 5th - 7th, 2000. Sydney Exhibition Complex at the Olympics, Homebush Bay. Fax + 61 2 9876-5715. web: www.conpub.com.au
- MusikMesse, March 15- 19th 2000, Frankfurt. www.messefrankfurt.com
- SIB, Mar 26 - 29th, 2000. Rimini, Italy. Ph +39 541 711711. www.fiera.rimini.it
- NAB, April 8-13th, 2000, Vegas, USA. www.nab.com
- NSCA, April 27 - May 1, 2000. Las Vegas. Ph +1 904 273-2760 www.nasca.org
- PLASA Shanghai. June 7-9. +44 171 370-8231. www.lightandsound-shanghai.com
- WORLD LIGHTING FAIR, June 22-24. Tokyo. www.wlf.co.jp
- SMPTE 2001, July 10-13. Sydney. Ph + 61 2 9939-4445. www.smpet.org

Pf-215

Performance series



The Pf cabinets have been designed to give you the same high quality performance of our large sound touring systems without forgetting that, for the time being, you're the rigger, the roadie and the band. Easy to setup and teardown, most of the Pf can fit in your car, making the band's life a little bit more like a band and less like a moving company.

The Pf series is tough and reliable, using the same advanced technology found in all D.A.S. professional sound products. They'll give you the same performance that has made D.A.S. famous all over the world. Night after night, gig after gig, you'll be heard, loud and clear.



SPECIFICATIONS

Model	Pf-012	Pf-115	Pf-215	Sub-15
RMS (Average) Power Handling ^f	250 W	300 W	500 W	300 W
Program Power Handling ^g	500 W	600 W	1000 W	600 W
Peak Power Handling ^h	1000 W	1200 W	2000 W	1200 W
Frequency Response ⁱ	60 Hz - 20 kHz	50 Hz - 20 kHz	50 Hz - 20 kHz	45 Hz - 500 Hz
Nominal Impedance ^j	8 Ohms	8 Ohms	4 Ohms	8 Ohms
On-axis Sensitivity 1 M/1 M	99 dB SPL	100 dB SPL	102 dB SPL	100 dB SPL
SPL at full power (RMS/Program/Peak)	123/126/129 dB	125/128/131 dB	129/132/135 dB	125/128/131 dB
Nominal -6 dB Beamwidth ^k	Horizontal 90° Vertical 85°	Horizontal 100° Vertical 80°	Horizontal 100° Vertical 80°	Horizontal 100° Vertical 80°
Enclosure Material	Complex Aggregate Board	Complex Aggregate Board	Complex Aggregate Board	Complex Aggregate Board
Colour	Grey Carpet	Grey Carpet	Grey Carpet	Grey Carpet
Transducers/Replacement Parts	LF Section P-12/GM P-12 HF Section M-3/GM M-5	LF Section P-15/GM P-15 HF Section M-5/GM M-5	LF Section 2 x P-15/GM P-15 HF Section M-5/GM M-5	LF Section P-15/GM P-15 HF Section M-5/GM M-5
Connector: (2 paralleled Neutrik Speakon)	Section NL4 wired as ±1	Section NL4 wired as ±1	Section NL4 wired as ±1	Section NL4 wired as ±1
Dimensions (H x W x D)	59 x 42 x 35 cm	66 x 48 x 39 cm	104 x 48 x 39 cm	66 x 48 x 39 cm
Weight	21 kg (46.2 lbs)	28 kg (61.6 lbs)	41 kg (90.2 lbs)	26 kg (57.2 lbs)

^fBased on a 2 hour test using a 5 dB crest factor, sandlimited according to IES 268-1 (1985). All power ratings are referred to the nominal impedance. ^gConventionally 3 dB higher than the RMS measure, although this already utilises a program signal. ^hCorresponds to the signal crest for the test described in ^f. ⁱ±10 dB. Half space anechoic. ^j8 ohm cables and connector impedance has to be added to all impedance values. ^kAverage of one-third octave band measures.

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D.A.S.
SOUND PRODUCTS



BIRKART EXPAND

MELBOURNE: Birkart Group has recently announced plans for further expansion in the region.

The Vice President of Birkart Fairs & Events Pty-Ltd, Mr. Chris Utz, announced that the Birkart Group has decided to further expand both its concert logistics services as well as its exhibition services in Singapore, Hong Kong, and Shanghai, as well as in both Melbourne and Sydney.

Mr. Utz also confirmed the appointment of Mattiag Becker as the manager of the Birkart Fairs & Events Singapore office. Mr. Becker will oversee the further expansion of Birkart's exhibition services throughout the Asia region, while Philip Hocking, the Managing Director of Birkart Fairs & Events in Australia, will also be responsible for the further expansion of Birkart's concert logistic division, Birkart Concert Cargo, throughout Asia.

Mr. Hocking has confirmed these plans to Connections and advised that, "Birkart Concert Cargo is slowly becoming recognized as a major player in concert tour logistics. We are still a few years away from being the number one concert logistics company in Atustralia, but that is our goal. Our truck fleet is 100% utilized at present and we even have advance bookings for our two additional new 48' vans which will be on the road later this year".

Birkart now has over 20 offices in Asia employing over 500 people - and for the first time tour managers can use the one freight company wherever they tour in the Asia Pacific region.



Soundcraft Series Four shapes up

Hot on the heels of Soundcraft's successful Series Five comes Series Four, one of a new breed of compact front-of-house consoles which brings the benefits of VCAs and automation within budget.

With the familiar control layout found on its bigger brother - but with a smaller footprint - the fully modular Series Four is available in four frame sizes, providing 24, 32, 40 and 48 mono inputs into 8 group buses, 10 aux buses and stereo and mono main mix buses.

Four full-function stereo input channel are also included in each frame, and the output section includes 8 VCA groups and an 18 x 8 matrix section, which includes feeds from four of the aux buses.

For theatre applications, optional Showtime automation can also be added. This powerful package runs on an external PC and provides scene-set automation, remote control of FX devices and built-in Virtual Dynamics on every channel.

Standard features on the Series Four include pre/post switches, four-band EQ, LCR panning on inputs-mix and groups-mix, balanced sends and returns throughout, balanced direct outs, VU output meter/bridge and console linking capability.

• Jands, +61 2 9582 0909.

LM Audio debut amp range

Amper Marketing Services has introduced three new products in the LM Audio amplifier range. This takes to 12 the group of amplification products designed and made in Australia under the LM Audio name.

New are the LM 150 (mixer/amp, A\$595 inc tax), LM 300L (induction loop amp, A\$695), and LM 6P (1 r/u, 6 channel preamp mixer, A\$795).

• Contact Amper on +61 3 9435-1745.



Gadgets & Gizmos With Dr G

Flashing Aerials for Mobile Phones

You can not help but notice the impact the mobile phones have had on our industry. In my experience, around 90% of crews working on shows have them hanging off their belts or bum bags, and there seems to be a growing number of associated stories about how they don't seem to survive falls from great heights and dunking in fog juice etc.

Well, one little gadget I came across has for me become one of the most useful widgets now attached to my mobile. Whenever my phone transmits something, the microwave energy (apart from cooking my head) energizes a little coil with enough power to light a little blue LED. You say, "So what."

Well now I can see if my phone is ringing without it making a sound. Even my vibrating battery is too loud in some quiet instances.

While I do not condone leaving phones turned on during rehearsals or performance, it has still been very useful. Besides, at this price it hardly breaks the bank! Take your pick of the suppliers out there, but I use...

- WES Components, Sydney +61 (0)2 9797 9866
- Various models priced at \$7.90 (trade)



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VAPAC Report

By Mandy Jones

The results of an extensive benchmarking exercise undertaken by the Victorian Association of Performing Arts Centres have been published.

Under a joint partnership with the Victorian Government, VAPAC surveyed Victorian performing arts venues in order to establish minimum standards of facilities and to make recommendations for venue improvements.

VAPAC recognised the need to establish standards across performing arts venues to maintain consistency for the growing number of touring productions.

Venues were surveyed according to 3 categories: Proscenium Theatres (broken into six sub-groups according to venue size and flying facilities), Other Format Theatres, and Concert Venues. A team of appointed consultants comprising experts in the fields of architecture, theatre consultancy, theatre management, acoustics, asset management, building surveying, and quantity surveying assessed the venues' facilities in order to establish benchmark standards.

The report makes recommendations of minimum standards for each of the venue categories for seating, acoustics, car parking, stage dimensions and flying heights, scenery suspension, production control systems, lighting systems, sound systems, cable infrastructure, power, storage, Staffing levels and facilities, toilets and Front of House facilities.

Technical assessments are especially detailed, covering Lighting, DMX streams and Audio.

Out of the results, the consulting team came up with technical specifications, design consideration and equipment inventories to which each category should aspire.

The report, titled *'Oh, You Beautiful Stage! Benchmarks for Performing Arts Centres'* is incredibly comprehensive and will become an essential reference.

• Obtain from VAPAC Secretariat
Robyn Birrell, T +61 3 5225 1200



REDBACK's PHASE 4 PA AMPS

Available in Power Amp or Mixer variants, these amplifiers deliver full rating at very low distortion levels, says Altronic Distributors.

"Their robust circuitry ensures a long life in even the most unfriendly environments". It must be true, since Altronics offer a five year warranty.

"Vox muting, Input 1 priority function, bass and treble controls and phantom powering capability gives these amplifiers unparalleled flexibility for a wide scope of applications".

All models feature on demand fan forced cooling. Over temperature sensing is employed to shut down the amplifier in extreme over heat conditions.

Re-start is automatic once normal temperatures are attained. They even include AGC output limiting to prevent damage to the speaker load.

• Priced from RRP A\$699.
• Altronics, +61 8 9328-2199

Sabine intro UHF wireless system - with feedback exterminator

Sabine have announced the first wireless microphone systems with built-in FBX Feedback Exterminator.

The Sabine True Mobility Wireless System. Sabine Wireless System includes the two most comprehensive features found in any wireless system: True Mobility and Targeted Input Processing.

"True Mobility" provides the freedom needed with a wireless system. Unlike conventional wireless systems that are limited by the potential for feedback in acoustical "hot spots," Sabine's True Mobility systems include their patented, industry-standard FBX Feedback Exterminator. FBX kills feedback in setup and during your program. Microphones will sound loud and clear without feedback, say Sabine.

Sabine's True Mobility doesn't stop with automatic feedback control. Conventional wireless systems require the added cost of outboard equalizers, compressor/limiters, and de-essers to maximize performance. Sabine uses "Targeted Input Processing".

With Targeted Input Processing, no mic gets more processing than it needs, and every mic gets precise, targeted control per-

fectly suited to provide maximum performance.

The UHF system is a PLL synthesized system with 30 channels, True Diversity, dual-squelch circuitry, excellent noise rejection and superior dynamic range. Choose a handheld, lavalier, or headset microphone. In addition the system offers optional front or rear mount antennas, extension antennas, and antenna divider systems.

• \$2438 inc tax for a full handheld or lapel with receiver.
• Audio Telex, +61 2 9647 1411



NEW CHIAYO ULTRA PORTABLE PA

Check out this little bazzo! The BA280 Ultra Portable Mini PA is a new mini PA the size of a standard walkman, and it is designed to clip directly onto your belt.

Crisp clear sound is delivered via the supplied corded headset mic, they say, and it has a high powered speaker with robust metal grill. This is truly the most lightweight and portable PA available, claim NSCA who import them - and who are we to disagree?

• Comes complete with 4 x rechargeable batteries and charger. A\$165 RRP. Call NSCA on +61 3 9434-1888.



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Store and recall up to 128 scenes or patches for instant response to rapid performance transitions.

The Yamaha Sound Reinforcement Console line is legendary. From the PM1000 on, they have set the price/performance standard for the industry.

Now there is a new standard.

The M3000.

With the diversity to serve as a front of house or a monitor mixer or both simultaneously.

It's ideally suited for fixed installations. Churches, theatres, night clubs and theme parks – not to mention concert and industrial gigs.

Rental companies can reduce inventory costs!

M3000 can mix FOH on Friday and monitors on Saturday. So there's no need to stock both main and monitor consoles.

Touring companies can get PM features at an affordable price point.

Please take time to review the specs. We think you will agree that this level of performance along with the quality and reliability you have come to expect from Yamaha will make the M3000 an invaluable tool for your work.

The legend grows!

PLEASE CALL YAMAHA MUSIC AUSTRALIA ON 1800 805 413 FOR MORE INFORMATION
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Yamaha PA Web Site—<http://www.yamaha.co.jp/product/proaudio/homeenglish/>

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Velcro Cable Ties

There is such a variety of Velcro cable ties out there now. These days, they seem to fall into three categories that I call "turn back", "end to end" and "double sided". Many people have their own personal preference (mine is "double sided") but here is a selection of the best and cheapest I have found:

- R&R Straps
- 0419 862 265

Two sizes in "turn back" style - long for bundle diameters 8-14cm and short for bundle diameters of 3-5cm. Turn back is good for attaching looms to pipes and trussing because it is not normally attached to the cable. The strap turns back through the ring and attaches on itself. Price \$2.10 for 25cm and \$2.30 for 40cm.

- Audio Sound Centre
+61 (0)2 9901 4455

Various sizes "end to end" style. These are meant to be attached to one end of the cable via the elastic loop at one end. Colour coded tails can make cable identification easier. These ones ties the cable by wrapping in one direction in the same way as "double sided" ties. Price \$3 for 17.5cm, \$4 for 22cm and \$5 for 30cm.

Various sizes/colours "double sided" style. These are also meant to be attached to one end of the cable by looping through the hole at one end. Being mass produced, these are typically cheaper than the other types which are manually sewn together. Available in large amounts on rolls, these work by attaching to themselves as they wrap the cable. Priced at \$1.83ea for 30cm - lots of colours.

- TLE Electrical
1800 681 412

Various sizes "double sided" style - TLE has a large range of sizes up to 1m in length, at reasonable prices but they are all black. Too many prices to list here.

AT release EASE data

BRISBANE: Acoustic Technologies announce that EASE Data is now available for their range of professional loudspeaker enclosures.

EASE is a highly regarded computer program which allows acousticians to model the performance of sound systems in 3D acoustic space.

Acoustic Technologies, in conjunction with Tim Kuschel from GUZ BOX Design + Audio utilised the anechoic chamber at the University of Sydney to generate the measurements required for EASE. EASE have authorised these measurements which are now available for world wide distribution. Acoustic Technologies have the EASE Data



File on their website for immediate download.

• Go to www.acoustic-tech.com.au

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www.ambertech.com.au

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BEHRINGER DJ MIXERS

BEHRINGER announce a range of DJ mixers. The DX100, DX500 and DX1000 are pro DJ mixers at a truly low pricing. The DX100 retails for A\$299, the DX500 for A\$499 and the DX1000 (pictured) A\$1,199.



All are fitted with a 3-band-equalizer, turntable grounding for the phono inputs, PFL-function, punch buttons and highly precise VU meter. As well as this, all have robust faders and a high-quality crossfader specified for more than 200,000 cycles.

A 12 second digital sampler in the DX500 allows you to integrate all kinds of creative samples and loops to the mix. It has 3 dual input stereo channels and mic in.

The DX1000 has five dual input stereo channels for ten stereo sources, dual mic inputs, talkover-function (with controllable ducking and ramp time), separate zone outs, light control, bass kill on the EQ, machine control on all channels, and a sub-woofer output with adjustable crossover. And more!

• (Au) MusicLink +61 3 94299299



NEW SHURE IN-EAR SYSTEM

Shure Bros has launched a new wireless personal monitor system for touring applications.

The PSM700 is a frequency agile system with two groups of 16 selectable UHF frequencies and an operating range of 300 feet. The system is fully compatible with all other Shure wireless systems, and up to 16 PSM700's, each providing a separate stereo mix, can be operated simultaneously.

Featuring Shure's new E5 universal fit earphones, the PSM700 offers users the choice of stereo, mono and MixMode operation.

Exclusive to Shure's PSM series, MixMode provides users with the choice of sending and receiving a pair of monoaural mixes rather than just a single stereo mix. When the MixMode function is active, the balance control on the PSM receiver can be used to adjust the relative volumes of these two mixes according to individual performance needs.

The E5 earphones are the first universal fit, dial driver personal monitors on the market. They incorporate proprietary low mass/high energy drivers and provide a secure and comfortable fit while delivering full range performance. They are also available with custom-fit sleeves.

Other components in the system include the 1/2RU P7T transmitter, equipped with front panel control and extensive monitoring capabilities, the highly featured P7R bodypack receiver, a rackmount kit, individual protective storage cases for the receiver and earphones, a 9V battery and 10 foam ear inserts. A full range of optional accessories is also available.

•RRP A\$7,595.00. Australia. Jands, +61 2 9582 0909

Following a very successful North American NAMM Show Launch earlier this year, AWA Audio Products has announced that its HHB Classic and Radius ranges of advanced tube processors are now available throughout Australia.

Exploiting the unique sonic characteristics of the vacuum tube in a series of uncompromising, low noise designs, HHB's Radius range includes a mic preamp, parametric EQ, compressor, voice processor and mic preamp/compressor, all available at prices not normally associated with high quality tube outboard equipment.

The Classic range, comprising of a compressor parametric EQ and

REDBACK C 2077 30 watt MUSIC HORN

A combination of a re-entrant horn with a high frequency driver allows this speaker to deliver better-than-you-think sound clarity. Equally suited to both speech and music applications, it is a neat weather resistant public address speaker. It incorporates an aluminum mounting bracket and has an IP65 rating. Manufactured from high impact ABS plastic, the speaker is ideally suited for installations in places such as schools, gymnasiums, around swimming pools, sporting stadiums, stations etc. RRP \$429



• Altronics, +61 8 9328-2199

HHB's new tube processors

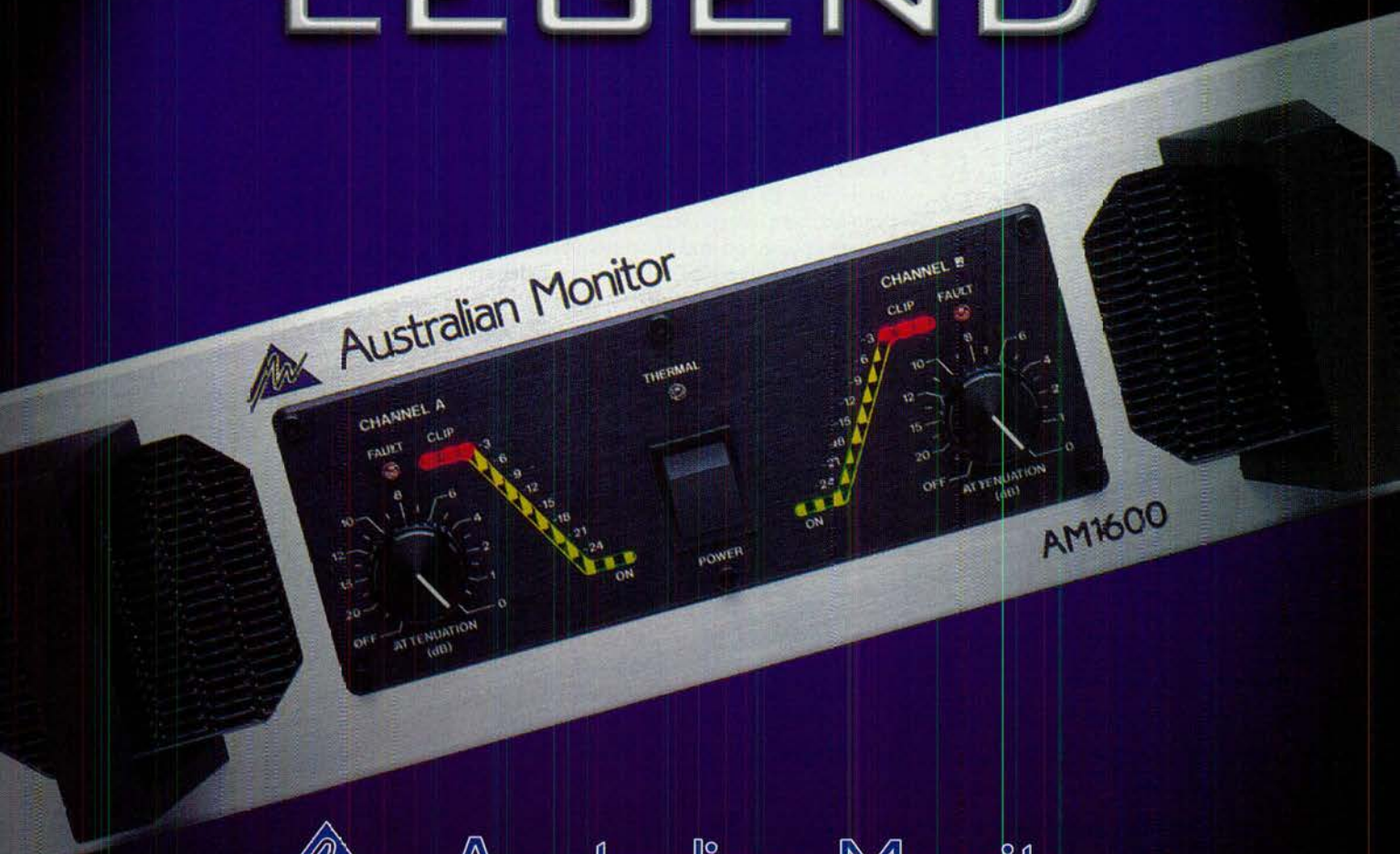
mic preamp, uses carefully selected military grade GE 12AX7 and Siemens EF86 tubes powered by high HT voltages to ensure maximum gain and minimum noise, further enhanced by the minimal use of transformers in the signal path.

Retail prices: Radius10, 20, 30 & 40 A\$1,999; Radius 50 A\$1,299, Classic60 A\$6,999, Classic70 A\$8,299, Classic80 A\$5,599.

• AWA Audio Products, call +61 2 9578-0112. www.hhb.co.uk



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DB Technologies UHF system @\$1,499



The UHF 2000 PRO is a professional 16-channel selectable wireless system operating between 770 and 920 MHz.

DB Technologies is extremely experienced in producing this type of product, having for many years manufactured OEM Radio Systems for some of Europe's largest microphone manufacturers.

The UHF 2000 PRO range consists of a full microprocessor controlled PPL-synthesised 2-channel true diversity receiver, a hand held transmitter (left) with integrated double suspended condenser microphone capsule, and two pocket transmitters, one for microphone and one for instrument application. Both use NEUTRIK Nano-Con input connectors. Double frequency conversion allows a switching band width of 20 MHz.

- Available from CMI Professional Products Group at a Recommended Retail of **A\$1,499.99.**

Meyer UPM-1P

The Meyer UPM-1P self-powered loudspeaker is more than a powered version of the Meyer UPM-1. The UPM-1P features phase-corrected electronics that produce flat acoustical phase and amplitude responses, resulting in exceptional system impulse response and precise imaging.

The speaker is the same size as the conventionally amplified version (UPM-1), but includes a sophisticated amplification and control electronics package which adds a mere 3kgs to the unit's total weight. Advanced horn design achieves a consistent polar response and smooth arraying behavior. A much wider vertical polar pattern (when compared to customary loudspeaker enclosures) is achieved by the unique design.

The UPM-1P is ideally suited for small PA applications requiring complete coverage with a compact, high-powered system, and also make excellent under-balcony, front-fill, and keyboard speakers.

A constant directivity high-frequency horn affords a 100° beam width, and sophisticated phase-correction circuitry assures true point-source performance without the off-axis cancellation effects that plague customary dual-woofer designs.

The UPM-1P is a bi-amped, three-way system comprising two 5-inch low-frequency cone drivers in a vented enclosure, and a 1" titanium dome on a symmetric horn. Inte-

gral bi-amplifiers (LF @ 225 Wrms, HF @ 125 Wrms, burst power) are built into the enclosure, along with an active crossover, driver protection voltage limiters, and frequency and phase response alignment circuitry. A laser-trimmed differential input stage affords superior common-mode rejection to accommodate signal runs through a simple twisted pair cable. Rear panel LEDs indicate power, and driver thermal limit.

The UPM-1P's integral power supply suppresses high voltage transients. Additionally, a PowerCon AC output connector is provided to facilitate AC looping.

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Write in Reader Service Number: 192

Wide Dispersion. Extreme Output. Mackie's New Professional SRM450 Active Speaker System

The stiffest, strongest, most elegant composite enclosure on the market. Unique asymmetrical trapezoidal design eliminates internal standing waves—and lets the SRM450 recline comfortably when used as a stage monitor. Handles on both sides AND top.

Mackie started out to make the best active composite speaker on the market. Through their acquisition of RCF, one of the world's foremost producers of high quality transducers, Mackie has been able to combine their state-of-the-art electronics with proven speaker design to build a *truly superior Active Speaker*.

High Accuracy. The SRM450's high end is crisp and airy. Midrange is detailed and natural without a trace of harshness. And the SRM450's tight, steel fisted bass simply blows away anything remotely close to its size or price range.

Extreme Output. The SRM450 combines Mackie's high-headroom/low-noise input circuitry with 400 watts of FR Series high current amplification - the most powerful of any active composite speaker of this size and weight. The low frequency amp is servo coupled to the bass transducer for maximum control and extended output in the lowest octaves.

Wide Dispersion. Using a proprietary wide dispersion horn design the SRM450 achieves better coverage than any other speaker in its class. Other features include Variable Gain Control, 75 Hz Roll Off, contoured EQ Switch and Timed Turnoff. All of this housed in a strong, elegant composite cabinet with built-in fly points on all sides. The unique asymmetrical design allows the SRM450 to double perfectly as a floor monitor.

To hear is to believe. Audition the remarkable SRM450 Active Speakers at your Mackie dealer today.



SRM450s couple their damped titanium compression drivers with the room via the same kind of multi-cell aperture used in the finest big-studio horns. This achieves more even horizontal and vertical dispersion than any other comparably-sized SR speaker.



SPECIFICATIONS

SRM450 Active Speaker Physical Specifications
Height 66cm; Width 39.6cm; Depth 37.5cm; Weight 23.2kg; Mounting Methods Integrated Mounting Points (10mm x 1.25mm) Two each located on sides, top, bottom and rear. **Transducer Specifications** • LF Transducer: Diameter, 300mm; Voice Coil Diameter, 63.5mm; Sensitivity, 98dB; Nominal Impedance, 8 ohms; Power Handling, 300 watts; Frequency Response, 50Hz - 3000 Hz • HF Driver and Horn: Diaphragm Diameter, 44.5mm; Exit Throat Diameter, 24.5mm; Diaphragm Material, Titanium; Sensitivity, 106dB; Nominal Impedance, 8 ohms; Power Handling, 150 watts; Frequency Response, 1000Hz - 20,000Hz; Horn Type, Composite; Exponential and Conical Mouth Size, 304.8mm W x 177.8mm H; Horizontal Coverage, 90° +/- 10° 1KHz to 20KHz; Vertical Coverage, 45° +/- 10° 2.8KHz to 20 KHz **Power Amp Specifications** LF Power Amplifier: Rated Power, 300 watts; Rated Load Impedance, 4 ohms; Rated THD, $\leq 0.1\%$; Cooling, Convection Extrusion; Design, Class G, Parametric Servo feedback • HF Power Amplifier: Rated Power, 150 watts; Rated Load

Impedance, 4 ohms; Rated THD, $\leq 0.1\%$; Cooling, Convection Extrusion; Design, Conventional Class AB • **System Specifications** • Input Type, Balanced Differential; Input Impedance Line, 20 kohms; Input Protection, RFI and Level Protected; Sensitivity, Line +4 dBu (center detent), Mix -36dBu; Max Input Level, Line +22dBu; Low Cut Frequency, 100 Hz Second Order; Music Equalization, Peaking +3dB @100Hz, -3dB @10KHz; Enclosure Alignment, 6th Order; Over Excursion Protection, 2nd order High Pass Filter; Thermal Protection, Amplifier Shut Down Auto Reset; Muting, 5 seconds at turn on; Low Line Voltage Shut Down, Nominal Line; Acoustic Frequency Response, 45 Hz - 20,000 Hz; Low Frequency -3dB Point, 55Hz; Maximum SPL at 1 Meter, 123dB; Low Frequency Crossover Type, 24dB/Octave, Time Offset corrected; High Frequency Crossover Type, 24 db/Octave; Crossover Frequency, 1800 Hz; Driver protection, Independent LF and HF Compressors; Low Frequency Roll Off, Dynamic-Signal Level Dependent; Wireless Power Interface, +15 volts DC and Normalized Signal I/O; Operating Temperature Range, -10°C to 45°C (14°F to 113°F)

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Write In Reader Service Number: 170

Apogee FH4 gets TEC nomination



Mix Magazine's Foundation for Excellence in Audio (TEC Award) announced that Apogee Sound's FH4 Concert Loudspeaker has been nominated in the category of Sound Reinforcement Loudspeaker Technology.

Apogee's FH4 is a high-power, three-way tri-amplified loudspeaker, and is the most advanced concert system that Apogee presently offers. Here's what they say: "Characterized by smooth, natural sound, even at very high levels, the F4HA can handle any task from opera and classical to full-out rock and roll. It arrays very smoothly with like units in both the horizontal and vertical axes, making it ideally suited for large-scale concert sound systems".

The FH-4 features a 15" horn-loaded bass driver, a 1W mid-range cone driver loaded by a large midrange waveguide for outstanding pattern control, and a 2" throat horn-loaded HF driver.

Special attention has been paid to the design and materials of all three horns, resulting in ultra rigid, highly damped construction, greatly reducing typical horn distortion characteristics. Additionally, all three drivers are damped and cooled by Ferro fluid, yielding lower harmonic distortion, greater power handling, and excellent control of short term impedance rise for better transient response.

• Australia: CMI Professional Products Group, Ph. +61 3 9315 2244.

MACKIE POWERED MIXERS

Australian Audio Supplies is pleased to announce the release of the Mackie PPM (Professional Powered Mixers) Series.

They offer real 32-bit EMAC digital effects, enclosed in an impact-resistant, injection-molded case instead of a rat-fur covered wood box, says Mackie. How rude! We like our rat-fur....

Inside each PPM Series mixer are two FR Series high-current power amps with a toroid transformer, big storage capacitors and tough fiberglass circuit boards. The entire mixer back is a custom-cast heat exchanger that ensures effective cooling and ensures reliability in conditions that would shut any other powered mixer down.

There are 5 models in the PPM Series: 808S - 1000 Watts Stereo, 8 mic/line channels; 808M - 1000 Watts Mono, 8 mic/line channels; 408S - 500 Watts Stereo, 8 mic/line channels; 408M - 500 Watts Mono, 8 mic/line channels; 406M - 500 Watts Mono, 6 mic/line channels.

• Mackie PPM Series are distributed by Australian Audio Supplies, Tel +61 2 4388 4666



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DN-M2300R



DN-C630

Denon are again first with the release of the DN-M2300R Dual Mini Disc Player/Recorder. The DN-M2300R has all of the features needed for today's DJs. This unit has the ease of operation that all Denon products have, as well as a recording function.

Denon have added to their line-up of single CD players the NEW DN-C630. Designed for Post Production, Live Playback, AV, Broadcast and Theatre. The DN-C630 has a price that you won't believe.

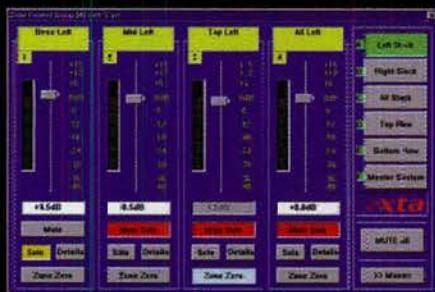
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Write in Reader Service Number: 137

Satisfaction!



HARRY WITZ (db Sound, Chicago) equips 'The Rolling Stones' touring system with thirtytwo DP 226's from XTA.

Combining XTA's AudioCore™ software and their new Array Control™ feature, Harry is able to provide array adjustment from the FOH mixing position.

XTA's Array Control™ feature gives Harry the ability to group outputs into any combination required, which makes the remote control of the Stones' large complex loudspeaker arrays an unconstrained reality.

Who says you can't always get what you want?



When will you change?

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Write in Reader Service Number: 123

Media Ethics?

I read, with fascination, your editorial (*Connections August*) regarding media ethics and your magazine's stated policy of being above the scurrilous conduct of providing favourable editorial in return for paid advertisements.

Perhaps you would like to explain to your readers why the inserted Hire & Production Directory has no reference to my company - even though the pointer to it on Page 5, the first real page of the magazine, is under a story detailing the four contenders for sound reinforcement for the Olympic Games ceremonies (of which we were one).

Is this omission because we neither subscribe to your magazine nor advertise in it?

Or is it because of oversight on your part that brings into ques-

tion the credibility of the directory? ...Or perhaps you have some other reason?

Is it because we have failed to fill in a form requesting a listing that we could have only known about by subscribing to your magazine?

If that is so, should you not advise in a prominent place and in large type that the directory is not intended to be either comprehensive or complete but merely a compendium of *Connections* advertisers and readers who have had the time to fill in a form or pay for a prominent listing?

Or is that taking media ethics just a little too far?

I await your published reply.

• **Chris Kennedy**
Norwest Productions
Sydney, Australia

• We regret that Norwest are not listed in last month's directory, and hope they will choose to be listed in the next one. The next Hire & Production Directory is in the February issue, the closing date for listings is December 31st. The Directory is open to all, and free listings can be on our form or by email. Call tollfree, 1-800-635-514, or +61 2 9876-3530 for details. -Ed

Dumb ass? Moi?

Surely you are the most **dumb ass** publishers in the free world, by saying never ever. (*Ethics, August*) How can you rule out doing what virtually every other branch of media do do, and do often. Forthwith, you've restricted your options. Now you can't quietly cut a deal with an advertiser, or take a contra trip, or some free loudspeakers, or even do lunch - without telling your readers. You must make serious profits there!

- **Michelle Vella, Communications, UTS, Syd.**

Multimeters

I have just seen your bowdlerised version of my Letter in the magazine (*August, Letters*) concerning using cheap multimeters on mains power.

Almost half the original letter is missing (censored?) including descriptions of the dangers involved and the subject itself, ie using a \$20 multimeter, rendering what remains meaningless.

I do not know who's interests you thought you were protecting by doing this but it certainly was not those of your readers who may be unwary enough to use an unsafe multimeter to test dimmer and three-phase outlets as intimidated by Andy Ciddor.

I request that you either reprint my letter in its entirety (only 266 words) or explain to your readers that it was heavily edited and the reasons for so doing.

-**Phil Allison, Sydney.**

• There was indeed a sad typo in our edited version of Phil's letter. But the edit conveyed the message, which was re-stated in John Grimshaw's GADGET pages of the same issue. The message is DO NOT use a cheap multimeter to measure mains voltage!

As for us protecting anyone's interests, we can only refer to this recent quote from Jacques Derrida, a most famous philosopher (and featured elsewhere in this issue) -

"What makes light visible, its visibility, is not visible. The visibility of the visible is not visible".

A nice letter!

I would like to sincerely thank those responsible for the placement of the two pictures - our studio photo, and a photo of Barry Humphries - in your last two editions.

Additionally, your tracking guide is a fantastic service for Australian Studios. As a show of gratitude I would like to order a one year subscription for a friend of mine, James Hewgill, the live engineer for the W.A. Symphony Orchestra - and arguably Australia's No. 1 engineer.

Thanks again!

- **Darren Halifax, Satellite Recording Studio, Burswood WA.**

• Thank you Darren. A nice letter is very rare, and the Tracking Guide is a thankless task to prepare every month, as we have for seven years or so now.

Why don't you..

I note that you seem reasonably responsive to reader suggestions, so how about comparing moving lights, side by side, without bias? I'd like to see that.

Also, what about studying the cost of ownership. How long will devices like that actually last?

- **Jim Bennett, Auckland.**

• Mindreader. See this month's lighting pages for almost just such a thing! Cost of ownership depends on usage. 3 years is roughly the economic lifespan of moving lights used fulltime. Perhaps longer.

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Write in Reader Service Number: 163

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Write in Reader Service Number: 135

Broadcast & Screen AUDIO

SEPTEMBER 1999

Telex Audiocom at the Gridiron

Continued from page 9

For the past 12 years all teams in the NFL have used Telex Communications Audiocom Intercom to relay information from the coaches booth to the field.

For the Australian match, preparations began 4 days in advance with the running of cable from the coaches boxes in the stands to the sidelines of the teams. The Telex Audiocom systems utilize balanced audio and allow standard telephone cable to be used - saving the expense of running expensive shielded cable. This is extremely handy when communications are needed quickly or needed for a temporary install such as the single NFL match in the Olympic stadium.

The two teams use 3 to 5 separate channels of intercom at their disposal. Telex installed two PS-2000L power supplies in each booth with the team's coaches providing 4 channels of intercom for each

team. The PS-2000L provided the necessary power to run the belt packs in the coaches booth and the power required on the field.

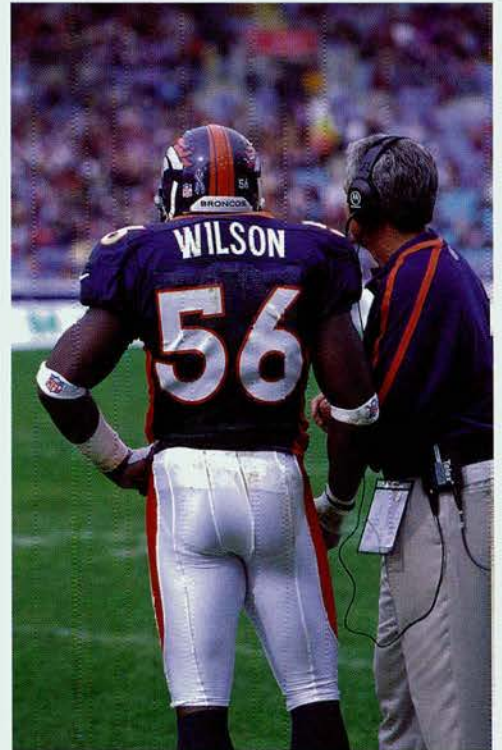
Using TW-5W splitters, Telex provided coaches with the BP-1000 single channel belt pack and where coaches needed to change channels, Telex installed the BP-2000.

The BP-2000 allows a coach the ability to switch between the two channels of the intercom system, this is done quite frequently in the NFL.

Coaches on the field also utilized the BP-1000 single channel belt pack or the BP-2000 dual channel belt pack.

Each coach was given the choice of a single sided HR-1 headset or a dual sided HR-2 headset. Many coaches in the upstairs

(continued on page 34)



ABC signs for 400 Netia Workstations

D-Card retained, but 51 locations to get new French audio production tools



A contract to supply 400 workstations to the ABC is signed and delivered: **Christophe Bernet** (Regional sales manager Asia Pacific for Netia), **Colin Knowles** (Head Technology Strategy and Development, Australian Broadcasting Corporation) and **Paul Heaton**, managing director, Sycrotech Systems Design Pty Ltd.

SYDNEY: The Australian Broadcasting Corporation has announced that it has contracted with Sycrotech Systems Design to supply Netia Digital Audio Workstations for ABC local and regional radio in 51 locations around Australia - as well as Radio National in Sydney.

SALE

"This is an important step for the ABC, enhancing our capacity to make radio programming and (to) make items more widely available across Australia for all of the ABC's media outlets" said Mr. Colin Knowles, Head of the ABC's Technology Strategy and Development group. "This decision continues our commitment to the development of regional broadcasting, ensuring regional stations have access to the same production tools as the major production hubs".

The digital audio workstations are replacing analogue reel-to-reel tape recorders and tape cartridge machines in both studio and radio production areas. The decision follows trial and pilot projects introducing digital audio workstations in

(continued over page)

VA⁴ technology

KF700 SERIES

Total
Acceptance



Whitney Houston tour 1999 (Maryland Sound custom KF750 System)



VH1 New Year's Eve 1998/99, NYC (Special Event Services)



River Stages 1995, Nashville (Special Event Services)

Never before has the audio industry so rapidly or so unanimously accepted a new product as they have the KF700 Series. In the 6 months since its introduction an astounding 1,600 units have been sold, putting it on track to become one of the best-selling loudspeakers of all time.

Designers, installers, consultants and engineers from all facets of the industry have enthusiastically embraced the unique features of the KF700 Series. These compact, lightweight cabinets provide exceptional sound quality, phenomenal arrayability and unbelievable SPL for their size, while fast, efficient rigging and truckpack save time and money. Every application, from tours to installations to special events, will benefit from the cutting-edge technology and problem-solving capabilities engineered into the KF700 Series.

If you haven't experienced the KF700 Series, then you haven't heard the future of audio.

Call us or visit our website to find out more.

Additionally, KF700 Series loudspeakers have been used on the Placebo, The J. Geils Band Reunion and Hootie & the Blowfish tours, and at the 1999 Women's World Cup Soccer Championship Game. They have also been used in installs including the Sands Casino (Michigan), The Gorge (Seattle), The Hampton Beach Casino (New Hampshire), the Calvary Church (Michigan), and the Breslin Student Events Center at Michigan State University.

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EAW is the worldwide technological and market leader in the design and manufacture of high-performance, professional loudspeaker systems.

Write in Reader Service Number: 108

(ABC, continued)

a limited number of regional radio stations.

The ABC is retaining the D-Cart system as its primary audio recording, editing and playout system throughout the capital city newsrooms. This central server, hard disk storage based system developed by the ABC continues to meet the requirements of large-scale newsrooms with up to 200 simultaneous users.

French company Netia Digital Audio is a leading manufacturer of software products for professional radio and television broadcasters. Its main range of audio products provide software tools for acquisition, production, live transmission and on-air automation for small and large broadcasters. The products are client-server solutions based on the Microsoft Windows NT operating system. Netia products are installed in over forty broadcasters around the world.

Radio France have also just selected Netia for a huge installation.

Syncrotech Systems Design are a Sydney based distributor of professional audio products. They also handle AMS-Neve.

Vegas Pro - multi-track audio has Just become VERY easy

With Sonic Foundry's soon to be released software, Vegas Pro, users will be able to get one of the most powerful software based audio multi-track solutions yet available on the market for the PC.

Building on its highly successful software, "Sound Forge" and "ACID", the developers at Sonic Foundry have produced a remarkably full featured and extremely well designed piece of

software. *Vegas Pro* does not claim to be the solution to all of your audio editing needs. Its job is to solve your multitracking needs as simply and efficiently as possible. And that is a job it does remarkably well - so much so that it could easily become THE benchmark in multitrack DAWs (Digital Audio Workstation).

As with any "software" solution, the perform-

TESTED BY JOHN GRIMSHAW

SOUNDCRAFT DEBUT DIGITAL RADIO CONSOLE



THE RM1D is a new digital mixing console from Soundcraft which comes in 6 fader, 12 fader, and 12 fader extendible frame sizes. As you'd expect, every parameter is recallable and resettable. Any physical input port can be assigned to any console input fader. Each input section has control over two inputs - either digital or analog. A Lexicon digital effector 'Reflex' is inbuilt. Every input has three band EQ with true parametric midrange. The smallest configuration has six input strips and a master section.

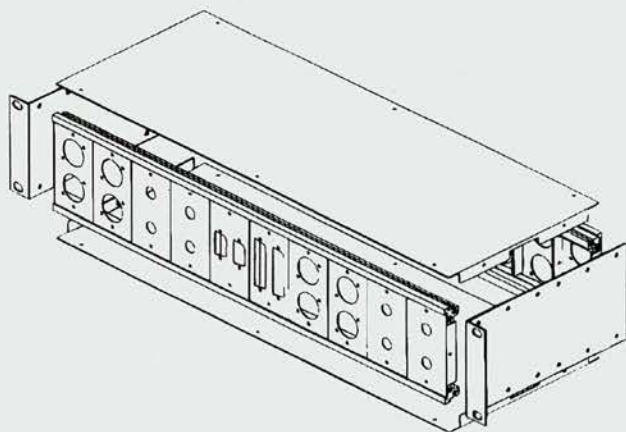
Soundcraft broadcast consoles are distributed by Jands (in Au). Call +61 2 9582-0909

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Write in Reader Service Number: 142

Broadcast & Screen AUDIO

ance of Vegas Pro is only limited by your processor speed, amount of RAM and hard drive space. Given these limitations, *Vegas Pro* allows you to have an unlimited number of audio tracks and up to 26 stereo outputs, each of which can be addressed to any sound card you have loaded in the system. And that is only the beginning

Useability

From my point of view, the "ease of use" is one of the most important aspects to any new piece of software that I try to learn.

Spending hours learning how to use a program is wasted time to me. So, I approached Vegas with some trepidation. Less than half an hour later, I had worked out most of the functions required to operate the software.

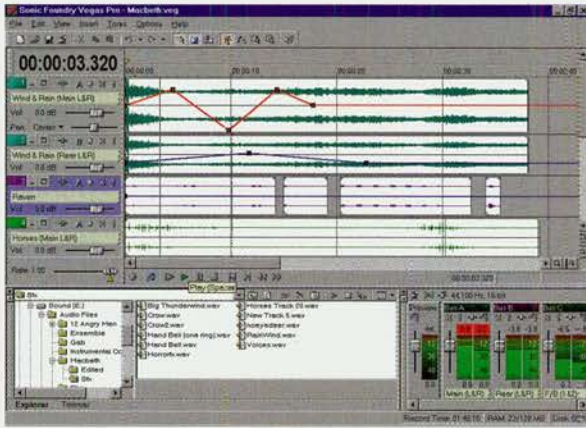
This is largely due to the fact that the developers have stuck religiously to the classic "Windows" design format, thus making navigation around the program obvious and easy to learn for anyone even vaguely familiar with Windows software.

Interestingly, *Vegas Pro* steers away from the concept of reproducing the controls of audio hardware on the screen. You won't find things that look like mixer faders, Pan or EQ knobs etc. Just simple controls that can do the same thing, take up less space, and not distract you or get in the way of the multitrack timeline (which is the most important thing that you should be able to see at any time).

The full screen picture you see at the top right is the result of twenty minutes work. In that time I was able to use the built in explorer window to place six stereo files into the Multitrack screen.

From there I could allocate them to the outputs of my soundcards, organise the pan and volume controls and record a live "heartbeat" sound effect to create a forty second atmospheric track with wind, rain, horses, birds and bells.

A further 15 seconds later and Vegas had mixed down this sequence to a new sound file ready to use. The speed with which I



was able to produce this relatively simple sound effect was stunning. Working on longer and more complicated projects was no less difficult. In fact, while trying to force the software to breakdown, I had forty stereo tracks happily playing simultaneously before I gave up the effort – and that was from a P2 350, with the IBM fast IDE 10Gb drive. Unfortunately I did not have time to organise a multitrack recording session while I had the software to review, however I could see how easily this work

(continued over)

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Write in Reader Service Number: 130

booth wear single sided headsets while many of the coaches on field wear dual sided headsets to help block out the noise of the crowd.

The head referee is also wired for sound using the Telex FMR150 so he announce penalties and confirm touch-downs which are broadcasted directly to the spectators. EV SX300's were strategically placed around the field for music and announcements.

The system used in Stadium Australia was typical of the set-up as used in the States. However, many teams are now using the Telex BTR600 wireless version. The BTR600 wireless system is very unique as it has Telex's proprietary encryption feature, which insures total privacy so the teams cannot listen in on each other.

Oh - and the score, in case anyone was interested: The Broncos won 20 - 17 by scoring a goal in the last minute - what excitement!

Telex Audiocom systems are also used in Australian footy... for such AFL teams as West Coast Eagles, Fremantle Dockers, Richmond and Geelong.

EVI Audio is a division of Telex Communications Inc. Call +61 2 9648 3455



Vegas Pro (continued)

could be achieved.

As I mentioned previously, *Vegas Pro* is a multitrack DAW, and not designed for serious two track editing. There are probably many reasons for this, not the least of which is that this type of editing is the domain of their other software item, "Sound Forge". This has resulted in a simplicity within *Vegas Pro* that makes it an excellent alternative option against its obvious competition, such as Cubase or SAW. In fact, the combination of both *Sound Forge* and *Vegas Pro* would make a powerful and well intergrated sound editing system, though this will set you back some serious money.

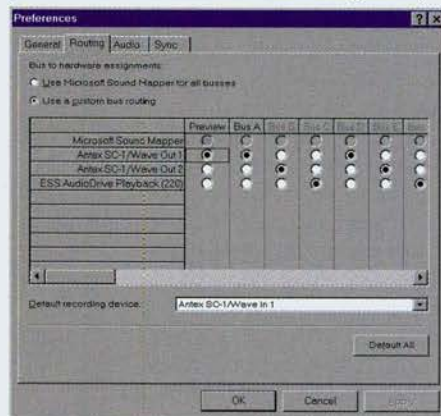
Features

It would be impossible to describe all of the features of this software in the amount of space I have here, so here are the highlights:

- The ability to combine sounds of varying resolutions up to 24bit/96kHz
- The ability to combine sounds of varying file formats (.wav/.aif/.ra/.avi) in the one project. Vegas will also support MPEG 1 layer 3 file formats (at time of writing, I could

not ascertain if they were considering the future support of the MPEG multitrack formats of MPEG2 - 5.1 or 7.1 that will be useable for audio on DVD Video and DVD Audio)

- Non-destructive editing
- Extremely simple punching in and retaking facilities
- The use of "plug-in" effects for various chorus, reverb, delay etc effects on any channel or over an output buss. These are not the standard DirectX plug ins, but a new format. It is likely that Sonic Foundry decided not to support these existing plug ins to increase the performance of the software. Reaserch suggests that they have made these new plug in specs available to outside developers. Four plug in effects are supplied with the software.
- Midi timecode syncing options
- Video monitoring window and/or timeline, used when editing the audio track on video files
- Simultaneous record and playback
- Simple "drag and drop" editing
- Keyboard controls are as used in Sound Forge, and quick and easy the learn
- Help pop up displays the function of every button as the cursor in placed over it
- Handy labels and colour coding for each audio track
- Simulated VU display of the buss outputs (these can be labelled as well - see picture)



Really, the best thing to do would be to use the program and see for yourself. The demo version can be found at - www.sonicfoundry.com

In the face of this new release it will be interesting to see the response of the other software and hardware developers. Vegas Pro is going to be hard to beat for high quality, high performance multitrack editing.

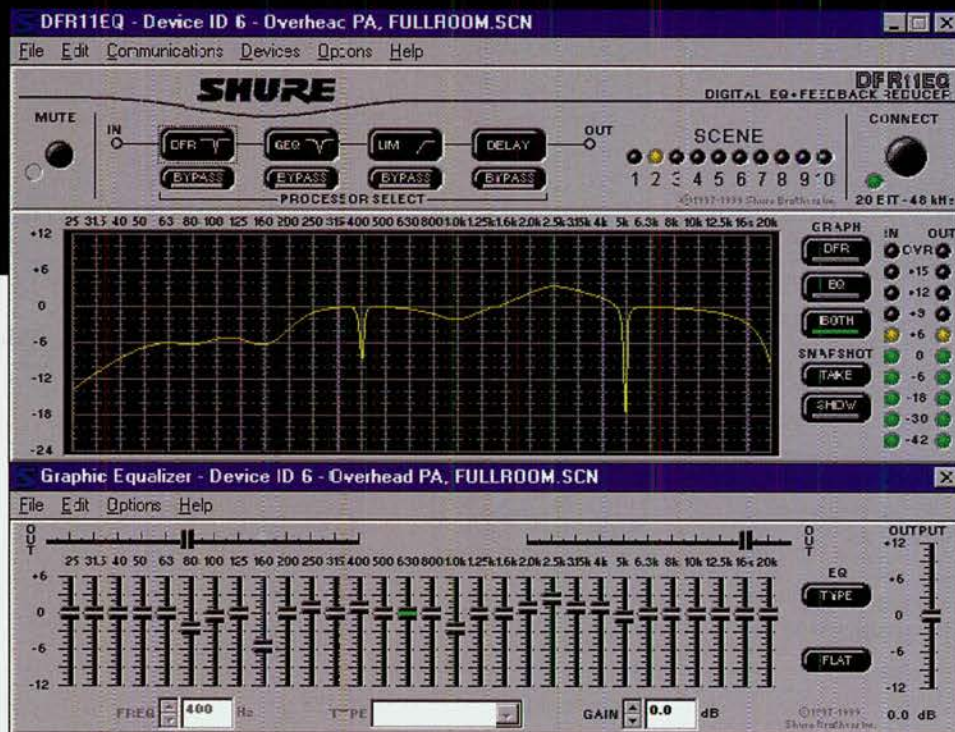
Requirements:

- 200 MHz Processor (400 MHz Processor recommended)
- System Requirements: Microsoft Windows 9x / NT 4.0;
- Windows-compatible sound card;
- At least 32MB RAM (128MB recommended);
- DirectX Media Runtime 6.0
- Internet Explorer, 4.0 or later
- 24-bit color display recommended
- Price US \$699



Tom Hansen (Telex Communications), Francesca Peskop, (EVI Audio) Gary Bosiaci (Telex Communications), and Bryan Davidson (EVI Audio) at the big match

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*The opinion of many in the commercial sound reinforcement industry.

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Write in Reader Service Number: 195

Duncan Fry

Wally's World Part 2

The story so far: Our two heroes have braved the wilds of Deriliquin and are about to head back to Melbourne in time for Sunday lunch. Read on!

We climbed into the truck and headed off down the highway. Wally bent down and lifted the lid off his Esky. Shock Horror! It was empty. The colour drained from his face as he stared into a swishing mass of melted ice. His fingers feverishly scabbled around in it, searching, searching, but he knew the truth. There was no beer left.

"We'll have to stop at the border" he said, "There's a pub there that opens early for about an hour, to sell the Sunday papers and stuff like that." His face took on a look of haunted desperation "Come on, we'd better hurry!"

How on earth does he know that, I asked myself? I'd never heard of such a thing. Was there some kind of alcoholic grapevine that disseminated such vital advice, and filed it away for a rainy (or dry, to be more accurate) day?

In an hour or less we were at the border. I could see the pub in the distance. It was the only building. Probably built in the previous century for just such an occurrence, I thought. I could imagine the thirsty bullock drivers hurrying along for a Sunday morning heart starter.

Wally was out of the truck cab before we stopped, his legs running before they hit the ground. A minute later he emerged beaming from the bottle shop with a dozen cans and a fresh bag of ice.

About ten miles or so down the road he turned to me. "I've got to have a leak," he begged. "Can you pull over to the side of the road?" I pulled over and he hopped out, had a quick leak and jumped back in the cabin. We headed off again, but it was only another thirty miles or so before he was asking me to pull over again for another one.

We'll never get home at this rate, I thought, but after a few more leaks we had it down to a fine art. Instead of stopping the truck, I would just slow down. Wally would open the door and stand on the running board, strain the potatoes, climb back in, close the door and off we would go.

We made pretty good time by this method, and were approaching the outskirts of Melbourne by eleven thirty in the morning. The road through the outer suburbs was quite crowded with families driving home from church, all in their Sunday best and travelling a little slower than Wally would have preferred.

Indeed, far from mellowing out he was really starting to fire up. As we would pull alongside a family, he would lean out of the window and yell abuse at them.

"Come on, get a f**ing move on, you bastards," he would shout, gesticulating madly with his can of beer as we sailed past.

Getting closer into Melbourne we came alongside another of these families. Wally leaned out of the window again.

"Come on, get a....uuurps" he yelled, and neatly vomited on to the roof of the car, unfortunately covering Papa, driving with an elbow out of the open window, with a shower of partly digested beer.

"Ah, that feels better," he gurgled, and reached into his Esky for another tinnie, settling back into his seat with a contented smile.

I added it up in my head. He had been drinking solidly for about thirty-six hours, with no sleep, and a lot of hard manual labour. The guy was a walking miracle.

Eventually we pulled up outside his house.

"Thanks," he mumbled, solemnly shaking my hand. "It's been great working with you. See you at the next gig."

He picked up his Esky, opened the door of the truck and stepped out, falling head first into a council garbage hopper that had been left open on his nature strip.

He lay there sound asleep as the guys he shared a house with came out and peered in at him.

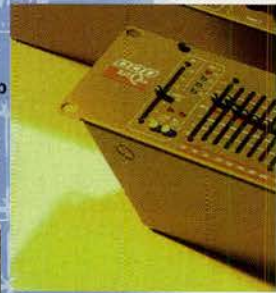
"Wally's back," they said to each other, and went back inside, closing the door behind them.

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Studio ROUNDUP



BASF National Tracking Guide

ARTIST PRODUCER ENGINEER/PROGRAMMER NOTES

New South Wales

A# Sharp Jeff Cripps Tel: (02) 9153 9988 24 Tk. Analogue & Digital			
Lucas Heights High School	Jeff Cripps	Jeff Cripps	C.D.
Hit Factory	Jeff Cripps	Jeff Cripps	C.D.
Jay Justin	Jeff Cripps	Jeff Cripps	Pre-Production
Grounded	Jeff Cripps	Jeff Cripps	Pre-Production
Hooty Toots	Jeff Cripps	Jeff Cripps	Kids C.D.
Aphex Studio Greg Dixon Tel: (02) 9876 8170. 24 Tk. Analogue & Digital			
Gang Arwy	Band	Greg Dixon (E)	Demo
John Connell	John Connell/Greg Dixon	Greg Dixon (E)	Album
Aerial	Band	Greg Dixon (E)	Demo
Richard Otmar	Richard Otmar	Greg Dixon (E)	Demo
Rohan Mansley	Rohan Mansley	Greg Dixon (E)	Backing Tracks
Damien Gerard Studios Marshall Tel: (02) 9555 1710. 2' 24 Track Music Facility			
Panadols	Ashley	Russell Pilling	Album
Anthill Mob	Artist	Russell Pilling	Album
Hindsight	Band	Russell Pilling	Album
Geraldine Turner	Brian	Russell Pilling	Re-Mixing
Fendahlene	Paul	Russell Pilling	Album
JMF Recording Studio Fran Esther Tel: (02) 9790 4097. 24 Tk. & 32 Tk Digital.			
Secret Images	Aldo Alibrandi	Ralph Esther (E)	Demo
Two Fires	Band	Ralph Esther (E)	Demo
Lukstat	Band	Mike Ward (E)	Demo
Cold Turkey	Bill Croft	Guy Saminaden (E)	Album
Chisel Concept Band	Michael Pitts	Ralph Esther (E)	Demo
Q Recording Richard M. Jeeke Tel: (02) 9212 4851. SSL G+, 24 Tk. 2" Music Rec.			
Richard Clapton	David Nicholas	David Nicholas (E)	Single (Mixing)
Steve Prestwich	Ike Brunt	Richard Muecke (E)	Album (Tracking)
The Whitlams	Daniel Denholm	Daniel Denholm (E)	Orch Overdubs
Louis Tillet	Louis Tillet	Richard Muecke (E)	Live Alb (Mixing)
Christ Art Museum	Band	Michael Letho (E)	Single -Tracking
R & R Recordings Robert Zimola Tel: (02) 9672 4494.			
Crimea River	Tim Costello	Rob Zimola (E)	Album Mix
Kristy Lee		Rob Zimola (E)	Demos
Simply Tina & Friends	Jeff Vandenberg	Rob Zimola (E)	Music Videos
Rockinghorse Anthony Lycenko Tel: (02) 6688 4005. 48 Chan Neve V, Studer 24 Trk, ProTools Mix 24			
Pirol	Christian Pyle	Anthony Lycenko(E)	Album Mixing
The Bell	Christian Pyle	Anthony Lycenko(E)	Album Mixing
Bharti	Artist	Michael Worthington (E)	Mastering
Marcus	Murry Burns	Greg Courtney (E)	Single Mixing
Sony Studio Ross A'Hern Tel: (02) 9383 6320. 48 Track Recording Studio			
The Catholics	Lloyd Swanton	Ross A'Hern	Mix Album
Leonardos Bride	James Cadsky	James Cadsky	Album
P & O Cruises	David Pritchard-Blunt	Lou Taylor	Record & Mix
Storm & Serenity	Lou Taylor & Band	Lou Taylor	Mixing Album
Sound Level Pty Ltd Jchn David Tel: (02) 9552 3200. 24 Tk. DA88 - Paris - Cubase.			
Grinspoon	Grinspoon	Jorden Brebach (E)	Demo
Bulletproof	Bulletproof	Jorden Brebach (E)	Mixdown
Holly Golightly	Daren Fenton	Daren Fenton (E)	Demo
Bluebirds	Mick Medew/Jed & Shayne	Patrick Sallock (E)	Album
Luxury	Paul McDonald	Paul McDonald (E)	Pre-production
Soundwarp Meredith Brooks Tel: (02) 9905 7144. Mastering			
Ian Cameron Smith	Ian	Meredith Brooks	Album
Bryan Lynch	Bryan	Meredith Brooks	Album
Miasma	Tom	Meredith Brooks	Album
Sesa Naga	Albert	Meredith Brooks	EP
Dale Nougher	Dale	Meredith Brooks	Album
Tiger Recording Danie le Tel: (02) 9922 4700.			
Analog	Gary Frost	David Hemming (E)	Demo
Supersonic - Foxtel	Vincent Sheehan	David Hemming (E)	Opening Studios
Gina Jeffries	Rod McCormick	David Hemming (E)	Xmas Album
Top Cat Recording Studio Brad Wann Tel: (02) 6628 0343. Automated 24 Tk.			
Geraldine Loong	Brad Wann	Brad Wann(E)	Album Mixing
Dead Mans Wish	Brad Wann/Band	Brad Wann(E)	Album Tracking
Chillblaine	Brad Wann/Band	Brad Wann(E)	EP Tracking
Chenlab	Band	Brad Wann(E)	EP Tracking
Grant Schwarz	Artist	Brad Wann(E)	EP Mixing



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This is a sad letter:

The equipment (listed right) was stolen from my premises, Sunday 15th August from Hendon, Adelaide South Australia.

Everything but our AMEK console was taken. Any help that anyone can offer to stop this kind of 'malicious' behavior would be appreciated. We set this facility up in Adelaide about 2 years ago at a cost of about \$ 500,000. In one evening \$300,000 has been taken. It kind of takes the desire away to establish a legitimate business in this industry, especially since there are these type of characters prepared to inflict this sort of "genocide" on another human.

Any assistance that anyone can give me to help uncover this equipment or net these individuals would be appreciated.

My contact numbers are 08 8445 2644 or home on 08 8244 1709. My mobile is 041045 2644.

- Steve Smith

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Trackdown Digital Mike Duffy Tel: (02) 9550 6890. 2-64 Tk.digl. Post,Music Narrowcasters
 Anna Cregan Torei Lists (E) Audio Guides
 Allnitters Allnitters/Tim Ryan Tim Ryan (E) EP Mixing
 Flipper Yoran Gross - EMTV Tim Ryan (E), Torei Lista (E), Damian Candusso (E)
 Conv. With A Dead Poet John Izzard Simon Leadley (E), Tim Ryan (E) Post Audio
 Magic Pudding Chris Harriott Simon Leadley (E) S/track - Vocal Rec.
Velvet Sound Recording Studios Dave McCunn Tel: (02) 9267 2915. 32 Ch./24 Tk. 2"
 Sandy Klöse Artist Tony Wall (E) Album Mixing
 Tao Of Mad Phat Tim Dennis Tony Wall (E) E.P. Track & Mix
 Brimstone - Andy Sorensen Album Tracks & Mixes
 Belle's Pocket Steve James Steve James Album Tracking
 Custard Barry Palmer Chris Dickey Soundtrack Singles

Queensland

Arctic Studios Alan Buchan Tel: (07) 3844 2199. 24 Trk 2" Otari/Neve Console
 Chaise Gary Kee D.C. Green (E) Gary Kee (PR) Album Tracks
 Matt Newnham Dozzi Brothers D.C. Green (E) E.P. Tracks
 Women In Docs Alan Buchan D.C. Green (E) Single
 Trevor Hart Quartet M.Jacobson M.Jacobson (E) E.P. Tracks
 Graham Rix M.Flanders D.C. Green (E) E.P. Tracks
Digital Paradise Ian Peters Tel: (07) 5527 0722. 32 Track Digital.
 Alva Turner Ian Peters/Alva Turner Ian Peters Relaxation Program
 Various Mike Taylor Ian Peters Amway Tapes
 Rush Hour Ian Peters/Gavan Bell Ian Peters Album - Demo Tracks
 Various Barry Pearson Barry Pearson T.D.K. Commercial
 Murray Shorning Jack McGregor Barry Pearsons Commercial
Domenic Sound Shane Hughes. Tel: (07) 3216 5187. 24 Track ADAT/BRC. Music & Jingles
 Jaquie Major Shane Hughes Shane Hughes (E & PR) EP - CD Rom
 AME Advertising - Vic Gordon Moore Shane Hughes (E & PR) Jingle
 Crichton Communications Les Crichton Shane Hughes (E & PR) 4BC Jingles x 3
 Jenny Balmer & Midnight HighwayBand Shane Hughes (E & PR) Tour Rehearsal
 The Sundays Band Shane Hughes (E & PR) Album Release
Evolution Recording Studios Shayne Cantly. Tel: (07) 4639 1636. 32 & 16 Track
 Lyn Bowtell Shayne Cantly Shayne Cantly (E) Album

ARTIST PRODUCER ENGINEER/PROGRAMMER NOTES

Red Zedz Studios Joe Panetta.Tel: (07) 3262 4150. 56 Trk. 24 2" Analogue, 32 Protocols
 Cherry Martin Lee (Regurgitator) Lachlan 'Magoo' GooldMagoo (E) Single - Sony
 Screamefeeder Lachlan 'Magoo; Goold Magoo (E) Album
Sherwell Studios Simon Sherwell Tel: (07) 5564 9600. Digital/Analogue Studio, CD Dupe
 Rob Hurst, Grant Hacketg Rob Hurst Simon Sherwell (E) Recording Drums
Vandersound Studios Eric Vandersande Tel: (07) 5546 8100. ADAT/XT 02R CDR HDR
 Ian Francis Eric Vandersande Andrew Hines (E) Mix Album
 One Way Not Andrew Hines & Toby Nasterson Toby Masterson Tracks for Demo
 Arrowmist Andrew Hines & Kevin Halpin Mastering For E.P.

South Australia

ATD MASTER SUITE Sue Muller. Tel: (08) 8212 7111. Mastering Suite CD & Tape Dupe
 Eco-Music Jaroslav Kovaricek Jaroslav Al Sankauskas Mastering CD release
 Rocky River Bush Band PeterThornton/Al Al Sankauskas Mastering CD release
 Blood Sucking Freaks Peter/Al Al Sankauskas Mastering CD release
 Phestive Phly Al Al Sankauskas Mastering CD release
 Blue Katz Steve/Al Al Sankauskas Mastering CD release
Mixmasters Productions Mick Wordley. Tel: (08) 8272 8506.
 Bergeral Jed Palmers Jed & Mick Album
 Little Black Dress Mick Wordley Mick Album
 Greasy Spoon Mick Wordley Mick EP
 Nexus Nexus Mick Wordley EP

Victoria

Back Beach Records Mark Rachelle Tel: (03) 5988 6948. 2" Automated Mix.
 Human Nature Andy Van/DuaneMorrison Mark Rachelle Single Re Mix
 Jackson Mendosa John Course/Arden Godgrey Mark Rachelle Single Re Mix
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ARTIST	PRODUCER	ENGINEER/PROGRAMMER	NOTES
Dallas Crane	Band/ R. Rowlands	R. Rowlands	E.P.
Cavalier Jeff/Justin. Tel: (03) 9437 0444. 24 Track Digital.			
musket	Musket	Simon Banko	Demos
Gareth malone	Gareth malone	Justin Skim	Live Demo
Do Not Eat	Justin Skim	Justin Skim	EP
Randell Newton-John	Randell & Justin	Justin Skim	Album
Downfall	Downfall	Justin Skim	EP.
Crystal Mastering Joe Carra Tel: (03) 9326 2318. CD Mastering Facility			
Blade	Blade	John Ruberto (E)Men@Work Remixer	
Kiril	Kiril/M. Ingram	Joe Carra (E)	Mastering Album
Dogfish	Band	John Ruberto (E)	Mastering E.P.
Luxum	Band	John Ruberto (E)	Mastering Album
The Surrigate	Band	Joe Carra (E)	Mastering E.P.
Lo Ricco Sound Studios Marcello Tel: (03) 9701 6220. 16 Tk. ADAT XT, 24 Tk. Logic Audio			
Tim Mitchell		Marcello Lo Ricco (E,PR)	Demos
Colin Rintoul	Marcello Lo Ricco/C. Rintoul	Marcello Lo Ricco (E,PR)	Single
Sapphire	Band/M. Lo Ricco	Marcello Lo Ricco (E)	E.P.
A Few Good Men	Band	Marcello Lo Ricco (E)	Demo
Metropolis Audio Toni Wright. Music			
Michael Spiby	Michael Spiby	Doug Brady (E)	Album
John Farnham 50th Birthday	Ross Fraser	Doug Brady (E)	Album
Deep Purple	Drew Thompson	Matt Thomas (E)	DVD
Sound Around/Front Room Trevor Cronin Tel: (03) 9531 3891. CD Mastering			
Alan Catlin	Andrew Peters Arnold	Trevor Cronin (E)	"Diamond Jingle"
Dry	Trevor Cronin	T. Cronin	Live Recording
Michael Crane	Jeremy Smith	Trevor Cronin	Mastering Poetry C.D.
Studio 52 Paul Higgins Tel: (03) 9417 7707. 24 Tk. ADAT, 32+ Track Analogue/Digital.			
Equinox	Trevor Carter	Trevor Carter	Album
Shelllife		Tim Cummings	Demo
Billanook College	T Carter/A Meakes/T Cummings	TC/AM/TC	Kool Skools Album
The Music Men	Trevor Carter/Andrew Meakes	Andrew Meakes	Football Club Song
Geelong College	Paul Higgins	Paul Higgins	Location Recording
Supersonic Dave Hannan. Tel: 0419 349 618. 24 Track ADAT			
The Honeyfield	Cavehannan & Chris Askey	Dave Hannan (E)	Album
Maggie Nelson	Dave hannan	Dave Hannan (E)	Album
Peter Brown	David McNicol	Dave Hannan (E)	Album
Thread	Dave Hannan & Matt Cairns	Dave Hannan (E)	Album
The Ranch Norman James Tel: (03) 9712 0136. Automated Digital & Analogue 24 Tk.			
Judy's Game	Stewart Cunningham	Norman James	Album
Ted Bardeo	Norman James & Ted	Norman James	Album
Various	Australian Music Abroad	Various	CD Promo Mag/Europe
Shenanigans	Gary King	Norman James	Children's Album
Valerie & Frank	Frank	Norman James	Jazz Album
True Form Recording Neil Gray Tel: (03) 9391 0907. 24 Tk. Digital/Analogue & HD			
Psycho Fish	Band/Ross	Ross O'Driscoll (E)	E.P.
Excarnated	Al/Band	Al Howard (E)	E.P.
Rumberos	Band/Ross	Ross O'Driscoll (E)	Demos
Dinsdale	Neil/Band	Neil Gray (E)	E.P.
Wombat Rd. Recording Studio Barrie Clissold Tel: (03) 5145 4204. 16 Tk/32 Tk. Mastering			
Zimran	Zimran	Barrie Clissold (E)	Album (C.D)
Kilswitch	Band/Clissold	Barrie Clissold (E)	Demo C.D.
Angie Higgins	D. McCann	Barrie Clissold (E)	Demo Tape
Buffalo Ballet	Band/Clissold	Barrie Clissold (E)	Demo Tape
Chris Wood	Chris Wood/B.Clissold	Barrie Clissold (E)	Album Tracking.
Woodstock Loft Doug Kelly. Tel: (03)6391 2277. Paris DAW + 24 Track ADAT.			
Equinox	Doug Kelly	Doug Kelly (E & PR)	Demos
Frog Music	Doug Kelly	Doug Kelly (E & PR)	Album

Western Australia

Bonsai Tom Thorpe. Tel: (08) 9246 4408. Analogue/Digital.
The 2-Ins Tom Thorpe Tom Thorpe (E/PR) Demos

ARTIST	PRODUCER	ENGINEER/PROGRAMMER	NOTES
Joob	Tom Thorpe & Band	Tom Thorpe (E)	Album
Outcast	Tom Thorpe	Tom Thorpe (E)	Tracking
True Learning Centre	Tom Thorpe	Tom Thorpe (E/PR)	Tracking
Blue Thing	Tom Thorpe & Band	Tom Thorpe (E)	Album
Planet Sound Studios John Villani Tel: (08) 9382 2211. 24/36-48 Trks, Mastering, Post			
Renald	Kevin Peek	John Villani (E)	Album
Rebecka Karlson	Kevin Peek	John Villani (E)	Album
Bradax	Kevin Peek	John Villani (E)	Single
The Ashley's	Kevin Peek	John Villani (E)	Demos
Yolanda	Kevin Peek	Les Williams (E)	
Poons Head Rob & Sam Tel: (08) 9339 4791.32+ Track.			
The Mission Blue	Rob Grant & Simon Leach	Rob Grant (E)	Album
Subtruck	Rob Grant & Banc	Rob Grant (E)	E.P.
Pillbox	Phil Bennett	Rob Grant (E)	Mastering
Hobyards	Rob Grant	Rob Grant (E)	Single
Seahorse Radio	Rob Grant & Ronin Charles	Rob Grant (E)	Album
Satellite Recording Studio Darren Halifax Tel: (08) 9470 4003. 64 Tk. 24 Bit ProTools+			
Riverview Church Band	Andrew Bolt	James Hewgill	Video & C.D. Live
Souvina	Souvina	James Hewgill	Album
Yabu	Delly Stokes	Darren Halifax	Album
No Flowers	Band	Darren Halifax	Album
Roger Gomez	Roger Gomez	Darren Halifax	Album

Tasmania

Precision Recording Studio Nathan Johnson Tel: (03) 6427 0906. 16+ Tk. ADAT, ProTools
Lee Thorpe Artist/N. Johnsor Nathan Johnson (E) Solo Album
Shellbacks Artist Tony Bird/Nathan Johnson (E) Mixing E.P.
Stephen Atkins Artist Nathan Johnson (E) Comple Live Tapes
Scream Band Nathan Johnson (E) Demos.

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Write in Reader Service Number: 121

Compact Monitor Systems

Specialist foldback company detail their specifications to Julius Grafton

A less known fact about stage monitors, and the art of mixing them, is that the difference between Kylie Minogue and silverchair isn't that great. You'd think that one is a much greater challenge than the other - for example, silverchair operate at Metallica volume, a chunky big rock band, to be sure.

Rod Matheson knows the difference because he's mixed foldback (monitors) for both Australian acts. Plus a whole host more in between.

silverchair operate at virtually maximum volume, which is defined as either just under the PA system limit, or just under the venue 'trip point', whichever comes earlier. At the mixing position, silverchair, AC/DC or Metallica would all arrive at the one level - loud. The main difference between these bands would be the onstage level of the guitar amp's, which are still then amplified by the P.A. system. AC/DC have the loudest onstage guitar amp volume in the world today, so their FOH engineer mixes less guitar in the P.A. - but overall, the level at the mixing desk for any of these bands is the same.

Onstage the foldback needs to cut through this. Our Kylie example goes to show that a band - any band- onstage are generally loud, before a P.A. system and a live sound engineer come into the picture. The kind of musical genre affects how loud the main front of house sound reinforcement (PA) system is run.

ENTER COMPACT MONITOR SYSTEMS

This is the only specialist stage monitor company operating in the southern hemisphere to our knowledge.

John Debord created Compact Monitor Systems Corporation of Los Angeles, then CMS man and Los Angeleon Bill Richardson (*above*) moved to Sydney due to love. It seems Bill liked the service on a particular Qantas flight five years or so ago a little too much, became enamoured with a stew called Michelle, and - instant Aussie. (They've just had twin baby boys too!)

Compact Monitor Systems currently operate two concert stage monitor systems, one was out on Chris Issak (two sends of monitors, and a complete in ear system for himself and the band) at the time I saw the silverchair system.

Compact have, as Bill puts it, a 'fortuitous alignment' with Norwest Productions, the Sydney audio company owned by Chris and Suzy Kennedy. Norwest have built an impressive inventory based on EAW KF 850 and 860 concert loudspeaker systems, and through the alignment with Compact are able to bid on shows that some growing audio companies may miss.

FUNDAMENTALS

I'll confess, as an old foldback engineer, that I'd heard about the CMS wedges and I wasn't turned on about the specification. I'd heard, correctly, that Bill uses old JBL 2482 mid-high frequency compression drivers, which only work to about 8khz (8,000 hertz) - and JBL

2402 ring radiators for high(er) frequencies. This is the kind of PA high frequency combination I cut my mixing teeth on back in the 1970's.

What makes CMS a hit with its customers is that the foldback wedge design produces obscene output levels, while sounding relatively smooth at the same time. The key to this is tri-amplification, and design. But we'll deal with design first.

The 2482 mid-high frequency compression driver was chosen because it has a Phenolic diaphragm, not a modern 'metal' one. Also, it will extend happily down to the chosen crossover point of 800hz, indeed on paper a 2482 will work from as low a frequency as 300hz, and in many cinema applications were crossed over from the bass boxes at 500hz.

Not too many high frequency drivers will handle 800hz comfortably, let alone 500hz. The 2482, a large driver with a 2" exit throat, will. It is an industrial strength driver, and used in a single foldback wedge, should virtually never fail. Coupled with a 2402 'ring', you have a tried and proven pair.

But importantly, the 2482 covers virtually all of the intelligible vocal spectrum, from 800hz to 5khz, where Bill crosses over to the 'ring'.

The 2482 is mated with a conical, short throat horn - a simple near field dispersion device that in the CMS wedges complements the 'ring' very well - according to 'chair man, Rod Matheson.

Handling signals below 800hz is a JBL 2226 15" woofer (in the 115TA wedges) or in the smaller CMS wedges, a JBL 2206 12" (112TF). All the CMS wedge designs are 3 way active, tri-amp designs.

The real kicker comes in a US patent, which covers the bass porting. Under the wedge, right in front of the performer's feet, is a tuned bass port which is covered by the design patent. "If you build a wedge with a bass port similar to ours, you'll hear from us", threatens Bill. This is because CMS reason that the main flaw with almost every foldback wedge is its inability to handle serious bass.

MORE BASS

The CMS wedge is allegedly the most bass capable monitor wedge available to rent in the region today. Some performers, when asked

Rod Matheson on monitors:

I've been in the business for going on 20 years, the last 15 or so on monitors. Mainly with Hunters and Collectors, but I've done a lot of acts before, during and since then.

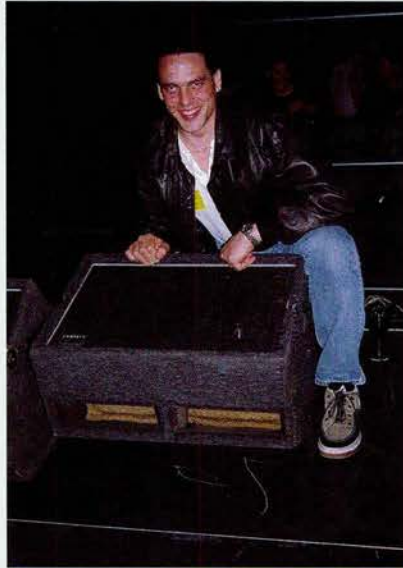
As a freelance engineer I've used nearly every monitor system in the country. They're all different. Sitting on up to 20 sends can be quite hellish, but to get a band feeling good, that is the thing.

silverchair only have a few open mic's on stage, so its interesting. Anc loud. Chunky loud! The bass is crankin! The band all wear attenuating ear plugs, except Daniel (lead singer) - he has in-ear's.

The mix is a full band mix to everyone, they're still friends, so they still want to hear each other!

I try to create some space on stage. Foldback is nothing like FOH! It's a whole different aspect!

(continued over the page)



TECHNOLOGY PROFILE

silverchair monitors

- Send 1: lead singer (emergency backup if in-ear monitors u/s)
- Send 2: front line pair of wedges
- Send 3: front line, bass player pair
- Send 4: side stage bass player pair
- Send 5: drumfill, four way
- Send 6: drum seat shaker/thumper
- Send 7: keyboard left
- Send 8: keyboard right
- Send 9: sidefill left
- Send 10: sidefill right



John Stanton



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for their requirements, require a full band mix in their mix. This can tax a monitor wedge, when low frequency stuff like kick drum, bass guitar and keyboard samples are added in.

A foldback engineer should know the system limitation of each send, and if an artist has a pair of wedges loaded with - say- a 12" driver and a single high frequency horn, a full band mix to this device is very ambitious. Especially if it needs to project over the top of the on-stage level, which is the mission statement of any foldback wedge.

Even a bi-amped wedge loaded with a 15" woofer will usually reach saturation point earlier if kick and bass are introduced.

TRI-AMPED

CMS say theirs are the only wedges commonly available which are tri-amplified, which means every wedge needs a dedicated three channel amplifier. In actual fact, wedges are normally used in pairs, indeed CMS have designed and designed their wedges as left/right pairs, a pair of wedges on the same send can run from one tri-amp.

The amplifiers used by CMS are made by BGW, an old established name in the American amplifier business. Each BGW tri-amp is just 2 rack units tall, and features a channel of 800 watt, one of 300 watts, and one of 150 watts. These output ratings depend on the impedance presented by the pair of drivers. Two 12" or 15" JBL speakers in a pair of wedges will present as a four ohm load because each speaker is rated at 8 ohms. But the 2432 and 2402 high frequency drivers will present as an 8 ohm pair, as each is rated at 16 ohms.

The cascading amp power in each of the three amp channels suits the components in the wedge. That is, two woofers need 300 watts between them, whereas the ring radiators only need 150 watts between them. It's a function of efficiency.

The BGW tri-amp also has a cross over card within, providing a 24dB linkwitz riley crossover slope. The 15" or 12" woofers cross over to the 2482 mid-high driver at 800hz, and the ring radiator crosses over from 5khz upwards.

800hz & 5khz respectively.

Why triamped? It's all about headroom and power, says Bill. Plus individual control over the low, mid and high sections of each wedge pair, where you could trim (attenuate) at the amp to suit - but in practice, the CMS amps are run full-on to each set of wedge components.

Each amp has a high pass filter switch on the front, which allows signal under 100hz to be rolled out. This is useful if an additional sub bass device is to be used for a four way system - like for sidefill or drumfill. The other amp feature that is neat is a phase switch on the back of the amp, so that the foldback system can run in or out of phase with the FOH. Some sound engineers ask for this, and there is considerable debate as to the merits of running the main PA and the monitor system out of phase to each other.

Finally, the system wiring is enormously simplified using an amp with an internal crossover, as one XLR feed is needed from the desk/eq chain, and one EP-6 speaker connector feeds out to the one or two wedges hung off each amplifier.

EXTRA BOXES, MIX AND MATCH

CMS have a variety of specialised boxes aside from the main fleet of 12" and 15" three way wedges. A trapezoidal upright version of the wedge is supplied for drumfill, which sits atop a custom subwoofer loaded with a single JBL 18" speaker. This is a kind of 'J' loaded cabinet, chosen for its short throw delivery of bass.

Some drummers, silverchair's amongst them, simply like enormous amounts of drumfill. It has always been a challenge to deal with this, and in the 'chair case, the drummer sits on a shaker seat as well.

The drumfill bass box requires a BGW stereo amp with its own



crossover card for 120hz and under signal. This necessitates a variation to the standard CMS amp rack of five amps, some of which carry 4 tri-amp's and one stereo amp, most are simply loaded with five tri-amps.

For side fill, CMS sit a trap version of the 12" wedge on top of a BGW brand powered sub woofer, loaded with an amp module and two McAuley 15" woofers.

SYSTEM ELECTRONICS

A Soundcraft SM12 monitor desk was in use on the silverchair tour, along with a Midas XL-3 console for the support act. In fact,

each act had its own racks of Klark Teknik DN 360 third octave crossovers.

CMS supply whatever is required, in the case of silverchair the band had one in-ear monitor mix for the lead singer, so this was fed off the stereo bus on the Soundcraft SM-12 desk. Aside from it, there were ten foldback sends used - see sidebox.

CLOSING

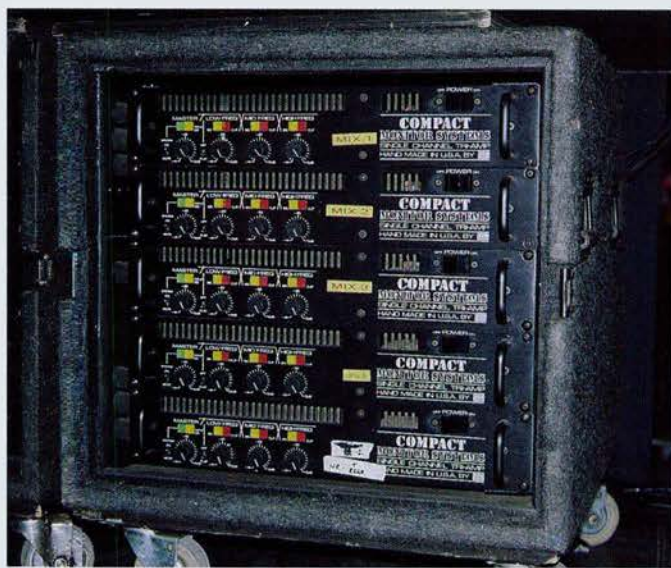
The CMS system has had a lot of thought put into it. Each wedge weighs in at a chunky 48kg - but a pull off wheel dolly makes handling easy. Plus the wheel dolly can sit back in front as an emergency weather cover too.

Under the grey carpet is 17mm finland birch, chosen for its acoustic ability. Without doubt the bass porting, the part subject to the US patent, goes a long way towards the customer appeal of the system.

CMS were chosen for the recent Cold Chisel tour too.

This is a company who specialise in a difficult science, and to enjoy some growth while doing so is almost remarkable. Indeed, CMS are beavering away at some new designs, which sound very interesting (at least on paper!) indeed.

Contact them on +61 2 9521-8115.



Rod on silverchair monitors (from previous page)

How do I set up a system? Start with a Shure SM 58 or Beta 58 microphone, and talk to the main send, listen to the box. I tune the wedges by ringing out, I don't use white noise or anything. I'll get each send sounding the same.

I spend a lot of time with the interaction between sends.

Anyone can do loud monitors - but clear and quality is another thing!

(Asked about the CMS system) These handle a shitload of drums. Lots of horsepower! They sound good, quite flat. I'm surprised how good they sounded.....



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ASTATIC

Horwood Australia +61 2 9585 1011
C-100 uni-directional super cardioid mic; electret condenser; 10kHz-18kHz; 148 dB SPL; servoed head amplifier; shock insulators; stainless steel internal filter; side address. \$1249.

AUDIO TECHNICA

Yamaha Music Australia +61 3 9693 5185

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AT4060 Vacuum Tube Large diaphragm (Twin) studio condenser with vintage tube warmth for contemporary performance. Each tube is hand selected and aged to optimise performance. Super high SPL capable (150dB), Extended response with warmth & clarity. Inc shock mount & PSU. \$3,499.

AT4041 Cardioid Condenser/ Rugged construction, high SPL capable (145dB), bass roll-off & pad switch, Extended response & wide range uniform polar pattern ensures natural sound on & off axis. 20-20kHz. \$549.

AT3525 Cardioid Condenser/ Outstanding performance/price classic-look vocal/instrument mic, high SPL capable (146dB), 10db pad, bass roll-off switch, inc. shock mnt 30-20kHz. \$695.

AUDIX CORPORATION

Production Audio Services +61 3 9415 1585

CX111 Rich, warm sounding condenser studio mic ideal for vocals, acoustic instruments, woodwinds etc. 10dB bass & pad roll-off. Ultra-quiet with a very low noise floor of 17dBA, 1" diameter, gold-splattered diaphragm. \$1295.

BEHRINGER

Musiclink +61 3 9429 9299

ECM 8000 precise electret condenser measurement microphone with ultra linear frequency response for absolute precision. True spherical characteristics. Operates on phantom power between +15v and 48v. \$199.

CAD

Australian Audio Supplies +61 2 4388 4666

CAD VX2 Dual Valve Condenser,

cardioid, omni and figure 8 patterns, external power supply, optional 24-Bit digital interface with 32 to 96kHz sampling rates and 120dB dynamic range. \$3995.

CAD VSM1 Single Tube Condenser, Optema OS110 capsule, extraordinary bandwidth, low noise/low distortion, 10-20kHz Frequency Response, external power supply. \$2595.

CAD E350 Multipattern Condenser, Optema OS110 capsule, high SPL capability, hi-pass filter, 20dB Pad, NiMH supported power supply, ZM-1G shock mount included. \$1995.

CAD E200 Incomparable low end and pristine highs coupled with remarkable transparency are achieved by servoed op amps and on board Ni Cad supported power supply, multipattern, 80Hz HPF, 20dB Pad. \$1395.

CROWN

Jands Electronics +61 2 9582 0909

PZM30D Added acoustical gain. Clean, clear high frequencies. Uniform polar response. A switchable dual-frequency response provides a "rising" position that adds brilliance and articulation, while the "flat" position maintains a smooth, flat and natural high-frequency response. Miniaturised allow direct connection to mixer with phantom power. Element Type: Electret Condenser. Frequency Response: 20 Hz to 20 kHz. Polar Pattern: Hemispherical. \$879.

CM-700 a condenser microphone intended for use in professional recording and sound reinforcement applications. Handling up to 151 dB SPL before overload, this mic is for miking, overhead drums or acoustic instruments. The CM-700 also features a 3-position roll-off switch. Element Type: Electret Condenser. Frequency Response: 30 Hz to 20 kHz. Polar Pattern: Cardioid. \$759.

CM-150 features a flat, wide-range frequency response, ideal for extremely accurate professional recording. It would also be an excellent choice for making free-field and sound-level-meter measurements. Element Type: Electret Condenser. Frequency Response: 20 Hz to 20 kHz ± 1.5 dB. Polar Pattern: Omnidirectional. \$1920.

SASS-P MKII is the latest version of our patented, stereo condenser microphone using PZM technology. The SASS-P Mk II features carefully controlled polar patterns and human-head-sized spacing between its capsules that create well-focused natu-

ral stereo imaging without a "hole in the middle. A low-frequency cut switch attenuates frequencies below 100 Hz by 12 dB-per-octave, reducing wind noise and low-end rumble. The SASS-P Mk II can be powered either by two internal 9 volt batteries or by phantom power. \$2295.

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4041-T 1% Dia Omni noise : 7 dB (A), THD less than 0.5% at 120 dB SPL peak, SPL handling capability 144 dB SPL. Response 10 Hz to 20 kHz. \$5853.

4011 Cardioid, 40 Hz to 20 kHz (± 2 dB), totally flat off axis response TEC Award SPL 158dB. \$3393.

4006 Omni, 20 Hz to 20 kHz high sensitivity, low noise floor. \$2890.

4007 Omni, 20 Hz to 40 kHz dyn range 124 dB, 1% THD, SPL 155 dB. \$2962.

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QTC1 Totally accurate Omni Directional, +/-1dB from 4Hz to 40kHz stainless steel body, updated lower self noise model, extraordinary accurate, 48V Phantom Powered. Available as matched pair in Cherry wood case for \$4895. \$2395.

SR77 Cardioid model, +/-1dB from 30Hz to 30kHz, ideal for both studio and live, great off axis rejection for high gain before feedback, stainless steel body, extraordinary accurate, 48V Phantom Powered. \$1495.

TC30K Totally accurate Omni Directional Microphone, +/-1dB from 9Hz to 25kHz, optimised to deliver clean impulse response and is time coherent on the microsecond level, carefully crafted stainless steel body, 48V Phantom Powered. Available as matched pair in Cherry wood case for \$2795. \$1295.

SR71 Cardioid model, +/-2dB from 50Hz to 20kHz, ideal for both studio and live, great off axis rejection for high gain before feedback, stainless steel body, extraordinary accurate, 48V Phantom Powered. \$995.

ELECTRO VOICE

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RE 200 Cardioid true condenser microphone. Large, ultra thin gold laminate diaphragm with high sensitivity and low noise. Ideal for instruments in critical recording or live sound applications. Requires 12 - 52v dc. Supplied in pouch with pop filter and clip. \$595.

RE 500 Cardioid true condenser microphone. Large, ultra thin gold laminate diaphragm with high sensitivity and low noise. Ideal for Vocals in critical recording or live sound applications. Requires 12-52 dc. Supplied in pouch with pop filter and clip. \$715.

RE 1000 Cardioid true condenser microphone. Large, ultra thin gold laminate diaphragm with high sensitivity and low noise. Ideal for vocal or instrument in critical recording and live sound applications. Requires 12-52 volts dc. Supplied in hard case with clip. \$1649.

RE 27 N/D Large format dynamic microphone with Neodymium magnet element. Fitted with two roll off filters and a high end filter that provides a shelving emphasis above 4k. Variable "D" Cardioid pattern provides minimum proximity. Supplied in hard case with clip. \$1499.

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SF-600 budget studio mic; uni-directional/moving coil dynamic mic; low impedance; cardioid; response 50Hz-16500Hz; includes mic clip and cable; gun metal finish. \$69.95.

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TLM103 An ideal mic for all professional applications where both high quality & low cost are critical, the TLM103 is a large diaphragm, cardioid condenser with superb acoustic balance & ultra-low self noise. Includes case & static mount. \$1,864.

M147 TUBE New tube condenser system featuring the same K47/49 capsule as used in Neumann's legendary U47 & M49, advanced transformerless circuitry, cardioid pattern & 20Hz-20kHz freq resp. Supplied complete with power supply, cables & carry case. \$3,845.

U87Ai The classic Neumann studio condenser. Large diaphragm construction with 3 x selectable patterns, LF roll-off & 10dB pad. Max 127dB SPL, 20Hz-20kHz frequency response. \$4,140.

MICROPHONES

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R121 Ribbon Microphone, high SPL capabilities, no internal active electronics, extremely low residual noise. \$2395.

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John Barry +61 2 9439 6955

COS-11s Lavalier ultra miniature available with various connectors for wireless transmitters, red dot for theatre handles 132d3, unique rubber mount, available in black or flesh. From \$590.

CS3 mono supercardioid shotgun mic with 3 capsules, 19mm diameter, 270mm long. \$1,939.

CU31 unidirectional condenser microphone, very flat response & ideal for digital recording. \$1,482.

CU32 right angle unidirectional condenser microphone, very flat response & ideal for digital recording. \$1,482.

SHURE

Jands Electronics +61 2 9582 0909

KSM32 a side-address, cardioid condenser mic outfitted with Class A, transformerless preamp circuitry. The KSM32 incorporates a 15 dB attenuation switch, has low self noise (less than 13 dB typical, A-weighted), an internal shock mount, integral three-stage pop filter, and a switchable low frequency filter. From \$1595.

SM81 Ruler-flat response; 10dB Attenuator and 3 Position Low-Cut Filter, excellent for use with most acoustic instruments. Cardioid Condenser; Phantom Power; 20 to 20,000 Hz. \$1050.

VP88 Single-point MS stereo condenser. Unique in its ability to capture the realism of "being there" while withstanding daily use in rigorous production environments. Built-in stereo matrix decoder; Battery or Phantom Power; 40 to 20,000 Hz. \$2299.

BG 4.1 Optimum choice for instrument recording. Low self-noise and flat frequency response keeps instruments and samples sounding accurate and true. Cardioid condenser; On-Off Switch; AA battery or Phantom Power; 40 to 18,000 Hz. \$469.

SOUNDFIELD

Studio Connections +61 3 9874 7222

SPS 422 is a complete studio microphone system comprising a multi-capsule microphone with A 1U control room processor. Flat frequency response is 20Hz-20kHz. \$

MkV offering truly coincident stereo and mono microphone patterns. This system comprises microphone, con-

trol unit, shock mount assembly, foam windshield and a 20m 12 pin microphone cable. Freq. range is 20Hz-20kHz. \$

MINIATURE & HEADSET

AEROBIC

Aerobic Microphones Australia +61 2 9313 4995

AM10 omni directional headworn microphone for aerobic instructors. One piece sweat resistant frame in 2 fitting styles. Supplied with either an Hirose or Switchcraft mini XLR connectors wired for Nady/Chiayo/Shure/Telex and other transmitters. \$499.

AM12H omni directional headworn microphone for professional voice users ie. platform speakers, product presenters, actors. Same details as above except it's not sweat resistant. \$399.

AM15 omni directional tieclip or hairline mic for professional voice users like the clergy and amateur dramatics productions with rustle free wide response. 100% serviceable. \$299.

AM22H cardioid response headworn mic for professional voice users as above. Suitable for outdoor work with windsock, slim profile electret type requires transmitter with Switchcraft 3 or 4 pin connectors. \$499.

AUDIO TECHNICA

Yamaha Music Australia +61 3 9693 5185

ATM75 Cardioid Condenser Headset/ Pivot mounted flexible boom descends from LH or RH side of headband. Belt mounted power module includes battery & windscreens. 60-15kHz. \$249.

ATM73AS1 Hyper-Cardioid Condenser Headset/ superior vocal performance, ideal for drummers & keyboardists. Flexible boom, Belt mounted power module, includes battery & windscreens 60-15kHz. \$349.

ATM15A Miniature Mic supplied with tie clip (for use as lavalier Mic) & instrument mount 40-20kHz. \$279.

AT853A Cardioid Condenser/ Ultra miniature with switchable bass roll-off. Recording, broadcast & SR, designed especially as choir mic, inc. hanger and mount 30-20kHz. \$449.

CROWN

Jands Electronics +61 2 9582 0909

GLM100/200 For instrument applications, miniature size for recording, sound reinforcement, broadcast and motion pictures. An omnidirectional electret-condenser, it features a smooth, wide-range frequency response for truly professional sound quality. GLM 100 features an omnidirectional pattern, whereas the GLM 200 features a hyper-cardioid pattern. From \$238.

CM-10 (E) electret condenser microphone provides professional-quality

voice reproduction for lavalier use. Featuring an omnidirectional pickup pattern and wide-range frequency response, for use in professional broadcasting and sound reinforcement applications. Comes with rugged tie mount; optional dual clip is available. CM-10/E comes without connector for use in wireless applications. Element Type: Electret Condenser. Frequency Response: CM-10: 60 Hz to 15 kHz. Frequency Response: CM-10/E: 20 Hz to 15 kHz. Polar Pattern: Omnidirectional. From \$228.

CM-311 is designed to meet the most demanding touring sound applications, with its electret condenser capsule providing full, clear and distortion-free sound. Gain-before-feedback and isolation are exceptional. Lightweight, rugged and comfortable, the headband and mic boom are adjustable to any vocalist. Element Type: Electret Condenser. Frequency Response: 50 Hz to 17 kHz. Polar Pattern: Differoid. From \$519.

CM-312 is ideal for live sound situations where a little less discrimination against high stage levels is required. It's also an excellent choice for aerobics and broadcast applications. Element Type: Electret Condenser. Frequency Response: 50 Hz to 17 kHz. Polar Pattern: Hypercardioid. From \$469.

DPA

Studio Supplies +61 2 99575389

DPA4060 Miniature pre polarised omni directional Condenser Microphone with a 5.4mm vertical diaphragm, water resistant, 20 Hz - 20 kHz, 134 dB SPL. \$579.

DPA4061 Miniature pre polarised omnidirectional Condenser Microphone with a 5.4mm vertical diaphragm, water resistant, 20 Hz - 20kHz, 144 dB SPL. \$579.

DPA4062 Miniature repolarised omnidirectional Condenser Microphone with a 5.4mm vertical diaphragm, water resistant, 20 Hz - 20kHz, 154 dB SPL. \$868.

DPA4065 Headband mounted miniature repolarised omnidirectional Condenser Microphone with a 5.4mm vertical diaphragm, water resistant, 20 Hz - 20kHz, 144 dB SPL. \$914.

ELECTRO VOICE

EVI Audio Australia +61 2 9648 3455

HM 1X Electret Condenser Headset microphone. Cardioid pattern. Compact with flexible microphone arm. Phantom Powerable from 12-52v dc. Also available in a radio version. \$629.

RE 90P Electret condenser podium microphone available in either 12 or 18 inch versions. XLR base. Phantom powerable from 12-52v dc. \$399.

RE 90H Electret condenser hanging microphone with 7.5 metres of cable terminating at XLR connector. Ideal

for Choir or Drama applications. Phantom powerable from 12-52v dc. \$595.

PolarChoice Electret condenser podium microphone available in either 12 or 18 inch versions. Fitted with dual capsules to allow for variable polar pattern. Four position switch allowing; Omni, Cardioid, Super Cardioid and Hyper Cardioid. Phantom powerable from 12-52v dc. \$499.

LIGHTSPEED

Audio Telex Communications +61 2 9647 1411

TK170 Lightweight, aerobics style slim line headset. Noise cancelling electret insert mounted on a tri-twist boom. Available un-terminated or with a Mipro style connector. \$395.

MIPRO

Audio Telex Communications +61 2 9647 1411

MU35 Durable electret headset microphone suitable for all speech applications. This unit comes with a Mipro connector for use with Mipro wireless systems. \$145.

PHILIPS

Philips CSS +61 2 9612 5747

LBB9085/00 omni-directional lavalier electret condenser type. 100-10kHz; 5mv/Pa +/-3dB; single pole on/off switch; requires 1.5v LR44 type battery; 5m cable with 2.5mm plug. \$48.

LBB9526/10 omni-directional lavalier condenser type for phantom supply of 11-52v. 100-16kHz; 1.8mv/Pa +/-3dB; 10m cable with 3-pole DIN180 plug with neck strap and tie clip. \$546.

LBC2704/00 uni-directional headset electret condenser type. 50-17kHz; -66dB +/- 3dB at 1kHz; 0.028kg. Supplied with headband 140mm. \$119.

ROLAND

Roland Corporation +61 2 9982 8266

RHS-300 Stereo Headset Uni-directional; dynamic. Frequency Response 200Hz ~ 10,000Hz; Sensitivity -87dB; Output Impedance 800 ohms; Weight 115g; Accessories - Cable 2.5m. Headphone Specifications: Semi-enclosed; dynamic; Frequency Response 20Hz ~ 20,000Hz; Sensitivity 103dB/mW; Impedance 32 ohms; Maximum Input 250 mW; Accessories Cable 2.5m. \$249.

SHURE

Jands Electronics +61 2 9582 0909

MX183/184/185 Professional condenser lapel mic; MX183 - omnidirectional, MX184 - Supercardioid, MX185 - cardioid. Side exit cable minimises handling noise and is easy to conceal. Features include field replaceable capsules, metal 4-way tie bar, and snap fit windshield Phantom Power, 80 to 20,000 Hz. From \$539.

WL61 Shure's new WL61 Series premium lavalier microphones are

MICROPHONES

subminiature, omnidirectional units. All WL61 Series microphones include a pair of interchangeable grilles which can easily be attached, removed, and cleaned as needed. One is designed for headworn (theatrical) use, providing the 3 dB boost between 8 - 20 kHz that is typically needed for that application. The second grille is for chest-worn (lavalier) usage; it provides a 10 dB boost at 12 kHz. \$1595.

SM93 Sub-miniature omnidirectional condenser lapel mic. Includes tie bar, mounting block and windshield. Battery or Phantom Power, 50 to 20,000 Hz. \$469.

WH20 is a rugged, light-weight, dynamic cardioid headset microphone that provides high-quality voice pickup. It fits securely for active microphone users, such as aerobics instructors and musicians, with low visibility for stage appearances. Suitable for any voice communications application where comfort and reliability are required. \$280.

VOCAL

ASTATIC

Horwood Australia +61 2 9585 1011

CTM-21 dynamic general purpose mic with switch; 100Hz-14kHz; for budget conscious school or hire com-

pany. \$98.

CTM-27 dynamic uni-directional for vocal or instrument; flex-form grille; 60Hz-14kHz; on/off switch. \$177.

CTM-28 dynamic cardioid mic featuring impact noise reduction and flex form grille; 50Hz-14kHz; on/off switch; durable; for sale, hire or install. \$187.

AUDIO TECHNICA

Yamaha Music Australia +61 3 9693 5185

AT4054/5 Cardioid Condenser/studio quality optimised for live sound, hi SPL/low noise, extended bass response on 4055 - uses AT4050 capsule 4055 (20-20kHz)/4054 (60-20kHz). \$879.

ATM89R Hyper-Cardioid Condenser/professional Recording, broadcasting or sound reinforcement. Incorporates superior shock mounting 70-20kHz. \$439

ATM31A Cardioid Condenser/Recording or sound reinforcement uses. Incorporates superior pop filter 30-20kHz. \$329

ATM61HE Hyper-Cardioid Dynamic/extended response & reduced off axis colouration. Low handling noise - rivals stage condensers 50-18kHz. \$299.

AUDIO TELEX

Audio Telex Communications +61 2 9647 1411

AMX003 For entertainment and professional sound reinforcement. This mic incorporates a shock mounted microphone element, making it great for schools, churches etc. \$145.

BEHRINGER

Musiklink +61 3 9429 9299

XM8500 professional dynamic vocal mic. 50Hz-15kHz frequency response. Cardioid directional characteristics eradicates background noise and minimises feedback. Two stage pop filter. Comes with hard case and mic clip. \$149.

XM2000S high sensitivity, low impedance dynamic mic. Cardioid directivity with feedback suppression. 2 stage pop filter. On/off switch. Ships with hard case and mic clip. \$99.

CAD

Australian Audio Supplies +61 2 4388 4666

CAD 25 Dynamic, 4 stage windshield, excellent bandwidth response, cardioid pattern, internal shock mount for minimal handling noise. \$139.

CAD 90 Dynamic, 4 stage windshield, excellent bandwidth response, cardioid pattern, internal

shock mount for minimal handling noise. \$349.

CAD 95 Condenser, 40-20kHz response, 3 stage windshield, 9-52 volt operation, cardioid, internal shock mount, exceptional clear response. \$399.

CROWN

Jands Electronics +61 2 9582 0909

CM-200 cardioid delivers fine studio quality sound in a rugged package that withstands the toughest field conditions. Its smooth, articulate performance combined with a wide frequency range make it an excellent choice for all-around critical uses. Element Type: Electret Condenser. Frequency Response: 80 Hz to 15 kHz. Polar Pattern: Cardioid. \$559.

CM-310A Featuring Crown's patented Differoid technology, the CM-310A provides performance combined with gain-before-feedback. Is ideal for high-level sound reinforcement and for eliminating strong ambient background noise. Element Type: Electret Condenser. Frequency Response: 60 Hz to 17 kHz. Polar Pattern: Differoid. \$649.

CM30 Nearly invisible and with a built-in (removable) hanger for easy positioning, the CM-30 is the choice for church choir and overhead stage

S m a l l W o n d e r

The miraculous DPA 4060 Miniature Microphone tops the bill in wireless systems for theatre and television. Not only does the 4060 offer outstanding audio performance under difficult conditions, it is also extremely robust in operation. Unique connection adapters ensure compatibility with a wide variety of VHF and UHF systems. A range of sensitivities encompass the vast majority of applications where high quality audio, near invisibility and lightness is required. Developed from many years of professional audio experience, the 4060 is just

one of the high quality products from the renowned 4000 series - available now from DPA Microphones.

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Write in Reader Service Number: 131

MICROPHONES

miking. Electronics for the CM-30 attach straight to a rectangular electrical box. Accepts phantom power and includes 30' cable and electronics. Available in black or white versions. Element Type: Electret Condenser. Frequency Response: 40 Hz to 20 kHz. Polar Pattern: Supercardioid. \$529.

ELECTRO VOICE

EVI Audio Australia +61 2 9648 3455

N/D 157B Cardioid low impedance vocal microphone with Neodymium capsule. Traditional Rock 'n' Roll sound utilising EV's exclusive warm grip handle. Also available with On/Off switch. Radio version also available. \$249.

N/D 267 Cardioid low impedance vocal microphone with Neodymium capsule. Ideal general purpose vocal microphone utilising EV's exclusive warm grip handle. Available with On/Off switch. Radio version also available. \$299.

N/D 767 Super Cardioid low impedance vocal microphone with Neodymium capsule. Ideal general purpose vocal microphone utilising EV's exclusive warm grip handle. Available with On/Off switch. Radio version also available. \$459.

N/D 967 Cardioid low impedance vo-

cal microphone with Neodymium capsule. Ideal general purpose vocal microphone utilising EV's exclusive warm grip handle. Available with On/Off switch. Radio version also available. \$629.

ESP TECHNOLOGY

ELSTA +61 2 9568 2100

AT867 high quality affordable microphone suitable for DJ's, singers and performers. Impedance is 600 ohm, frequency range 60Hz-13kHz, dynamic range and is unidirectional. Comes with lead, 6.5mm jack - 3 pin XLR. \$49.95.

NEUMANN

Amber Technology +61 2 9975 1211

KMS140 Cardioid condenser for stage vocal applications. Acoustically de-coupled transducer with excellent feedback rejection, wide natural sound & 20Hz-20kHz frequency response. Hypercardioid KMS150 version also available. \$1,995.

PEAVEY

Audio Telex Communications +61 2 9647 1411

PVI Dynamic microphone featuring a cardioid polar pattern, high quality integral on/off switch and black metal mesh windscreen. Supplied complete

with carry pouch, clip and XLR cable. \$92.

PVM22 Destined to become an industry standard, features include diamond coated diaphragm technology at an entry level price. Low handling noise and rugged construction. \$259.

PM16S Peavey's flagship electret lecter microphone. Features a 16i gooseneck, XLR or flange mounting, excellent feedback rejection. 50Hz-20kHz. \$465.

ROLAND

Roland Corporation +61 29982 8266

DR-10 Hyper Cardioid; Frequency Response 60Hz ~ 15,000Hz; Sensitivity -75dB - 3dB (0dB=1V/0.1Pa at 1kHz); Output Impedance 400 ohms Weight 310g; Accessories include Cable, Mic Holder, Hard Case. \$129

DR-20 Hyper Cardioid; Frequency Response 60Hz -15,000Hz; Sensitivity -74dB - 3dB (0dB=1V/0.1Pa at 1kHz); Output Impedance 330 ohms Weight 250g; Accessories include Cable, Mic Holder, Hard Case. \$199.

PHILIPS

Philips CSS +61 2 9612 5747

LBC2900/15 uni-directional dynamic mic, handheld. Balanced; 80Hz-12kHz; 1.7mv/Pa +/-3dB; 7m cable

with 6.3mm stereo jack; 165x52.4mm; 270g. \$45.

LBB9098/20 uni-directional handheld dynamic mic. Balanced; 100Hz-13kHz; 2mv/Pa +/-4dB; 3P x LR male connector; 53x178mm; 260g. \$103.

LBB9510/20 cardioid condenser handheld mic. Balanced; 100Hz-16kHz; 2mv/Pa +/-3dB; phantom supply 11-52v; 3P x LR male connector with spring clamp. \$277.

SHURE

Jands Electronics +61 2 9582 0909

Beta 87A Finally brings studio condenser performance to the road. Extended HF response brings detail, accuracy and warmth to any vocal. Highly consistent supercardioid pattern for excellent isolation and unsurpassed gain-before-feedback. Phantom Power; 50 to 16,000 Hz. \$899.

Beta 58A Top choice among vocalists and touring sound professionals world-wide. Its durability continues to make it one of the most rugged microphones in the live sound business. Supercardioid dynamic; 50 to 16,000 Hz. \$569.

BG5.1. studio-quality condenser microphone is perfect for laying down accurate vocal tracks. High sensitivity, low noise, and specially-shaped frequency response for vibrant and

LM AUDIO

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PROEL

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Aluminium swivel joints with rubber washers, prevent boom-drop and vibrations



Nylon insert prevents scratching when stand or boom adjustments are made.



Newly designed aluminium base with nylon inserts assure maximum stability of vertical section. An innovative system allows tilt-leg to stay in either an open or closed position after years of use.

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MICROPHONES

clear. Operation with internal AA battery or phantom power. Frequency response: 70 to 16,000 Hz. \$469.

BG 3.1 Designed to withstand the rigours of prolonged use for serious gigs and showcase performances. High-output neodymium magnet for added impact in live vocal performances. Cardioid Dynamic; Low Z; On-Off Switch; 60 to 14,000 Hz. \$259.

ZECK

Horwood Australia +61 2 9585 1011

ZM9 dynamic vocal mic with cardioid pattern; 70Hz-14kHz; on/off switch; low handling noise; suitable for instruments; made in Germany. \$159.

ZM21 dynamic cardioid mic for accurate reproduction of all instruments including bass drums; 50Hz-16kHz; integrated swivel stand adaptor: sensitivity -74dB; made in Germany. \$329.

ZM31 hypercardioid condenser mic with 70Hz-19000Hz response; battery or phantom; for productions in schools or theatres; made in Germany. \$359.

INSTRUMENT

AUDIO TECHNICA

Yamaha Music Australia +61 3 9693 5185

ATM33a Cardioid Condenser/ outstanding linearity both on & off axis. High SPL capability 30-20kHz. \$299.

ATM25 Hyper-Cardioid Dynamic/ Rugged high SPL warm bass Mic. Integral stand clamp especially suitable for bass drum/floor tom 20-18kHz. \$329.

ATM63HE Hyper-Cardioid Dynamic/ Extremely rugged hand-held vocal & instrument Mic. Extended response & wide range uniform polar pattern ensures natural sound on & off axis. 50-17kHz. \$289.

ATM23HE Hyper-Cardioid Dynamic/ Rugged low profile snare drum/rack tom Mic. Integral stand clamp 70-16kHz. \$329.

AV LEADER

Production Audio Services +61 3 9415 1585

PMM20 Professional Hyper-cardioid Kick Drum Microphone. Excellent sound isolation, reducing input from other instruments. Hardworking shock-mount system reducing transmission noise. Integral multi-layer wind filter, built-in pivoting stand adaptor. 84dB±3dB. \$TBA.

PHM901 Professional Surface Mount Mic. Rich, full reproductions of voice & music, low sensitivity to stage vibration & thumping noise, excellent user sound isolation with excellent feedback rejection. Low-impedance balanced output. \$317.20

PHM910 Professional Installation Mic. Electret condenser uni-directional mic with a clean, crisp sound & low ambient noise. Wide frequency response

optimised for speech/voice reinforcement. Low profile, miniature design, the ideal mic for corporate conference rooms. \$285.50.

CAD

Australian Audio Supplies +61 2 4388 4666

CAD 88 Dynamic, 4 stage windscreen, excellent bandwidth response, cardioid pattern, internal shock mount for minimal handling noise, great for high SPL's. \$329.

CAD CM17 Unidirectional Electret Condenser, battery or phantom powered, high gain, low noise, 30Hz-18kHz. \$349.

CAD 95 Condenser, 40-20kHz response, 3 stage windscreen, 9-52 volt operation, cardioid, internal shock mount, exceptional clear response. \$399.

CAD E100 Single Capsule Condenser, cardioid, servoed op amps, on board Ni Cad supported power supply, 80Hz HPF, 20dB Pad. \$795.

CROWN

Jands Electronics +61 2 9582 0909

GLM100/200 For instrument applications, the GLM's miniature size and gigantic performance make it a natural for recording, sound reinforcement, broadcast and motion pictures. An omnidirectional electret-condenser, it features a smooth, wide-range frequency response for truly professional sound quality. GLM 100 features an omnidirectional pattern, whereas the GLM 200 features a hyper-cardioid pattern. From \$238.

PZM Sound Grabber II A smaller integral boundary makes the PZM-6D even more inconspicuous than the PZM-30D, while performance remains high. Ideal for mounting overhead or on conference tables, it offers switchable dual-frequency "rising" or "flat" response. Miniaturised electronics found in the PZM-6D's XLR-type connector housing are attached to the mic via a 12' mini cable. Element Type: Electret Condenser. Frequency Response: 20 Hz to 20 kHz. Polar Pattern: Hemispherical. \$169.

PZM-6D Ideal for applications such as conferences, group discussions, interviews, home video production, lectures, and recordings. The mic can be placed on a large surface such as a table, floor, wall, or lectern. Element Type: Electret Condenser. Frequency Response: 50 Hz to 16 kHz. Polar Pattern: Hemispherical. \$879.

DPA

Studio Supplies +61 2 99575389

DPA4061 Miniature prepolarised omnidirectional Condenser Microphone with a 5.4mm vertical diaphragm, water resistant, 20 Hz - 20kHz, 144 dB SPL. \$579.

4021 Cardioid Condenser mic. 40Hz to 20kHz (±2dB). \$2689.

4033 Omni condenser mic. 20 Hz - 20 kHz ultra-small design. \$2400.

EARTHWORKS

Australian Audio Supplies +61 2 4388 4666

SR77 Cardioid model, +/-1dB from 30Hz to 30kHz, ideal for both studio and live, great off axis rejection for high gain before feedback, stainless steel body, extraordinary accurate, 48V Phantom Powered. \$1495.

SR71 Cardioid model, +/-2dB from 50Hz to 20kHz, ideal for both studio and live, great off axis rejection for high gain before feedback, stainless steel body, extraordinary accurate, 48V Phantom Powered. \$995.

ELECTRO VOICE

EVI Audio Australia +61 2 9648 3455

N/D 168 Cardioid instrument microphone designed specifically for snare but also suitable for guitar/instrument applications. Supplied with swivel clip and easymount clamp to allow for attachment to stand or drum rims. \$349.

N/D 468 Supercardioid instrument microphone. Industry standard percussion microphone, unique pivoting yoke design to allow for optimum flexibility in mounting. \$459.

N/D 868 Cardioid variant microphone designed exclusively for Kick Drum use. Dynamic range of 140db, optimised for Kick Drum. \$629.

RE 20 Variable "D" microphone with no proximity. Ideal for kick drum and brass applications also commonly used in voice over applications. \$1299.

PEAVEY

Audio Telex Communications +61 2 9647 1411

PVM480 The most popular Peavey microphone. This is an electret cardioid microphone featuring exceptionally flat far-field response and smooth, extended bandwidth performance. \$430.

PVM520I Neodynamic, cardioid microphone featuring titanium laminate diaphragm with neodymium magnetics, superior off-axis rejection. Excellent low frequency response. \$615.

PHILIPS

Philips CSS +61 2 9612 5747

LBB9512/20 cardioid condenser type. phantom supply 11-52v; 2mv/Pa +/-3dB with 3 switchable filters to change response from 100-16kHz to 200-16kHz, 350Hz-16kHz, 100-18.5kHz plus lo-cut and hi-boost switches. \$480.

SAMSON

Electric Factory +61 3 9480 5988

QMIC High output, low impedance.

Neodymium Dynamic Element. Hyper-Cardioid pickup pattern. Humbucking aluminium voice coil. Multi-axis shock mounted mic element. Carry case and mic clip included. Applications: Vocal, Instrument & Project Studio \$169.

S12 Low impedance. Neodymium Dynamic Element. Hyper-cardioid pickup pattern. Die-cast zinc casting. Carry case and mic clip included. Applications: Vocal, Instrument & Project Studio \$119.

S11 Low impedance. Cardioid pickup pattern. Die-cast zinc casting. Carry case and mic clip included. Applications: Live sound & PA applications \$89.

SHURE

Jands Electronics +61 2 9582 0909

Beta 57A/56 for acoustic and electric instruments, as well as vocals. Supercardioid pattern and gain-before-feed-back. New restyled grille hardened to withstand prolonged use. Supercardioid dynamic; 50 to 16,000 Hz. Beta 56 is a right angled, low profile version of the Beta 57A. From \$479.

Beta 98D/S a miniature supercardioid condenser unit designed expressly for toms, featuring a maximum SPL rating of 160 dB, and a frequency response tailored for this application. Each Beta 98D/S microphone comes with Shure's new A98D drum mount. \$739.

Beta 91 Shure's successor to the SM91. Outfitted with a cardioid capsule which supplies attack and low-end punch, the Beta 91 provides excellent gain before feedback, and rejection of unwanted noise. \$695.

BG6.1 a high-output, dynamic instrument microphone for professional sound reinforcement and project studio recording. Features include Smooth, extended frequency response, Neodymium magnet for high-output level and signal-to-noise ratio, Integral mounting base with adjustable, pivoting design, Dent-resistant steel mesh grille and 4.5 m XLR to XLR cable. Frequency response: 80 to 15,000 Hz. \$299.

next month::

AMPLIFIERS

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How to do it

DUNCAN FRY'S LIVE SOUND MIXING SERIES

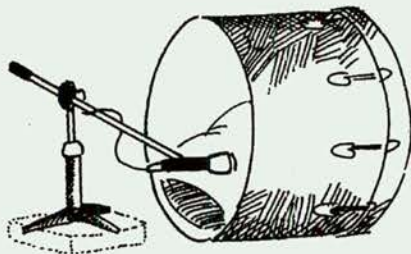
- MICROPHONES (Part 18)

PLACEMENT OF DRUM MICROPHONES

Drums should always be set up on a good thick piece of carpet, preferably rubber backed, to stop them sliding around and to dampen any reflected sound off the stage. Using a carpeted drum riser will also help isolate them from the other instruments. This will make getting a good sound easier, both out front and in the drum monitor.

KICK DRUM

Put the microphone on a short boom stand, if possible with a shockproof mount, and point the microphone into the drum so that about 3/4 of the microphone length is inside the drum. If you want more 'click' on it, place it closer to the back skin. Put a pad of foam rubber under the stand, or you can just lie the microphone on a pillow in the drum if the front head is removed. If the drummer doesn't want the front head removed, then hopefully he has a hole cut in it so you can poke the microphone through. If there is no hole, and he doesn't want you to cut one, just point out it at the centre of the front head and hope he plays like John Bonham.



SNARE DRUM

If you can't get a short stand in next to the snare drum because of the forest of cymbal stands, put a boom arm on the short stand towards the snare. Point the microphone towards the centre of the drum head (skin), with the front of the microphone about 2" above the edge of the drum. Don't put it any closer or the drummer may hit it, and cost you quite a bit of money.

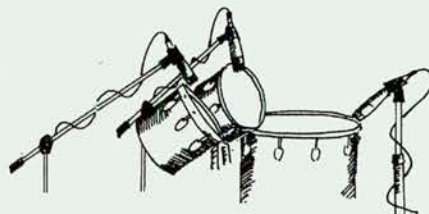


Make sure the snare microphone points away from the drum monitor.

TOMS

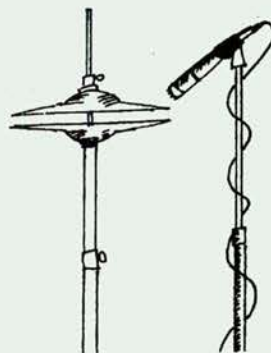
What's good for the snare is good for the rack toms and floor toms - don't put the microphone in any closer than the edge of the drum.

Providing it is pointing towards the centre of the skin it will pick up perfectly.



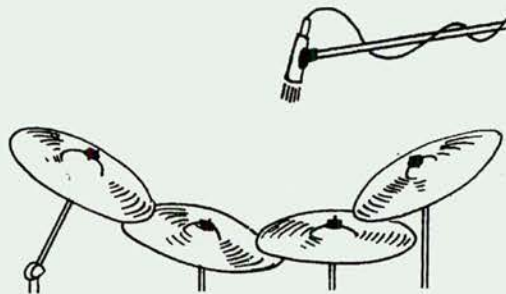
HI HATS

The microphone should be pointing down at about a 45 degree angle to the top edge of the Hi Hat cymbals. It should not be pointing into the air space between them, nor towards the centre (bell) of the cymbal. If your stand is not quite high enough to point down, you can put it underneath and point it up at the same angle. It won't sound too bad, but it will lose the 'ting' of the stick hitting the top cymbal.



OVERHEADS

This can be one microphone, if mono, over the approximate centre of the kit; over each side if stereo, and about 18" above the cymbals. Use similar microphone choices as for Hi Hats. If you are really enthusiastic you could try a couple of PZM (Pressure Zone Microphone) attached to squares of perspex and mounted on stands over the kit. Just



don't get carried away - at smaller gigs your vocal microphones will usually pick up more than enough cymbals!

There is nothing to stop you experimenting with drum microphone placement. For example, you may prefer the sound of the toms miked from underneath rather than on top; if you have enough channels you could try putting a microphone underneath the snare as well. This microphone will pick up a more 'rasping' sound that often sounds good mixed in with the sound of the top snare microphone. If you do this, remember to flip the phase reverse switch on the snare bottom channel. If you have any new ideas, try them out.

This is extracted from the top selling book: **LIVE SOUND MIXING**, by Duncan Fry. © D.R. Fry 1998. ISBN0 646 11235 X. Retail: \$39.00. Available from book stores and music shops everywhere, also through the Connections Shop, call 1-800-635-514.

How to do it

TOM MISNER'S PRACTICAL STUDIO TECHNIQUES

- MICROPHONES (Part 18)

AB Technique

This technique uses two microphones, placed parallel to each other and approximately 1.5 meters apart, with the distance between the microphones determined by the size of the sound source. The stereo image is created by level, time and phase differences.

The AB technique is used more for rock and pop recordings because it tends to leave a large hole in the center stereo image which is not acceptable for classical music. In rock and pop music this hole can be used to advantage when mixing. The microphones used should both be condenser types of the same model, with cardioid or omni polar patterns. This technique is very commonly found above the drum kit. If the producer requires a very wide stereo sound, then the AB technique is the ideal choice.

Support microphones

Since some stereo microphone techniques cause a 'hole in the middle' effect, sometimes an additional microphone is placed in the center. The support microphone is placed closer to the sound source than the stereo microphones, thereby focusing the sound for the listener - the sound picked up by the support microphone will reach the listener earlier.

If the support microphone is placed off-centre in order to focus on a particular instrument, it must be panned so that the instrument remains in the correct position in the stereo image. In situations where additional support microphones are used, the same rule applies.

MS Technique

The MS ('Mid Side') technique uses two condenser type microphones placed in the center of the sound source. One microphone has a cardioid polar pattern (M), while the other microphone has a figure eight polar pattern (S). The microphones are placed with the cardioid microphone facing the center of the sound source, and the figure eight capsule facing the sides. The stereo image is created by phase differences only. The MS system needs to be connected through a phase matrix in order to operate successfully. There are a number of manufacturers offering MS microphones with the necessary matrix built in (e.g. AKG and Neumann). It is possible to create the MS technique's phase matrix using three channels of the mixing console. For this example, we'll use channels 10, 11 and 12. Here's a step-by-step guide.

1) Put the cardioid (M) microphone through channel 10, adjust the gain and pan it to the center of the stereo image. Tempo-

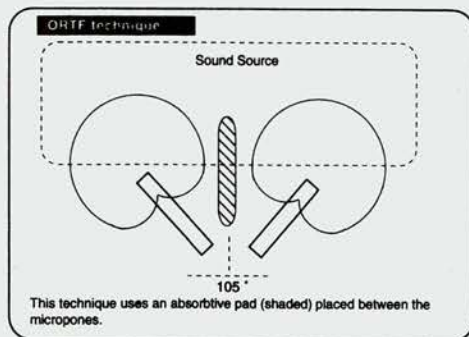
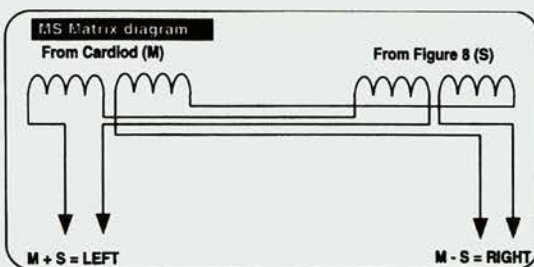
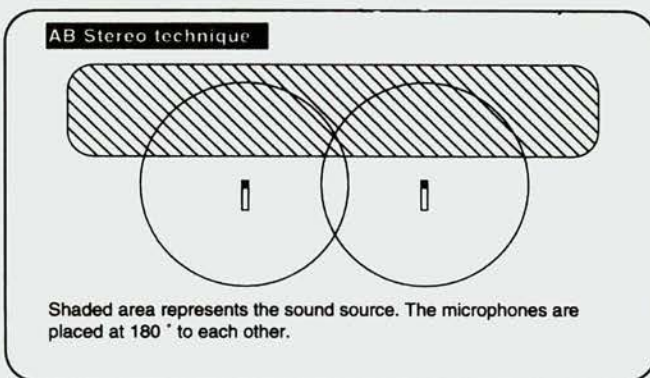
rarily mute this channel.

2) Put the figure eight (S) microphone through channel 11, adjust the gain and pan it to the right side of the stereo image.

3) Take the post-fader output of channel 11 and put it through channel 12 via a line input. Pan it to the right side of the stereo image and phase reverse the channel path. It is crucial that the signal through channel 12 is a phase reversed version of the signal through channel 11. If your console does not allow phase reversal on the channel path, use a phase reverse lead to connect the signal from channel 11 to channel 12.

4) We now have the same microphone going through two different channels (11 and 12), to the same monitor speaker - except channel 12 is phase reversed and will cause cancellations when mixed with channel 11. While listening to the right side of the monitors only, adjust the fader level of channel 12 until maximum cancellation occurs. The signal level of channels 11 and 12 are now identical, and it is extremely important that you do not move channel 12's fader any more while it is being used as part of the MS phase matrix.

5) Pan channel 11 to the left side of the stereo image, and release the mute on channel 10. Adjust the balance between channels 10 and 11 to achieve the desired depth and stereo spread. Remember, *do not touch channel 12.*



ORTF Technique

This technique was developed by the French Broadcasting Authority. In principal, two cardioid microphones are placed 17 cm apart, at an angle of 110°, with an absorptive baffle placed between them. This technique is well suited for recording in large rooms where there is too much reverberation.

A variation of ORTF is known as the 'NOS Technique' (developed by the Dutch Broadcasting Authority), using a pair of cardioid microphones placed 30 cm apart at an angle of 90°. This technique is very similar to the ORTF technique, but offers a smaller, more direct, stereo image.

This is extracted from the top selling book: **PRACTICAL STUDIO TECHNIQUES**, by Tom Misner. ©Tom Misner 1988. ISBN0 646 16704 9. Retail: \$40.00. Available from book stores and music shops everywhere, also through the Connections Shop, call 1800 635 514. Tom Misner is the owner of SAE International.

L I V E

PRODUCTION REPORTS



BURN THE FLOOR

Oceania Audio secure European tour

The dance spectacular *Burn The Floor* is a celebration of ballroom dancing with a few twists. Flash costumes, a large lighting rig designed by Patrick Woodruffe, a set by Mark Fisher all add up to a visually attractive show. Forty four of the world's best dancers from eleven countries perform in this new international show.

The producer of the show is Australian Harley Medcalf who is obviously hoping the show will prove as popular as other recent dance extravaganzas.

The World Premiere was held in Perth and after Australia, the show travels to Europe for two months and, after Christmas, on to the US where over 200 hundred shows are already on sale.

Personally, two hours of ballroom dancing was enough for me and I'm not sure if it suited an arena situation as there was a definite lack of atmosphere, however good luck to the show. What I did notice was the quality of the sound produced by Oceania Audio of New Zealand.

Oceania have also secured the contract for the European run of the tour and they are hoping to also

do the American dates.

"At the end of the Australian tour, the PA is shipped over to England," said Greg Peacock of Oceania Audio. "We made it clear in the beginning that we wanted to do the whole world but we don't expect any commitment from them until after the Australian shows. I think they were very brave to drift off from a company like Jands and get a New Zealand company (Jands supplied the lighting). Oceania have recently expanded into Australia with the opening of a Melbourne branch.

The audio design was unusual in that a third dimension was evident achieved by rear speakers as well as the more traditional PA design.

"It's a six channel system - the same layout as a home theatre or a modern movie theatre where you have a left, a centre and a right main cluster plus, behind us, a left rear effect, a right rear effect and sub bass hidden under the stage," Greg elaborated.

"The idea came from the sound designer Lucas Corrubia (known by the crew as Mr Las Vegas) and it is his design," continued Greg. "I don't know where
continued on page 50



BURN THE FLOOR

continued from page 53

it came from apart from the next generation of home entertainment, it's an interesting idea to try achieve that in a large environment like this. It's not so uncommon in the true theatre world where they have rear effects. Pink Floyd also once used rear speakers, more as a pure effect."

Greg said that the hardest thing about the system is trying to get more than half of the audience to actually perceive the rear effects - because he's limited by the horse-shoe shape of the arena.

ZONES

"We divided each venue up on paper into three zones - left zone, centre zone and right zone," he explained. "There's a total of 35 separate zones which we're sending audio to, and they are all separate. They can all be controlled individually, not just a crosspatch of speakers. It allows changes of volume as you move around the theatre, and also to allow more expansive use



of the rear effects".

"Apart from the nine positions in the main array there are six more individual zones at the back of the theatre to try give as many people as possible that feeling of more than just one speaker, or a left and right speaker. I was worried that you wouldn't perceive the rear speakers (if you are) right at the front of the audience - but I've been surprised at how well it has worked. At Perth you could perceive them right down to the front row and in Melbourne two or three rows back, because the sound from the front masked it."

Under the stage are infills for the audience in the front rows. The subs are also hidden under the stage.

SOUNDTRACK

The soundtrack for the show is pre-recorded and played off a hard disk player. Harley Medcalf hired the London Symphony Orchestra to play the various musical numbers.

"There's nothing live apart from some vocals," said Greg. "As he was dealing with playback rather than a live band, I think Lucas tried to do something a little bit different."

A Shure radio microphone system was used for the vocals. FOH Engineer Simon Venning was using two Yamaha O2R mixing consoles linked together so one could act as backup. The soundtrack comes from two Akai DR16 hard disk recorder/players, again in sync in case one fails. Other equipment included two Glyph 18Gig HDDs, two Tascam MD players, a Tascam DAT player, a Marantz CD player and a z-System 16x16 digital switcher.

Simon was using an Outboard Electronics TiMax, an audio matrix system which makes time delay panning possible in any distributed or surround sound system.

continued on page 56

Greg Peacock and Simon Venning



FULL HOUSE::THEATRE NEWS

- As if *Grease the Concert Spectacular* wasn't tenuous enough, now there's an arena production of *Happy Days - The Musical* due to premier in October. Presented by Dainty Consolidated Entertainment the arena production will tour the country starring Craig McLachlan as the Fonz, Jo Beth Taylor, Rebecca Gibney, Jon Stevens and Human Nature as the Doo Wop Group. The original "Mr Cunningham" from the television series, Tom Bosley will also perform. The set is designed by Brian Thompson and the Lighting Designer is John Rayment. The show will open at Sydney's newest arena - the SuperDome located at Homebush.

- Sue Hunt will replace Stephen Armstrong as the new General Manager of Queensland Theatre Company. Sue has been the Chief Executive of the Geelong Performing Arts Centre for the last four years.

- A Cockpit-In-Court style theatre, similar to the International Globe Shakespeare Centre in London, is planned for the *Mittagong Regal Cinema*. The 71 year old cinema is large enough to house the authentic style theatre inside it's walls, making it the first in the southern hemisphere. The theatre will accommodate 300 patrons on the ground floor with additional seating in the three tier balcony above the stage. The development will also feature a high-tech interactive mu-

seum and a Shakespeare shop. The concept promoters are currently looking for investors with \$1 million urgently needed to kick start the project.

- Janet Holmes a Court has announced the sale of the Stoll Moss group of theatres in London's West End. The theatre chain includes the London Palladium, Her Majesty's, the Gielgud, Theatre Royal Drury Lane, Cambridge, Lyric, Garrick, Apollo and Duchess and is expected to attract up to £100 million (\$250 million). Potential bidders include Cameron Mackintosh, American group SFX Entertainment, as well as Peter Holmes a Court's New York based theatre company, Backrow Productions.

Plans are underway to stage a free production of *La Boheme* at the new Docklands Stadium in Melbourne. The Puccini opera will be performed by Opera Australia and the Melbourne Symphony to a capacity crowd.

- The newest trend in live Australian entertainment seems to be cabaret. More and more venues are recognising the potential of this 'low overhead' form of live performance. The Sydney Opera House and The Royal Theatre at Canberra's Convention Centre are among the newest additions to the cabaret scene showcasing local and international talents.

LIVE

Women in Voice



Leah Cotteral in concert

The eighth Women in Voice Concert was held at the Princess Theatre, Brisbane for 15 performances to very large (often sold out) and appreciative audiences. This year the concerts featured Alison St Ledger doing big musical numbers, the renowned opera soprano Deborah Cheetam (who sang an extraordinarily haunting rendition of Summertime) and Margaret Roadknight with her own peculiar blend of music. After a well lubricated interval came jazz singer Leah Cotteral who sang duets with the musical director Helen Russell. Canita Farrer also sang duets...with herself...a bizarre case of split personality. Lil'Fi of the Delta Rhythm Kings belted out some bluesy retail therapy before being joined on stage by all for an encore or two.

The Princess is the second oldest existing theatre in Australia and keeps a lot of its charm, it also presented a number of obstacles to the technical producers Kismet Cafe Productions. The FOH lighting bars are side mounted but while the previous show (Zen Zen Zo) had flown a truss in front of the proscenium the fly points were very cubious and an E.Z Lift was required for access. The fly bars on stage are a 1" by 3" rectangle which meant that to hang "rock'n'roll" style cyc washes, the crew had to cut out 18 aluminium L brackets before hanging.

"The fun began when we had to winch dimmers up onto the fly bridge 7 metres up," said Daniel, Manager of Kismet and lighting/set designer on the project. "It's a very suspicious looking structure in itself. What a place to put dimmer land."

Old steel par cans, from Mothers Lighting it's rumoured, were powder coated and hung in the front of house position to suit the architecture. A feature was made of the proscenium arch in the lighting design. The other feature was a 50m backdrop of satin in six drops lit from behind 1500W Q1's and from 18 Par 56's on top each on it's own channel for chases and cross fades. A further bank of Par 64's lit from the floor.

An Acoustic Technologies Tomcat System provided the front of house.

"A mistake we realise now as the horn loaded system was a little in the face," said Phil Turvey, the Sound Engineer. "The Princess is a very live room with a steep rake and, to top it off, a glass wall between the auditorium and the balcony audience, add to that a very punchy foldback, also AT, pointing into a deep hollow (the stage is a brick cave 30' deep) and it's fun all the way!"

"Considering the diversity of the performers and the difficulties inherent in the venue, including ghosts and the bio position from hell, you can see why I've got a grey hair or two."

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BURN THE FLOOR

continued from page 53

"TiMax has the ability for amplitude and delay on cross points, it also incorporates a show control computer," explained Simon. "The advantage of having delay lines on all inputs and outputs is that we can use the Haas Effect to move an image around the room without actually turning it up or down. It does it very elegantly, and it can all be saved on a cue by cue basis, which is where the show control computer comes in. The show control computer takes timecode from the hard disk so, although it's not in sync, when it sees appropriate timecodes it triggers an event cue".



"So we've got six channels of audio and then we're using TiMax to image between those six channels."

The PA consisted of 32 Turbosound Flashlights with 36 Turbosound subs. For underhangs, front fills, surround and flown, a total

of 46 Oceania T12 loudspeakers were deployed. Two Galaxy Hotspot loudspeakers were also used.

Processing equipment included nine BSS FCS366 'Compact Plus' Omnidrives, nine Gold Bins and eighteen Ceep Linkers.

The amplifiers used on the show were all made by Oceania.

SHOWS WE'VE SEEN LATELY

A Punter's Perspective

MACBETH



After reading several glowing reviews of the Sydney Theatre Company's latest production of Macbeth directed by Ian Judge, I looked forward to a special night. Performed without an interval, the production runs for two hours and yes, I was bored.

I know it's probably sacrilegious in the acting world to say Shakespeare can be boring. But it was. Maybe

the newspaper critics were also bored in places but darling, it's Shakespeare so it must be worthy. The lady to my right fell asleep and my friend left after thirty minutes, muttering something like "appalling direction...". I feel more people would have left if the seating at the Drama Theatre in the Sydney Opera House didn't trap you in so much. Also, a large proportion of the audience were high school students who probably had to be there, under threat.

The saviour of the show was Colin Friels, wonderful in the title role. Unfortunately I found his exceptional portrayal only highlighted the inadequacy of the other actors particularly Helen Buday as Lady Macbeth. Lines were delivered in a garbled rush and, if you didn't already know the story, you'd be wondering what the hell is going on.

The Weird Sisters were particularly annoying and certainly on stage far too much. John Gunter's set designs were simple, elegant and occasionally inspiring. The battlefield set was very beautiful and his use of curtains clever. However, after a while the bleached floorboards and neutral shades began to make me think I was in an up-market fashion boutique.

The lighting was by Nigel Levings who as always turned in a professional, low-key design that craftily changed the space and locale (did he get to say "out, cut damn spot...").

Costume designer Kristian Fredrikson produced some stunning outfits. Unfortunately they were all a bit 'over designed' and would maybe look good in John Gunter's up-market boutique. The costumes could have varied a bit more in their design especially as many of the male characters looked the same, it was difficult keeping track of who was who.

Maybe if you really dig Shakespeare, you'd enjoy the production. I didn't but then again I'm a bit of a cultural heathen.

● Cat Forcer

DOING LITTLE!

"During the show I do very little," admitted Simon. "Tonight I want to tidy a few things up, but once you've been somewhere a couple of days I'm virtually sitting here for ten minutes at a time with nothing to do. The show runs itself and is totally programmed as you step through. It makes it easy but the downside is that there is a lot of programming. We had to put in a new industrial noise yesterday and I was up to 5am this morning programming in - literally mixing like in a studio."

● Cat Forcer



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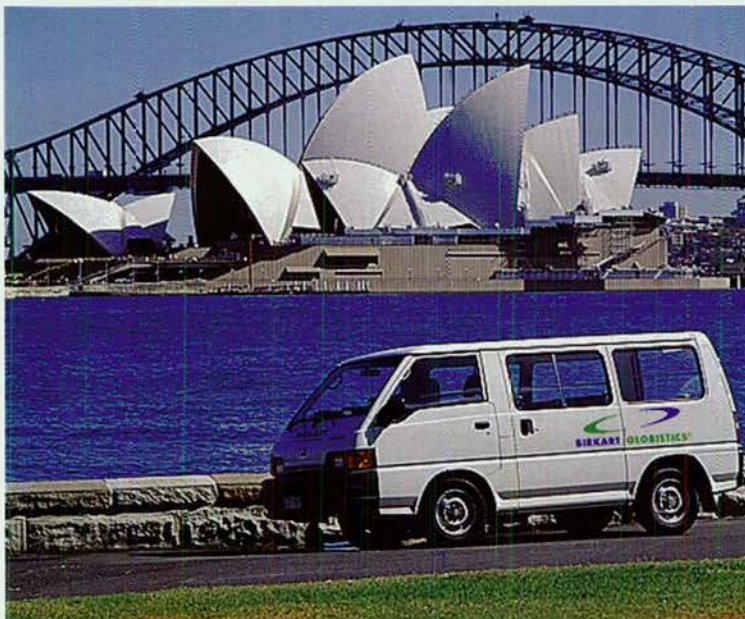
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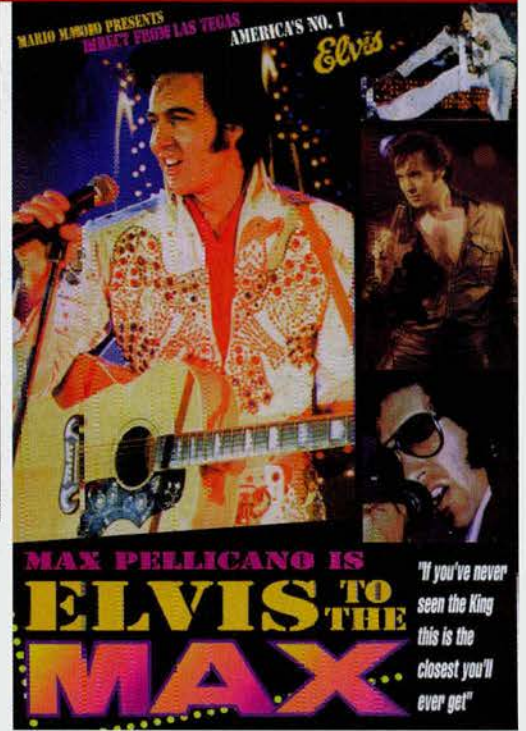
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ELVIS LIVES!

appearing at an RSL near you

Daylight International are a well-known production company within the corporate/special events world but every couple of years they let their hair down to do *Elvis To The Max*.

The advertising screams "If you've never seen the King this is the closest you'll ever get". Bar being buried next to him, they're probably right. Max Pellicano is extraordinarily like the real thing. Not just his voice but the way he looks and moves.

The tour is spread over three months, covers the country and generally sells-out whether it's a 500-seat venue or, as at the Footbridge Theatre in Sydney, a 2000-seater. Daylight International cover all of the NSW gigs. The man who bought Max 'direct from Las Vegas' is promoter is Mario Maiollo.

"We take on this sort of rock'n'roll run to break the winter barrier," said Steve Lowe, Production Manager from Daylight. "A lot of the corporate jobs we do use this type of equipment any-



way. *Elvis To The Max* is a rock'n'roll show but it's still very much a corporate type of event. It's not big stacks of speakers, people are coming to hear Elvis not a rock band."

Tour Manager Argentino D Russo travels with Max all around the world as he is also his guitar player. For the Australian tour, his 14 year old son was playing the drums.

"This is one out of two crews that I can instantly remember," he said. "If you give them a

time to start the show it's always ready. Just don't mention the strobes. It's a pretty hard gig to get ready and you're dealing with eleven egos on stage. The crew are sensational, strobes are another matter."

"The Australian audiences are probably the most excitable. When we last did Manly Warringah we had a woman who must of weighed about 480 pounds faint. we did five songs before the ambulance turned up and these four little guys struggled to lift her up over the audience."

Underwear flying on stage is fairly common particularly at Burswood RSL for some reason and the crew find the flowers and teddy bears handy to take home to their wives and girlfriends.

The average age of the women who go berserk is 45 upwards.

"The hardest thing about the show is to pull the same sound every night out of a different venue," said Brian Loughlin, Monitor Engineer. "Some nights we swap players, so you're dealing with different levels of dynamics with different players and we have to compensate for that. You have to get it within the first song otherwise you're wasting your time. They get it every night except for the strobe."

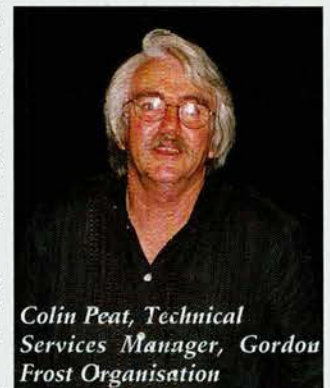
Lighting designer Troy Spence has been through three different brands of strobes until he found one that triggers the first time.

"It's a Megastrobe from our friends at Show Technology," he said. "The whole gig could fall down but if the strobe doesn't work, it's not worth being here!"

The show consists of 54 par cans with no moving lights. The



Argentino D Russo, Tour Manager



Colin Peat, Technical Services Manager, Gordon Frost Organisation

crew said this was because they wanted the show to look like an authentic Elvis show, true to the era. A main feature was a 6m star cloth of chasing bud lights. Elvis used to have a basic five followspots and a white wash, nothing else. This show relies mainly on the songs and Max's ability to deliver them.

Lighting control was a Jands ESPII 24 channel and Jands Roadpak dimmers were used.

"We have a 'mist' machine," said Troy. "I find that if you tell clubs you have a fog machine, you're out the door. But if you say 'mist' machine, you win every time as they haven't caught on to what a mist machine is yet!"

FOH Engineer was Cameron Balzer promoted from monitors on the last tour.

"Instead of having big stacks only, we have no subs with small main stacks with multiple delays or infills - lots of little boxes to fill out the room so the sound is consistent as possible," Cameron said. "The main thing to do is enable the audience to hear Max and then you blend the band underneath making it sound as nice as possible. Mostly we're using our own audio gear including six Acoustic Technologies FRO7's which can fill a 2000-seater easily."

The effects rack had a Denon CD/tape player, a SPX990, a Rev500, two Presonus ACP8 compressor/gate units giving 16 channels, a delay unit for the delay stacks throughout the room, and two stereo ARX graphics. Mixing was on a Mackie SR24 desk.



"The show isn't too busy to run but there is a lot of walking around the room checking how it sounds and adjusting accordingly," said Cameron. "You don't tend to sit behind the desk terribly long! Mostly CAD microphones, 95's and 88's, were used with Max using his own AKG 535. A couple of years ago, wireless microphones were used but it was decided it would be more original to use a lead microphone."

Monitor desk was also a Mackie SR24, a desk described as hand and easy to carry an important factor on this sort of run. Monitors were all Acoustic Technologies passive wedges with 15 2" horn.

"They are awesome, use them for anything," said Brian. "I've done some of the most finicky performers with these monitors and they all say they are fantastic. They can cut any size room. There are also two Mongocse boxes for side fills used strictly for Max across the front so he is the loudest thing heard on stage."

● **Cat Forcer**

From the back left - Paul Melross Spot Op Cameron Balzer
FOH Brian Loughlin Monitors Troy Spence LX Steve Lowe
Production Manager



FULL HOUSE :: THEATRE NEWS

● The launch of the program for the **Melbourne Festival** has caused more than the usual buzz of excitement. Among the wide ranging program of international productions and performers were plans for a opening ceremony featuring fireworks and Japanese drummers at the Shrine of Remembrance. An RSL and talk-back radio led campaign has forced the organisers to rethink the opening ceremony, without the fireworks. The program for the 17 day festival features the

Dance Theatre of Harlem, New York dance troupe Buglisi/Foreman a new opera *The Ghost Wife* and Shared Experience Theatre's physical transformation of *Jane Eyre*. Check out the website at www.melbournfestival.com.au

● Yet another Arena spectacular will sweep through the capital cities in November. This time it is the **Ultimate Rock Symphony** - a two hour concert featuring Roger Daltay, Peter Frampton, Alice Cooper, Paul

Rodgers. Thelma Houston, Jack Bruce, Eric Burden and Gary Brooker backed by a ten piece choir and band.

● The Media Entertainment and Arts Alliance will represent the cast of the forthcoming production of **The Sound of Music** at the Industrial Relations Commission following a reported pay dispute. The future of the musical is now in doubt due to the Producers, The Gordon Frost Organisation, declining to pay the

performers in between each season on the show's national tour.

● The freehold of **Fitzroy's** the Universal Theatre, Cinema and Production Complex (housing Open Channel) is up for sale. Tenders close on September 10th, and the asking price is expected to be well in excess of \$1 million. Hopefully it will be bought by someone committed to the continuance of this integral Melbourne theatre complex.

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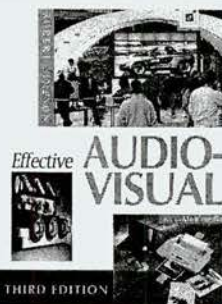
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LIGHTING

EDITED BY CATRIONA FORCER

Major Changes in Film/TV Lighting Distribution

There has been some hot 'wheeling and dealing' recently resulting in a shake-up of TV/Film luminaire distribution in Australia.

Miller had already stopped distributing Balcar and had taken on Brightline who have applied over ten years of cool light experience to create an innovative fluorescent lighting system, solving long-standing issues such as efficiency, robustness, cost-effectiveness and fixture compatibility along the way.

"Launching Brightline in Australia at SMPTE in July gave us the opportunity to splash fixtures over seven camera and lens makers' stands," explains Miller's National Sales Manager, Andrew Ball. "The response from lighting cameramen and LD's to the light output and fixture versatility was overwhelming. From the start we knew we had a winner."

Moving Head Prices on the Move

Our product comparison of Smallish Moving Head luminaires has moved more than just the six robotic fixtures that Andy Ciddor and a cast of dozens were comparing. When we asked the distributors to check the facts in this month's product comparison it was mostly prices that were corrected. The price of the High End Studio Spot 250 fell by around \$2,000 over the weekend, while the Martin Mac 250 lost \$1,200 off its price in the same couple of days. A spokesman for Martin said the change of price on the Mac 250 was due to the introduction of the Mac 250+ which is shortly to arrive in Australia.

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Brightline 1.2
Photometrics

production facilities. Andrew Ball continues, "Within a month of Kathy's trip and the introduction of Brightline, we have already supplied our first studio, with orders for three more broadcast and pay television studios following over the next few weeks."

Brightline's refinement of cool light technology has led to an elimination of the obstacles that have restricted acceptance of cool lights in many traditional incandescent applications. Due to their newly-developed high-frequency electronic ballast, Brightline have the ability to dim high output 55W colour corrected lamps utilising existing dimmer systems.

"With direct dimming integration, and more light output (with or without Brightline's detachable intensifiers), we can now provide

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VARI-LITE GRANTED PRELIMINARY INJUNCTION AGAINST MARTIN

Temporary Injunction to affect U.S. market only

Pertaining to the Vari-Lite suit filed against Martin Professional for patent infringement earlier this year, Vari-Lite asked the Federal Court in Sherman, Texas to grant a preliminary injunction against Martin in order to stop sales of four Martin products.

Recently tried at an oral hearing in Sherman, the Court ruled on July 27th that Martin sales of the MAC 300/500/600 and Case Controller must cease in the U.S. only. The injunction however is only preliminary and is not a final ruling.

The ruling has been appealed to the next level, Federal Circuit Court in Washington D.C., by Martin Professional where it is expected to be tried soon.

The Injunction does not affect Martin Professional outside of U.S.

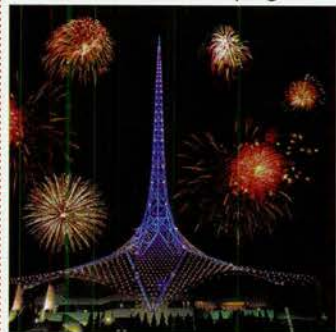
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INSIDE LIGHTING



LIGHTING RINALDO

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FIBRE OPTICS IN YOUR FUTURE?

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POWDERFINGER LIVE

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NIKE STORE

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TECH TALK ON FAULT FINDING

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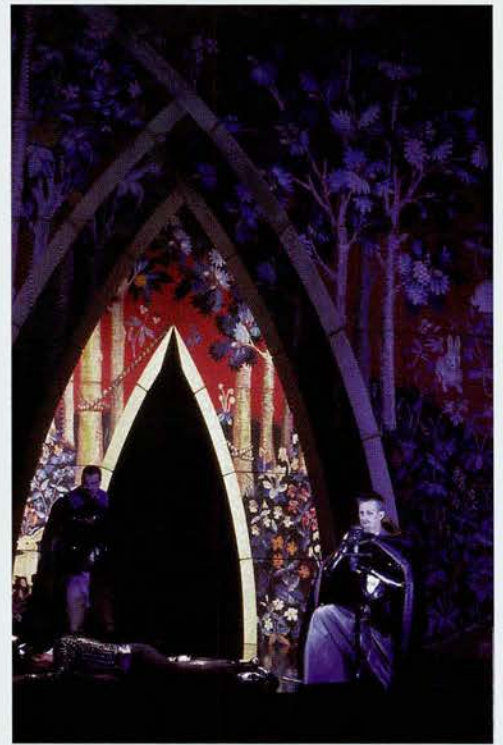
BUYERS GUIDE: FRESNEL SPOTS, FLOODLIGHTS

The new Opera Australia production of Handel's *Rinaldo* is another triumph of ingenuity over adversity. The Opera House stage is notoriously cramped, yet they still produce the most elaborately staged pieces.

Rinaldo opens with light slowly rising on a 2m gold Christ hanging over the stage. The scrim comes up to reveal a pair of massive golden doors, which slide open to present a gilded glowing medieval church framed by burnished prosceniums. Light glints off the chain metal and helmets of spear bearers. A giant slit of a red velvet staircase moves into the centre. Two huge dragon wings arc from the flies. The church later turns into a garden, painted like the Lady and the Unicorn tapestry. The effect is of a medieval tableau, flat and bold like a Ucello painting.

In the second act the whole stage opens up, with a dramatic ribbed boat hanging vertically in the air, framed by three huge curved ultramarine blue panels on either side, and a golden radiatae in the back. Three chalky sirens sit in the boat as it is dramatically lowered onto the stage by a hidden hydraulic piston. The boat then slides up and down in a cradle, and turns around, as more sirens gather around it.

The coup in the third act is golden cubes which form a 3D staircase, then part to let actors through, and then re-form as a gilt screen/parapet.



BIG SETS, LITTLE STAGE

OA DOES RINALDO



THE CATAPULT BOAT

The sets are exquisite and stunning. The designer, Michael Scott-Mitchell is brilliant with colour, texture, borders, strong concepts, and multi-media.

"We were playing around with the idea that the first act would start very two-dimensionally, like a medieval painting," Scott-Mitchell said. "We were trying to make it quite flat, and rigid. In the second act, it starts moving into a three dimensional world. I think that notion was working reasonably well."

Scott-Mitchell was pleased with the show, but a bit unhappy that the boat didn't go back up on opening night. The boat had to be lined up properly by the performers before it could move. A locking device only pops when the sirens have lined it up. Opening night nerves meant that they didn't manage this, and the boat didn't go back up.

The 5m high boat was raised and lowered by a diagonal piston device that ran on compressed air. One swivel seat in the centre was like a swing, hanging there, so that the dancer stayed vertical as the boat was lowered. The storage tanks kept a charge so that the boat could go up and down twice.

The man responsible for the ingenious boat movements was Hannes Finger.

"It took a long time to figure the boat out," Finger said. "When it was introduced to us as a design submission, I thought it was easy. Then it became difficult, and more difficult, and extremely difficult. We made trials mentally in the head first, and then on paper, and then started reality. It took all my little brain for a long time! It was a five dimensional movement!"

"The rocking bit, naturally, had to be locked. Otherwise it flies out! That happened once, in the workshop. The whole boat shot out, when somebody who didn't know that it wasn't finished pressed a button. It could be very dangerous, but I invented a locking device, so that it locks automatically in both positions. All the locking devices had electronic sensors which gave the sign that the boat could be moved. Then the dancers could rock it and

VARI-LITE GRANTED PRELIMINARY INJUNCTION AGAINST MARTIN

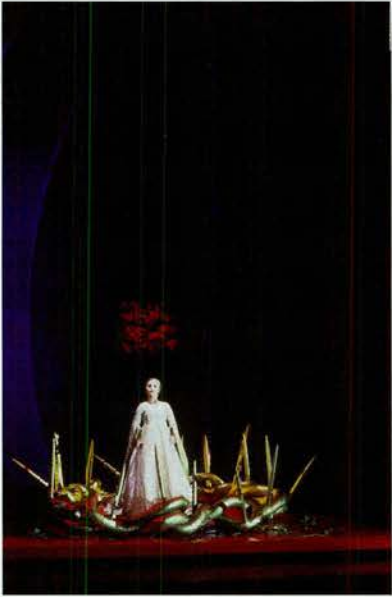
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The suit, which covers the territory of the USA only, relates to one patent only and affects the sales of the MAC 300/500/600 and Case Controller (only when sold in conjunction with the aforementioned products) exclusively.

All other Martin products in the U.S., as well as the entire range of Martin products outside of the U.S., are unaffected. Previously purchased products are unaffected.

Furthermore, the injunction in no way affects use of, or sales of, the aforementioned products by customers in the U.S. who have previously bought the MAC 300/500/600 and Case as the injunction only covers Martin sales into the U.S. market.

Customers in the U.S. who have previously purchased the affected products will still receive Martin's full support and service backup as the injunction only covers sales of these products from this day forward.



turn it around like a carousel.

"One hydraulic piston was attached. The whole boat was only on two arms—one was at the front of the big bearing and one on the upstage side of it. The hydraulic disc had an accumulator in it, so that the oil pressure was up, and there was no motor noise. It worked very well in the end, and we were very excited when it did, but it took a long time!"

The shape of the red vertical staircase, the boat, and the blue curved flats were all inspired by female genitalia, Scott-Mitchell casually added. (I suspected as much.)

"Oh there were lots of tricky bits," Finger said. "In the colonnade, the floor had to disappear and the stair had to come up. We had to slice the floor open, because it was about 1m20cm high. That was tricky; the whole fascia was trucked."

The revolving golden cubes needed two different types of castor systems inside, one which revolved, and one which was fixed so that the whole structure could part.

HEAVY SCENERY

The size and weight of the set was also problematic. Most of it was moving. "We had to build the flats very structural and thick," Finger said. "We couldn't actually fly them because they were too heavy, so we had to break them into parts when we put them on stage. We built two huge storage trucks for them, so that the

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GLANTRE ENGINEERING LIMITED cease to trade

LONDON: The Directors of Glantre Engineering have announced that they were forced to place the company into receivership on Thursday 12 August 1999, after more than 25 years in business.

There are two main contributing factors: firstly, the refusal of the company's export credit insurers to pay out on a substantial claim on a contract with the Amedeo Corporation of Brunei and secondly, the continued and repeated delays of a major Italian shipyard in making payments in respect of work successfully completed by Glantre on several cruise ships.

The Chairman of Glantre Engineering, Derek Gilbert, said: "Where possible, we are doing everything feasible to minimise the inevitable disruption that this will cause to our customers by finding companies which will take over the contracts in progress." He continued: "I am well aware of the domino effect which may result from this and on behalf of all the Directors of Glantre I would like to say how bitterly disappointed we are at having to take this course of action."

Financial Director Francis Wells stated that the two debts had been completely beyond the company's control, saying: "Amedeo was recently wound up owing \$6bn to their creditors."

Major Changes in Film/TV Lighting Distribution

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energy-efficient lighting without aesthetic compromise," explains Katz. Recognising this, several high profile US broadcasters have replaced existing fluorescent installations (acquired on cost savings platforms), with Brightline. "We can now offer all the operational benefits of fluorescent lighting systems with a product that truly enhances your visual image."

Commonality in housing sizes is also a major development. The two-tube and four-tube housings are the same size and share common accessories such as intensifiers and a range of intensifier-mounted and fixture mounted control screens and gel frames. Both fixtures have a double track accessory holder that lets you place both gel frame or intensifier control screen in the front of the unit at the same time.

Additional innovative features of Brightline's evolutionary system include: the revolutionary rack mounting system which permits you to place multiple units in the same location - this enables a 10-light cyc system to be lit with under 2400W; vertical or horizontal mounting yokes provide the ability use Brightline fixtures both as key or fill as well as placing lights in tight corners; Construction is rugged and location-proof - great for permanent installation or rental; Daylight or studio balanced environments with a quick change.

Call Miller Professional +61 2 9439 6377.

Meanwhile Mediavision Australia have taken over the exclusive Balcar distribution with the entire range of Balcar products including their traditional fluorescent fittings Fluxlite/Quadlite/Duolite/Twinlite as well as the newly developed Zoomlite45, Camflux 30, Spotflux1, 2 and 4, and Powerflux 1 and 2 fluorescent fittings now available.

The Zoomlite 45 with manual dimming and focus control creates a location 3 light kit drawing less than 150W as the total kit, and the Camflux 30 is a battery fluorescent with silent high frequency technology to avoid camera noise for use as a fluorescent "sungun" or camera mounted light. The Spotflux range can produce a shadow, increase contrast and create an effect similar to a fresnel fitted with a light diffuser, and can create a spot effect using a horizontal angle from 35° - 90°. The Powerflux is a fluorescent fixture which can light at distances between 3 - 7 metres, enabling fluorescence to be used in production studios with high grid systems, either as a main light, fill light or cyclorama light.



Balcar Zoomlite

The new partnership will include a dealer network throughout the entire country, enabling support and service to all Australian customers from the evaluation of customer requirements, the design of studios, to on-site demonstrations and after sales service.

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Continuing the soap.....after many years John Barry no longer distribute ARRI with Cine Australasia taking over this distribution. However, at the time of going to press, John Barry are about to sign a MAJOR Film/TV lighting equipment manufacturer. Details are still being thrashed out and until contracts are signed in blood, we can't reveal who it is! You'll just have to wait until next month.....

• Cat Forcer

OA DOES RINALDO

continued from page 65

upper half could fly into the storage cages which were on heavy castors, and we took off the bottom half with other devices to store them. So that when we set it up, we first flew the top bit, which was light enough to fly. Then we came with our bottom part attachment, which was another invention. Then we connected the bottom part so that we didn't have to move up and down, we could move off and on. Some of that had to be done during act changes which was rather time consuming and worrying. In the end it worked quite well."

Scott-Mitchell is still unhappy with the Opera House stage. "I think it's fascinating that all this stuff has come up with Edo de Waart [SSO conductor], saying that the concert theatre should be given back to the Opera. It's crazy. On the last show we had real problems because of the wing space. On this show, we had real problems because of the drift available. We had so much stuff compressed downstage, like in the first half of the stage from behind the proscenium to mid-stage, that there was very little room left to be able to mask through properly.

"It's a joke venue, basically," he says, with a laugh. "I think it's more and more outrageous that one of Australia's premier production houses is forced to put up with a shoebox, that doesn't work properly. Whereas the Victorian Arts Centre has loads of room, and fantastic flying facilities."

BIG BOLD LIGHTING

One problem for everyone was that the LD, American Mimi Jordan Sherin, didn't come over until two weeks before the show and before arriving in Australia, she had been working solely from reproductions of photos of Scott-Mitchell's model.

"The quality of the photos changes with the processes, so for example, Mimi thought that the false proscenium was a much brighter gold than it really was, because the flash flared out that bit on the model," Scott-Mitchell said. "Unless you get people in the same room, physically with the model, then a lot of it is guesswork. Also it was a technically complex piece, because there are a lot of moves. And for her to try and piece that show together



only looking at plans and a series of photos is no easy task! The Opera doesn't quite understand the importance of that, and I think it's an absolutely critical part of the process."

WHY THE OPERA LIGHTING GRID IS OLD-FASHIONED

Based in New York, Sherin has won awards and worked in theatre, opera and the New York Shakespeare Festival. *Rinaldo* was her first production with OA.

"I knew that the production would be formal, no guessing with the cueing," she said. "If you follow the rules of Handel, that's how it is, and you need a very good reason to break those rules. I realised when I opened all the paperwork from the Opera itself that their normal rep plot was not going to do at all. So I proposed a number of different things to them, and ended up compromising, which you do a lot as a lighting designer around the world these days.

"I had to cut some of the bigger instruments that I asked for. I essentially lit the show with 12 lamps, four 4kW Arris (HMLs) with scrollers and eight regular 5kW, which were in the Opera stock, and footlights. That was basically it.

"With a smattering of exceptions, I didn't use their rep plot at all. I've worked with Jim Robinson [the American director] a lot, and he has a very modern eye, one that can deal with video and film. That's what I think we have to offer people in the opera. We can't go back to something that is tired."

Like a straight-forward, upfront American, Sherin wasn't reluctant to say what was wrong with the Opera rig. "There's a lot of small stuff, which you don't really have time to use these days. Also, they don't make bold statements.

"Let me give you one example. They have a perch position upstage of the proscenium, where they have 650w Preludes, which nobody should have anywhere. They should just be thrown in the dumpster, or at least given to a community theatre. I used about 12 on one side, in one colour, to try to make some crosslight. I used it once, then cut it, just cut it. It was not even worth focusing, not worth spending the time on.

"Why use 12 lamps from one side, when you can use a 5kW with a scroller? What exactly is the point? It's ludicrous, certainly in terms of time."

I asked Sherin if she had talked to OA about their rig. "I didn't know what I was walking into here. But they have a really good electric crew, headed by Colin Alexander. He's just fantastic."

Sherin arrived here two-and-a-half weeks before opening, but she found that, "the set took a long time for them to get together and put in. A lot of my time was given up to it. I probably had about 10-12 hours of lighting time outside of rehearsal."

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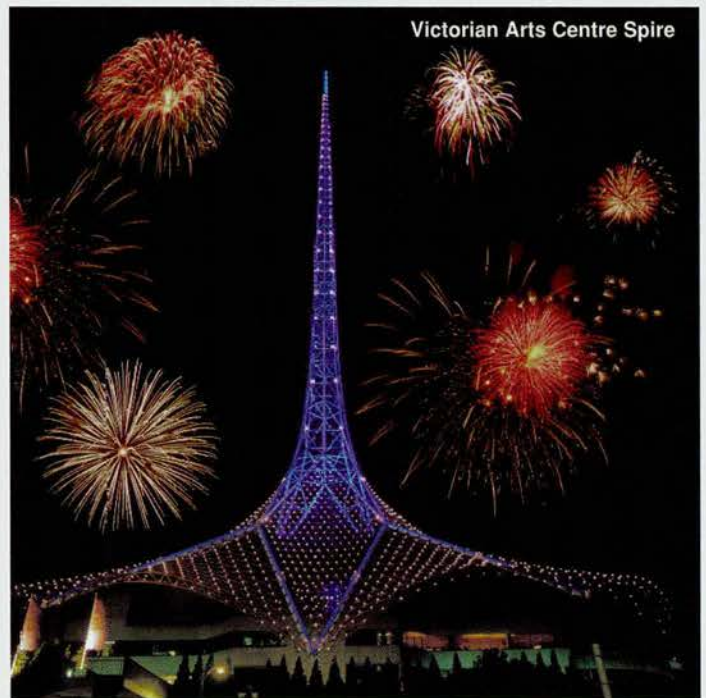
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The optical fibre has been with us for around forty years although it's only really in the last decade that its use in practical lighting applications has been affordable. The optical phenomenon of total internal reflection, on which all fibres depend has been understood for a couple of centuries, but it was the developments in the areas of materials technologies and light sources that have made them a possibility and finally a practical reality for lighting applications.

When a ray of light crosses a boundary between transmissive media (air, water, glass, plastic) some of the light will cross the boundary and some will be reflected back. If the angle between the ray of light and the boundary is very acute (close to a right angle) the majority of the light will be transmitted: the situation we are used to seeing when we look through a window. As the angle at which the ray crosses the boundary becomes more shallow, a higher proportion of the light will be reflected, until finally an angle is reached where virtually all of the light is reflected. This is total internal reflection, and can easily be observed when you look up at the surface of a swimming pool from under the water.



Are There Fibre Optics in Your Future?

Optical fibres are simply long cylinders of material with high optical clarity into which light is injected at a sufficiently shallow angle that it will be reflected from wall to wall until it emerges at the other end. The first practical optical fibres were finely drawn pieces of glass which were restricted in length because of both the limitations of the process of drawing out the fibre and the light losses over the length of the fibre. The intercontinental communications fibres in current use can be tens of kilometres long, with distances in the hundreds of metres being spanned in office buildings and studios every day. As the optical fibre used for such applications is finer than a human hair, the vast majority of what we identify as an optical fibre cable is actually packing, strengthening and sheathing to produce something robust enough to be run through ducts and cable trays and conduits. To get the data in and out of a communications fibre in one piece a pulsed, solid-state laser is generally used as the light source.

Perhaps the most difficult problem with optical fibres is joining them without experiencing huge light losses due to reflections at the joins. Originally this could only be achieved in a mobile



optical laboratory using microscopes, but today field joining kits and low-loss plug-style connectors have brought fibre to the point where it is not that more difficult to work with than coaxial cable.

There may well be a communications fibre in your future, as an off-the-shelf single-fibre 100Mbps (Megabit per second) link can carry approximately ten broadcast quality video feeds and ten DMX universes (5,120 channels) and four talkback loops and forty 24bit audio channels. All of this with no ground loops, crosstalk, Electro Magnetic Interference (EMI) or signal attenuation, while commercial 1 Gbs (ten times the capacity) fibre communications systems are now available, although at a somewhat higher price.

Optical fibres as light sources fall into two broad categories: those which serve as the transmission medium between a light source and its output, and those which emit light; identified as end emitting and side emitting (or linear) fibres. Fibre can be used to transmit light between the light source and its output for a number of reasons: the need to maintain electrical isolation between source and output, the ability carry light into otherwise inaccessible places, the

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Are There Fibre Optics in Your Future?

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Closeup of Fibres bonded into common end

ability to supply a maintenance-free light source of controlled quality and the ability to distribute the output from a single source to a number of locations.

There are many situations where mains power is simply not an option for providing light for a job; where water and light need to be together in gardens,

pools, fountains and water effects; in hazardous locations where an electrical spark is unacceptable such as volatile liquid stores and explosives magazines; and where mains voltages present the risk of electrical shock in such applications as medical imaging.

Fibre's ability to get light into otherwise inaccessible places is one of its most exciting characteristics for lighting designers, set designers, architects and interior designers. The accompanying photograph of the Burswood Island Resort logo which was set into a floor only 150mm deep is an example of an application

which would otherwise have required a substantial sub-floor space for both installation and maintenance. Footpaths, planter boxes, hand rails, window sills, walls, column pediments and floor panels are amongst a host of places where optical fibres have sprouted in recent times.

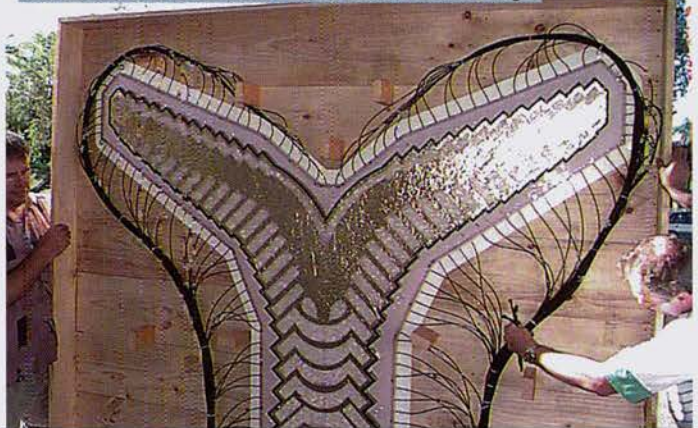
As the light source is remote from the luminaire end of the fibre, no access is required for lamp changes. This allows a fibre optic sourced luminaire to be located in inaccessible or sealed locations with little likelihood of any requirement for access to the fitting for maintenance. The light source can be filtered at the head end to remove any Ultra Violet or Infra Red components, thus giving a light of a controlled quality which is ideal for use in sealed display cases containing fragile exhibits.

The hundreds, or even thousands, of individual fibres gathered at a common end and lit with a single controllable source can be spread out to create patterns in walls, floors, ceilings, sculptures and star drops, a task that could only otherwise be handled by the use of hundreds of individual light sources and the complex cabling that would be associated in their installation and operation.

The side-emitting or linear fibre is designed to allow a small light leak across the fibre/air boundary at each reflection which results in a fibre which appears to glow over its entire length.

While communications fibres are manufactured to maximise data accuracy and use such exotic materials as glass with a graded refractive index to keep the light from leaking, illumination fibres may be constructed of individual glass or polymer strands or

Fibres fitted to Burswood Island Resort Casino logo



bundles of strands twisted together to achieve the required size. Glass fibres tend to come as a single 0.75mm fibre, with multi-stranded bundles of between two and ten fibres for use where larger thicknesses are required.

Polymer fibres are available in single strands ranging from 0.05mm to 14mm and for linear applications are usually bundled

into twisted rope-style bundles of around 9mm or 16mm in diameter. The plastic materials which form the sheathing on glass fibres and the cores of polymer fibres are very sensitive to ultraviolet light which can cause them to break down after pro-

longed exposure to sunlight or artificial sources such as fluorescent lights or metal halides. All fibres (and especially fibre bundles) are coated with a cover, usually of PVC, and filler materials which consist of UV stabilisers, algacides and fungicides.

Fibres are far from cheap. As a guide for thinking about what you would like to do with fibre, Table 1 shows some indicative recommended prices for fibres.

The optical fibres used for lighting applications are not extraordinarily efficient and therefore require fairly substantial light sources with efficient optics to produce the kinds of output needed

for most applications. The lightboxes in common use are generally an enclosure containing a light source, filtering and focussing optics, a cooling system and often one or more colour or effects wheels.

The sources used in lightboxes range from dichroic incandescent MR16 lamps and metal halide discharge lamps with objective lives of around 6,000 of thousands of hours, to high intensity enclosed metal arc lamps with an objective life of only 350 hours. As both heat and UV are the natural enemy of the optical fibre, dichroic filtering is generally used to remove these components from the light source before focussing it on the common end termination in the light box. A great deal of care is also necessary

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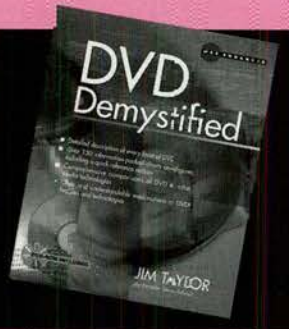
Fibre	Cost metre cut	Roll size	Cost metre on Roll
End emitting			
0.75mm high grade glass	\$1.21	2,700m	\$0.44
3mm high grade glass	\$10.53	150m	\$7.12
3.2mm (teflon jacket)	\$13.04	300m	\$9.82
Linear			
9mm twisted	\$58.55	N/A	N/A
16mm twisted	\$130.39	N/A	N/A

Light Source	Colour Wheel	Lamp Life	RRP
50 watt MR16 Dichroic	None	6,000	\$212
Metal Halide 150 watt	6 cols 1RPM	6,000	\$2,188
Metal Halide 150 watt	6 cols 8 bit DMX	6,000	\$2,700
Metal Halide 150 watt	6 cols 16 bit DMX	6,000	\$2,962
HTI 400 watt	8 colour DMX	350	\$6,333

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Are There Fibre Optics in Your Future?

continued from page 70

Arc Blaze, metal halide lightbox for linear fibre



with waste heat disposal from the lightbox, especially if the box is to be placed in an enclosed space or buried in a pit for outdoor applications.

Many lightboxes offer control over their colour wheels either in the form of a rotational speed control or as a fully indexed DMX po-

sitioning control.

Some of the more advanced lightboxes contain two DMX controlled wheels on the same axis to allow for colour mixing effects.

Table 2 on the previous page shows some indicative retail prices for lightboxes. The point of connection between the optical fibres and the light source is the common end, the place where all of the fibres are grouped together to be inserted into the lightbox. The common end may be constructed as simply as binding all of the fibres together with a cable tie or a few feet of electrical tape, but the most reliable way of achieving a good light coupling and predictable colour changes, sweeps or other sequential effects is to insert and bond the fibres into a machined common end.

At the business end of the fibre there is a vast selection of luminaires, lenses and diffusers which may be fitted; ranging from glowing pavers, to garden lights, fountain up lights, room downlights and wall washers, spot lights, flood lights, hideous chandeliers and even grommets to take the end of a small diameter fibre for drapes and star cloths.

The possibilities of what can be achieved with careful use of optical fibres are endless, as are the opportunities to make an expensive dog's breakfast of your vision. Fibre may be a cool idea, but solving the problem with a couple of fluoro and some diffuser may turn out to be the most effective answer. There should only be fibre optics in your future if they are the best solution to your problem.

positioning control. Some of the more advanced lightboxes contain two DMX controlled wheels on the same axis to allow for colour mixing effects.

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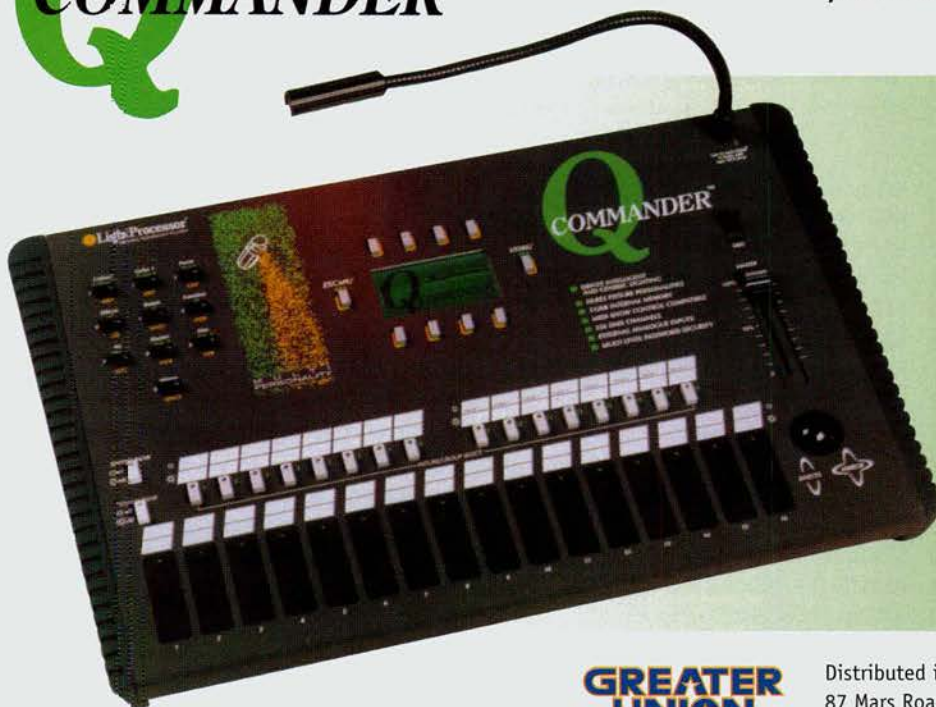
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Powderfinger

Internationalist Tour



One of the best Australian bands to emerge in the last five years is Brisbane group *Powderfinger*. Featuring the intense vocals of lead singer Bernard Fanning the band have enjoyed chart success and have gained a devoted live following. On their current *Internationalist Tour* I caught up with the band's LD Anthony 'Bazz' Barrett at their Monash University gig in Melbourne.

Bazz is a freelance lighting designer and operator who has worked with over 200 bands. His current 'regulars' are *You Am I* and *Powderfinger*. It was while Bazz was on tour with *You Am I* that he met up with the boys from *Powderfinger* who were the support band at the time. After lighting a couple of their shows, the band asked Bazz to tour with them.

For this national tour, Bazz has kept the lighting design small and versatile.

"It's basically a pretty small light show with only 23 lights all together. I love Martin gear so I'm using four Mac 600s, five Mac 500s, 14 Robocolor Pro 400s, and six token par 64's because it is a rock gig after all. I'm running it all off an Echelon 1k which has been behaving well."

Bazz explained the Macs are the perfect choice for this tour because of the range of venues the band are playing.

"The Macs are awesome, I just love them. One Mac 600 is worth 50 par cans. We've taken this little show and done it outdoors at Brisbane in front of 6000 people and it was better than what they had hanging in the air."

At the Monash gig Bazz and his rigger Danny North had to work with a very low ceiling so the majority of the fixtures had to be used from the floor, or on roadcases next to the flexistage. The stage was framed by a huge grey cyc at the back of the stage suspended from truss, and broken up by five grey banners with black building scapes painted onto them.

Bazz describes his lighting style as a bit more 'theatre' than the old rock lighting cliches.

"I try to make it a bit more

special than a standard rock show. And I try to use the moving lights subtly. I don't like to 'see' the moving lights move except for those very rare occasions. I'm much more of a lighting person than a moving light guy. But I use them because they do so much.

It's really easy to just turn them on and make them do stuff, but to actually make them subtle takes time. It's having an opportunity to muck around with them, and usually time is against you with Australian touring - we don't have the luxury of production rehearsals and weeks in a studio. But I managed to get 20 songs worth of programming done during breaks.

"The show is heavily programmed enough so that I can still 'wing it' on the night. There are about 290 cues so far and I've got every song down on a page, but I've also got a couple of pages that are just fun. I tend to just grab stuff out of the blind mode and make it up as I go along."

Bazz is in the fortunate position where the band are interested in the lighting design but at the end of the day, totally trust him to interpret their music for the design.

"They're great guys, and they're very easy to get along with. We always sit down and have a chat about the lighting. They're being creative with their music and I've pretty

much always been able to just do a design and they've always been happy with whatever I've come up with. My lucky thing in life is that I've always been able to convey music through lights. I've been very lucky that way - I never went looking for it, it just happened.

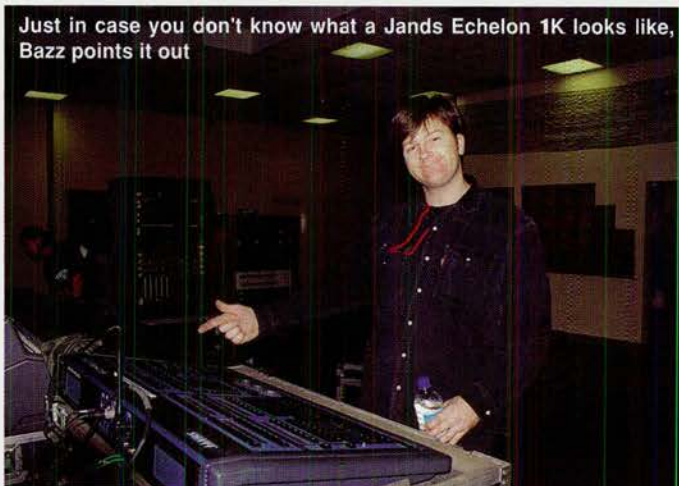
"They like the lights to match the intensity of the songs. And they've got really big dramatic moments in the show - lots of stops to dead silence and then we go to dead blackout. And then blast back in with strobes or lots of open white."

Bazz makes good use of the colour mixing capabilities of the Martin fixtures. He said he likes the simplicity of scrolling through the colours and being able to create any shade he can think of. He gave the dichroic filters a good work out at this

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Bit squashey



Just in case you don't know what a Jands Echelon 1K looks like, Bazz points it out

Powderfinger

Internationalist Tour

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show using lots of strong colour combinations like Congo blue and gold, green and lavender and then breaking it up with saturating washes in a single colour.

"I like to use lots of Congo blue, and blues and greens. I've never been a fan of too many pinks, they don't say too much to me, but lots of primaries and I guess dark colours are what I go for. But I also use a lot of whites."

Bazz had some custom gobos made by the Gobo Factory in Melbourne to be used in the Mac 500s.

"I got some pictures off the internet of a B29 bomber a big propeller, and a radar tower and they turned out really well. I just wanted to avoid those typical gobo looks that everyone is using because they're a bit boring now."

And while Bazz's operating style is very much locked in with the beat of the music, he says his approach is more unconventional than others.

"I'm not too fussed about symmetry and the rest of it. Balance more than anything is what I'm after. You can stick a whole bunch of lights anywhere as long as there's other lights to counterpoint them and to hide everything. I'm only ever really happy when you can't really see any of the lights. I think when you walk



into a gig it should look like you've forgotten to put the light show up - to look at a stage and think there's not even a light up there - that's my true secret aim. That's what makes me truly happy."

Tour Credits

Tour Manager Denis Sheahan **Lighting** Anthony 'Bazz' Barrett
Touring Lighting Systems Rigger Danny North **FOH Engineer**
Mark McElligott **Monitor Engineer** Brendan 'Blossom' Keane **FOH**
Systems Rigger Tristan 'T-man' Farrow **Transport Operator**
Russell Austen (Roadpro Event Services) **Stage Manager** Mathew
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SMALL-ISH MOVING-HEAD SPOTS

Deciding on the name of the product category for this comparison has proved to be a serious problem. It was going to be "250/300watt Moving Head Spots" until Universal Light and Audio sent a 575watt luminaire. Then it was going to be "Budget Moving Head Spots", until the prices came in. How can you possibly call units that range from \$5,734 to \$9,999 budget luminaires? That sort of left "Small Moving Head Spots" which is not really very appropriate for luminaires that weigh in at 16 to 22.4kg, which brings us to smallish and nowhere else to go.

There seems to be a lot of activity in the world of smaller moving-head fixtures with Martin already at their second version of the Mac 250 (the Mac 250+ has indexing gobos) while virtually every other manufacturer now has smallish units available. To keep this comparison down to a manageable size it was decided to keep the selection to spot units only; the wash lights will have to wait for a later work-out. Even with a restriction to spots there were six candidates: the Stage Light 300 from Clay Paky, Coef's MP250, the MH-660 from Future Light, the Studio Spot 250 from High End Systems, JB-Lighting's Varyscan 6 and the Mac 250 from Martin. It was pretty impressive to see these all lined up in WA Academy of Performing Arts lighting studio for the comparison, particularly as the word had got around Perth about the test and there were lighting people coming out of the woodwork to participate.

CREDITS

Thanks must go to Dave Trapp from AVLA, Sean McKernan and Tim Bradsmith from Concert & Corporate Productions, Andrew Newnham from Light Applications, John Reynolds from Bytecraft, Nick Higgins and the dozen other students from WAAPA's lighting course who helped to get everything working and Mark Howett



for making the studio available. Unpacking, configuring, testing and hooking up six luminaires, some brand new and several unfamiliar to all of us, was a bit of a challenge and a heap of fun.

DMX CONNECTORS

One problem that became obvious immediately was the inability or unwillingness on the part of a number of manufacturers to follow the USITT's DMX 512 specification. Three of the luminaires had 3 pin XLR connectors for DMX data, two had the correct 5 pin XLRs, the Studio 250 from High End has two-bob each way with both 3 pin and 5 pin connectors and the Future Light MH-660 can apparently be ordered with 5 pin XLRs. This caused a few cabling hiccups which were eventually resolved by scrounging enough 3 to 5 and 5 to 3 adaptor leads from the participants to get a DMX network running. The USITT standard calls for 5 pin

continued on page 76

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Write in Reader Service No: 101

Lighting::PRODUCT COMPARISON

BY::Andy Ciddor

SMALL-ISH MOVING-HEAD SPOTS *continued from page 75*

connectors, and with the high likelihood of mistakenly using 3 pin audio cables which are almost certain to cause problems, there can be little reason to persist with the 3 pin connectors. Martin even attempt in the Mac 250 manual to insinuate that their 3 pin XLR connector complies with the DMX standard because they use the same pin numbers for the functions. Certainly the dollar or so saved by using the wrong connectors is a fairly insignificant sum when a unit sells for over \$5,700.

THE TESTS

Although AVLA had kindly supplied an MA Scan Commander desk which had all of the latest personalities loaded, the consensus of the gathered experts was that a fader-per-channel desk would probably make the testing process easier and so WAAPA's venerable Event 48 was cranked up for the job, despite its known propensity for showing a little DMX jitter.

Light output was measured with a Gossen Mastersix digital photographic exposure meter in the centre of the beam at a distance of approximately 4.7 metres from the head. As the meter was not calibrated before the tests, measurements should only be considered as relative values for comparisons.

Flatness of field was evaluated by directing a sharply focussed beam onto a large sheet of white paper (the back of a lighting plan) placed at right angles to the beam. It should be noted that both the Varyscan 6 and the Stage Light 300 exhibited fields that were totally flat to the eye.

Light leakage was tested by examining the light striking a sheet of white paper as it was moved around the luminaire which had



its lamp struck but its blackout shutters closed. In theory there should be no light leaks from any of the luminaires.

Smoothness of fade was evaluated by slowly fading the luminaire from full to blackout while the sharp focussed beam was directed at right angles to a wall.

Repetition of position was tested by repeatedly moving the beam from one reference position to another at different speeds. No units showed any sign of drifting.

Positional stability was judged by the movement exhibited by the beam while the luminaire was focussed on a reference point and the desk was in a fixed state. In acknowledgment of the fact that a Jands Event jit-

ters a little anyway, all luminaires were tested simultaneously. Both the Varyscan 6 and the Studio Spot 250 were rock solid.

Reset time was measured as the time it took for a luminaire to return to its previous position after the mains was cycled off then on; an attempt to replicate the effect of a power dropout to the rig. Reset noise refers to the racket that the luminaire makes as it resets itself and establishes its index position.

DMX dropout is about how a luminaire behaves when you momentarily interrupt the DMX stream. The Studio Spot 250 and the MH-660 both closed their shutters but all luminaires held their position and went about their business when DMX data was restored.

TERMINOLOGY

Kill display LEDs refers to the ability or otherwise to shut off the LED indicators on the luminaires to eliminate the "lighting rig as a

continued over

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Device	Stage Light 300	MP250	MH-660	Studio Spot 250	Varyscan 6	Mac 250
Manufacturer	Clay Paky	Coef srl.	FutureLight	High End Systems	JB Lighting	Martin
Distributor	Show Lighting Australia	Universal Lighting & Audio	Coemar DeSisti Australia	Bytecraft	Universal Lighting & Audio	Martin Professional Lighting Australia
Telephone	02 9898 1666	07 5532 9922	03 9467 8666	03 9587 2555	07 5532 9922	02 9898 1111
Recommended retail (tax inc)	\$9,999.00	\$5,734.00	\$6,499.00	\$9065.39	\$8,174.00	\$5,999.00
Channels	10	9	16	18	12	13
Focus	yes	no	yes	yes	yes	yes
Colours	7 + 3 on effects wheel	10	11	12	7 + 2 on effects wheel	12
Gobos	6	8 (6 metal + 2 dichroic)	6 (4 metal + 1 glass + 1 dichroic)	8	6	8
Gobo Rotate	yes	yes	yes	yes	yes (1 fixed)	yes
Gobo index	yes	yes	yes	yes	yes	no
Prism/effects	static prism	no	3 facet prism	3 x prism effects	4 facet prism	3 facet prism
Effects Rotate	no	no	yes	yes	yes	yes
Diffusion	2 on effects	no	exchanges with prism	yes	yes	exchanges with prism
Iris	no	no	no	yes	yes	no
Motor Speed	track only	track only	track & vector	track & vector	track only	track & vector
Lamp	HTI 300w / HMD 300w	MSD 250/2	MSD/HSD 250	MSD 250/2	HMI 575	MSD 250/2
Lamp Hours	750 / 3000	2000	2000	2000	750	2000
Lamp Cost	\$399.00	\$350.00	\$350.00	\$350.00	\$366.00	\$350.00
Colour Temp	5350k	6070k	6500k	8210k	5450k	7110k
Lamp Restrike	cold	cold	cold	cold		cold
Beam Angle (deg)	16-23 (zoom)	not available	15	18	not available	14/17/21 (selectable)
Flatness of field	good	satisfactory	satisfactory	satisfactory	good	satisfactory
Centre beam lux	1700	4200	3600	3600	3600	2400
Light leak	satisfactory	satisfactory	excellent	excellent	leaks at both ends	excellent
Smoothness of fade	noticeable flag at low dim	noticeable flag at low dim	jittery flag at low dim	two flags visible at low dim	jittery at low dim	smooth iris then clunk
Kill display LEDs	no	yes	yes	yes	no	yes
Pan (degrees)	450	450	530	570	370	540
Tilt (degrees)	252	270	285	270	270	289
Repetition of position	good	good	good	good	good	good
Positional stability	satisfactory	satisfactory	satisfactory	good	good	satisfactory
Access to lamp	5 cent piece required	2 screws	4 screws, dead easy	2 screws	8 screws	2 screws
DMX Socket	5 pin XLR	3 pin XLR	3 pin XLR (order as 3pin or 5pin)	3 pin & 5 pin XLR	5 pin XLR	3 pin XLR
DMX drop out	no effect	no effect	closes shutter	closes shutter	no effect	no effect
DMX terminate	external	external	external	external	external	external
Start Address	any channel	any channel	any channel	any channel	any	any
Reset Noise	minimal noise	whirring	grind on reset, light from lens	very quiet	very noisy-grinding sounds	low rumble/grind fairly quiet
Reset Time (sec)	38	35	25	43	41	56
Noise of fans	slight whine	whirring and v slight rattle	gentle low rumble	very quiet	fan whir	low fan whir
Rigging method	4 x hook clamps & bolts	2 x brackets & 4 x bolts	2 x hook clamps & bolts	2 x hook clamps & bolts	mounting plate with 4 bolts	Mounting plate with 2 x 1/4 turn fasteners
Weight	20.5kg	20kg	16kg	22.4kg	19.8kg	20kg
Manual	Slender - light on information	Light on information & not a great literary work	Clear & comprehensive	Excellent & comprehensive	less than brilliant translator - all but unintelligible	clear & comprehensive
Extra Functions or Facilities included in price	very good optics Zoom lens UV filter	10 extra gobos UV filters	5 extra Gobos fan speed control	Scene capture & playback	UV filter programmable stand-alone mode very sharp optics	gobo shake mode noise vs speed optimisation

Small Moving-Head Spot Comparison

Lighting::PRODUCT COMPARISON

BY::Andy Ciddor

SMALL-ISH MOVING-HEAD SPOTS *continued from page 77*

Christmas Tree" effect during blackouts.

Scene capture and playback is the ability of a luminaire to store a series of positions and effects and replay them at a later stage in the absence of a lighting controller.

Motor speed tracking refers to a luminaire moving to a new position each time DMX data is received from the controller, ie. tracking the movement of a fader or wheel or even a crossfade from the desk. Motor speed vectors are about the ability send a DMX signal to the luminaire which specifies its new position and how quickly to make the transition.

Gobo indexing is about being able to specify the final rotational angle of a rotating gobo rather than simply having it spinning around.

MANUALS

These luminaires are all complex pieces of optical, electrical, mechanical, electronic and software engineering which require good documentation to be used to their maximum potential and maintained in a good operational state. The manuals provided with the luminaires vary in quality from totally inadequate to well thought out and well written. Several of the manuals are bizarre translations from other European languages and while it may be entertaining, material such as "regulate the focalization by positioning the projector where desired" and "Your %%% is suitable for the use in standing position as well as for the montage on a traverse. But you should take care that there are no flammable things within a radius of 60 cm because the headlight produce a great heat." is of no help to some poor tech trying to figure out why the luminaire always cuts out after running for 45 minutes. The electrical contractor who follows the instructions to run out RG58 (50 ohm coax) or RG59 (75ohm coax) cable for DMX data as incorrectly translated in one manual will certainly not be very entertained.

The balance between features and price is going to be an issue when the prices vary by so much more than the available functions. While the Studio Spot 250 at \$9065 clearly has the widest range of features and functions, it's very hard to say that the MP250 is only half as good for half of the money. In the overall features for money stakes the MH-660 and the Mac 250 (especially since its recent price drop) look pretty good, but if you have a theatrical or exhibition application where you absolutely must have serious quiet, then for the moment at least you are going to have to fork out for the High End Studio Spot 250.

HAVE YOU GOT ANY GOOD EXAMPLES OF MANUAL/BROCHURE
BAD TRANSLATIONS OR PURE GIBBERISH?
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CLAY PAKY STAGE LG-T 300



HIGH END STUDIO SPOT 250



COEF MP250



JB LIGHTING VARYSCAN 6



FUTURELIG-T MH-660



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Following on from the introduction of the successful range of M series Chroma-Q colour changers, A.C. Lighting have announced their latest addition - the Chroma-Q M8-Lite. It incorporates all of the standard, durable Chroma-Q technology in a robust metal enclosure designed specifically for 8-Lite fixtures. Forced air-cooling ensures that the intense heat generated by 8-Lite fixtures will not affect the Chroma-Q M8-Lite or its internal workings. Fast to rig and de-rig, the Chroma-Q M8-Lite has been designed to withstand the rigours and demands of the touring world, and includes features such as quarter-turn catches that allow fast access to the inside of the unit for maintenance. Scroll changes are accomplished from the front of the unit, with no need to disassemble any part of the unit shell.

The Chroma-Q M8-Lite will fit 8-Lite fixtures from all of the industry's major manufacturers via the interchangeable backplate system, features a colour scroll length of between 2 and 11 colours, and comes complete with barn door fixing points.

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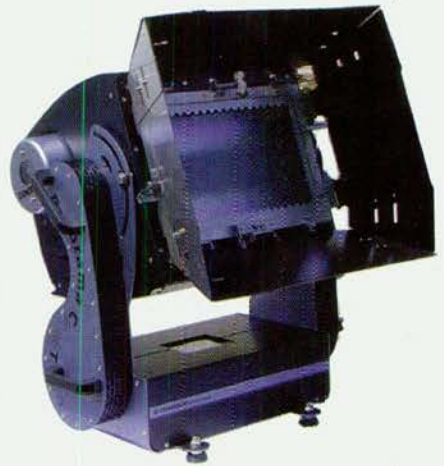


PANORAMA CYC

The Panorama Cyc 1800 from Coemar is a wash fixture designed for large area projection. Fitted with an infinite CMY colour-changer, it also features a proportionally controllable dimmer allowing complete control over the luminous output of the fixture. Colour changes are seamless and repeatable due to the unique design and arrangement of the colour filters.

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The Morpheus range of Color Faders, Moving Head Fixtures and support is now available for purchase in Australia.

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These units are controlled by DMX512 and are powered by a truss mounted 6 way supply. Two versions are available, an E" for Pars and a 4" for Ellipsoids. RRP: \$2,860.00 (Incl Tax)

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TWO TYPES OF MAC250 NOW AVAILABLE

The Mac 250 and The Mac 250 Plus.

Martin Professional has responded to the market need for a small moving head for effect and projection lighting. The Mac 250 is mainly used as an effects fixture, which provides beautiful mid-air effects. The Mac 250 Plus is more for those applications where a gobo will be projected onto a surface, often logos for promotional or corporate functions. Therefore the Mac 250 Plus has higher quality optics and comes with indexing gobos. Another great new feature for the Plus is a new colour wheel which has replaceable dichroics. The Mac 250 Plus is an automated yoke-mounted profile spotlight that employs a 250 watt discharge source. It provides an achromatic high-quality lens, its 12 saturated dichroic colors are easily replaceable like its 3 easily replaceable rotating gobos. The Mac 250 Plus provides indexing gobos, for projecting logos at promotions and corporate functions. A fast 3-facet rotating prism, variable focus, strobe effects, 0 to 100% dimming, and accurate 16-bit movement are just some more of the abundant features. High performance optics, attractive design, and numerous touring friendly features combine to make the Mac 250 Plus well suited to a wide range of lighting applications. Mac 250 Plus comes with a fixed beam angle of 18.3°.

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SELECON

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Write in Reader Service Number: 178

Shades of Blue

lighting the Nike store in Melbourne

When Nike decided to open their first retail outlet in Australia the design had to be cutting edge. Known for their huge 'Nike Town' outlets throughout Europe and the United States the stores are renowned for their spacious, themed atmospheres. Somewhat smaller than the Nike Towns, the flagship Australian store located on the corner of the Bourke Street Mall and Swanston Street in the heart of the Melbourne CBD features 1800 sqm of retail space spread over two stories.

The store is broken up into sections dedicated to specific sports and their associated merchandise. Each of these sections, called 'pavilions', has been given a specific architectural treatment and lighting design. Tennis, golf, training, basketball and football pavilions are spread over the two levels, and the centrepiece of the store's design is the two story Running Pavilion, an enormous blue glowing structure housing the Nike running shoe range.

Senior Lighting Designer on the project was Jason Longland from architectural lighting consultants NDYLIGHT. In addition to designing and specifying the general merchandise lighting throughout the store, NDYLIGHT was charged with illuminating two of the store's most prominent features - the central running pavilion, and a collage wall.

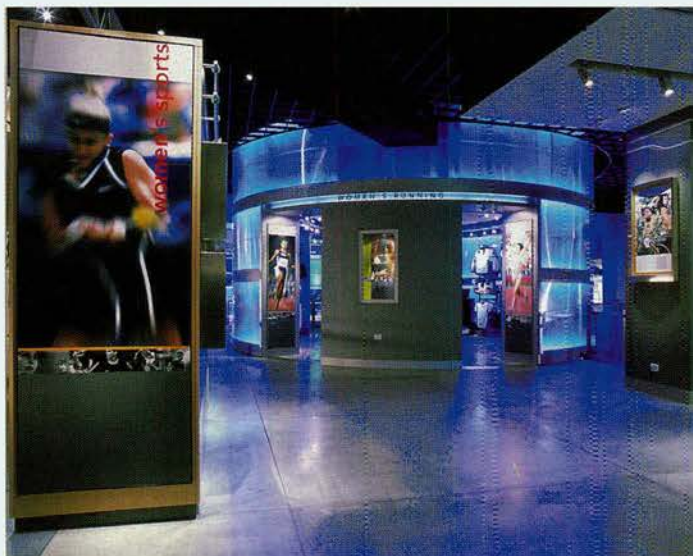
"Nike Retail Services from the States gave us a design brief which set out in a general way the intended look for the various pavilions and how they saw it in its complete form, partially based on the Nike Towns they have overseas. Because it was the first store in Australia we had some licence in terms of the choice of fittings we could use and in the effects which I could achieve with merchandise and other features," explained Jason.

The main exterior feature of the store is the collage wall which faces Bourke Street adjacent to the Bourke Street Mall. Made up of individual plastic panels which have imprints of various Nike sporting icons, hung from a scaffolding structure and lit from above and below by metal halide fixtures.

Inside the spacious store, the most prominent feature is the blue double story cylinder at the shop's core.

"The brief from Nike for the centre structure was simply 'a glowing pavilion'. It is supposed to stand out and hit you in the face the moment you walk in the door. You can't miss it."

At approximately 11 metres tall, the frame of the structure is lined with sheets of a bendable



plastic material called corflute. In between the corflute panels are blue neon strips which run around the perimeter of each row, top and bottom of each section. The light is diffused by the corflute, creating the effect of the whole structure being blue.

"One of the original intentions was to have the panels as opaque by using diffusion paper behind the corflute panels so it would glow more, but it was decided that we wanted a bit of vision through the panels so instead of just seeing blurred shapes you get to see a bit more."

The curved neon tubes were made specially for the project by Trineon Signs, and are a good choice of lamp type given that they are extremely efficient and that they have a lamp life of around 10 years. "It's all very simple, that's probably the key to the design, but it comes across as being very different. No one ever said it had to be difficult to be effective. The choice of the blue was deliberate in the sense it works in well with a lot of the merchandise, and it's a

great neon colour. The blue actually changes from day to night as the ambient light levels drop. During the day the light from the street gives a white wash filtering across it, whereas at night the blue dominates and it becomes a darker vibrant colour."

Throughout the rest of the store NDYLIGHT avoided over-use of ambient light by making use of the reflected light from the merchandise. The main escalator area between the ground and first floor is simply lit by fluorescent battens mounted into slots in the wall so that direct light is kept to a minimum.

"It's a transition space so



there's no need for highlighting, there's no merchandise. And Nike don't sell concrete ceilings so there's no point making a feature of the ceiling or the walls. The fact that it's a bit darker is effective because it draws your eye to the brightly lit merchandise." All the merchandise light fittings are on single circuit continuous lighting tracks. Not every piece of merchandise is lit evenly to create a sense of contrast, rather than a general wash. Choice of fixture for the merchandise lights was dominated by the necessity for true colour rendition which was a more important design criteria than lamp efficiency.

"Colour rendition is the most important thing with the merchandise - the colours must look how they're going to look outside, so we use a lot of low voltage ELV lamps because they provide excellent colour rendition. They're not extraordinarily efficient so there's a bit of a compromise but we have been energy efficient in the sense that we don't have a lot of other light fittings. There's not a lot of other ambient light in the space. The priority is lighting the merchandise and then reflected light spills into the other space. The only exception is the double story running pavilion - it's the only ambient lighting in the space."

Display boxes feature throughout the store as merchandise-based tributes to great athletes in the league of Michael Jordan, Michael Johnson and Tiger Woods. Set into the interior walls, the glass fronted displays use a single low voltage fitting with a narrow 10° spot to hit the particular piece of merchandise, while the remainder of the display, usually a photo of the person and accompanying text, is lit only by am-

bient light so that the merchandise is the focus.

Various makes of fixture were used - the main spotlight fittings made by Sylvania Lighting International, metal halide fixtures for the collage wall by Versalux Lighting Systems, and other general lighting supplied by Inlite and Ercc.

For the dimming control system, NDYLIGHT brought specialists Lightmoves in on the project. Made by Sydney based company Dynalite, Lightmoves supplied and installed 5 x Dimtek 905 (12 x 5 amp dimmers), 2 x Dimtek 210 (2 x 10 amp dimmers), 6 x Dimtek 936 (6 x 3 amp switcher), 2 x Dimtek 925 (4 x 10 amp switcher).

The system uses a total of 106 channels of control made up of dimming and switching channels. The dimmers are networked together using Dynet (an RS485 based protocol), and a digital Minder Timeclock calls up various preset levels at certain times of certain days. An eight button control panel on site also allows for manual selection of the eight different preset levels.

The Dynalite system enhances the efficiency of the design through voltage regulation and voltage limiting to deliver a minimum 200% lamp life.

One of the main considerations in choosing the control system was ease of operation given that the Nike staff are retailers, not technicians. The automatic Timeclock controls various settings throughout the day for cleaners, daytime retail, nighttime retail, as well as a security setting, and the control panel can be locked to prevent unauthorised tampering.



Senior Lighting Designer
Jason Longland

Designed in conjunction with Nike Retail Services (USA)
Lighting Designers: NDYLIGHT
Senior Lighting Designer: Jason Longland
Lighting Designers: Fay Albanis, Shane Henderson
Control Equipment Supplied by: Lightmoves (Haydn Brennan)
Client: Nike Australia Pty Ltd
Project Manager (Aust): Woods Bagot (Bill Chow)
Architect (Aust): Woods Bagot (Nik Karalis, Vicki Adam)
Project Manager (USA): Nike (Jack Lowe)
Architect (USA): Nike Retail Design (Lois MacKenzie)
Electrical Contractor: KLM Group
Builder: Hooker Cockram

"The system is also capable of being linked up via a modem so I can change the settings in real-time from my office, and of course it can be controlled from the store. We usually use hand held remote controllers and walk around the space to work out what changes need to be made to the schedules and patterns of dimming to affect the lighting sequences as we go."

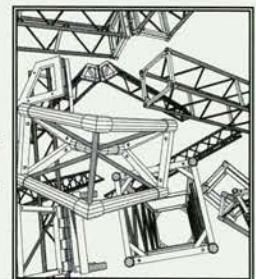
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Zenith Sleek new design to suit all applications, particularly shop and other display purposes. Wattage: 300/500W G. Beam spread: 8 deg. to 50 deg. Size(mm): (LWH) 290 x 290 x 307 approx. Working Distance: 3m -10m. Options include: Barndoors, Colour Frame, Safety Wire Guard, Motorised Colour Wheel. \$359.02.

Corto Wattage: 300/500W G. Beam spread: 8 deg. to 50 deg. Size(mm): (LWH) 290 x 290 x 307 approx. Working Distance: 3m -10m. Options include: Barndoors, Colour Frame, Safety Wire Guard, Motorised Colour Wheel. \$260.66.

Passo Wattage: 650W/1K Beam spread: 5 deg. to 60 deg. Typical. Size(mm): (LWH) 435 x 290 x 240 approx. Working Distance: 5m - 15m. Options include: Barndoors, Colour Frame, Safety Wire Guard, Motorised Colour Wheel. From \$396.72.

DE SISTI

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Monet Wattage: 1K/1.2K G22. Beam spread: 7 deg. to 54 deg. Size(mm): (LWH) 290 x 307 approx. Working Distance: 3m -12m. Options include: 4 or 8 Leaf Barndoors, Colour Frame, Safety Wire Guard, Scrims, Cones, Manual or Pole Yoke. From \$721.31.

Monet Wattage: 2K/2.5K G38. Beam spread: 8 deg. to 54 deg. Size(mm): (LWH) 360 x 410 x 426 approx. Working Distance: 4m -25m. Options include: 4 or 8 Leaf Barndoors, Colour Frame, Safety Wire Guard, Scrims, Cones, Manual or Pole Yoke. From \$955.74.

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PR7-F 500/650W, Beam Angles 5/65 deg, Length 285mm, Body 157x157mm, Weight 2.6kg, Power Cut-off Switch, Swaged Safety Cable, Freight included, B/Door \$37. \$180.

PR10-F 1000/1200W, Beam Angles 8/65 deg, Length 315mm, Body 198x198mm, Weight 4.1kg, Swaged Safety Cable, Freight included, B/Door \$51. \$305.

PR22-F 2000W, Beam Angles 6/70 deg, Length 390mm, Body 247x270mm, Weight 9.0kg, Swaged Safety Cable, Freight included, B/Door \$57. \$437.

SELECON

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Spot Eco Wattage: 650W/1K/1.2K. Beam spread: 12 deg. to 52 deg. Typical. Size(mm): (LWH) 341 x 254 x 250 approx. Working Distance: 4m -15m. Options include: Barndoors, Colour Frame, Safety Wire Guard, Motorised Colour Wheel. From \$260.66.

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Colore Fresnel Wattage: 200/250MSD discharge lamp. High performance internally ballasted fresnel unit with multiple dichroic colours, 0-100% mechanical dimming, 9 - 21 degree beam angle, strobing function, DMX controllable. \$1,598.36.

TEATRO

Lightmoves Technologies +61 2 9560 0000

Punto F 300/500W 400hr T25 240V lamp; d:255mm X w:204mm X h:255mm; beam of 7m - Spot 1.35m diam. 428 lux; Flood 5.1m diam. 149 lux; tilt angle 135°; CE approved. \$280.

Onda F 650W 240V T27 lamp; d:336mm X w:209mm X h:301mm; beam of 7m - Spot 0.7m diam. 1320 lux; Flood 6.2m diam. 140 lux; tilt angle 135°; CE approved. \$300.

WILDFIRE

GUET 1800 773 187

WF-400SF-E 400w long throw UV-A spot-flood fresnel. Focuses from 16.5°-59° and throws over 33m. Supplied with ballast, header cable, C-clamp, safety cable and lamp. \$7339.27.

WF-600SF-E 600w long throw UV-A spot-flood fresnel. Hot restrike, supplied with ballast, header cable, C-clamp, safety cable and lamp. \$16,466.31.

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ALTMAN

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Acclaim Fresnel 300 - 650w. Wide range of beam angles (6 - 60). Captive slide focus system. Adjustable yoke. Rear grab handle Auto mains power disconnect, exceeds European safety requirements. Wgt - 2.4kg. \$240.

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LOWEL

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1.2 Photometrics 2 x 55W lamps, 3000°K and 5000°K available with 10,000 hour rated lamp life, fluorescent light head with range of accessories including fixture screens, intensifier, intensifier screens and gel frames, dimming feature optional. \$2050.

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COEMAR

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Ribalta 1 Work Light Compact sheet steel units c/w colour frame. Range through 300W to 500W. \$91.80

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DE SISTI

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Source 4 Par MCM Same specifications as Par EA version but unit fitted with Cold Mirror Technology. 90% of heat transmitted back through Dichroic reflector. Perfect for Themed environments or washing stage areas for Orchestras. (Low direct heat, power consumption) \$680.

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PROLITE

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PR5-CHA/1 300/500W, Single Cell, Beam Angles 110/96deg, Length 241mm, Body 200x247mm, Weight 3.2kg, Swaged Safety Cable, Freight included. \$149.

PR10CHA/1 1000/1200W, Single Cell, Beam Angles 110/96deg, Length 313mm, Body 200x247mm, Weight 3.6kg, Swaged Safety Cable, Freight included. \$169.

SELECON

Aust wide dealer network.

Selecon Acclaim Cyc 300 - 500w. Asymmetric reflector using linear halogen lamps. For lighting Cyc/ backcloth up to 5m high from a throw distance of 1.5m to 2.0m. Smooth, well controlled output due to software modelling and extruded reflector. Constructed from injection moulded nylite & extrusions. Dual chamber air flow unique to Selecon luminaires maximises filter life. Designed to be used as groundrow. Modular assembly. 3 & 4 way batten options. Barndoors fitted as an accessory. Auto mains power disconnect, exceeds European safety requirements. \$208.

Selecon Acclaim Flood 300 - 500w. Symmetric re-

continued on page 80



LIGHT WALLPAPER

Selecon's 90 degree **PACIFIC**, with its ability to cover large areas with light and colour, can effectively be used as a full-stage wash, using one gobo to light flat returns in traditional sets, to a very effective boom light. As one would expect when using this technique, the Pacific 90° will distort images and gobos, however it is entirely possible to get an even just-off hard focus across the beam, making it ideal for breakup gobo washes and wallpaper.

TRUE PEAK/FLAT FIELD DISTRIBUTION

= less focus time + lower costs

Thanks to the latest generation of compact biplane filament lamps and Selecon's reflector design the **PACIFIC** range delivers a beam which can be easily adjusted between a peak (+3:1) and a flat field. Peak field distribution is essential when overlapping beams from FOH positions to create visually even illumination. Multi-coil filament lamps don't allow for a true peak field — as a result a lot of diffusion gets used to even out unwanted highlights.

UNIQUE LAMP MODULE

Peak/flat adjustment of the **PACIFIC** beam is fast and simple with Selecon's unique planetary gear. Always cool to operate even after hours of continuous use as the heat is exhausted away from the lamp module.



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MY FAVOURITE GEL COLOUR

CHRIS PATERSON

Director, Picture This! Productions



"Working across drama, music, dance and corporate you tend to have favourites for each style. But I guess my favourites are the heavier colours; I love mixing Lee 170 and Lee 132 because of their contrast. I like to put these into even something quite straight such as "Mums the Word", although for drama you can't go past good old Bastard Amber (Lee 162)."

buyers guide:: FRESNEL SPOTS/FLOODLIGHTS

flector using linear halogen lamps. Smooth, well controlled 90 degree flood beam. due to software modelling and extruded reflector. Constructed from injection moulded rynite & extrusions. Dual chamber air flow unique to Selecon luminaires maximises filter life. Fitted with 4 barndoors. Modular assembly. 3 & 4 way batten options. Auto mains power disconnect, exceeds European safety requirements. \$225.

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TEATRO

Lightmoves Technologies +61 2 9560 0000

Riga 1 Symmetric; 500W 240V K9 lamp; units can be fastened together; d:144mm X w:280mm X h:240mm; CE approved. \$170.

Riga 1A Asymmetric; 500W 240V K9 lamp; units can be fastened together; d:144mm X w:280mm X h:240mm; Suitable for Schools & Medium Theatres; CE approved. \$195.

Diluvio A500 Asymmetric; 500W 240V K1 lamp; units can be fastened together; d:240mm X w:290mm X

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Diluvio A1250 Symmetric; 1250W 240V P2/12 lamp; units can be fastened together; d:240mm X w:360mm X h:260mm; colour filter frame; CE approved. \$465.

MULTIFLOODS

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COEMAR

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Ribalta 6 Work Light Compact sheet steel units c/w colour frame. Range through 300W to 500W. \$377.05

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LOWEL

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De Sisti Leonardo

SELECON

Aust wide dealer network.

Selecon Aurora Cyc range 625 / 1000 / 1250w. Asymmetric reflector using linear halogen lamps. For lighting Cyc/backcloth up to 9m high from a throw distance of 2m to 3m. Smooth, well controlled output due to software modelling and extruded reflector. Dual chamber air flow unique to Selecon luminaires maximises filter life. Flat filter frame, economic sheet cut. Comprehensive range - single, dual vertical, 4 way linear & 4 way 'square' configurations. Your choice of multi connectors. Pole Op option. Barndoor accessory. Auto mains power disconnect, exceeds European safety requirements. \$395.

Selecon Aurora Flood range 625/1000/1250w. Symmetric reflector using linear halogen lamps. Smooth, well controlled 90 degree output due to software modelling and extruded reflector. Dual chamber air flow unique to Selecon luminaires maximises filter life. Flat filter frame, economic sheet cut. Comprehensive range - single, 4 way linear configurations. Your choice of multi connectors. Pole Op option. Barndoor accessory. Auto mains power disconnect, exceeds European safety requirements. \$395.

Selecon Aurora Groundrow range 625/1000/1250w. Asymmetric reflector using linear halogen lamps. For lighting Cyc/backcloth up to 9m high from the floor, as close as 1.0m from the cloth. Smooth, well controlled output due to software modelling and extruded reflector. Dual chamber air flow unique to Selecon luminaires maximises filter life. Flat filter frame, economic sheet cut. Comprehensive range - single, 4 way linear configurations. Your choice of multi connectors. Auto mains power disconnect, exceeds European safety requirements. \$460.

STRAND LIGHTING

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Coda 500 Wide-angle 500W 4 compartment floodlight unit with asymmetric distribution for even coverage of backcloths or cycloramas. Available as single, 3 or 4 compartment units. From \$385.

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next month::

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Fault Finding (part 1)

You just brought up channel sixteen on the fader, wheel or keypad and nothing happened. Oh dear, here we go again! Is it the DBO switch, the scene master, the grand master, the softpatch table, the desk, the control cable, the DMX splitter, the missing DMX terminator, the dimmer rack, the dimmer fuse or circuit-breaker, the mains to the dimmer, the supply to the local distribution board, the patch panel, the multicore loom, the outlet socket, the splitter board, the extension cable, the tail or the luminaire, the lampholder, the lamp or the safety cut-out switch. Are the shutters or barndoors open on the luminaire? Is the desk in the right mode? Is the DMX cable in the right socket? Has the dimmer rack got the right DMX start address? Is the rigger's control overriding the desk? Has the luminaire even been rigged yet, has it been delivered by the hire company or maybe it's just pointing straight into a black drape? No doubt you can probably add at least a dozen similar questions the list.

What are we to do? We could start at one end of the system, let's say at the luminaire and work our way back to the dimmers or the control desk. If the problem is a blown lamp or a configuration switch set to expect MIDI Show Control data from a Microbee computer then we'll hit pay dirt straight away. On the other hand, if the desk has been switched to AMX 192 output, or channel sixteen has been erroneously allocated to an inhibit group, it's going to take a long time to discover. If faults occur randomly within our rig, then we will on average test half the system in order to locate any fault, but statistical averages do not take Murphy's law into account. Murphy correctly predicts: *Any search for a fault will always start from that part of the system which will maximise the time required to locate it.* Don't get too smart and decide to start from the other end of the system instead, because Murphy's prediction has already taken that

it into account.

We could think back to the last time we encountered a similar fault and start testing from there, but of course Murphy has a prediction that covers those bold enough to make assumptions: *Apparently identical faults invariably have different causes.*

Fault finding really is as simple as ABC:

Assume nothing
Believe no-one
Check everything.

There is an approach to locating faults which is generally more efficient than the end to end or linear search. It's the process known as the binary search, which involves dividing a system up in to successively smaller sub-systems until the fault is isolated. At each step in a binary search we eliminate half the system from our suspicions until what we have left must be the cause of the fault, even if we aren't really prepared to believe what we've found.

A key element to applying this divide and conquer technique to fault finding is the process of substitution: replacing the sub-system under suspicion with another which is known to be working correctly. If for example you wish to eliminate the dimmer rack from your suspicions, there are two steps to follow. First, plug a known working load (which must be a resistive load like a lamp, and of least 100watts if your dimmers are not digitally fired) in to the dimmer in question. If the known load works then you have exonerated the dimmer, if not proceed. Next, plug the load from the faulty circuit in to a known working dimmer. If the load now works, you have exonerated the load. In the case of our hypothetical problem with channel sixteen the approach would be to verify that an adjacent dimmer and its load are working, then swap the loads between channel

sixteen and the adjacent dimmer and note the result. It is of course imperative to swap the loads back again after the test to prevent an occurrence of that paranormal phenomenon, the mysterious moving fault. If both the load and the dimmer test as

OK then you have a fault which is possibly best dealt with by taking up Permaculture, macrame or wool-spinning, as you have completely missed the bus with electrical technology.

The most powerful piece of test equipment required for rapid and successful fault finding is an inquiring, methodical and above all, sceptical mind. Very few if any tools are required. If the DMX data lights are glowing on three racks, but the first one in the chain isn't working then you don't need a \$1,200 DMX tester, or even one of those natty little tester plugs to verify the DMX stream. There's a pretty fair bet that the power to the racks is on as well, so you can also leave your mains-rated multimeter with its finger guards and shrouded connectors, resting in its high impact holster. If you can't believe the evidence of your eyes then don't: assume nothing, believe no-one, check everything.

Responses, suggestions or personal abuse to TechTalk@kilowatt.com.au



this FREE CD-ROM from ROSCO will turn your Pentium™, Windows 95® equipped PC into a powerful lighting control console with incredible performance specs. The HORIZON CD-ROM software offers 3,072 channels of control and is designed to control any DMX512 compatible device. This includes dimmers and traditional fixed lighting but also includes automated lighting, colour scrollers, fcg machines and show control systems.

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MY FAVOURITE GEL COLOUR

DAMIEN COOPER

Associate LD, Fox Studios Backlot Attraction

"I try not to pigeon hole myself into a favourite gel although I've been accused of admiring Lee 195 a lot. The colour correction range from 202 through to 200 is a favourite. I sway more towards the blue side of the spectrum."

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WELL YES, AS A MATTER OF FACT, I DO MIND

Next to drunks, I guess the thing I hate most about working in pubs/night clubs is nicotine. Nights when I have to go outside between sets, even though the temperature might drop 20 degrees, just to clear my lungs. Getting home at 3 am with my clothes, hair and skin stinking of expelled tobacco fumes, eyes red and sore is no fun.

Not so great for the gear, either. Amplifiers with built in fans can eventually drag enough of that filthy air through themselves to coat their innards with a tarry sticky goo. Encrusted components overheat and moisture within the goo can wreak havoc. Some amplifiers are easier to clean than others.

Some modules unplug and pull out without too much fuss. These can be soaked in warm water with a little detergent while the goo is gently dislodged with a small soft paintbrush. Rinse clean and then dry slowly but thoroughly with a hair dryer before reassembling.

Many amplifiers with fans have filters to help prevent this contamination in the first place. This is a great idea provided you have the discipline to remove and clean them on a regular basis. A clogged filter will of course reduce airflow, inevitably causing more problems than it solves. If a particular type of amplifier in your system doesn't have filters, then you might consider fitting them yourself, provided you promise me you'll clean them.

Fitting involves nothing more than a few offcuts of miracell foam and velcro leftover from having tarted up your speaker boxes two articles ago.

We opted for the more open mesh type of foam. Funny, even when it didn't look that dirty, it would still often disgust me how much foul brown sludge would wash out of it, with a little soap and warm water, after a few months in pubs.

It's not just the foam filters on amplifiers that need cleaning. Those on your vocal microphones also suffer. I must admit,

I don't get around to removing them and washing them out as often as I should.

I've often removed and washed filters in the gents at gigs if a setup's gone quickly and I'm bored for something to do. A washed pop filter on each finger under the hand dryer.

When hiring my systems, engineers often comment about the mic in the kit with the tape on it. No, it's not faulty. That's the mic Jim or myself will use for running up and tuning. When we're done setting up it goes back in the case. Much the same reason that many singers carry their own mics. A word of warning here about the first series of Shure Beta 58s. The feed wires to the diaphragm are easy to nick when removing the grill. These can't be repaired, which means a new insert. Ouch.

It's a good idea to carry a can of spray disinfectant/deodorant, such as Glen 20, in your gig bag. If you choose to use it as a service to your clients, give the mics a short spray either before you put them away or when you first put them on the stands during the setup, giving the liquid residue, which tastes awful, time to evaporate.

Plastics become discolored in cigarette-heavy environments. Nice new consoles start looking old much too soon, as all the knobs develop that thin coating. Know what I've found? Nothing rejuvenates them better or easier than taking them all off and placing them in the cutlery holder of your (or your mum's) dishwasher before the evening wash. Next morning, wrap them in a cotton towel to drain, and there you go: new knobs!

Cigarette ash within the sliders of your console can be a bit of a worry. Not so bad with the more expensive "Alps" type rail faders where the ash falls through into the desk. But with the cheaper enclosed carbon track type faders it will blend with the grease within the fader, corrupting the "feel" and conductivity. As one of my Jands manu-

als puts it: cigarettes shorten the life of both the faders AND the operator.

Cleaning these faders is not a simple job. A decent brand (such as CRC) purpose designed contact cleaner may help. But after a while you may find that as well as flushing out impurities, the cleaner is also dissolving the grease that makes the fader move freely.

Care must be taken when prizing apart the tabs that hold the base in place. Remove the base while leaving the traveller within the shell. Wipe down the track with a little spray contact cleaner and a clean, lint-free rag. Then gently wipe any greasy residue from the feet of the traveller, taking care not to apply any undue pressure which may bend the legs. A dab of slider grease can be reapplied via a jeweler's screwdriver, before reassembling.

Take care when bending the tabs back with long nosed pliers. Too much pressure may give the fader a lumpy response or even seize it completely. Of course, these tabs were never made to be folded over more than once, so even if you are able to effect a repair/clean, the chances are, the next time you try it, the tabs will snap.

It always irritates me to see someone smoking over one of my consoles. I have been known to push operators aside, blow their ash off the console and then slam an ashtray down on the table beside them. Most are able to glean the subtle intent from my actions, but I remember one particular operator on whom this had no effect whatsoever. In fact, at one point in the night I found that a couple of cigarettes he had left balanced on the side of the console had burned down into the timber sidecheeks.

P.S. I'll be taking a break from the PA page for a few months. Thanks for your support and contributions. See you in 2000!

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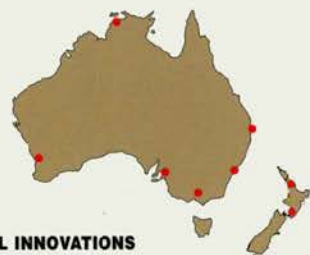
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