

# Connections

NOVEMBER 1999 AS\$5.00 • New Zealand \$6.50 • Malaysia 36r • Thai 2500bt • Singapore \$10 • Hong Kong \$45 • Philippine 240ps • Elsewhere US\$7

Warning: This UHF product will ignite your performance.



## INTRODUCING THE SHURE UT SERIES UHF WIRELESS SYSTEMS.

Get ready to deliver your best performance ever. With the new UT Series from Shure, you'll have the freedom to move with less interference. Plus you can get it for an amazingly low price.

In fact, no other comparably priced UHF wireless system even comes close to what the Shure UT Series has to offer.

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With the UT Series UHF Wireless Systems from Shure, every performance will be energised. For more information, please contact Jands Electronics on (02) 9582 0909.



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*THE GUITARIST™ UHF*

*THE VOCAL ARTIST™ UHF*

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**SHURE**

THE SOUND OF PROFESSIONALS... WORLDWIDE.®

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Pro Audio, Lighting & Staging monthly

# BIGGEST, BEST & BE

Sunday March 5, Monday March 6, Tuesday March 7- 10am to 6pm daily. Sydney Showground & Exhibition Centre, Homebush Bay.



## TRAVEL DEALS

Fly to ENTECH for **50% off** standard economy fares on QANTAS, from Australian capital city ports. Only available from Stage & Screen Travel.

Stay in the Sydney CBD and take our free airconditioned luxury coach transfer to the show, catch the train, or drive.

## HOTEL DEALS:

Star City Casino, from \$185  
The Rex (Kings X), from \$117  
The Sebel (Kings X), from \$139  
Landmark Park Royal \$140

\* Plus taxes if applicable

## Call Stage & Screen,

+61 2 9383-4533 or fax +61 2 9383-4577



**From New Zealand:** return airfare on Qantas & 2 nights accommodation. Prices start from \$608.00 per person, twin share, ex Auckland, Wellington or Christchurch. Conditions apply. Contact Petra at Budget Travel Parnell Tel: 09 302-0553, Fax: 09 358-1206

## Sunday 5th

### OUR FERRY TO ENTECH!

This morning only, at 9am, a leisurely one hour tour up Sydney Harbour to ENTECH! Return bus from 5pm. It's a big day out! Accompanied kids under 16 are FREE. **Ferry from Darling Harbour \$10, bus is free.**

### SCREEN SOUND DAY

The Australian Screen Sound Guild presents an action packed day of screen sound! Sessions on location sound, mixing, editing, surround and more. **10.30am to 5pm. \$45, Students \$32.**

### DJ/MC BOOTCAMP

4 Sessions, hosted by Dont'e D'one. Learn about mixing, DJ and MC business, and equipment. **10.30am to 5.30pm. \$15 session, or \$45 all day, Students \$32.**

### CLUB LIGHT

• 10.30am DIMMER SHOOTOUT (L1) \$15  
• 2.30pm BASIC POWER DISTRIBUTION (Extended session, ends around 5pm) (L2) \$15  
Free desk demo's at **11, 1pm and 3pm.**

### PRESENTATIONS ACADEMY

A DAILY class on Presentation Techniques and Tools. Hosted by the ICIA. **11am - 3pm. \$95,** includes comprehensive handbook.

### CARNIVALE

End the first day of ENTECH with an outdoor party, relax as the sun sets and the lights turn on! Free.

## Monday 6th

### BIG AUDIO FUNDAY

Tour the Olympic Stadium PA, see/hear the shootout, heaps of sessions & experiments! **10.30am to 5pm. \$45, Students \$32.**

### AV FACILITY MANAGER'S CONFERENCE

FOR facility managers from higher education, military and corporate AV units. Topics include technology and management issues. **9am - 5pm. \$385 includes lunch. Info: 1-800-635-514**

### TOMCAT RIGGING WORKSHOP

Reg Dew and Ian Messner, along with others, present an intensive day on rigging and safety issues. This workshop is limited to 50 people only, and includes material from the successful US Tomcat workshops. **10.30am to 5pm. \$125.**

### PRESENTATIONS PLAYOFFS!

See the best Presenters from around Australia compete to represent Australia at the INFOCOMM INTERNATIONAL show in Los Angeles. Free to see, at 4pm today. Directly after the **Presentations Academy**, a DAILY class on Presentation Techniques and Tools. Hosted by the ICIA. **11am - 3pm. \$95,** includes comprehensive handbook.

### CLUB LIGHT

• 10.30am OLYMPICS SPECIAL & TOUR (L3) \$15  
• 2.30pm 1K FRESNEL SHOOTOUT (L4) \$15  
Free desk demo's at 11, 1pm and 3pm.

Info: [www.conpub.com.au](http://www.conpub.com.au) or call 1-800-635-514 • REGISTRATION form on following pages

# ENTECH

Get there: Trains or buses to Olympic Park Station, bus transfers from ENTECH Hotels in Sydney CBD, car parking at P1 (Stadium/Superdome car park) or one of five other car parks on site.

# ANNUAL!

## AWARDS NIGHT

Monday March 6th, the fantastic awards dinner!  
7pm. \$79 includes lots of entertainment!

Tuesday 7th

## AUDIO SEMINAR DAY

- Induction Loops for hearing impaired. 10.30am
  - Remote courtroom operation w/digital mixers. 12md
  - Audio file transfer & media, the DAW session. 1.30pm
  - Contractors and digital audio routing 3pm
- \$15 per session

## CLUB LIGHT

- 10.30am CONTROL TECHNOLOGY: PROTOCOLS & TECHNOLOGIES. (L5) \$15
  - 2.30pm MOVING HEAD WASHLIGHTS SHOOTOUT (L6) \$15.
- Free desk demo's at 11, 1pm and 3pm.

## PRESENTATIONS ACADEMY

A DAILY class on Presentation Techniques and Tools. Hosted by the ICIA. 11am - 3pm. \$95, includes comprehensive handbook.

## TOMCAT HOIST WORKSHOP

Intensive hands on workshop, hosted by Ian Messner and Reg Dew. Learn about limitations, user techniques and service of modern chain hoists. Limited numbers.  
10.30am to 5pm. \$125,

# 2000

**3 ACRES OF TECHNOLOGY**  
**2.1 million lumens**  
**ONE million watts**

THE LARGEST EQUIPMENT EXPO IN THE SOUTHERN HEMISPHERE. FEATURING AMONG OTHER THINGS—

(preliminary estimates)

- 12,000<sup>m<sup>2</sup></sup> floorspace (129,000 square feet)
- 138 NEW LIVE & STUDIO MIXERS
- 31 NEW PRESENTATION TOOLS
- 48 NEW DJ MIXERS
- 21 NEW HARD DISC RECORDING SYSTEMS
- 30 NEW MOVING YOKE LUMINAIRES
- 72 NEW AUDIO PROCESSORS
- 118 NEW SPEAKER SYSTEMS
- 109 NEW MICROPHONES
- 42 NEW LCD/DLP PROJECTORS
- 22 NEW LIGHTING CONTROL DESKS
- 46 KILOMETRES OF CABLE
- 500 BRANDS ON SHOW
- SCREENS AND SOFTGOODS GALORE
- 10+ PRODUCTION COMPANIES
- 140 STANDS INCLUDING SOME WHOPPERS
- 1 KILOMETRE OF AISLES
- LARGEST, BRIGHTEST SCREENS
- 500M TRUSSING
- TONNES OF PORTABLE STAGING
- (and a lot of cold beverages too.....)

## FREE TRADE ENTRY

YOU ARE TRADE IF: You have a business card, you are with someone who has, or you register as a student who has a genuine interest, and you are over 16

Exhibition space sales: call +61 2 9876-3530

# introducing \_\_\_\_\_

## THE presentations zone

### Corporate theatre. Presentations. Events.

They are everywhere. The people making today's big AV hiring and buying decisions are very comfortable in front of a Powerpoint presentation. They know that their organisation needs great visual and event presentation, and they need to understand the technology. They also need to meet people who can assist them. *That's where ENTECH shines, with our first PRESENTATIONS ZONE.*

### **MOST MAJOR AV DISTRIBUTORS HAVE BOOKED!**

Major PRESENTATIONS ZONE exhibitors include Barco, Sony, Fujitsu, Audio Visual Australia, WolfVision, All AV, Sanyo, Hagemeyer, AV Technology - and over 130 others! See the latest DLP, LCD and LED technologies, and the biggest and best in big screen projection!

### **WHERE IS THE PRESENTATIONS ZONE?**

The PRESENTATIONS ZONE is at the end of the main aisle. As you walk into ENTECH look directly down the wide centre aisle - you'll see giant images luring you in, walk through the one hundred plus bright and vibrant ENTECH exhibits - and you are there!

### **PRESENTATIONS ACADEMY**

Turn key training for effective presentations! See how presentations are designed, developed and delivered. The Presentations Academy is run by the International Communications Industries Association, and is an Australianised version of the successful one day event they stage in the USA. This daily class on Presentation Techniques and Tools is intended for anyone who does, or needs to, make public presentations using technology.

**11am - 3pm, repeated each day at ENTECH.**

\$95, includes comprehensive handbook.

### **PRESENTATIONS PLAYOFFS!**

See the best Presenters from around Australia compete to represent Australia at the INFOCOMM INTERNATIONAL show in Los Angeles.

The Playoffs Australian Grand Final will be staged at 4pm on Monday March 6th, directly after the Presentations Academy. It is free to see, and will be held in the ICIA Presentations Academy Theatre in the Presentations Zone at the rear left of ENTECH.

Finalists from around Australia will battle, laser pointer to laser pointer.

**Sponsored by PRESENTECH magazine.**

Info: [www.conpub.com.au](http://www.conpub.com.au) or call 1-800-635-514 • **BOOKINGS:** See next page for booking form →



Pro Audio • Lighting • Vision • Staging • AV

# ENTTECH

The Entertainment & Presentation Technology Trade Show

## AV FACILITY MANAGER'S CONFERENCE

Australia's first Audio Visual Facility Manager's conference will be held on **Monday March 6th** at ENTECH.

Targeted at department heads from higher education, military and audio visual unit managers, the conference will present trends, issues, problems, solutions and a unique networking opportunity.

The conference chair is Neil Langford, CEO of Space Age Communications.

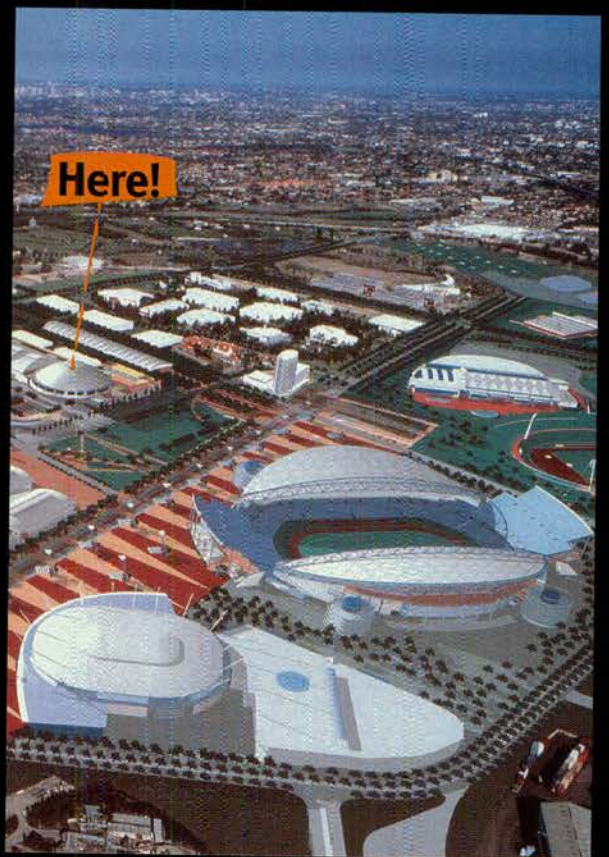
### Topics: (provisional)

- Conference Facilities
  - Scheduling & Management Applications
  - Video conference services
- Distance Education / Remote Learning
  - Video Over IP
  - Group Collaboration / Information Sharing / T.120 Applications
  - Lighting for Distance Learning / Tele Teaching Environments
  - Acoustics For Distance Learning / Tele Teaching Environments
- Teaching Spaces
  - Facilities For The Disabled, Hearing Loops
  - Electronic Document Projection
  - Systems Integration, trends and experiences
  - AV facilities Management & Maintenance
- Projection
  - DLP limitations, against CRT and LCD

**9am - 5pm.** \$385 includes lunch.

Info: 1-800-635-514 [www.conpub.com.au](http://www.conpub.com.au)

# 2000



Australian  
**SCREEN SOUND**  
Guild Inc.



**PRESENTTECH**

**Connections**

# see the brands

- Abstract  
 Acoustic Technology  
 Ad\*Ball  
 ADJ  
 Advance Lighting Equipment  
 Aeromic Systems  
 Aeromix Mixers/Amps  
 Aflex Cable  
 AKG  
 Alesis  
 Allen & Heath  
 Altec Lansing  
 Altinex  
 Altman Stage Lighting  
 American DJ  
 Ampetronic  
 Amphenol  
 Amphenol-Tuchel  
 AMX Control Systems  
 Analog Way  
 Antari  
 Anton/Bauer  
 Anytronics  
 APC Hardware  
 Apogee Sound  
 Aqua-Screen  
 ARX  
 Ashly  
 Astatic  
 ATC  
 Atlas/Soundolier  
 Audio Flat Cable  
 Audio Technica  
 Auditel  
 Audix  
 Autopatch Matrix Switchers  
 Avenger  
 Avolites  
 AVR  
 Azden  
 Barco  
 B&C Speakers  
 B.G.W.  
 Balcar  
 Beacon Colour Gobos  
 Beat Suite  
 Beaver Lifting Products  
 Beaver Safety Equipment  
 Behringer  
 Belden Cable  
 Bellari Tube Products  
 Beyer Dynamic  
 Birkart Concert Cargo  
 Birkart Fairs & Events  
 Bose  
 Botex  
 Brilliance Cable  
 BSI Software (Reseller)  
 Bullfrog Loudspeakers  
 Bytecraft  
 Cable Labels  
 CAD  
 Calrec  
 Canare
- CC's Light & Sound  
 CD Music Systems  
 Cerwin Vega  
 Chiayo Electronics Co. Ltd  
 Citronic  
 Clay Paky  
 ClearCom  
 Climb Cable  
 Cloud  
 Club Catalogue  
 Coef  
 Coemar  
 Color Kinetics  
 Colortran  
 Community  
 Compulite  
 Comrex  
 Connections Magazine  
 Contemporary Research  
 Cosmolight  
 Countryman  
 Crest Audio  
 Crestron  
 Crown  
 CTX  
 D&R  
 DAS  
 db Technologies  
 dbx  
 DDA  
 Decorative Lighting  
 Denon  
 DeSisti  
 DHA  
 Digidesign  
 DOD Electronics  
 Doremi  
 Doughy  
 dsp  
 Dual Computers  
 Dynacord  
 Dynamite  
 Dynaudio Acoustics  
 Earthworks  
 EAW Eastern Acoustic Works  
 Ebony  
 Ebtech  
 Ecen  
 Ecler  
 Electralite  
 Electro-Voice  
 Electrohome  
 Eminence Loudspeakers  
 Ensoniq  
 ESP Technology  
 ETC  
 ETEK  
 Eurocable  
 Evromodule  
 EV Cinema Systems  
 Event Electronics  
 EWA-Marine  
 EziStage  
 Fairlight
- FAL  
 Fender  
 Fitness FM W/Transmitters  
 Focusrite  
 Fostex  
 Fujitsu  
 Furman Sound  
 Futurelight  
 FX Range  
 Gemini  
 Geni  
 Gentner  
 GIS Electric Chair Hoists  
 GLP  
 Gobos Glass & Steel  
 Goddard Design  
 GPT Audio/Video Products  
 Griven Full Range  
 Griven-Searchlights  
 Hafler Amplification  
 Hartland Cables  
 HHB  
 High End Systems  
 Hire Track  
 Hughes JVC Technology  
 Ianiro  
 IMP Amplifiers  
 Infinity  
 Inline Computer Interfacing  
 Inter-M  
 Intimidation  
 Jaflac Roadcases  
 Jam Loudspeakers  
 James Thomas Engineering (UK)  
 Jands  
 JB Lighting  
 JBL  
 Jeil  
 JEM  
 JVC Professional  
 Kata  
 KDM  
 Klark Teknik  
 Klipsch Loudspeakers  
 Kobold  
 Konig & Meyer  
 Korg  
 Kramer Video & Audio Products  
 KRK  
 Kupo  
 Kustom  
 LA Audio  
 Le Maitre  
 Lee Filters  
 LEEM Electronics  
 Legrand  
 Leon Audio Products  
 Light Emotion  
 Light Processo  
 Link  
 Lite Puter  
 Litecraft  
 Litetouch  
 LM Audio Products
- Logic Technologies  
 Lowel  
 LSC  
 Lycian  
 Lyte Quest  
 Mackie  
 Macro-Media Manager  
 MAD Lighting  
 Mann  
 Marantz Professional  
 Mark of the Unicorn  
 Martin Audio  
 Martin Professional Lighting  
 Mastercut Australia Gobos  
 MC2  
 MDG  
 MEC  
 MediaMatrix  
 Media Tw St Cable  
 Merlin  
 Meteor  
 Meyer Sound  
 Midas  
 Miller Fluid Heads  
 Mipro  
 Misco  
 Mix Machines  
 Mixrak Studio Furniture  
 Mobolazer  
 Mogami Cable  
 MSB Modular Rack Systems  
 MTS Cases  
 N.E.A.R.  
 Nady Wireless Systems  
 Nebula  
 Ness  
 Netia Digital  
 Neumann  
 Neutrik  
 Nexo  
 next!  
 Nocturn  
 Nocturn  
 Nova Forge  
 NSI  
 Numark  
 Omnimax  
 Omnitronic DJ Gear  
 OMP  
 Onkyo  
 Optikinetics  
 Oracle Laser Systems  
 Osram  
 Otari  
 OZ Audio  
 Pani  
 Panja  
 Panna Control Systems  
 Patriot Speakers  
 Peak Audio (Australia)  
 Peaston Australia  
 Peavey Architectural/Concert  
 Penn  
 Perreux Amplifiers
- Phast Control Systems  
 Philips  
 Philips Professional Audio  
 Phonic  
 Phonic Ear  
 Phrixus Virtual Reality  
 PolyOptics Fibre Optic  
 Powerlock  
 Presentech Magazine  
 Presonus  
 Pro-Co  
 Pro-Stage  
 Proel  
 Proplex  
 Programmi Sistemi Luce  
 Prolinx  
 Prolite  
 Pulse Music CDs  
 QSC  
 Quail  
 Quam  
 R.C.F.  
 R.F. Link Wireless Products  
 Radian  
 Radio Design Labs  
 Rane  
 Rapco  
 Re'an  
 Red Sound  
 Redback  
 Reel EFX  
 Revolution 6 & 25  
 RFX Effects  
 Rigging Services  
 Roland  
 Rolls Rack Products  
 Rosco  
 Royer  
 Ryger  
 Sabine  
 SAE Technology Co. Lage  
 Samson  
 Sanha  
 Sanyo (Reseller)  
 SBA Music Custom Music  
 Programs  
 SBA On Hold Messaging  
 SBA Productions  
 Scenery Services  
 SC Systems  
 Sek'd  
 Selecon  
 Selenium Loudspeakers  
 Sennheiser  
 Show Pro  
 Showbiz Digital Video CDs  
 Showbiz Video  
 ShowCAD  
 Shure  
 Sinodial-Ser es  
 Smoke Design  
 Socapex  
 Solution Base  
 Sonic Foundry
- Sonly  
 Sounc Advance Speakers  
 Sounc Tube Speakers  
 Souncraft  
 Souncscape (Reseller)  
 Souncsphere  
 Space Cannon  
 Spect aviation  
 Spirit  
 Sportz Grip Pouch Belts  
 Spruce DVD  
 SST  
 Staging Services  
 Stanton  
 Stard'aw  
 Stewart Electronics  
 STK Electronics  
 STK Loudspeakers  
 Strand Lighting  
 Strong Followspots  
 Studio Due  
 Studios 301  
 Switchcraft  
 Symetrix  
 Tacky Microphones  
 Tannoy  
 TAS  
 Tascam  
 TC Electronics  
 Teac  
 Teatro  
 Telex  
 Telex  
 TenLx  
 Terratec  
 The Audio Toolbox  
 The Effects Co.  
 Theatrelight  
 Toa  
 Tomcat Truss  
 Toshiba  
 Trolleys and Carts  
 Tube-Tech  
 Turbosound  
 Unibind  
 Vege  
 Vestax  
 Videoflex Cable  
 Video Music Systems  
 Visualizer  
 Weircliffe  
 Westcott  
 White Instruments  
 White Light  
 Wilcfire  
 Wol'vision  
 Xenotech-Strong  
 XTA  
 Yale/Coffing Electric Motors  
 Yamaha  
 Zeck Audio  
 Zero 88 Lighting  
 Zomax Hardware  
 (List dated 26th October '99)

# Registration

Name \_\_\_\_\_

Firm/organisation \_\_\_\_\_

Position/title \_\_\_\_\_

Street \_\_\_\_\_

Suburb \_\_\_\_\_

State/postcode \_\_\_\_\_

Phone \_\_\_\_\_

Fax \_\_\_\_\_

Email \_\_\_\_\_

Tick one:  Audio  Lighting  Staging  Presentations

# ENTECH

Sunday March 5, Monday 6, Tuesday 7. 10am - 6pm.  
Sydney Showground & Exhibition Centre, Homebush Bay.

**TRAVEL:** Call Stage & Screen, +61 2 9383-4533 or fax +61 2 9383-4577.

Fly to ENTECH for 50% off standard economy fares on QANTAS, from Australian capital city ports.

Stay in the Sydney CBD and take our free airconditioned luxury coach transfer to the show, catch the train, or drive.

See the program in detail at [www.conpub.com.au](http://www.conpub.com.au)

The promoter is Connections Publishing Pty Ltd ACN 058443182

Fax this form to +61 2 9876-5715 or mail to ENTECH REGISTRATIONS, PO Box 439, Epping NSW 2121, Australia

Free entry to tradeshow each day, plus:  
Optional Events that cost money:

**SUNDAY 5th March:**

- Ferry to ENTECH @ 9am \$8 \_\_\_\_\_
- Club light L1 10.30 am \$15 \_\_\_\_\_
- Club light L2 2 pm \$15 \_\_\_\_\_
- D. / mc bootcamp \$45 \_\_\_\_\_
- DJ / mc \*student: \$32 \_\_\_\_\_
- Screen Sound day \$45 \_\_\_\_\_
- Screen Sound \*student \$32 \_\_\_\_\_
- Presentations Academy \$95 \_\_\_\_\_

**AUS**

**MONDAY 6th March:**

- Club light L3 10.30am \$15 \_\_\_\_\_
- Club light L4 2 pm \$15 \_\_\_\_\_
- AV Facility Mgr Conf. \$385 (incl papers, transfers & lunch) \_\_\_\_\_
- Big audio fun day \$45 \_\_\_\_\_
- Big audio \*student \$32 \_\_\_\_\_
- Tomcat rigging workshop \$125 \_\_\_\_\_
- Presentations Academy \$95 \_\_\_\_\_
- Awards dinner 7pm \$79 \_\_\_\_\_

**TUESDAY 7th March:**

- Club light L5 10.30am \$15 \_\_\_\_\_
- Club light L6 2 pm \$15 \_\_\_\_\_
- Audio Seminar A1 10.30 \$15 \_\_\_\_\_
- Audio Seminar A2 12.00 \$15 \_\_\_\_\_
- Audio Seminar A3 1.30 \$15 \_\_\_\_\_
- Audio Seminar A4 3.00 \$15 \_\_\_\_\_
- Tomcat hoist workshop \$125 \_\_\_\_\_
- Presentations Academy \$95 \_\_\_\_\_

TOTAL: A\$ \_\_\_\_\_

Method of payment:

- Cheque  Purchase order attached
- Diners  Amex  Visa  M'Card

Card No.:

Expiry

Card name \_\_\_\_\_

Signature \_\_\_\_\_

# PRESENTTECH

MAGAZINE



THE NEW MAGAZINE FOR PRESENTATIONS, EVENTS AND AV PROFESSIONALS. FROM THE TEAM AT CONNECTIONS

**ONSALE NOVEMBER 17 AT NEWSAGENTS EVERYWHERE**

For a free sample copy, call 1-800-635-514 or fax +61 2 9876-5715

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The Entertainment Technology Trade Monthly



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## LIVE

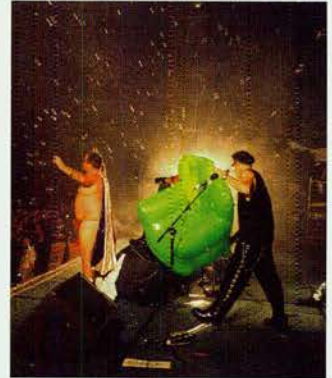
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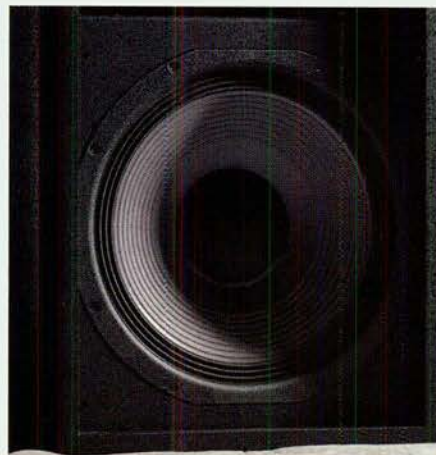
## COMING UP IN CONNECTIONS!

**DEC: Retailer Directory, GIANT 2000 Wall Planner!**  
Buyer's Guides: Recording systems. Scrollers, colour changers.  
**Deadline** 15th November. **Onsale** December 15th.

**FEB: ENTECH Visitor's Guide**  
Buyer's Guides: Studio Monitors. Truss, Flying, Rigging.  
**Deadline** 15th December. **Onsale** February 2nd.

**MARCH: ENTECH SHOW ISSUE**  
Buyer's Guides: Effects, Reverbs etc. Effects Lighting.  
Hire & Production Directory: **Deadline** 01 March!  
**Deadline** 15th February. **Onsale** March 8th.

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



## COVER:

It's LOUDSPEAKER MONTH here at Connections, with our monster Buyer's Guide starting on page 54.

Jands supplied this fabby photo. Ta!

# We make our own, so they **cost less!**

Most of the 'cheap' mixers out there are made in 'job lot' factories. But at Phonic, we build our own, in our own factory. Our mixers cut it for music or speech. We don't sit around copying other mixers, we actually DESIGN our own. Phonic has been making mixers since 1973!

-Tony Ching, PHONIC

## LOW COST POWERED MIXERS - EVERY MONTH!



**1060 • 3 amps • \$1295**  
RRP

**Features:**

- 3 x 200 watts (or bridge 400w + 200w Monitor) • 8 Mic/2 Stereo Channels • Graphic EQ for Main (Stereo) and Monitor • Phantom Power • Digital Effects • Inbuilt Limiters • Tape In/Out



**1860 • 600w • \$1995**  
RRP

**Features:**

- 2 x 300 watts (bridge 600w) • 8 Mic/4 Stereo Inputs
- Desk-type with carry handle • 2 x 7 band Graphic EQ • PFL/Mute each channel • 2 Monitor/1 Effect Sends • 256 Digital Effects • Individual Phantom Power each Mic channel • Low-cut filters Channels 1-4 • Inserts each channel

### Phonic vs The Rest

- 3 year warranty
- Quiet components
- Heavy duty design
- Regular low cost everyday, no strings, no offers, no conditions, no tricks, no mirrors!



**615 • 150w • \$599**  
RRP

**Features:**

- 150 watts • 6 Mic Channels • Digital Delay • Monitor and Effect send • Tape In/Out



**Power Pod 7 • \$895**  
RRP

**Features:**

- 2 x 200 watts (Main + Main or Main + Monitor or Bridged Main 400w) • 2 x 7 Band Graphic EQ (Main + Main or Main + Monitor) • Phantom Power • Digital Effects

### Pre Packaged PA!

- 615 with 2 SE712 speakers • \$1299 RRP
- PP7 with 2 SE 715 speakers • \$1695 RRP
- 1860 with 2 SE 115R speakers • \$3195 RRP

Since 1991 from CMC Music Australia  
Call (02) 9905 2511 for your nearest dealer

**PHONIC**  
PERFORMANCE ENGINEERING

Write in Reader Service Number: 149

# Connections

The Entertainment Technology Trade Monthly ~ November 1999

## Digi goes after mass market

**D**igidesign have broken the DAW rulebook with Digi 001. This is an audio and MIDI hardware and software package that simplifies setup for new users - and adds MIDI sequencing to Pro Tools for the first time.

The Digi 001 digital audio workstation for Mac OS and Windows 98 offers flexible and comprehensive audio I/O, and is powered Pro Tools LE 5.0, Digidesign's new software version of Pro Tools.

Digi 001 is a comprehensive, plug-and-play 24-bit audio/MIDI digital audio workstation that draws from Digidesign's award winning commercial TDM-based Pro Tools systems.

Digi 001 hardware components consist of a PCI card and a multi-channel I/O breakout box (below).

The I/O box provides the following:

8 analog audio inputs (2 with mic pre-amps), 8 analog outputs, separate monitoring outputs, 2 channels of S/PDIF digital I/O, and 8 channels of ADAT optical I/O, for a total of 18 simultaneous inputs and outputs.

Digi 001 also includes MIDI In and Out, a 1/4-inch stereo headphone jack with separate volume control, and a 1/4-inch footswitch jack for record punch-in.

• Cost: A\$1995, NZ \$2295. [www.Digi001.com](http://www.Digi001.com)



## Fairlight moves HQ to LA

**FAIRLIGHT ESP** is to be headquartered in Los Angeles, and re-established as Fairlight Incorporated.

According to David Hannay, President & CEO of the newly formed American corporation Fairlight Inc., the worldwide management of all sales, marketing, finance, and administration programs will move to Fairlight USA's new corporate campus in Hollywood, California. Audio

Research & Development, as well as design and manufacturing, will continue to be based in both Sydney and Perth.

"To best meet the needs of the rapidly converging digital audio, video and radio broadcast customers we serve, we have decided to shift the geographic centre of the corporation to the United States," Hannay said.

"We are by no means leaving Australia. Just the opposite is in

fact the case. We will be increasing our presence and our staff'.

John Lancken now assumes the position of Senior Vice President, Worldwide Sales. Mervyn McCulloch is Executive Vice President, Finance, and Greg Sampson assumes the position of Internet Business Manager. All of these positions are based in the USA. Andrew Bell continues to serve as Director of Product Development, based in Sydney.

## Lake to float

**S**ydney based audio pioneers Lake DSP hope to raise A\$5.5 million in much needed capital on the stockmarket, listing next month.

Renamed Lake Technology Limited, the firm have pioneered a variety of new digital signal processing technologies, applied for 30 patents, and achieved licensing deals with the likes of Bose and Dolby.

Unlike many share floats, Lake promise to reapply the proceeds on business development and to retire debt. In particular, \$2.7m will be applied to R & D and patent registrations, while \$1.2m will be allocated to overseas marketing and support.

Lake was established in 1991 and have waged a brave, dogged and at times idealistic battle to bring their ideas to market. Perhaps similar to the Orbital Engine Company of Perth, Lake may well further develop a business that sells intellectual property - but the high cost of pursuing patents, along with research and development has led to a loss of A\$1.2 million last year.

Founded by Brian Conolly and David McGraph, Lake DSP has most recently developed a headphone surround sound technology which emulates surround in a startlingly realistic manner.

Connections sampled the technology on a Singapore Airlines flight last month, where several movies with and several without the technology were compared. It works well, and airline licensing is a major potential source of revenue.

Lake paint an attractive future in their Prospectus, and industry insiders say they have a good chance of fame and fortune.

The 50c shares will list on December 6th.

• Lake founder David McGraph is profiled on page 26 >

## Sennheiser launch aggressive UHF wireless product push

*Evolution wireless comes in at A\$999 as Sennheiser host world wide rollout*

Simultaneously around the world Sennheiser conducted roll out parties to show dealers their new Evolution UHF wireless system.

In Australia dealers and press were invited on a harbour cruise aboard the Bounty, a replica sailing ship. Dealers were impressed to see a product that retailed at A\$999 in a product sector where \$1699 was the previous hot price point.

Three discrete ranges comprise the Evolution range. The price leading 100 Series offers a Diversity (two antenna) receiver, above. The A\$999 price is for a system with handheld mic, with a cardioid E835 capsule.

A super cardioid version, the E845 costs just \$100 more, and body pack or plug-on transmitter packages both start at A\$999 also.

The entry level 100 Series has 4-channel pre-set switchable frequency operation & battery low-level warning LED. The plug-on transmitter option converts any favorite wired dynamic microphone to wireless transmission.

Australian and NZ Sennheiser dis-



tributors Syntec International reported brisk trade in Evolution after the launch.

Dealers enjoyed their night on the water, and were entertained by the classy vocal act Taxi Ride, who went on to collect an ARIA award the very next night.

• Syntec +61 2 9417-4700.

*Michael White (SOS Communications) with Syntec CEO Bob Sloss. Taxi Ride try Evolution (bottom)*



## Win a VIP ENTECH Pass!

Australian Audio Supplies and ENTECH are providing the opportunity for you to have the VIP treatment at Australasia's premier Entertainment Technology Trade Show, ENTECH.

The VIP Pass includes airfares to and from ENTECH from your State Capital, accommodation, entry to the show and entry to a selection of the show's popular seminars.

How do you enter?

Australian Audio Supplies have just released their Pro Audio Live Catalogue which not only contains the latest, innovative 'live' products from Mackie, PreSonus, CAD, Earthworks and Ebtch, but also features an entry form on the back cover.

Just fill the form out, post or fax it to Australian Audio Supplies and you will be in the draw. Entries close January 14th, and the winner will be drawn by ENTECH's Queen of Ceremonies Caroline Grafton on Monday 17th January.

ENTECH is run across three days in March, starting Sunday 5th and ending at 6pm Tuesday 7th. The show is free, after trade registration - but the VIP pass entitles you to attend ANY seminar or conference topic, anytime across the three days!

• Want to enter but you need an entry form? Call Australian Audio Supplies on +61 2 4388- 4666. And, Good luck!



## Antares Mic Modeler Software

The first two versions of the Antares Microphone Modeler Software are ready for release for Pro Tools and MOTU on Mac. There will be a minimum of 75 microphones in the first release.

Included in the first release are all of the most popular mics from: AKG, Alesis, Altec, Audio-Technica, Audix, B&K, Beyer Dynamic, BPM Studio Technik, Brauner, Baltic Latvian Universal Electronics (B.L.U.E), CAD, Earthworks, Electro-Voice, Independent Audio (Coles), Langevin, Lawson, Manley Labs, MircoTech, Neumann, RCA, Royer, Sennheiser, Shure, Sony and Telefunken.

Antares estimate they have already modeled over US\$300,000 worth of amazing microphones - many which are unavailable at any price.

There will monthly additional mic models that can be downloaded from the Antares WEB Site on a monthly basis. Many of these Microphones (like Telefunken) have never been available to the general public and have been beyond reach in price for most people, they say.

Antares say if you'd like to see them model a mic that's currently not on the list, email your suggestion to: info@antarestech.com with the words "Mic Suggestion" in the subject line.

• Sound Devices +61 2 9283 2077 [www.sounddevices.com.au](http://www.sounddevices.com.au)

## ATC office in SA

◆ **Audio Telex Communications** Pty Ltd is to open a sales office in Adelaide. From December 1st South Australia will have a local Audio Telex Communications sales office.

In the past, Audio Telex have been very well served in South Australia by Electronic Concepts via their role as an exclusive distributor. Audio Telex's local presence will see Electronic Concepts' role change from one of an exclusive distributor to that of a valued dealer customer.

• Audio Telex Communications Pty Ltd, 31 Walsh St. Thebarton, 5031 SA. Ph: +61 8 8352-4444, Fax +61 8 83524488

## Production Bids Sought

◆ **Richard Montgomery** has commenced employment with the NSW Centenary of Federation as the Production Manager for the Centennial Ceremony to be staged in Centennial Park on January 1st 2001.

He is seeking up to date info on all products and services available for such a large event, which in the planning stages.

• Initial contact: Production Manager, Centennial Ceremony, PO Box R1193, Royal Exchange, Sydney NSW 1225.

## MOVED

◆ **Showtech Australia**, the rigging kingdom of Tiny and Robyn Good, has moved to

510 Williamstown Rd, Port Melbourne, 3207.  
Phone +61 3 9645 4133,  
fax +61 3 9645 4637.

◆ **Music Link** have moved, and can now be reached at PO Box 650, Ferntree Gully, VIC 3156. The huge new place is at:

29 South Corporate Ave,  
Rowville VIC 3178.  
New Phone: +61 3 9765-6565,  
and Fax: +61 3 9765-6566

◆ **Gearhouse Brisbane** are on the move too, find them at:

31 Wellington Road,  
East Brisbane, QLD 4169.  
Phone +61 7 3392-2777  
Fax +61 7 3392-2477



*The Australian Screen Sound Guild awards were held in Sydney last month. Adam Spencer and Lisa Hensley assisted. See story page 29.*

## PEOPLE NEWS

◆ New staff at GUET: NSW Distribution Sales Manager: **Claver Harper**. SA/WA Distribution Sales Manager: **Derek Croser**. QLD/NT Distribution Sales Manager: **Adam Quinn**. NSW Distribution Administration Officer: **Ann Nguyen**. Marketing Coordinator: **Fiona Stack** ...and new PA to General Manager: **Naadeen Hanley**.

◆ The Show Technology team has been expanded with the addition of 2 new trainee technicians. Jan Rod and Alex Maggot.

"This brings the total number of engineers and technicians in our service department to six - something I am proud of" says Managing Director Emmanuel Zirc. "We are also pleased to announce the promotion of long servicing engineer Phillip Ngay to the newly created position of Service Manager". Contact service@showtech.com.au or toll free 1-800-649 999.

◆ Altronics is pleased to announce that **Aldo Alibrandi** has joined the dynamic sales team in Auburn, Sydney.

• You can contact Aldo and Altronics at: +61 2 9648-5266.

◆ **Sean Crayn** joins the Night-Shift Entertainment Services team as their Junior Service Person.

◆ Studio Solutions is pleased to announce the appointment of

**Colin Abrahams** as senior service engineer. Studio Solutions will now be offering service on Tasca DAT & 3 track recorders. Ph +61 2 9417-3200.

## AGENCIES

• **GUET** are now distributing the Bullfrog speaker line.

• **Joe Meek** studio audio products are now handled by Mick Wordley who has taken over Shape International. Call +61 3 8278-8506.

## ~ Vaie ~

*Suzie Kennedy, partner of Chris Kennedy from Norwest Productions, taken in the most callous manner of an aggressive cancer, after a long fight in a Sydney hospital room.*

*A wonderful parent, who beat over backwards to breed good ethics and principles into her children - who were her biggest delight.*

*A strong and courageous woman and human, adored by her partner, with whom she spent 35 years. Their's was an unconditional union.*

*Her struggle to survive ended on October 27th. She faced the inevitable with unbelievable calm and strength*

*Chris was with her.*

## ENTECH events announced

Aside from what the organisers call 'the must-see factor' of five hundred brands in three acres of expo space, the visitor's program at ENTECH 2000 is considered an essential educational attraction.

Split into dedicated days, the program allows visitors time to see the exhibits.

Starting on **Sunday March 5th**, the program features:

- Screen Sound Day, hosted by the Australian Screen Sound Guild.
- DJ/MC Boot Camp, hosted by Donte D'One.
- Club Light, includes product shootouts, desk demos.
- Presentations Academy, a daily session hosted by ICIA.
- Carnivale after party.

### Monday March 6th:

- Big Audio FunDay, with tour of the Olympic's PA and a large format PA comparison, hosted by Connections.
- AV Facility Manager's Conference, hosted by Neil Langford and Presentech.
- Tomcat Rigging Workshop.
- Presentations Playoffs, the Australian Grand Final.
- Club Light, seminars daily.
- Presentation Academy.
- Entech Awards Dinner.

### Tuesday March 7th:

- Audio Seminar Day.
- Club Light, daily.
- Presentations Academy.
- Tomcat Hoist Workshop.

Entry to the trade show is free after registration, while the events (above) carry a cost which vary from \$15 for a single Seminar.

Full details are online at [www.conpub.com.au](http://www.conpub.com.au) or call 1-800-635-514 or +61 2 9876-3530 for a brochure.

Qantas offer a 50% discount fare from capital cities, & hotel deals. Call Stage & Screen on +61 2 9383-4533.

ENTECH 2000 is at the Olympics site, Homebush Bay.

The publisher has an interest in ENTECH



## Harrison LPC awarded

Harrison's LPC (Live Performance Console), a ground breaking new mixing console jointly developed by Harrison and Showco, (*Connections*, January '99), has been nominated for the EQ Magazine Blue Ribbon Award. It also won a recent TEC award.

The LPC provides a large number of channels with Instant Recall of every function on the console.

The control surface's small physical footprint requires less floor space in the theater, leaving more available seating than other multiple-console configurations with the equivalent power.

It has 80 Input Channels per rack unit: each channel has a full dynamics section, four-band EQ, high- and low-pass filters, 32 sends and sidechain filters on the dynamics section.

LPC also boasts three Microphone and one Line-level input on every channel, and redundant automation computers continuously monitor each other to provide fault-tolerant operation.

Expatriate Australian Howard Page, now senior VP at Showco, was instrumental in specifying the LPC. Showco have sole rights for their touring inventory, while Harrison can sell the console for installations.

## Yamaha's Flagship PM1d detailed

By Buck Freeman

NEW YORK: Amidst longtime industry-wide speculation that the company would be releasing a new digital board at the 1999 AES, Yamaha finally confirmed the rumors by unveiling the PM1D, its first large-format digital mixing console designed specifically for live and installed sound applications.

Yamaha made the historic announcement of its new flagship desk at a private presentation at Carnegie Hall on September 23 to an exclusive international audience of industry media, consultants, commercial dealers contractors and Yamaha engineers who had flown in from Japan especially for the event.

Coming from a heritage of leading live sound mixing consoles such as the popular PM4000, and innovative breakthroughs such as the O2R in digital mixers, the PM1D is a state-of-the-art digital mixing console which is sure to set the stand-

ard for live sound boards as the industry enters the 21st century.

The PM1D mixing console is a totally digital, computer-based system which performs all mixing and audio processing functions completely in the digital domain with 32-bit internal processing for superior audio quality.

The CS1D Control Surface (pictured) operates the DSP1D digital audio engine, which is contained in a variety of stage racks that can be located with the control surface or 'remoted' to the stage or other convenient location- where all audio is processed.

Configurable in both 48- and 96-channel versions with 48 mix busses, 24 matrixes and 12 DCAs (Digitally Controlled Amplifiers), the board system features utilises top-quality 28-bit A/D and 27-bit D/A conversion. Dual inputs on each channel provide 96 inputs for the 48-channel system and 128- 192 inputs on the

96-channel version.

The console is highly advanced in many aspects. For one, at approximately a shade over half the weight (120Kg) and footprint of comparable analog consoles, its compact, streamlined configuration is ideally designed for easy transport and positioning - a very important factor especially in touring situations.

The dimensions of the CS1D are as follows: 353mm height x 974mm depth x 1904 mm width.

Being smaller and lighter, the PM1D is much more easy to handle than comparable analog systems.

Set-up of the PM1D is light-years ahead of its analog counterparts, with 100 Base-T Ethernet-based communication system connections that provide fast, easy setup and minimum cabling. All console-to-stage audio and control signals are carried via one 68-pin cable (per 48 32 channels) and three Ethernet-

(turn to page 20)



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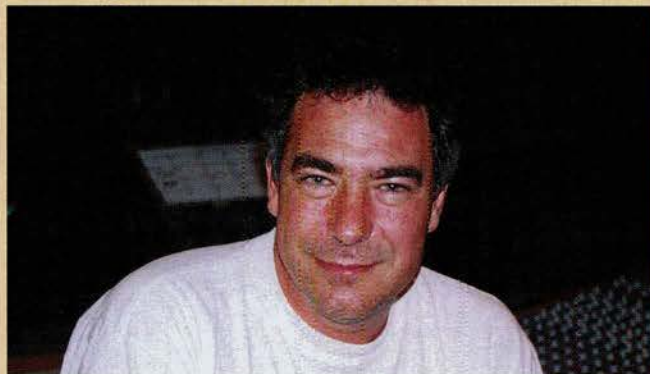
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## My Favourite Mic!



**Chris Thompson, Sound Engineer – ABC Television and Radio, Triple J network.**

The mic I find to be the best most useful, would have to be the Shure SM57. It's versatile, reliable, takes high abuse, sustain high sound pressure levels, and can be used on any instrument.

But what's my favourite microphone? I would say indisputably for me it's the re-issued AKG C12. Working at the ABC I'm in a fortunate position where I had access to some original models so I've used them for many years, and they are the cleanest, most natural sounds I've heard. They are not a transparent microphone, they have a quality of their own but in this particular case it's a quality that I really like. I use them quite often for vocals, for brass, I've used a C12 on a double bass, for most acoustic instruments, they're just fantastic. And the re-issued ones which have been around for about three years now have a beautiful clean sound with very little noise.

Normally I wouldn't run it through a desk. I'd run it into a good quality pre-amp, I'd add no EQ to it at all but I'd possibly roll the bottom end off depending on what instrument I was recording, the most I'd roll off would be from 100 cycles down, and I'd record flat. In mixdown I might add a bit of 16k to it if it was on a vocal, to put some air around it, but I like it flat.

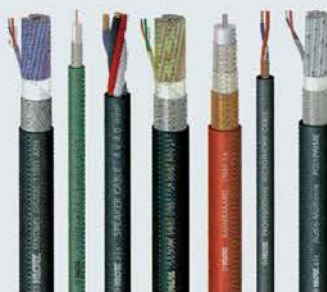
I usually position them between one and two feet back from the instrument because again I like to get a bit of air around it, however they perform extremely well with a vocal right into them, and they don't seem to have the same proximity effect of various large capsule Neumanns. So it's good for doing nice intimate quiet vocal - right up close with a pair of pants-hose in between is just fine for me. *-As told to Mandy Jones.*

## KLOTZ-ais ROLLS INTO AUSTRALIA

German Cable company Klotz-ais (Audio Interface Systems) has appointed Technical Audio Group as their distributors in Australia. The appointment follows a steady roll-out of distributorships and major contracts throughout Asia.

Klotz products fall into two main areas: bulk cable and interface (multicore/stagebox) systems. The premium quality bulk cables are specifically designed for live, broadcast and studio applications, including heavy duty OB broadcast multicores with overall braided shield and up to 56 pairs.

The interface systems include a large variety of hardware including rack mount, wall mount or floor standing stageboxes with optional transformer splits and



various tails, looms and multicores all with Harting multipins or the premium quality Litton Veam circular touring multipin.

**TAG: +61 2 9810 5300. [www.tag.au.com](http://www.tag.au.com).** (Note: Klotz ais and Klotz Digital are entirely separate companies with separate ownership and distribution. Klotz Digital are represented in Australia by Klotz Digital Pty Ltd).

## AMPOWER debut extra LM amplifiers

AMPOWER Marketing Services advise of another two newly released products in the LM AUDIO amplifier range.

They are the LM 100 Mixer Amplifier, a three Channel Mixer Amplifier rated at a genuine 100 Watts RMS. It features priority VOX mute, remote master volume control, and has 8 Ohm, 100V, and 70V outputs. It's designed and made in Australia, and sells at A\$495.00 inc tax.

The LM 450 is a quad amp, delivering 4 X 50 watts into 8 Ohm, 100V, or 70V outputs. Built in a compact 2RU case, it has adjustable mic sensitivity, priority VOX mute and a remote volume facility for each amp. It's ideal for multi zoning and costs A\$325.00 inc tax.

• **Ampower, Call +61 3 9435-1745**

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## Positions Vacant in Adelaide

We are opening a branch office in Adelaide this December and are seeking applications for two new staff positions:

### Regional Manager

We are looking for a 'hands on' regional manager with a strong background knowledge of all aspects of the audio signal chain and of the South Australian market for commercial and industrial audio products. Some general office and staff management duties are involved but the main emphasis will be on quality customer support and informed product promotion. The successful applicant will need to be dynamic, self motivated and able to work effectively in a small office environment. An excellent salary package is available, including generous commission, a company vehicle and non contributing superannuation.

### Sales Support Assistant

We are looking for someone to support our regional manager in all aspects of the operation of our sales office. Duties will include all areas of internal customer service and support, stock control and other general office duties. As we are in the audio business, a good knowledge of and interest in audio would be a distinct advantage. The successful applicant will need to be self motivated and able to work unsupervised at the direction of the manager. An excellent salary package including generous commission and non contributing superannuation is available.

Application for either position should be sent to: **The Managing Director, Audio Telex Communications Pty Ltd**  
**Private Bag 149, Silverwater NSW 1811**

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**Director:** Caroline Fitzmaurice-Grafton caroline@conpub.com.au

**EDITORIAL:** Deadline 15th of each month

**Publisher & Editor:** Julius Grafton

Email: julius@conpub.com.au

**Assistant Editor - 7th year**

Catrina Forcer Email: catrina@conpub.com.au

**Profile journalist:** Madeleine Murray

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## Regular Contributors:

**ADELAIDE:** John Matheson **BRISBANE:** Sid Kidman  
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**USA:** Buck Freeman (Detroit), Gary Kayye (NC)  
**SINGAPORE:** Nazir Keshvani **HONG KONG:** Sandy Goh

## CREDITS:

**Production Manager, Art, Layout:** Sharon Miceli sharon@conpub.com.au

**Business Development, Marketing:** Nicole Morris nic@conpub.com.au

**Fiscal Whiz:** Jenny Royal **PerFunctionary:** Barbara Randell

**Web:** Andy Ciddor **Printing:** Superfine, Syd. (3rd year) *Ta Gaz!*

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**Newsagents Distribution:** NDD, Sydney. (7th year)

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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;
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10. We shall do our utmost to correct any published information found to be harmfully inaccurate.

# industry NEWS



## DISCO MIXERS ALLEN & HEATH STYLE

After three decades in professional live and studio consoles Allen & Heath have made a remarkable debut in the disco mixer world with the launch of their premium quality Xone club mixers. Making some characteristically bold design moves, Allen & Heath have included 4 band EQ and an analogue synth-style VCF filter.

The Xone:62 has 6 dual stereo inputs, enough for 12 stereo devices, including 4 turntables and 2 mics. The 4 band EQ has an extra lower-mid control at 250Hz, allowing the DJ to mould bass textures. All inputs have a pre/post fcc aux send, large illuminating cue switches, 4 bar led meters and smooth travel 60mm faders.

Xone:464 (above) uses a larger 19" rack mount size, adding features to the Xone:62 to provide a comprehensive hybrid Live/DJ mixer.

Four fully featured mic channels with twin mid sweep 4 band EQ, 6 auxiliaries and an extra set of mix outputs provide all the facilities a live DJ act requires.

Retail prices (inc Sales Tax) are Xone:62 \$2,995 and Xone:464 \$4,495.

**Allen & Heath is distributed in Australia by Technical Audio Group, +61 2 9810 5300. www.tag.au.com**

## MAJOR TRADE EVENTS

- REPLITECH ASIA, Nov 10-12, 1999. Hong Kong. www.kipinet.com
- DI Nov 19 - 21st, 1999. Orlando. Ph +1 212 229-2965 web: www.etecync.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.fierarimini.it
- NAB, April 8-13th, 2000, Vegas, USA. www.nab.com
- NSCA, April 27 - May 1, 2000. Las Vegas. Ph +1 904 273-2750 www.nasca.org
- LASA Shanghai. June 7-9. +44 17 370-8231. www.lightandsound-shanghai.com
- WORLD LIGHTING FAIR, June 22-24. Tokyo. www.wlf.cc.jp
- SMPTE 2001, July 10-13 Sydney. Ph + 61 2 9939-4445. www.smpete.org

# CUT THE COST... NOT THE SOUND



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is achieved by simple application of the eye-bolt kit (included) to threaded inserts.



keeps each system working and looking good in almost every environment (conforms to Mil-Std-810 and IPX4 per IEC529).



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Series is the new 'Specified Solution' for small venues, area fill locations, and near field requirements.

Marquis Series consists of five full-range 2-way designs and one compact subwoofer system. The series includes three cabinets designed with low profile applications in mind, allowing for close ceiling mounting; all may be suspended either horizontally or vertically.

All systems have integral passive networks that incorporate JBL's proven SonicGuard™. The series features the JBL OASR™ (Optimized Aperture Symmetrical Radiator) which provides even, clear high frequency coverage over a uniformly defined area.

Marquis Series integrates with Sound Power and Venue Series, both sonically and visually, to extend the designer's reach to all possible areas.



Sound Power



Venue Series



Optimized Aperture Symmetrical Radiator

SPECIFY



A Harman International Company

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



## Electrix MO-FX

Mo-FX is the third unit in the series of unique processors from Canadian manufacturer IVL / Electrix. Other units include: FilterFactory - High Order Analogue Filter and the WarpFactory Vocoder.

The Mo-FX is a Time Synchronized, DJ and Remix oriented multi-fx processor. Emphasis is placed on real-time control and "playability" of the effects. Engage or momentarily "blast" any or all the modules: distortion, flange, auto-pan / tremolo, and delay. There are no presets or programming, says Electrix. Mo-FX is the ultimate live studio remix signal processor, they claim! It is sure unique, we think.

The Mo-FX is flexible and easy

to use, Electrix say they consider it an electronic instrument.

Parameter control is transmitted via MIDI so you can record real-time, front panel adjustments into a sequencer. MIDI clock is received for synchronising the modulated FX. The phono pre-amp enables Mo-FX to be inserted directly between a turntable and a mixer. No auxiliary sends are required to cue effects.

The Mo-FX also has a 'kick ass, road worthy aluminum chassis' that is both rack-mountable and can sit on a tabletop.

A\$1095 rrp.

• Major Music Wholesale  
Ph +61 2 9545 3540  
[www.majormusic.com.au](http://www.majormusic.com.au)

## PRODJ2 Pitch Controller CD player

The Prodj2 from American DJ is a single front loading pitch controlled CD player with a silver brushed aluminium face plate. It is pictured in glorious black and white below.

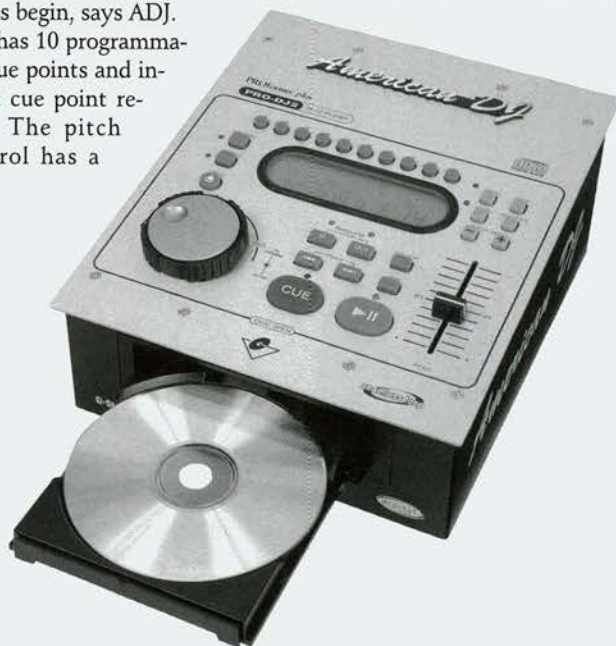
It features seamless looping and fader "Q" start meaning the CD player can be started by using the cross-fader on a "Q" compatible mixer. The Prodj2 has true instant start and is able to eliminate "dead space" before tracks begin, says ADJ.

It has 10 programmable cue points and instant cue point recall. The pitch control has a

range of plus or minus 12%. Two units can be hooked up together and interact on a flip flop basis - you can programme tracks on both units and have them play one after the other without gaps - great for lazy DJs!

Prodj2 also handles CD recordable, CD rewritable and 8cm single CDs. It retails for A\$749.00 including sales tax.

• Call American DJ  
on +61 2 9568 2100



## Yamaha's PM1d detailed

type cables.

"PM1D is the natural evolution and marriage of Yamaha's expertise in providing the best in large-format live sound consoles and innovative digital consoles," remarks Mark Amory, pro audio product manager, Yamaha Music Australia.

The PM1D's computer-based operation offers live sound engineers all of the benefits that recording consoles have offered for years: programmability, repeatability and instantaneous total recall of all parameters.

Features include: total recall, undo, off-line programmability, central control, graphic and graphic parameter readout and advanced user interface.

Up to 1,000 scene memories can be stored. In the event of a control surface disconnect or crashpower failure, the system will still pass audio, so emergencies can be averted.

One useful feature of the CS1D Control Surface is the implementation of dual inputs on each channel (A and B). This is advantageous when large numbers of inputs are needed and where some are only used occasionally. It's a perfect feature for festival situations with two or more stages. Another type of situation that can benefit is the large complicated show with many small acts performing such as the Oscar and Grammy award shows. A/B assignments can be

stored in scene memory so that the correct input is automatically switched when the scene is recalled.

Other channel features include remote control of head amplifier gain from the control surface. Head amp gain trim settings are recallable. In the case of where multiple control surfaces are used which share I/O (e.g., FOH, Remote truck and Monitor Board), are used, sharing I/O, the main DSP-2000DSP1D mix and processing 'engine' is switchable. It can be configured with a simple switch to select which control surface can control head amp gain. Additional channel features include a very powerful 'virtual channel', 4-band fully

parametric EQ, dynamics processing on every channel, user-definable number of aux sends, effects processors and graphic EQs.

The PM1D is an easily expandable rack-based system system that allows the addition of I/O modules to create the ideal system depending on requirements. The system is based upon a variety of expandable racks and modules

For more information on the PM1D, call Yamaha Music Australia on +61 3 9693-5164; or visit [www.yamaha.com](http://www.yamaha.com)

# Satisfaction!



HARRY WITZ (db Sound, Chicago) equips 'The Rolling Stones' touring system with thirtytwo DF 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?



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## My Favourite Mic!



**Andy Irvine**  
**Troy Balance, Melbourne**

My Favourite mic of all time is the AKG C414. It's so versatile I use it on everything. You can use it on kick drum if you're really careful, just place it right in the barrel. And it's great for guitars, overheads and vocals. It's just an all round great condenser microphone.

The ambience and the whole audio spectrum that it captures and feeds down the line to you at FOH is just awesome. It has a really flat response. It's sound gives you that warm and fuzzy feeling, it's a true replication of what the guitar amplifier or the kick drum is doing.

Typically with the C414, I EQ it really flat. With kick drum I take a little bit of the bottom end out, it's just too much for the C414, it captures the whole sound so you have to trim that a bit. Vocals depends on who is singing into it so again I keep it pretty much dead flat. If I had twenty of them I'd be a very very happy man.

I discovered the C414 back in 1990 when I first started international touring with Farnham. It was introduced to me by Grant Walsh and I've just loved it ever since. I use them wherever I get the opportunity.

Everyone will find a microphone that does it for them - the C414 just does it for me.

*As told to Mandy Jones.*

## Program Fail Safety for Radio

AV Communications announces the release of a new stereo audio, program fail alarm, which can trigger up to six separate relay based conditions. The PFA201 can be used to detect low or absent program signal levels and will activate front panel LED's, a sonic piezo alarm and the on-board relays when certain preset alarm conditions are detected.

The PFA has an LED Peak Program Meter (PPM) on the front panel for visual recognition of program levels and there are two Trip LED's and a Fail LED which show PFA alarm status. The PFA201 can be housed in a 1/3RU or 1RU box. The PFA203 is a 1RU rack containing three PFA201 boards for applications where up to three stereo balanced inputs are required. The Program Fail Alarm mode of operation, trip levels and delay settings are set by DIP switch settings which are accessible from the front panel.

• **Info: email AV Communications Pty Ltd on [levy@avcom.com.au](mailto:levy@avcom.com.au) or telephone +61 8 9249 6688.**



BBE have improved on their "hot-selling" model 362 by adding fully balanced inputs and outputs plus strengthening the circuitry for true professional-level high headroom.

It's produced in California, pictured below, and retails in Au for \$489. Suitable for recording studios, broadcast stations, commercial installations and contractors.

*F. Payton & Son, +61 2 9439 1822*

Sony's W-DC5 (above) is a very high quality dual channel ADC & DAC with AES/EBU & SPDIF inputs & outputs, synchronisation with AES/EBU input or external word clock, 24 / 20 / 16 bit word length selectable output, and front panel ADC sample rate & word length indication.

Info from:

• **Sony Australia, +61 2 9887-6666.**



## Tube compressor with EQ

Alalon Design's new VT-747SP is a combination stereo tube-discrete spectral opto-compressor with a Class A six-band program equalizer. The VT-747SP is ideal for high performance DAW input signal conditioning, stereo buss compression-EQ, mastering, as well as stereo keyboard/synthesiser applications.

The VT-747SP features a stereo Class A opto-compressor with built-in two band parametric side chain for spectral control, stereo Class A six-band discrete passive program EQ, Tube Signal Path (TSP) vacuum tube bypass, large gain reduction VU meter, twin 60 dB range LED output meters, internal regulated power supplies, extremely high headroom (+34d13 input before overload), and low noise (-92d13 unweighted).

Avalon say there is nothing like the VT-747SP anywhere: a high-end stereo compressor with built in side-chain for spectral control, plus passive EQ for sweetening. The built-in side chain function enables complete spectral control to carve into and shape specific frequencies.

It sells for A\$4,250 including sales tax.

• **Call Mixmasters Productions, +61 8 8278-8506.**

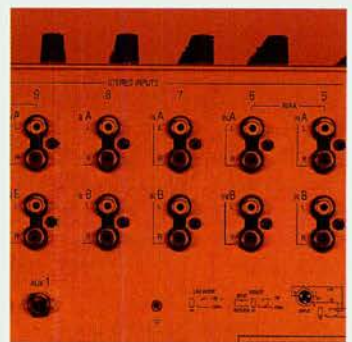


# Knowledge = Desire

**XONE:464** PROFESSIONAL CLUB MIXER

**XONE:62** PROFESSIONAL DJ MIXER

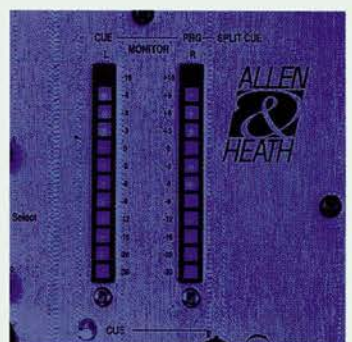
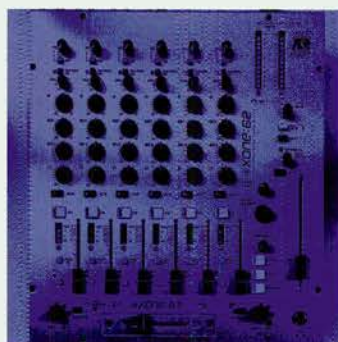
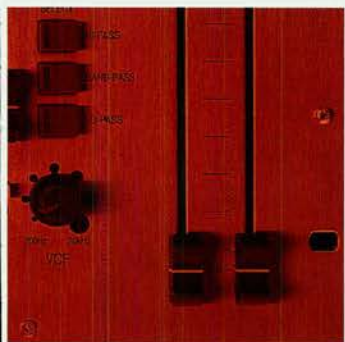
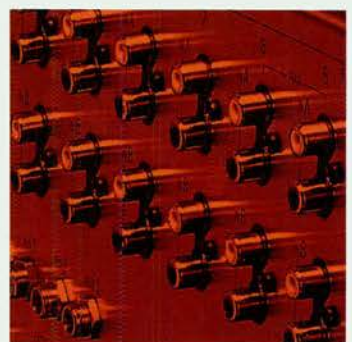
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premium quality consoles for professional venues and d.j's.  
Alongside killer features like 4 band EQ and synth-style VCF filters, we've applied the same passion for outstanding audio and bombproof build that has made us a key player in pro studios and touring for 3 decades.



- XONE:464**
- 16 input, 5 output club mixer
  - Live + DJ performance features
  - 4 band EQ
  - VCA crossfade
  - VCF filters



- XONE:62**
- 12 input pro club / DJ mixer
  - 4 band EQ
  - VCA crossfade
  - VCF filters



<http://www.allen-heath.com>

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## Audio Patents

Anyone who can make a dollar from that tiny niche in niche markets - high level concert sound stage monitors, should be congratulated. (*silverchair, Sept*).

But in the CMS article a lot of mention is made of the US patent on the porting, and it should perhaps be pointed out that:

(a) the US patent examiners appear to allow just about anything audio to be patented, regardless of how much prior art exists, or how obvious a design might be. Any search of US audio patents will bear this out, believe me!

(b) the Australian and European patent examiners are a lot more exacting in their inspections of prior art, and knock back a lot of audio patent applications; and, most importantly...

(c) a US patent has no effect in Australia.

A quick consensus of opinions around the factory here drew the conclusion that, from the photos shown, the patented porting looked very similar to that on early Martin wedges.

• **Duncan Fry, ARX, Melb.**

## DVD audio & video

Moti Konfort's concern over DVD-Audio's compatibility with DVD-Video (*October's Letters*) highlights the consumer confusion that will inevitably be caused by the delayed launch of DVD-Audio - a situation, incidentally, that has been created more by the record industry's

concerns over copying than by the DVD Forum itself.

The latest DVD-Audio specification v1.1 provides for a bewildering number of options.

High resolution audio up to 192kHz sampling - in two up to six channels - can now be recorded as linear PCM at 16, 20 or 24 bits or using Meridian Lossless Packing (MLP), a data reduction scheme which saves space without any loss of fidelity. An optional DVD-Video partition to enable the addition of a music video (similar to an Enhanced CD) is also included.

Now for the confusing bit. The high resolution audio on a DVD-Audio disc will not play back on DVD-Video players, only on dedicated DVD-Audio or a new generation of 'Universal' DVD-Video/Audio players. These will begin appearing soon and are likely to supersede DVD-Video machines very quickly.

Being fully DVD-Video compatible, the video portion of a DVD-Audio disc can be played on both DVD-Video players and Universal machines, but not on a dedicated DVD-Audio player.

All may not be lost, however. There's a growing belief within the industry that early DVD-Audio releases may include a DVD-Video formatted Dolby Digital track of the same programme material so that those who have already bought DVD-Video players can also enjoy the surround experience, albeit at slightly lower fidelity.

**Bill Foster, AIX Media Group, London**

## Hall sibling rivalry

I read with amusement my comments about gel selection (*October*) because at the time of the phone call I was programming over 50 moving lights and was running close to our deadline before rehearsals commenced.

It is true that a "Hall" was responsible for the design of Dreamscapes - but I was merely the moving light programmer.

Christmas lunch may be somewhat awkward this year given that my brother believes that I took credit for a gig that was in fact his lighting design. To set the record straight Tim Hall was the LD and analogue operator, Andy Edis programmed 16 x Icons and 12 x 8-lites with scrollers. I used a Wholehog II to control 20 x Studio Colors, 24 x Cyberlights, and 8 x Claypaky Stagelights.

I have been spending the majority of my time looking after one of our clients new Claypaky 1200 moving head installations at the Crown Showroom. Although I've done some stuff with Tim at Resolution X, our businesses don't often cross paths and he didn't find the article half as amusing as I did.

**Kait Hall, Melbourne**

## WA woes

Living way over here in Western Australia, there is a couple of drawbacks.

Everything that happens in the way of sport etc in the East is usually delayed.

Electric bulbs don't emit light - rather, they suck dark. The darker the dark sucker, the greater its capacity to suck dark. Once they are full of dark, they can no longer suck.

Henceforth, brightness shall be measured in sucking capacity, while life will be measured in sucking volume. -Anon.

We have to put up with West Coast Eagles supporters and we don't get many trade shows.

When we do get anything in Perth, we seem to get the information a little to late. For example, in last months (October) industry news, Digidesign announced their tour dates with their Pro Tools 5. The dates for this in Perth were Oct 12 and 13.

A little to late for people who receive their magazine on the 13th (subscription) and way to late for those who buy their mag on the release date of the 15th.

The registration phone number given was in Melbourne, which is a little hard to get hold of late afternoon on the 13th.

Just a note for promoters and the like, don't forget to include W.A. We may be far away, but we are still interested in up and coming events.

**Jason Fenton, Golden West Network, Bubyry.**

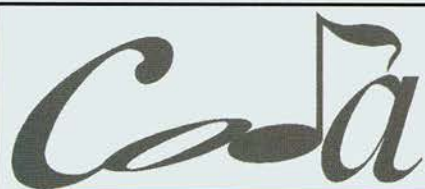
## VAPAC report warning

I'm the un-named theatre consultant in the article 'VAPAC REPORT' (Sept). A warning to would-be designers and managements: the document was never intended to be, and must not be used as, a design guide.

The original motive came from the desire to encourage productions to tour throughout Victoria, by making it easier to plan the logistics, and reduce the amount of equipment to be carried.

Handy reference the book is, but it is no substitute for proper professional advice to ensure the best outcome for particular projects.

**-Denis Irving, Entertech, Terang, Vic.**



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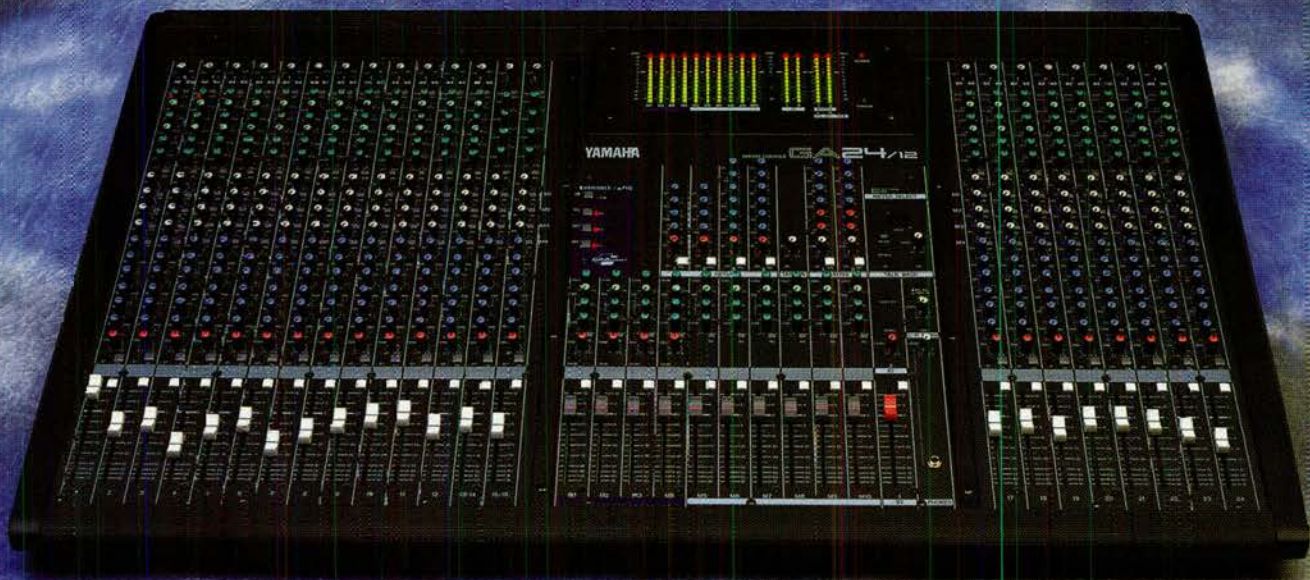
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The GA console, which comes in either 24-input (GA24/12) or 32-input (GA32/12) versions, has some other nifty features as well. You get four band EQ on the inputs, three band EQ on the outputs, a two-mix matrix, PFL, AFL and channel on/off switches. And, you get the rugged construction, reliability, and sonic performance you have come to expect in a Yamaha console.

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ACN 004 259 527

## David McGrath is a genius

By Madeleine Murray

**E**verything about David McGrath is modest—except his achievements. He has a cherubic face, and a gentle hesitant voice. He lives in an unassuming suburban street, and works in a cluttered converted garage behind his one-storey house. Yet he is the chief scientist and algorithmic genius of Lake Technology, the company which invented Auditioner, Huron, and the hardware behind Dolby Headphones, used on Singapore airlines.

Lake has attracted interest and investment from Paul Keating, and had its public share offer last month.

# The Man Behind the Algorithms

McGrath's garage has been roughly divided in half: one side is full of children's toys, and the other half is his office. It is from here that the 36-year-old McGrath figures out the complex algorithms that have changed the nature of testing acoustics, surround sound, and led to over 30 patents in process.

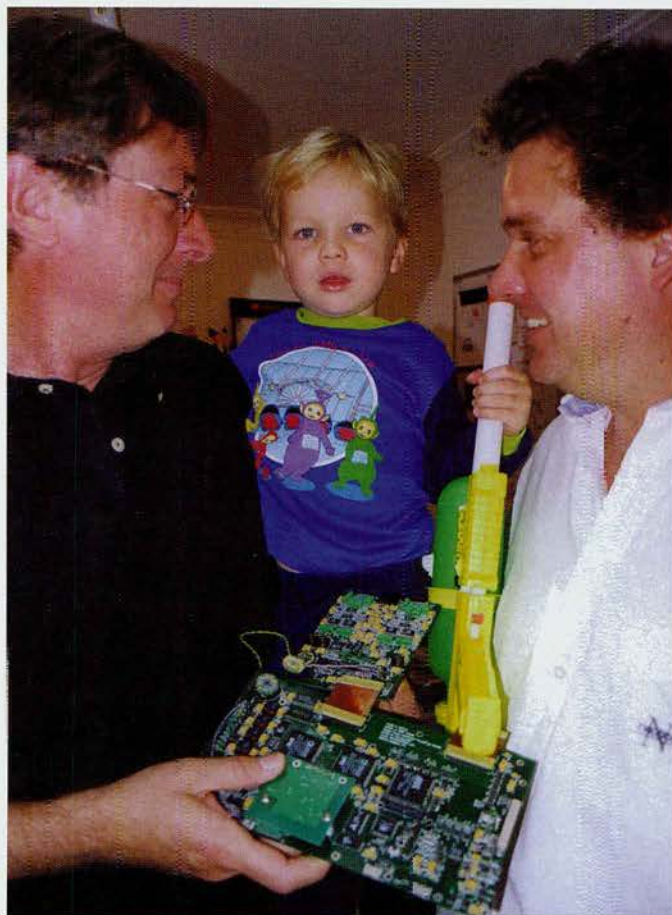
The narrow room has a laptop, a miniature Huron machine, a stack of digital signal processing algorithm books and magazines, AES and IEEE journals, a CD player with a digital output, a record player, and a couple of other computers. McGrath explained that, "my main tool is simulation software like Matlab, which lets me crunch numbers and experiment with algorithms and come up with new ways to improve sound processing. It's all about developing algorithms."

McGrath has a degree in math and electrical engineering. "To me, everything to do with music and audio is all to do with mathematics. Modern digital signal processors are a wonderful tool to have because you can turn everything into numbers and process it that way."

### Handshakes and Bruce Jackson

McGrath would rather work out a deal with a handshake than with a bevy of lawyers. That's impressive, considering that his ideas are the capital.

McGrath is also working outside of Lake, with audio legend Bruce Jackson, on a computer game which trains ADD children.



Bruce Jackson (left), with David McGrath and son

The game is driven by the child's brainwaves, accessed from sensors placed on the player's skull. A player who uses the 'right' brainwaves gets points. McGrath created the complex algorithms to break the brainwaves into their fundamental components while ignoring twitches and peripheral information. The work is related to microphone technology.

McGrath is also involved in a secret venture with Jackson and Clair Brothers Audio that, according to Jackson, "promises to change the way we manipulate sound. David has used his lateral thinking and algorithms to create a new set of tools for EQ, compression, and limiting." Jackson won't say any more, but promises that we will be impressed.

Jackson is a big fan of McGrath's and adds that David has also created a new way of improving CD sound by adding a secret pattern of numbers which extend the detail and resolution of an ordinary CD.

"And be sure to make it clear how cool David's convolution things is, and what he has done there," Jackson exhorts me on the phone from his hotel room. "He has made accurate reproduction of natural reverberation possible. Well-known manufacturers are in

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No expensive add-on electronic crossover module required! Dual built-in 4th-Order Linkwitz-Riley electronic crossovers switchable at 60, 90 and 120 Hz. Low pass outputs feed internal Subwoofer modes. Easily handles 2 x 18" and 4 x 18" bass bins.



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the process of licensing this technology that David developed. The theory has been around for a long time, but there is an inherent problem in doing real time reverb. This is a new way of simulating reverb on a real time basis. It's a fundamental invention that he's made!"

Jackson, who was in Sydney last month to minutely acoustically examine venues for Barbra Streisand, and to do more Olympic Ceremonies sound tests, took time out of his frenetic schedule to tell me more about McGrath. "I was looking at different facilities for Streisand, and her manager and I were looking at Melbourne. We were hearing some reflections coming back, and we were trying to optimise stage position so that reflections would be minimised. They sent the dimensions of the stadium to David, and he whipped out a model on his computer. He could then show me what the sound was doing, how the sound goes out, reflects off the walls and comes back in, the bad points and the good points, where it's a problem because of the glass being tilted. So that's another little highlight to him!"

## The beginning of Lake

McGrath and his partner Brian Conolly started off in Adelaide, working for Austek microsystems. When Austek folded, the pair got the chip design that they had been working on. Later, when they were working at CSIRO, the research organisation funded the pair's trip America to sell their own ideas.

The two men founded Sydney-based Lake eight years ago, in March '91. Since then, the company has grown from 2 to 30 employees.

"Brian got our first contact with Bose corporation, and we got our first contract—that really started the company," McGrath said. Lake began by building products for acoustic research. The first customers were research labs interested in architectural acoustics. "If you have an auditorium with an acoustic problem, you can try raising the roof, or change wall materials—all very expensive. It's much better if you can simulate the changes on your computer. Back then, the idea of simulating a brand new building was pretty far-fetched."

Bose saw the big market in installed sound, and putting speakers into existing spaces. "While they had all the computer tools to simulate how the acoustics should sound, the final step for them was to be able to take a piece of existing music, and pass it through some process so you could hear the effect on real time live sound."

Enter Lake, who built the hardware.

Bose bought several for their internal research, then Lake took on a contract to build a single board that plugged into the Macintosh computers that all the Bose sound system consultants used. The Auditorium allowed them to plug a CD player into the input of the board, plug headphones in the output and hear the 3D sound. Bose developed their own special way of listening to the sound, by using a chinrest and little speakers near the ears.

"The method used to achieve the processing was pretty much out of a 20-30 year-old textbook; a technique known as fast convolution. Lake seemed to get a foothold because no one else

could be bothered to implement it, as it's quite a complicated algorithm to apply."

## The Huron Workstation

Lake started building products based on McGrath's algorithm, and selling "a large number" of Hurons, first in Japan, then Europe, and now the US. "For anyone interested in trying to recreate three dimensional acoustics, the Huron machine is still the machine of choice. If someone is spending a million dollars on a big Silicon Graphics workstation researching virtual reality, it makes sense to spend an extra \$100,000 on the world's best 3D audio creation machine. That's the niche that Huron sells into. Virtual reality is the next big market beyond the acoustic research.

## The Dolby Headphone Process

"One of the neat things you can do with convolution is to create the illusion of a 3D sound field. This idea of using binaural playback applies in the sort of processing that Lake does when we simulate 3D acoustic space with all the echoes and reverberations. We simulate the way the sound would hit the left and right ears and build that into the model. If we want to simulate someone playing one sound in a room, we build a filter system in the electronics that has one input and two outputs. We feed the audio signal in, and what comes out the other end is fed to the two channels of the headphones, and gives the illusion of a sound out there in space.

"We started getting interested in this as a way of playing multi-channel sound over two headphones. There's a sibling technology to binaural, called cross talk cancelled stereo. People saw that as a useful way to get five channel surround sound, to give people the illusion of five speakers when they only have two."

Dolby had never given accreditation to headphones for the Dolby Virtual Surround stamp, because they didn't like the sound of any of them. "At Lake, we created one built on all the fast convolution. That enabled us to build a form of headphone virtual surround that worked far better than any other." When Dolby heard it, they promptly licensed the technology from Lake.

"At the same time, we were trying to push the technology to other markets, like DVD players, and portable DVD players. We knew that a good way to get publicity for the technology was to have it on airlines, and preprocess the stereo sound track."

Singapore Airlines has been showing movies encoded with this Dolby headphone process since April.

Lake's whole business revolves around creating new technologies and they are working on several projects. McGrath's job is to think up new things, and look ahead. "We need to be aware of what is going on in the industry, to know what problems need solving, so that Lake can be there at the right time."

*Lake have a sharemarket float underway, which wasn't known to Connections when we started researching this article. The story appears for no other reason than reader interest. No consideration was sought or received in order to run this story. -Editor.*

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# Screen Sound News Special

AUSTRALIAN  
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## 1999 Screen Sound Awards

**T**he second annual Australian Screen Sound Guild 1999 Screen Sound Awards were held in Sydney last month, with unanimous industry support.

"We had to beg and bludge last year, this time we've paid our own way" said President Ross Linton. "This is a user based association" he continued, hardly needing to affirm the role of ASSG in a full house of supporters.

ASSG is an abnormality in Australia, where people do not naturally join or support associations. It has a regular newsletter which is widely read - indeed, Connections regards it as important reading. And most importantly, the ASSG meets and attempts to resolve issues, mainly to fight for the integrity of the audio process in screen productions.

While the awards night was in no uncertain terms a major pissup, it did credibly bring membership recognition of excellence in sound to the forefront. Co-host Adam Spencer set the mood by saying "Good Evening" three times, then announcing it was a wrap! "If you win, kiss everyone - and slip the tongue in" he advised.

Presenter Lisa Hensley took the stage to announce that a large majority of men present had touched one of her breasts.... meaning of course she had been wired for sound by many of them.

Naturally industry raconteur and honorary presenter Peter Fenton (above, left) couldn't let this go. Referring to Lifetime Achievement recipient Clive Cross (above right) he said that between them they had 150 years, and "in all that time no-one suggested we even look at her boobs, let alone touch them!" It was that kind of night.

It is a very different lifestyle choice, being a recordist, editor, mixer, boom swinger or working in a post facility, but the one constant ambition amongst the industry types in the room that night was to get the best product.

Clive Cross took the stage in a determined manner, despite the advance of years, to accept the Lifetime Achievement Award. "I'm very pleased to be with my own kind" he said, as the audience rose for a standing ovation.

### The CineSound Sound System

Clive Cross, Arthur Carrington Smith and Bert Cross were behind Australia's first successful sound-on-film recording process which truly helped to revitalise Australian film making. Foreign optical film sound recording and reproducing equipment was available but very expensive and not an option for most early Australian filmmakers. It is the classic story of untried inventors producing results that amazed everyone, and doing it more cheaply than anybody could have imagined.

Bert Cross was one of only a couple of experienced cinematographers working in Australia in the early days of cinema. He moved from Melbourne to Sydney in 1926 to work as second cameraman on *The Term of His Natural Life* and manage Australasian Film Labo-

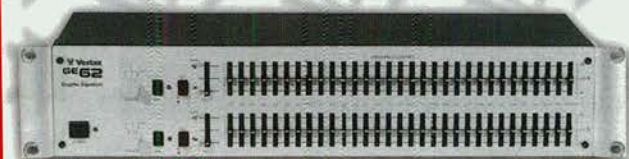


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**Awards winners:  
next page**

# Screen Sound News Special



Mixer Phi! Heywood worked on a lot of award winning projects. He is pictured above right, with Mentor (and wise guy!) Peter Fenton

ratory (a part of Union Theatres Ltd - headed by Ken G Hall). He was in charge of design and installation of the lab at Bondi Junction.

He began working with Don Knock of Wireless Weekly, trying to get sound on film. Don knew electronics and Bert knew photographic. Arthur Smith left his wireless business in Launceston and went to FOX to learn about sound on film. He was referred to Bert Cross and soon began working with him and Don on the sound-on-film experiments.

Don Knock left for the Northern Territory but Arthur and Bert continued. They managed to get decipherable sound with an ARC tube but it was distorted and at a low signal level.

A young Clive Cross spent three days on the set of *The Term of His Natural Life* in the part of a young criminal. Clive built radio sets at school but in 1928 he left school and joined Phillips to pursue a radio electronics career. Quotas were set on the import of Phillips

## 1999 SCREEN SOUND AWARDS FINALISTS FOR BEST ACHIEVEMENT IN SOUND IN TELEVISION/VIDEO

Best Achievement in Sound in an Educational, Training or Corporate Program: **Roseville Public School** produced by Arunta.

- Sound Recordist - Alan Scott
- Editor - Gary Schweikert
- Mixer - Philip Purcell
- Post Facility - Tracks Television

Best Achievement in Sound in a Television Commercial:

**Norwich "Navigator"** produced by Silverlining.

- Sound Supervisor - Simon Kane
- Music - Raj Kamahl
- Post Facility - Jon Marsh Studios

Foxtel Award for the Best Achievement in Sound in a Single Documentary: **"The Jim Conway Blues"** produced by Film Buff Productions.

- Sound Recordist - Declan Cooney
- Editor - Jackie Powell
- Mixer - Serge Lacroix
- Post Facility - Tracks Television

Zomba Production Music Award for the Best Achievement in Sound in a Documentary Series: **Getaway - "The Orient Express in Australia"**, a Nine Network production

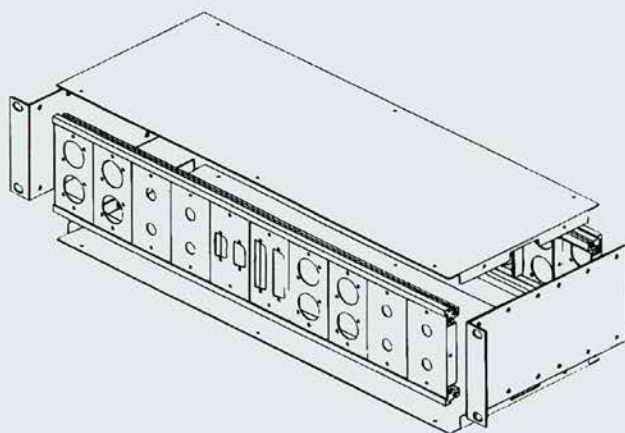
- Sound Recordists - George Lang and Shane Munro
- Editor - Mike Featherstone
- Mixer - Philip Purcell
- Post Facility - Tracks Television

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# Screen Sound News Special

## Clive Cross (continued)

receivers and soon he was retrenched. In 1929 he was invited to join his father and Arthur in their experiments with sound on film. [It must be said that both Arthur and Clive spent a lot of their time developing the Cinesound System while unemployed. It was their interest in the technology that spurred them on. They received no payment at the time.]

They switched from an ARC tube to a British Glow Tube (and from what I can gather modified the amplifier) and achieved greatly improved recorded sound quality.

They demonstrated to Ken Hall what was to become the Cinesound Sound System. At this time, Frank Hurley created sound effects for silent films from the projection room. He was so impressed he added an FX and narrative track to the silents on Mawson's adventures, Southward Ho and Siege of the South.

Soundtracks were added to other existing silents e.g. Tar She Blows, and soon was used for new features such as On Our Selection, and on all newsreels produced as CineSound Review.

Both Smith and Cross went on to the design and perfection of equipment made by Smith and Cross, the company Arthur Smith and Clive Cross ran from the early 1930's. Arthur continued to work in this field, however with the abolition of tariffs by the Whitlam Government business was more difficult.

His three way mixer, however, was used on the feature film "TIM". Clive continued his involvement with sound recording and directing for documentaries and commercials.

The CineSound company was named after their invention.

## Screen sound guild seeks to influence industry

*Connections interviews outgoing ASSG president Ross Linton*

The screen sound industry is fed by a steady stream of graduates and aspirants who may be getting the wrong message, says outgoing Australian Screen Sound Guild president Ross Linton. Production costs are often wasted because of lack of awareness of the need for clean location sound, and a tendency to make good later on.

## 1999 SCREEN SOUND AWARDS FINALISTS FOR BEST ACHIEVEMENT IN SOUND IN TELEVISION/VIDEO

*Tracks Television Award for the Best Achievement in Sound in a Lifestyle/Infotainment Program or Story: "Patsy" produced by XYZ Entertainment*

- Sound Recordist - Dacre Timbs
- Sound Supervisor - Megan Brown
- Post Facility - Foxtel

*Murray Tregonning & Associates Award for the Best Achievement in Sound in a TV Drama Series: "Wildside" Episode 59*

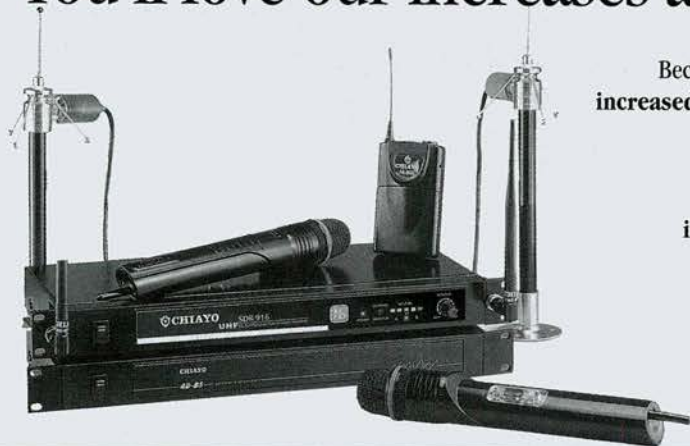
- Sound Recordist - Grant Shepherd
- Boom Swingers - Stephen Jackson-Vaughan, Todd Kirkness and Pip Mason
- Dialogue Editors - Peter Hall and Jon Hemming
- Sound FX Editors - John Salter and Ian Neilson
- ADR/Foley Recordist - Ian Donato
- Foley Artist - George Turnure
- Mixer - Peter Purcell
- Music Engineers - David Hemming and Peter Best
- Post Facility - ABC TV

*Lemac Deva Award for the Best Achievement in Sound in a Telemovie or Miniseries: "A Difficult Woman" a Southern Star & ABC production*

- Sound Supervisor - Peter Purcell
- Recordist - Nicholas Wood
- Boom Swinger - Cathy Gross
- Dialogue Editors - Gavin Myers and James Harvey
- ADR Recordist - Julie Pearce
- FX Editor - Fabian Sanjurjo
- Foley Recordist - Nigel Croydon
- Mixer - Peter Purcell

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# Screen Sound News Special



"An old American actor, Hal Holbrook, once told me the classic American style of post syncing all dialogue became the norm because actors of his generation were intent on breaking the job into two - concentrating on the visual, and doing the spoken part later on".

But good practice means getting it all recorded at the time, insists Ross. "Everyone wants good clean audio. But I get upset when we can't get it - because of bad locations, or even someone talking on set".

Producers or Directors too often get everyone into a mini bus the week before a shoot and go looking at locations that have been committed, says Ross. "If we are involved in pre production, before locations were set, we could save a lot of money down the track. To replace dialogue might involve flying an actor back, and it certainly involves time and expense. Against this, maybe there would be a few extra costs up front to involve a sound professional in pre production, but it is nothing compared to the costs incurred later on."

To try and press the point, the ASSG will host informational seminars at ENTTECH and at the SPAA (Screen Producers Association of Australia) annual conference in 2000. The lack of attitude towards professional sound is not particular to the region, it's also endemic in the USA, says Ross.

"Maybe we can't change the minds of directors and producers -

## 1999 SCREEN SOUND AWARDS FINALISTS FOR BEST ACHIEVEMENT IN SOUND SHORT & FEATURE FILM

*Dolby Award for the Best Australian Film Soundtrack is "Paperback Hero" produced by Lance W. Reynolds & John Winter*

- Sound Recordist - Greg Burgmann
- Boom Swinger - Gary Dixon
- Sound FX Editor - John Patterson
- Sound FX Assistants  
Craig Butters & Luke Dunn Gielmuda
- Dialogue Editor - Ross Brewer
- Dialogue Assistant - Megan Shaw
- ADR Recordist - John Dennison
- Foley Recordist - Duncan McAllister
- Foley Artist - Paul Huntingford
- Foley Editors -  
John Dennison & Duncan McAllister
- Mixers - Tony Vaccher & John Dennison

*Fox Studios Australia Award for the Best Foreign Funded Film Soundtrack: "The Thin Red Line"*

- Sound Recordist - Paul 'Salty' Brincat
- Boom Swinger - Rod Conder
- Second Boom Swinger - Gary Dixon
- Cable Operator - Steven King
- 2nd Unit Recordist - Greg Burgmann

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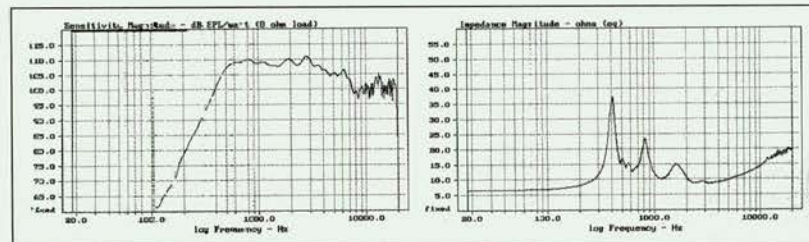


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Write in Reader Service Number: 124

# Screen Sound News Special

the people in power. A lot of attitudes and perceptions are set. But we can influence the younger producers and directors of the future.

The ASSG doesn't have a financial reason for driving a change in the way screen audio is treated. Its objectives are to provide the best possible soundtracks for today's demanding multi-channel film theatres and the digital television of tomorrow. Many of the Guild's membership are freelance technicians, and as such have had to acquire the skills of negotiating their own deals. Some use the services of agents to help in this field.

ASSG members would prefer that original audio, which captures the performance as well as ambient sound, be useable.

Another way of potentially influencing the producers and directors of tomorrow is a proposed mentoring program, suggested by Guild member John Haeny. It would see a student attached to the various sound crews which work on a scene, from location recording through editing and fx creation, possible dialogue replacement, and final mixing. Then hopefully they'll go talk to their peers about the advantages of correct process, and the costs of incorrect process.

Ross Linton is stepping down at this year's AGM, after a full year heading the ASSG. He saw the establishment of last year's inaugural Screen Sound Awards, and has been heavily involved in this year's Awards also.

"Our Guild has already opened the lines of communication between the various practitioners of the three crafts of screen sound - recording, editing and mixing. Now it is time to look outwards and spread the good word to the rest of the industry".

We hope the incoming president has Ross's vision and drive!

## 1999 SCREEN SOUND AWARDS FINALISTS FOR BEST ACHIEVEMENT IN SOUND SHORT & FEATURE FILM

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### FEATURE FILM

The 1999 Screen Sound Award for Best Achievement in Sound in a Short Film: "**Mozzie**" produced by Jane Keneally

- Sound Supervisor - Philip Meyers
- Sound Recordist - Daren Clark
- Boom Swinger - Jules Trudeau
- ADR Recordist/Editor - Philip Meyers
- Foley Artist - Jim Morely
- Mixer - Phil Heywood

The 1999 *Showfilm* Award for Best Achievement in Location Recording in a Feature Film: "**Two Hands**" produced by Marian Macgowan

- Recordist - Ross Linton
- Boom Swinger - Jack Friedman

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## BEST ACHIEVEMENT IN SOUND SHORT & FEATURE FILM

The 1999 *Digidesign* Award for Best Achievement in Dialogue Editing and ADR in a Feature Film: **"Two Hands"** produced by Marian Macgowan

- Dialogue Editor - Tim Jortdan
- ADR Recordist - Nick Breslin and Rick Lisle

The 1999 *Sound Devices* Award for Best Achievement in Sound Effects Creation and Editing in a Feature Film: **"Two Hands"** produced by Marian Macgowan

- Sound Supervisor - Lee Smith
- FX Editor - Peter Townsend

The 1999 *Frameworks Sound* Award for Best Achievement in Foley in a Feature Film: **"In A Savage Land"** produced by Bill and Jennifer Bennett

- Foley Artists - Simon Hewitt and John Simpson
- Foley Recordist - Peter Smith

The 1999 *Atlab* Award for Best Achievement in Mixing in a Feature Film: **"Two Hands"** produced by Marian Macgowan

- Mixer - Phil Heywood

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# How to do it

## TOM MISNER'S PRACTICAL STUDIO TECHNIQUES

### - MICROPHONES (Part 20)

#### BRASS AND STRING INSTRUMENTS

These instruments sound best when recorded in a live acoustic environment, preferably a large room, with the microphones placed to capture the whole section rather than concentrating on each instrument. If the balance of the individual instruments is not acceptable ask the musicians to move closer to, or further away from, the microphone until you have achieved the desired balance. With a string section the position of the microphones can be critical - moving them a few centimetres may improve the stereo image and clarity of the sound. The final choice of microphones is governed by the acoustic climate of the studio, but will usually be of a condenser type.

When recording solo brass instruments it is advisable to use a high quality dynamic microphone (e.g. EV RE 20), as this microphone will be less sensitive to mechanical noises of the instrument and will produce a more direct sound, which can be easily blended during final mixdown.

#### ELECTRIC BASS

Electric bass guitar can be recorded via a DI (Direct Inject) box or miked up. Miking a bass guitar amp in the studio can create leakage and spill problems, making it very difficult to record and subsequently mix the track. When using a DI box the bass guitar output can be patched to an instrument effects processor with a number of bass presets which the player can choose.

#### ACOUSTIC BASS

The microphone can be placed in front of the sound board or placed under the bridge. If the microphone is placed under the bridge (e.g. Sennheiser MD441) it should be wrapped up in foam with only the capsule protruding, giving the musician room to move around. The bass guitar should be placed in a semi-live acoustic climate to minimise low frequency reverberation. The most suitable microphone in this environment is the AKG C414 large diaphragm condenser microphone, using the omni polar pattern. If there is too much spill, choose a less sensitive microphone (eg Beyer M201).

#### PERCUSSIVE INSTRUMENTS

It is not common to close mike percussive instruments such as bells, congas, cowbell, triangle and chimes. Place an overhead microphone above the percussionist, or two overhead microphones if recording in stereo. Percussion should be set up on a hard floor in the live area of the studio with the microphone(s) about 1 metre above the instruments. The type of microphones most commonly used are high quality large diaphragm condenser type (e.g. Neumann U 87) with the -10 dB pad switched in to reduce the microphone's sensitivity, giving each percussive instrument more definition.

#### PRACTICAL INFO: Using effects

When sending a sound to an effect unit, such as reverb, solo the instrument and the effect. To start with, have more effect returning than necessary, adjust the sound of the effect and then reduce the amount of effect relevant to the dry signal before returning to the mix. Sometimes adjusting all available parameters will not improve the sound of the effect.

#### GRAND PIANO

The grand piano is a very difficult instrument to record. It is a percussive instrument with a very large frequency response and dynamic range. Most of the sound comes from the piano's sound board and microphones should be pointed in that direction. The best way to record the grand piano is using a stereo technique (my favourite choice is the MS stereo technique).

Placing the microphones closer to the sound board will give the engineer a very direct sound, while placing the microphones just outside the piano lid will give a more balanced sound. Being such a large instrument, it is affected by room acoustics and spill from other instruments, so great care must be taken. The recording level should not exceed -3 VU, to compensate for excessive transients.

#### PRACTICAL RECORDING

The following is a summary of what to know and look out for. There are many things to take into consideration when recording a sound in the studio, and it becomes difficult to concentrate on all these things during a session. The general listings given below are only guidelines and should be used by novice engineers as a starting point. The choice of microphones, effects and equalisation is very subjective and changes with time.

#### KICK DRUM

Usual microphones are Beyer M 88, AKG D 112; equalisation boost 100 Hz, cut 400 Hz; gate with fast attack and decay times; record level at -3 VU; dampen kick drum with cloth or a pillow; can be recorded on edge tracks.

#### SNARE DRUM

Usual microphones are Shure SM57, Beyer M201; equalisation boost 100 Hz, cut 400 Hz and boost 2.5 kHz; record at -3 VU; limit at 20:1 for a tight sound; place additional microphone underneath the snare for extra brightness; tune the snare lower than necessary for live performance; send through pitch shifter for extra depth; during recording place snare in an acoustically dead room, for overdubbing place snare in an acoustically live room.

#### HI HAT

Usual microphones are AKG C460, Schoeps CMC; place microphone furthest away from the snare drum; always mike up from the top; use a de-esser to soften sound; equalisation boost around 5 kHz; record at 0 VU; use flanger as special effect; use compressor setting to create backwards like sound.

#### TOMS

Usual microphones are Sennheiser MD421, Shure SM57 or Beyer M 88; use the same type of microphone on all toms; equalisation cut 400 Hz, boost 3 kHz; insert a gate across the microphone channel; blend close microphones with overhead microphones; record at -1 VU; gate the reverb returns for a large tom sound.

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.

# How to do it

## DUNCAN FRY'S LIVE SOUND MIXING SERIES

- MICROPHONES (Part 20)

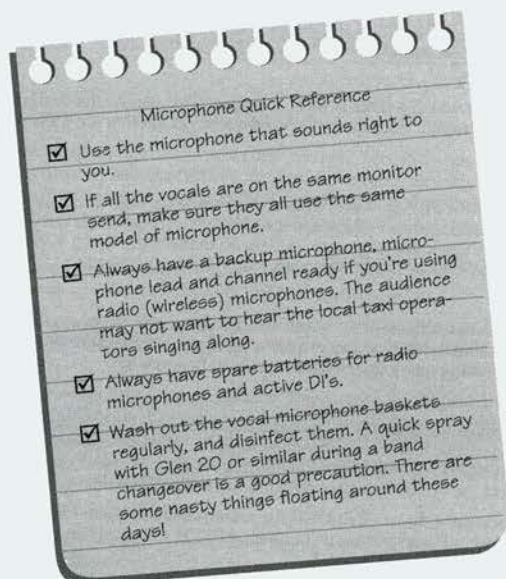
### ACTIVE DI BOXES

Active DI's need power to run them, usually in the form of one or two 9 volt batteries, or they can run off the console's Phantom Power supply, if it has one. An electronic circuit inside the DI converts the Hi Impedance instrument signal into a Balanced Low Impedance signal. It will have the same INs and OUTs as the passive unit, plus Battery LOW or OK warning LEDs with Battery Check switch, and either a Gain control or switches for Speaker, Line or Instrument Inputs.



Active DI's are popular because the active circuit does not overload as easily as a passive, the signal to noise ratio is better, and they can send a good 'fat' signal down the long multicore snake to the desk. They are unpopular because the batteries can go flat when you least expect it. If economically possible, make sure it can run off Phantom power or maybe an external power supply.

If you are short on available microphone channels, you could bring an active DI signal back into the desk via an Auxiliary return. An active DI runs at LINE rather than microphone level, and the Aux returns are set up for LINE level signals from tape decks or effects units.



### WORDS YOU'LL NEED TO KNOW

#### Active

An electronic circuit that uses power to drive it, and is capable of gain as well as attenuation. For example, an Active crossover, an Active DI.

#### Amplitude

The level of a signal (i.e. its volume), usually measured in dB or volts.

### Attack Time

The time it takes for a signal processor such as a compressor/limiter or noise gate to start to work, once the threshold has been reached.

### Balanced

A way of organising cable wiring to reduce noise. It consists of 3 wires; Positive + and Negative - signal lines shielded by an Earth/Ground braid. The signal lines are opposite polarity, so any noise occurring in them is cancelled out at the Balanced Input. This Balanced Input can be Transformer Balanced, or Electronically (Differential) Balanced.

### Bandwidth ('Q')

The space between two frequencies which are the upper and lower limits in a circuit. For example, the bandwidth of a filter in a Parametric Equaliser can range from 3 octaves through to 1/20th of an octave. *See also Frequency Response*

### Bi-amped

An active 2 way sound system, with an active crossover feeding a Low amp and Low speakers, and a High amp and High speakers. The next step would be Triamped, a word hardly ever used, for an active 3 way system.

### Centre Frequency

The Frequency at which a filter is most effective. This can be the designated slider frequency on a Graphic Equaliser, or the frequency dialled up on a Parametric Equaliser.

### Clipping

The 'squaring off' of a sine wave. This occurs when the signal has increased past the point where the unit can reproduce it accurately. For example, an amplifier will clip when it can't produce any more voltage no matter how much you increase the input, and a tape deck will clip when too loud a signal is recorded.

### Compressor

A variable gain amplifier whose output voltage compared to its input voltage decreases as its input level increases past a set threshold. In other words, a device to stop a signal getting any louder than a threshold that you set.

### Crossover

A crossover splits up the audio signal into different frequency bands for different speakers, and can be a 2, 3 or 4 way depending on the type of system. It ensures that the LOW speakers only get the LOW frequencies, the MID speakers only get the MIDs, and the HIGH speakers only get the HIGH frequencies.

An Active crossover comes BEFORE the amplifiers, and needs one amplifier per frequency band; a Passive crossover comes AFTER the amplifier, and is usually mounted inside the speaker cabinet.

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.

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# Studio ROUNDUP

## To Master Or Not To Master

Connections reader Andrew Broadhead says many customers know little about Mastering. This is what a studio customer needs to think about, preferably BEFORE booking the session....

Usually once I've finished mixing a project I'll turn to the band or artist and ask "So where were you thinking of getting this mastered?" More often than not this question will be answered with confused looks all around.

Mention mastering to any audio engineer and they'll immediately know what you're talking about, however a lot of musicians don't know or understand the process or realise how important it is.

Some believe that mastering is just another excuse to add a couple of hundred dollars onto the budget at the end of a project without really doing anything. In reality if you compare a non-mastered recording to one that has been properly done, the difference is clear.

In a nutshell, for those who don't know, mastering involves processing of a completed mix. This processing can include equalisation, compression, stereo imaging, limiting, fading in or out, track ordering and so on. Whatever is done, though, is usually done to the entire two-track master tape.

Mastering can make a bad recording sound half decent and a good recording sound great - so long as you know what you are doing! In years gone by, mastering was done by relatively few engineers who were specialists in the field. You'd hand them your master tape and they'd tweak it using a bunch of mysterious looking "black boxes" and hand you your mix back sounding greatly improved and hopefully like a "real record".

Recently, however, the home studio boom has reached the mastering arena. Many people who run a home studio now also run home mastering studios. With CD burners now being within the financial reach of most people, the rise in the number of two track editing software programs and plug-in's and the advent of products such as TC Electronic's Finaliser and dBx's Quantum Mastering Processor that offer mastering studios "in-a-box", mastering has definitely been made available to the masses!

There is no doubting the quality of some of the above products, they all do what they say they can do, however, like Ginsu knives, in the wrong hands they can be lethal. Having these tools does not automatically qualify you as a mastering engineer.

Owning the gear is only step one. Realise that when you are forking out the extra fifty or sixty dollars an hour for a high end mastering job that, not only are you paying for their gear but also their experienced ears (these people do this for a living and know what a good recording should sound like) and the monitoring environment (usually high end mastering facilities sink a lot of cash into creating a 'flat room' where what you hear is what you get!).

The importance of mastering shouldn't be overlooked, particularly with so many recordings being made in budget studios. Mastering studios "in-a-box" and software plug-in's are great tools if you can't afford a professional job, especially if you take the time to learn their strengths and weaknesses.

However don't be fooled into thinking that they can take the place of a fully equipped and functional mastering facility with a good set of ears running it and the track record to back it up as mastering experience cannot be bought "in-a-box!"



# BASF

## National Tracking Guide

ARTIST                      PRODUCER                      ENGINEER/PROGRAMMER                      NOTES

### New South Wales

<b>A # Sharp</b>	Jeff Cripps Tel: (02) 9153 9988. 24 tk Analogue + 8 tk digital			
Fun Factory	Jeff Cripps	Jeff Cripps		Demo
Green Acre Baptist Church	Jeff Cripps	Jeff Cripps		CD
David Westmore	Jeff Cripps	Jeff Cripps		CD
Grounded	Jeff Cripps	Jeff Cripps		Pre-production
The Hooty Toots	Jeff Cripps	Jeff Cripps		Kids CD
<b>Aphex Studio</b>	Greg Dixon Tel: (02) 9876 8170. 1" 16tk an. 8tk digital soudcraft ghost console			
Imagery	Band	Greg Dixon		Album
The Hunchbacks	Band	Greg Dixon		
Jumanah Mine	Band	Greg Dixon		Demo
John Connel	John/Greg	Greg Dixon		Album
Riz	Riz	Riz/ Greg Dixon		Demos
<b>Festival Mastering</b>	Melissa Sinclair Tel: (02) 9395 8070. Mastering			
Groove Terminator	Band/Noel Burgess	William		Album
Amiel Danielson	Josh Abrahams	William		Single
Peter Wells	Pete Wells/Russel Pilling	William		Album
Turnstyles	Band	William		Album/single
<b>Festival Studio</b>	Bianka Tel: (02) 9395 8070. Recording			
Grinspoon	Jonathan Burnside			Album
Kate Cebrano	Phil/Kate Cebrano	James Cadsky		Album
EV3	Chris Campbell	Jeremy Allom		
Phobia	Phil Cebrano	James Cadsky		
<b>JMF Recording Studio</b>	Fran Esther Tel: (02) 9790 4097. 24 Tk. 2"x850,1" Digital, 24 Tk. ADAT			
Carla Werner	Claude Morello	Mike Ward (E)		Demo
Dave Deen	Dave Deen	Ralph Esther (E)		Demo
Commora	Commora	Ralph Esther (E)		Demo
Cold Turkey	Bill Croft	Guy Saminaden (E)		CD Album
Jis	Jis	Guy Saminaden (E)		CD Album
<b>Lokollama Recordings</b>	Abel 'eltoro Polo Tel: (02) 9519 4355. Any sound you desire.			
Abel 'eltoro	HJ Kim			The Hoong & I
<b>Megaphon</b>	Shane Fahey Tel: (02) 9557 2008. Sound recording studio			
Gas Light Radio	Zomba Records	Tim Whitten		4 songs
Alien Christ	Endgame	Shane Fahey		Album
Rumanastone	Mushroom Records	Tim Whitten		Album
Steve Clark	Endgame	Shane Fahey		Album
<b>Nu-Town Studio</b>	Greg Hopping Tel: (02) 9516 3306. 16 anal/32digital - recording/production			
Exude	Greg Hopping	Sofie Laicou		Remix
Neveg	Greg Hopping	Greg Hopping (E)		Album
Anita Spring	Greg Hopping/Kyle Neven	Sofie Laicou		Album
Kevcar	Band	Greg Hopping (E)		Demos
<b>Q Recording</b>	Richard Muecke Tel: (02) 9212 4851 SSLG+ 2" Analogue.			
Segression	Band/R. Muecke	Richard Muecke (E)		Album
Cats Runaway to the Circus	Peter Casey	Christo Curtis		Cast Recording
Grounded	Band/Mik Seage	Mik Seage (E)		E.P.
Native Fear/Seth	Band/W.Buzacott	Warwick Buzacott (E)		Single
Turpentine	Band/R. Muecke	Richard Muecke (E)		Album
<b>Rockinghorse</b>	Anthony Lycenko Tel: (02) 6688 4005 48 Ch Neve 24 Tk Studer, Protocols Mix24			
George	Brendan Morley	B. Morley (E) J. Ressler (PR)		Album
Pirol	Christian Pyle	Michael Worthington (E)		Album mixing
Fluid	Band	Anthony Lycenko (E)		Album tracking
Silver	Rob Walsh	Anthony Lycenko (E)		Album tracking
2Pac	Peter Noble	Michael Worthington (E)		remastering
<b>Sony Music Studio</b>	Melissah Kocheil (02) 9383 6461 24 Tk analog/digital			
Vince Jones	Vince Jones	Ross A'Hern (E)		Album
Passionflowers	Lee Cutelle	Tod Deeley (E)		Album
Storm & Serenity	Band	Louis Taylor (E)		Demos
Ulf Kaiser	Jivan Diwano	Ross A'Hern (E)		
Luvatarian	Simon Tonx	Simon Tonx (E)		Demo
<b>Sound Level Studios</b>	John Soane Tel: (02) 9522 3200. 24 Tk. DA88 Hard Disk 16 Channel.			
The Modernists	Band	Jorden Brebach (E)		Album
Chris Fickert	C.Fickert	Brett Valentine (E)		Demos
Caroline cheika	C Cheika	Brett Valentine (E)		Demo
Paul Cornwall	P.Cornwall	Jorden Brebach (E)		
Shayne Brightwell	S. Brightwell	Jorden Brebach (E)		Demos



YOUR MUSIC IS SAFE WITH US

Now go put it on a CD! > page 46

# SOUNDCORP'S



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<b>CD8AE</b>	O2R AES / EBU 8 channel I / O card for O2R only.	30	\$945.00	\$495.00
<b>CD8AD</b>	O2R 8 channel I / O card 20 bit A/D & D/A converters, switchable +4 / -10dB. For O2R only.	17	\$1,595.00	\$995.00
<b>CONVERTERS</b>				
<b>AD2X</b>	2 CH A / D converter, switchable sampling rate, word-clock I/P, AES / EBU, SPDIF, Y2 & word-clock output formats.	6	\$2,645.00	\$995.00
<b>AD8X</b>	8 CH A / D converter, switchable sampling rate, Y2 & word-clock output formats. Designed for use with Yamaha DMR8, DRU8 & DMP7D.	1	\$7,345.00	\$995.00
<b>DA2X</b>	2 CH D / A converter, auto-switches to sampling rate, AES / EBU, SPDIF, & Y2 input formats, XLR balanced outputs.	2	\$3,345.00	\$1295.00
<b>DA8X</b>	8 CH D/A converter, Y2 input format, XLR balanced and unbalanced outputs. Designed for use with Yamaha DMR8, DRU8 & DMC1000.	1	\$7,345.00	\$1295.00
<b>RACK EQUIPMENT</b>				
<b>GQ2015A</b>	Stereo 15 band graphic equaliser, balanced XLR & TRS I/O. ( $\pm 6$ or 12dB), 1RU.	14	\$845.00	\$545.00
<b>YDG2030</b>	Dual 30 band digital graphic equaliser with 4 notch filters + high & low pass filters, sweep function permits feedback elimination, graphical display, 20 bit A/D & D/A, 40 programs. Balanced I/O with -10 / +4dB level, Y485 & MIDI.	12	\$2,945.00	\$1995.00
<b>YDP2006</b>	Dual 6 band digital parametric equaliser with variable GAIN, FREQ. & Q, (12 band mono), with 4 notch filters + high & low pass filters, graphical display, 20 bit A/D & D/A, 40 programs. Balanced I/O with -10 / +4dB level, Y485 & MIDI, 1RU.	19	\$2,845.00	\$1895.00
<b>DE05</b>	Dual 30 / 6 band digital graphic / parametric equaliser, with 4 notch filters + high & low pass filters, graphical display, 40 programs. Balanced I/O and AES / EBU & Y2 digital I/O, RS485 & MIDI, Time-code & word-clock input.	5	\$6,595.00	\$4,495.00
<b>PR0R3</b>	Stereo digital reverb, with - dynamic filter and compressor, pre & post reverb EQ, gate, 90 preset + 90 user programs. Balanced I/O with -10 / +4dB level, MIDI, 2RU. 20 bit AD & DA.	7	\$2,645.00	\$1845.00
<b>D1030</b>	Digital delay and parametric EQ / channel divider configured in a 1 in 3 out format with independent delays and 3 band PEQ / crossovers for time alignment etc, 40 programs. Balanced I/O, remote & MIDI.	12	\$2,395.00	\$1595.00
<b>HA8</b>	8 channel Mic / line pre-amp, balanced XLR inputs & outputs, individual switched attenuators & phantom power, 2RU.	1	\$3,795.00	\$2595.00
<b>RH40M</b>	Monitor headphones	19	\$295.00	\$195.00

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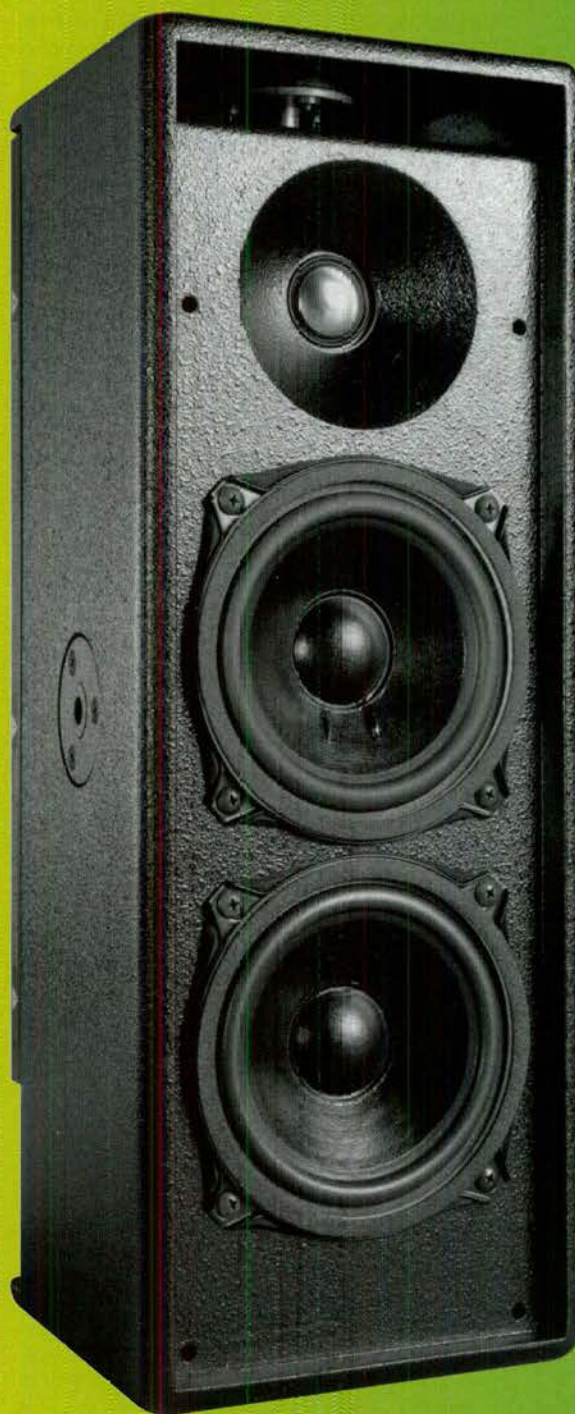
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**ARTIST                      PRODUCER                      ENGINEER/PROGRAMMER                      NOTES**

<b>Soundwarp</b> Meredith Brooks Tel: (02) 9905 7144. Mastering			
Cyren	Alex Gueshardt	Meredith Brooks	EP
Don Meers	Don	Meredith Brooks	EP
The Mirth	Band	Meredith Brooks	Album
Neil Sutherland	Gavin Drew	Meredith Brooks	Album
Midnight Goblins	Bones Martin	Meredith Brooks	Album
<b>Studios 301</b> Suse Fewster (02) 9211 7301 Australia Premier SSI Mix room.			
Alanis Morissette	Chris Fogel	Chris Fogel	MTV unplugged mix
Jimmy Barnes	Mark Opitz	John X	Album mix
EV3	Chris Campbell	Jeremy Allom	Album mix
Grinspoon	Jonathan Burnside	Jonathan Burnside	Single mix
<b>Studios 301 Mastering</b> Jacqui Espie Tel: (02) 9211 7301. CD Mastering Facility			
The Whitlams	R. Taylor/Band	Don Bartley	Album
Jimmy Barnes	Mark Opitz	Don Bartley	Album
Julie Anthony	Mark Beckhaus	Don Bartley	Album
Grinspoon	Jonathan Burnside	Don Bartley	Single
Various	Phillip McKellar	Don Bartley	Triple J Live
Toe To Toe	Band	Steve Smart	Album
<b>Top Cat Recording Studio</b> Brad Wann Tel: (02) 6628 0843 24 Tk 1" Anal. 24Tk Did mastering.			
Seven	Band/Brad Wann	Brad Wann (E)	EP Mixing
Richard Gutwin	Brad Wann	Brad Wann (E)	Album mixing
Six Seconds Slower	Brad Wann	Brad Wann (E)	EP mixing
Balaams Ass	Band/ Brad Wann	Brad Wann (E)	EP tracking
Lee Hardisty	Artist	Brad Wann	Album mastering
<b>Trackdown Digital</b> Mike Duffy Tel: (02) 9550 6890 64 Tk Post and Music.			
Cut	G. Goss/Mushroom Films	Simon Leadley (E)	Film Soundtrack
Flipper	Yoram Gross/EMTV	T.Ryan/T.Lista/D.Candusso (E's)	TV series
Iva Davies	Iva Davies	Simon Leadley (E)	Mixing
Skippy	Forest Interactive	Damian Candusso (E)	CD Rom
Asian Civilisation Museum	Narrowcasters	Torgi Lista (E)	Museum Audio Guides
<b>Troy Horse</b> Mickey Levis Tel: (02) 9319 1799 Fax: (02) 9698 9494. 24 Track 2" Fully automated			
Jon English	English/Blicka	Blicka (E)	Tracking
Caviar	Worral/Band	Mark Worrall (E)	EP
Peg	Tony Bonza/Blackwell	Jason Blackwell (E)	Album
Jigsaw	Peter Kennard	Colin Wright	Album
J Eleven	Worral	Mark Worrall (E)	EP
<b>Velvet Sound Recording Studios</b> Dave McCunn Tel: (02) 9267 2915. 32 Ch./24 Tk.2"+PTools24			
The Cool of Me	Band/Tony	Tony Wall (E)	Album
Cryogenic	Tony Jarrett	Adrian Grigorieff (E)	Album mixing
Lord Kaos	Band/Adrian	Adrian Grigorieff (E)	
Boot	Band	Adrian Grigorieff (E)	EP
Psikore	Nick Tropiano	Lachlan Mitchell (E)	EP

## Queensland

<b>Big Time Recording Studio</b> Dave Fitzgerald Tel: (07) 4772 1822 16 Track ADAT			
B.A.T.S.	Band/D. Fitzgerald	D. Fitzgerald	Album
Twisted Sisters	D. Fitzgerald	D. Fitzgerald	
Mr Meaner	L. Wild/Nicklas Sample	D. Fitzgerald/N.Sample	Album
<b>Grevillea Studios</b> Bruce Jacobson Tel: (07) 3262 8422			
Mr Jones Productions	Artist	Bruce Jacobson (E)	Advert.
Qwired	Erin Murphy	Bruce Jacobson (E)	Album
Andrew Barreth		Bruce Jacobson (E)	Album
One	Tony Byrne	Bruce Jacobson (E)	Rec/mastering
Stan Lenz		Bruce Jacobson (E)	Mastering
<b>Vandersound Studios</b> Eric Vandersande Tel: (07) 5546 8100. All Digital & Valve ADAT/XT 02R			
The Hub	A Hines/S Mulready	Scott Mulready (E)	Demo
Oz Deli	A Hines/T Masterson	Toby Masterson (E)	EP
Mystery of Sixes	Eric Vandersande	Andrew Hines (E)	Demo
Ian Francis	Eric Vandersande	Andrew Hines (E)	Mix Album

## Victoria

<b>Cavalier Music</b> Jeff/Justin Tel: (03) 9437 0444. Multi Track Digital Studio			
Bind	Justin Skim	Justin Skim	Demo
Ringleader	Justin Skim	Justin Skim	Mastering Demo
Field Trip	Justin Skim	Justin Skim	Demo
Bernhard Bolton	Justin Skim	Justin Skim	Demo
Tamika	Tamika/ Justin Skim	Justin Skim	Album
<b>Crystal Mastering</b> Joe Carra Tel: (03) 9326 2318. CD Mastering Facility			
Gameover	Band	Joe Carra (E)	Mastering
Tim Rolfe	Rolfe/B. Stocks/dale	John Ruberto (E)	EP
Persona	R. Wilson	Joe Carra (E)	EP
Tiffany Eckhardt	Tiffany	Johnruberto (E)	Album
28 Days	Band	John Ruberto (E)	Mastering
<b>Lo Ricco Sound Studios</b> Marcello Tel: (03) 9701 6220. 16 Tk. ADAT XT, 24 Tk. Logic Audio			
From The Inside	Band	Marcello Lo Ricco (E)	EP

## Now put it on a CD!

Connections reader Dean Preston finalises his CD burning article, the first half of which we ran in August. As Andrew Broadhead states in his Mastering article on page 42, there is more to it than meets the ear!

Once everything is hooked up and ready to go, there are still some important things that need to be taken into consideration before the final writing process. The audio going on the CD will usually go through a number of different processes which can ultimately affect the overall sound quality.

As I mentioned in my first article in August, a good quality sound card is essential in maintaining quality throughout the process.

Those inexperienced in CD mastering will have tracks that vary considerably in level, with some tracks louder or softer than others. If all the tracks are to be at a similar level throughout the entire CD then normalisation is the essential for each track. Most software programs have this function.

Most programs have a fade function which allows the user to select the area to be faded, with different fade curves available depending on how slow or fast the user wants the fade to happen. If a song is to start abruptly, there should be a space of between 300 - 500 ms before the track starts. This allows the CD player ample time to cue the track up for playback. Anything less than 300 ms and there's the risk of cutting the beginning of the track off.

Before each track is go on a CD-R, it must first be mixed down to a stereo sound file format that's compatible with the CD writer. Most programs have what's called a bounce to disk function, which allows the user to mix an edited track to a stereo sound file format. Usually tracks must be either in a WAV or AIFF file format. They must also be stereo (don't forget to pan your tracks left and right when editing otherwise the tracks on CD will be in mono). Don't forget to make sure there's enough disk space as each of these sound files can be between 30 and 100 Mb or more.

Once all the files are ready to go, it's time to assemble the sound files in the order that they will appear on the CD-R and start writing. I use a great and easy to use program on Mac called Toast. It's just a matter of dropping the sound files into the program, put them in the order they need to go on the CD, and press write CD. I've found it's a good idea to play the sound files one by one just to make sure that there's something there. Sometimes computers can do crazy things so it's a good idea to check the first 20 seconds of each sound file for any errors. Also, when compiling the audio remember that a CD-R can only hold up to about 78 minutes of CD quality audio, with 74 minutes considered a safe limit.

There are a few things that will need to be taken into consideration when purchasing a CD writer. The speed at which data is written on CD-R can vary from 2x to 8x with higher speeds coming, so if you're always in a hurry then go for a higher speed as there is no real difference in quality. One limitation with the CD writer that I have is that it doesn't allow me to have gaps of less than 2 seconds between tracks. If there were two tracks that were joined together where one faded out and the other faded in, there would be a 2 second gap of silence put in there regardless to mark the beginning of the next track. 95% of the time there are gaps between each song but having the option of having a gap or no gap could be the difference between writing or not writing the CD at all. The ability to also copy directly from one SCSI device to another (such as a computers internal CD-ROM drive) is also another function that's handy to have as the files don't have to be in either a WAVE or AIFF format. CD writers can also write Mac files and folders and ISO 9660 files (DOS and UNIX file formats), effectively acting as a cheap hard drive.

One thing I forget to mention is that mastering audio is an art form, so if the budget allows for it, get the final audio mastered professionally.

Email me at [deanssd@yahoo.com](mailto:deanssd@yahoo.com)

# Studio ROUNDUP

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ARTIST	PRODUCER	ENGINEER/PROGRAMMER	NOTES
Brad Meekoms	Artist/M Lo Ricco	Marcello Lo Ricco (E)	EP
All Down	Band/M Lo Ricco	Marcello Lo Ricco (E/PR)	Demos
Stephen Miginley	S. Miginley/Lo Ricco	Marcello Lo Ricco (E/PR)	Demo
Colin Rintoul	C. Rintoul/M. Lo Ricco	Marcello Lo Ricco (E/PR)	Demo
<b>Newmarket Studios</b> Ben Hurt Tel: (03) 9329 2377 24 track 2" analogue			
Andrea Keller Quintet		Ben Hurt	Jazz Demos
Gary Young/Paul Keenan		Ben Hurt Musical Cast Recording	
Aura's Revenge		Ben Hurt	Mixing
Second Honeymoon	Gristian & Ben	Ben Hurt	Album
Brian Conway	Peter De Ryk	Ben Hurt	Soundtrack
<b>Sound Around/The Front Room</b> Trevor Cronin Tel: (03) 9531 3891			
Jack Jones	J.J.	Trevor Cronin	Tracks
Scale	Bernard Fudge	Trevor Cronin	
Cezary	Cezary	Trevor Cronin	Film Score
Rainbow Pilots	Band	Trevor Cronin	Album
Perfect Strangers	Dallas Booth	Trevor Cronin	Demos
<b>Studio 52</b> Paul Higgins Tel: (03) 9417 7707. Studio A: 32 Tk. Automated, Studio B: 24 Tk. ADAT			
Olympic Mascots	T. Carter/P. Cupples	A. Meakes/T. Cummings	Childs' CD
Delta	Trevor Carter	Trevor Carter (E & PR)	Tracking Album
Various Kool Skools		A. Meakes/T. Cummings	CD Projects
Roger That		Tim Cummings (E)	Demo
Various Artists	LaTrobe Music Assoc.	Andrew Meakes (E)	Mastering CD
<b>The Ranch</b> Norman James Tel: (03) 9419 1506. 24 Tk. Farm			
Shenanigans	Gary King	Norman James	Album
Bernard Bolan	Norman James	Norman James	Album
Cobbers	Norman James	Norman James	Restoration Work
Dave Richard	Dave Richard	Norman James	Mastering Album
Various New Australian Artists	Music Marketing Board	Norman James	Sample CDs
<b>Toyland Recording Studio</b> Adam Calaitzis Tel: (03) 9482 2111 24 Tk Analogue + 64 Tk Logic A.			
Pseudo Echo	Brian Canham	Adam Calaitzis (E/PR)	Live/studio CD
Red Symons	Red Symons	Adam Calaitzis (E/PR)	TV Show
Ultra Violet	Adam Calaitzis	Adam Calaitzis (E/PR)	CD Mastering
Engraved	Adam Calaitzis/Band	Adam Calaitzis (E/PR)	Album
New World Audio	Henri Grawe	Adam Calaitzis (E/PR)	Music for Film
<b>True Form Recording</b> Neil Gray Tel: (03) 9391 3907. 24 Tk. Digital/Analogue & HD			
Average	Andrew Jackson	Neil Gray (E)	CD
Audabon	Finn/Band	Finn Keane (E)	EP
Booze Hounds	Neil/Band	Neil Gray (E)	Live Demo
Klinger	Neil Gray	Neil Gray (E)	Sound/Promo Video
<b>Wombat Rd. Recording Studio</b> Barrie Clissold Tel: (03) 5145 4204. 16 Tk. Analogue/Digital			
East Gippsland TAFE	B. Clissold	B. Clissold (E)	Demo
Young Voices of Sale	Julie Ward	B. Clissold (E)	Album CD
Rick Hodee (Lone Rider)	B. Clissold	B. Clissold (E)	CD Tracking
Flatten Before Disposal	Band/Clissold	B. Clissold (E)	Demo CD
Mental Disaray	Clissold/Band	B. Clissold (E)	Demo CD
<b>Woodstock</b> Tim Dudfield Tel: (03) 9531 9011 2" Protos 24 ADAT Outboard heaven.			
Gadflys	Band	Marky Thomas	Album of Hits
Celine Dion	David Foster	Alan Parsons	Demos

## Western Australia

<b>Bonsai Recording Studio</b> Tom Thorpe Tel: (08) 9246 4408 Fax: (08) 9246 4408. Pro Tools			
The 2-Ins	Tom Thorpe	Tom Thorpe	Demos
Terry Pergamalis	Tom/Terry	Tom Thorpe	Album Tracking
Gary Hanford	Tom/Garry	Tom Thorpe	Demo
<b>Planet Sound Studio</b> John Villani Tel: (08) 9382 2211			
Ten Seldom	John Villani	John Villani (E)	EP
Relish	John Villani	John Villani (E)	
Michael Edward Stevens	M.E.S	John Villani (E)	
Godspell	Nunzio Mondia		Demos
Jeannie Norris	Eugene Mueller	John Villani (E)	Album

ARTIST	PRODUCER	ENGINEER/PROGRAMMER	NOTES
<b>Revolver Sound Studio</b> Vic Manfrin Tel: (08) 9272 7505. 32 Tk. Automated Analog & Digital			
Crawlspac	Band/Ben Glatzer	Ben Glatzer	Album mixing
Novak 'N Goode	Artists	Ben Glatzer	Album mixing
Wax Tadpole	Band/ Ben Glatzer	Ben Glatzer	Mixing
Greenroom	Band/ Ben Glatzer	Ben Glatzer	Tracking
Silent Type	Band	Vic Manfrin	Demos
<b>Satellite Recording Studio</b> Darren Halifax Tel: (08) 9472 8040. Protocols 64Tk x 24 bit.			
Mike Burns	M. Burns/A. Neil	Andrew Neil	Album
Vibrolators	Band	Darren Halifax	Live Album
The Joys of Women	Ellie Kognheir	Darren Halifax	Album
Wunjo	James Hewgill	James Hewgill	Album
Self Made Guru	Band	Darren Halifax	TV clip
<b>Sonic Lab</b> Mark Whitehouse. Tel: (08) 9375 3902. Sonic Solutions Mastering Facility.			
Catbeach	Buster Stiggs	Mark Whitehouse	Album Mastering
The Patrons	Kevin Bloody Wilson	Mark Whitehouse	Vietnam Vets CD
Reynold Indich	R. Indich/J. Villani	Mark Whitehouse	CD Master
Chris Gogos	Chris Gogos	Mark Whitehouse	CD Master
Eugene Mueller/Jeanne Morris	E. Mueller/J Morris	Mark Whitehouse	CD Mastering

## Northern Territory

<b>Masters Studio &amp; Production</b> Lindsay Masters Tel: (08) 8932 1754. 8 Tk. Mobile 16 Tk HP			
Crossfire	L. Masters	L. Masters	Demo
Chantelle	Chantelle & Lindsay	L. Masters	Album

## South Australia

<b>"The Fridge"</b> Nigel Sweeting Tel: (08) 8231 3888 16tk digital full automation.			
Sweet Baby James	James Meston	Nigel Sweeting (E)	CD
St Andrews Orchestral/Choir	Glenni Kempe/Nigel	Nigel Sweeting (E)	CD
Argon	Band/Nigel	Nigel Sweeting (E)	CD
Tingali	Band	Nigel Sweeting (E)	CD
Joseph Williams/Nigel Davidson	Nigel Sweeting	Nigel Sweeting (E)	CD

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## "Controlled Directivity" - or Just Contrived Sales Pitch?

John Matheson has a thing about so called "constant" or "controlled" directivity loudspeaker systems. Here is his argument:

Loudspeakers are by far the weakest link in the professional audio chain today. In fact their performance is orders of magnitude (ie multiples to the power of 10) worse than what we would accept from other audio processing devices.

Regular readers of my articles may be beginning to suspect I'm a bit of a cynic when it comes to the claims of loudspeaker manufacturers. Let me assure the reader, that this apparent cynicism is founded in many years of catching the bastards out!

For the benefit of those who missed it, I'll repeat an earlier claim from my article *When TOO MUCH BASS is never enough!* in *Connections February '99*, that loudspeaker manufacturers are pathological marketing fibbers. If you think this statement is a bit strong, I'll issue the following challenge:

Find a manufacturer's published data sheet for a PA loudspeaker, where the stated frequency response agrees with the plotted frequency response.

Provided it is at least a semblance of a real 1/3 octave smoothed plot, not one "tidied up" by the marketing department! Despite two and a half decades of looking, I haven't found one yet!

### Constant Directivity?

Like many other people, my career in professional audio started by tinkering with loudspeakers. Years later when I joined a large institution as a sound engineer, I had access to an excellent library of hundreds of product data sheets from the

professional audio manufacturers such as Altec, Electrovoice, JBL, RCF, Tannoy, etc. See Figure 1 for a sample data sheet.

These companies are to be congratulated for the vast amount of highly detailed technical information they make available about their loudspeaker drivers, horns and other accessories. It allowed me the opportunity to compare the directional performance of some of the older designs of exponential horns with the (then) new constant directivity horns, which appeared to be made out of flat surfaces rather than continuously varying complex curves. Figure 2 compares the sections of typical exponential and "constant directivity" horns.

Herein lies the roots of my cynicism - I couldn't find the purported improvements of constant directivity horns! It seems to me that the manufacturers had simply discovered that complex curvature horns really don't work that well anyway, and horns work just as well when approximated a series of flat surfaces.

"Hey! That's going to save a lot on tooling costs!" said the engineers. "Let's think of a new name to call the horns.

How about constant directivity!" said the marketing gurus.

Now I'm not saying that horns haven't improved over the past few decades, or that all horns are equal. What I am saying is that the terms "constant directivity" and "controlled directivity" are misnomers.

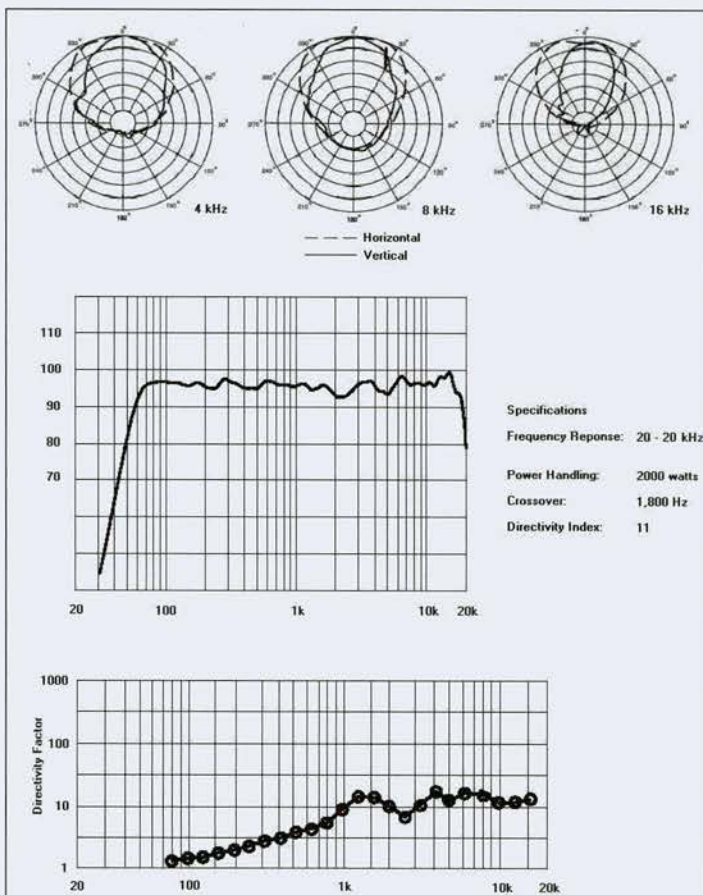


Figure 1: Data Sheet for the Mathesonics Mythical 1 available one day soon!



Figure 2: How horns have changed. The exponential horn (a) has largely been replaced by the so called constant directivity horn (b).

# LOUDSPEAKERS: THE BUYER'S GUIDE SPECIAL

## Directivity Defined

To start off, I'll just say I am not about to define the meaning of the terms "Q" or "DI" (Directivity Factor and Directivity Index, respectively) often found in specifications for loudspeakers, because I can't see what use these specifications have in real life when they are such spurious quantities.

So what is it about loudspeaker directivity that causes all the fuss? We need to start by considering the behaviour of sound energy in semi reverberant (or "real") rooms.

When we put sound energy into a room, the energy level (sound pressure level) in the room builds up until the rate at which energy is being added to the room is equal to the rate at which it is being lost, by absorption or leakage, from the room. This is a fact that results from the Law of Conservation Of Energy.

To make an analogy, it's like adding water to a leaky bucket. The level of water in the bucket will rise (or fall) until the rate at which water is running in to the bucket is equal to the rate at which it is leaking out. (This is a result of the Law of Conservation Of Mass - ie the bucket cannot create or destroy water.)

An "anechoic" (echoless) chamber is like a bucket made out of a sieve material; it cannot hold any water at all. The only water in this anechoic bucket is rushing through on its way out! At the other extreme, a "reverberant" chamber is like a regular leak-less bucket. If we keep adding water it will fill up until it overflows. The behaviour of "real" rooms, ie like you will encounter in real life, will fall between these two extremes, hence the notion of the leaky bucket.

So a dead room, the type preferred for amplified performances such as rock concerts, is fairly leaky, whilst a live room such as a cathedral or gymnasium, is preferred for acoustic performances where the gain in sound pressure level brought about by low leakage is considered beneficial.

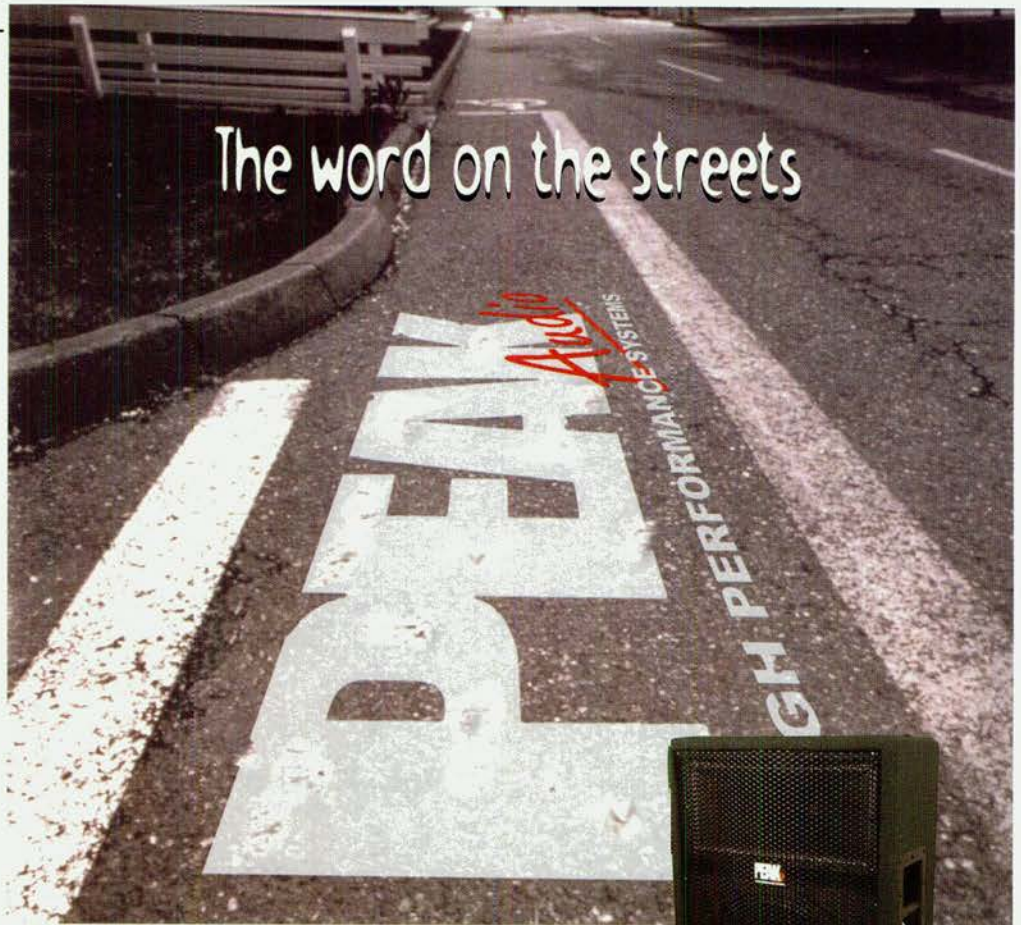
Unfortunately, we are often called upon to produce amplified performances in real rooms that are not as dead as we would like. Unlike a leaky bucket, highly absorbent rooms, particularly large ones, are very expensive to construct. And entrepreneurs seem intent on using inappropriate venues for contemporary music performances at every opportunity, for

example, any rock concert in any concert hall or any sports stadium!

## Perceptions

As a listener in a real room, there are three components to the sound that you perceive. Firstly, you hear the direct transfer function of the loudspeaker system in your particular direction. Assuming a perfect (or perfectly equalised) system, this component will have a flat frequency response. With most real loudspeakers, there is only one axis on which this can be true. As you move off axis, "power holes" develop as illustrated in Figure 3.

Secondly, you will hear the early reflections in the room, although you won't perceive them as echoes. These come from



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# LOUDSPEAKERS: THE BUYER'S GUIDE SPECIAL

## "Controlled Directivity"

(continued from previous page)

walls and boundaries near the loudspeaker and are often nearly as strong as the direct waves. Once mixed with the direct wave, the resultant transfer function at your ears will be far from flat!

Because of the longer propagation delay of the reflected signals, they will arrive out of sync with the direct waves, leading to frequency dependent destruction or reinforcement of the direct wave. The resultant transfer function is known as a "comb" filter, because if plotted on a linear frequency scale, the dips in response are equally spaced like the tines on a comb. When displayed on the normal logarithmic frequency scale, as in Figure 4, the dips appear to get closer as frequency rises.

Finally, (disregarding discreet echoes) you will hear the late sound field of the room. This field often gives a sense of colour to a room, hence the terms bright and dark rooms. If a range of frequencies is overly prominent in the late field, it will give rise to boominess, if low in frequency, or harshness if in the mid-range.

By the way, if you want to deaden a room for practice or recording, don't use egg crates! Their frequency selective absorption will give rise to a nasty sounding room. (If you want proof, have a look at the absorption properties of egg crates as depicted in Figure 5.)

### Controlling Room Behaviour

So now that we understand the effect of putting a loudspeaker in a room, I guess that it is easy to see where loudspeaker manufacturers are coming from. What if they could eliminate early reflections by controlling the direction in which the sound radiated so that it only travelled in the direction of the audience? BINGO – no comb filtering!

Unfortunately, whoever wrote the Laws of Physics and Acoustics wasn't consulted on this one. There are some things that loudspeaker manufacturers would like to tell you they can do, but none, as far as I am aware, is exempt from these Laws.

A consequence of the Laws of Physics is that ALL loudspeaker systems have directivity that varies with frequency and that has a resultant impact that has on our perception of sound in a real room. I.e, at some frequencies our leaky bucket will be almost full, whilst at others it will be almost empty. And almost all devices used by loudspeaker manufacturers to control directivity introduce some other, often nasty, undesirable effects.

The most musical results are always attained by addressing the room problems to eliminate, minimise or otherwise mitigate the effects of destructive early reflections, and then using a loudspeaker system with a near even power response (read NOT "controlled directivity").

Having said that, you still need to look at the claimed directional performance of loudspeakers when selecting and arraying them. Just don't take manufacturers' specifications as gospel; a pinch of salt doesn't go astray.

You can email John Matheson at [johnmath@senet.com.au](mailto:johnmath@senet.com.au)

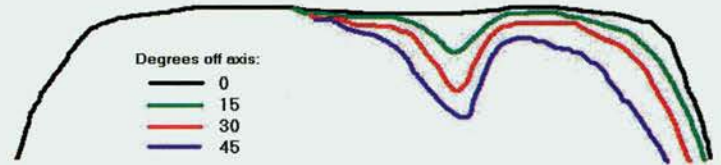


Figure 3: Typical polar frequency responses for a two-way system printed with on-axis response. Note how a "power hole" develops at approximately the crossover frequency.

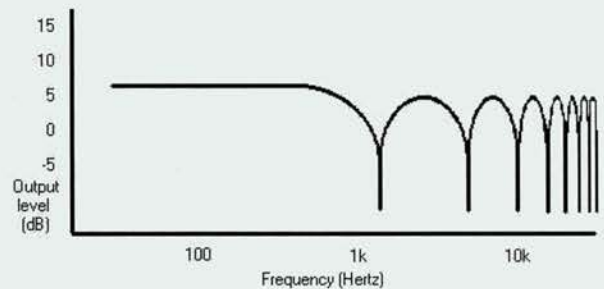


Figure 4: Comb filtering due to early reflections



Figure 5: Absorption of egg crates mounted against a hard wall. Don't use them unless you like a muddy, harsh sounding room!

• While not possessing Matho's superior knowledge on the matter, I can comment on what I know.

Once upon a time a loudspeaker system manufacturer had their consultant cook the frequency plot to match the market. It was done with a parametric equaliser inserted before the plotter. Instant 'do it yourself' frequency plot. I was there, no names, no packdrill.

Then there's the resolution of frequency plotting, or the proprietary of the frequency claims, ie: 20Hz to 20kHz, +/-5dB. Funny how often the bit at the end, plus or minus 'X' dB is left off, and when it isn't, the plus or minus dimension tells you to look harder. But what do you look harder at? The frequency plot ..... which might have been sampled at somewhat wide one-third octave increments! Or been cooked up altogether.....

I had a CAT scan once and the specialist came around with the results. "It's clear" she said. "But since it only samples 5mm slices, you'll need an MRI". After the MRI, the specialist said that it was clear too, but it might have missed something and extra tests were necessary.

-Editor.

# R-1000 Reference series

D.A.S. introduces the New Reference Series. Installation loudspeaker systems with exceptional efficiency, enhanced pattern control and intelligibility, easily adaptable to aesthetically complement the decor of any venue. Engineered from "real world" experience, the Reference Series provides acoustical engineers with the primary tools needed to solve the problems of permanent sound reinforcement installations.



## SPECIFICATIONS

Model	R-15	R-18	R-212	R-215	Sub-18	Sub-218
Frequency Response	50 Hz - 20 kHz	35 Hz - 300 Hz	50 Hz - 20 kHz	35 Hz - 20 kHz	35 Hz - 1 kHz	35 Hz - 1 kHz
RMS Power Handling	LF 400 W HF 200 W	500 W	LF 800 W HF 200 W	LF 1000 W HF 200 W	500 W	1000 W
Program Power Handling	LF 800 W HF 400 W	1000 W	LF 1600 W HF 400 W	LF 2000 W HF 400 W	1000 W	2000 W
Nominal Impedance	LF 8 Ohms HF 8 Ohms	8 Ohms	LF 4 Ohms HF 8 Ohms	LF 4 Ohms HF 8 Ohms	8 Ohms	4 Ohms
Sensitivity (1W/1m)	100 dB SPL	100 dB SPL	102 dB SPL	102 dB SPL	98 dB SPL	101 dB SPL
SPL at Full Power/Peak	126 dB/129 dB	127 dB/130 dB	131 dB/134 dB	132 dB/135 dB	125 dB/128 dB	131 dB/134 dB
-6 dB Coverage Angles	90° H x 45° V		90° H x 45° V	90° H x 45° V		
Crossover Frequency	1250 Hz	160 Hz	1250 Hz	1250 Hz	160 Hz	160 Hz
Components	LF 15" B-30 HF 1.5" Driver ND-10	18" G-45	12" B-20 1.5" Driver ND-10	2 x 15" G-35 1.5" Driver ND-10	18" G-45	2 x 18" G-45
Dimensions (HxWxD)	71 x 51 x 38 cm	71 x 51 x 72 cm	98.5 x 51 x 41 cm	112 x 56 x 49 cm	74 x 51 x 41 cm	112 x 55 x 48 cm
Weight	33 kg / 72.6 lbs	50 kg / 110 lbs	52 kg / 114.5 lbs	59 kg / 129.8 lbs	36 kg / 79 lbs	59 kg / 130 lbs

## D.A.S. OUTLETS:

**ACT** Nova Productions Unit 1, 41-45 Tennant St, Fyshwick ACT 2609  
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**NSW** Anything Audio P/L Unit 12, 5-13 Parsons St, Rozelle NSW 2039  
Ph: (02) 9818 8000 Fax: (02) 9818 0011

Byron Music 93 Johnson St, Byron Bay NSW 2481  
Ph: (02) 6685 7333 Fax: (02) 6685 7552

Custom Audio Installation 150 Maitland Rd, Mayfield NSW 2304  
Ph: (02) 4967 7733 Fax: (02) 4967 7733

**QLD** Entertainment Lighting Supplies 2/37 Taree St, Burleigh Junction QLD 4220  
Ph: (07) 5593 5105 Fax: (07) 5593 5161

**SA** Bob's Light & Sound P/L 334 Port Rd, Hindmarsh SA 5007  
Ph: (08) 8340 3100 Fax: (08) 8340 4177

**VIC** Music Workshop 39 Fryans St, South Geelong VIC 3220  
Ph: (03) 5221 5444 Fax: (03) 5221 6036

**WA** RMX Music 10 Cleaver St, West Perth WA 6005  
Ph: (08) 9226 2727 Fax: (08) 9226 1477

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**D.A.S.**  
SOUND PRODUCTS

## The Real Problem with speakers

By Duncan Fry

When I was born, the turn of the next century was further away than the turn of the previous century, and predictions for life in 2000 were mainly along the lines of *The Jetsons* or Roger Ramjet!

But here we are on the doorstep of not just the next hundred years but the next thousand (I'm sick to death of the word millennium!), and we're still using -speakers.

Yup, speakers.

We've put people on the moon, we've given people replacement heart, lung, and kidney operations, we've put more computing power in this notebook computer that I write this on than people would ever have dreamed possible, and yet it still has a pair of, albeit tiny, paper cone speakers delivering the beeps and grunts of Windows computing!

This ultimate hi-tech modern tool is still using a device that hasn't really changed much in the last 80 years or so since speakers were invented.

They're still essentially a combination of paper and wire sitting in a metal basket, at the mercy of the ever-increasing power output of the amplifiers driving them.

Sure, there have been refinements, but in a way they're a bit like internal combustion engines – a highly refined version of a very complicated, inherently lossy mechanical idea. In the case of speakers, we're talking about an electro-mechanical idea. But the analogy is still appropriate. Both machines have been around approximately the same number of years and have pretty well reached the limit of their technology.

Both have similar efficiency (or lack of it). A speaker that converts more than 10% of the energy it uses into acoustical energy would be a major breakthrough (likewise the amplifier that drives it, but that's another article!). The figures for a car engine are similar; only a fraction of the energy generated by the fuel combustion is translated to power at the wheels (and in the case of my 6 litre Dodge land yacht, probably somewhat less).

These devices are essentially late Victorian/early Edwardian era concepts, where a lot of energy is expended during the process of delivering a different sort of energy as a final product. We can laugh at Heath-Robinson's extremely complex and humorous cartoons of the 40's and 50's, depicting amazing designs for everyday processes, but are they really any different to the process of delivering sound reinforcement?

Take a deep breath and let's see:

A sound is pointed at a microphone, a miniature speaker in reverse, containing a wire coil in a magnetic field, which vibrates in sympathy with the sound and sends electrical impulses to a pre-amplifier, a complex electronic circuit designed to raise the voltage of those tiny electrical impulses, which feeds into a power amplifier, a high current device with an electrical power transformer consisting of multiple windings of copper wire around steel, converting AC power to DC to drive several transistors, which themselves are complex devices to raise the voltage of the impulses even further, so they can be fed down a wire to a speaker, a device with a coil of wire that moves in the field of a magnet, pushing a paper cone in and out following these electrical impulses, and recreating the original sound.

Wow! All this just so the people down the back can hear better! The reciprocating internal combustion machine isn't any less

complicated – maybe even more so, but the major difference is that internal combustion engines are not the only method of delivering motive power. Alongside them, developing at the same time, are far more efficient power sources such as gas turbine engines, jet engines, liquid fuel rocket engines, and probably quite a few other ones that governments and large corporations don't want us to know about right now!

But where is the parallel development for a replacement for the speaker? What radical technology exists to deliver a louder version of the human voice, or guitar, or piano, or anything, without using magnets, wire or paper? What are we going to be using for the next thousand years?

Nothing immediately springs to mind, although there are several variants or refinements:

### Piezos

The piezo crystal is an interesting gadget. You squeeze it and it generates an electrical current; you feed it an electrical current and it moves. That's how your barbecue starter fires up, and that's how piezo tweeters work. They're not as efficient as a compression driver, but they are a whole lot less complicated to make. Still, as a speaker replacement they're a bit limited - they don't like low frequencies at all, and despite years of development, they don't sound as sweet as a good speaker.

### Flat panel speakers

A drive motor, probably voice coil driven, attaches to the rear of a flat panel, and the vibrations of the panel reproduce the sound. Neat, unobtrusive, but low efficiency at present. Still, if it worked really well, you could kill two birds with one stone and have the concert video wall on the front, and the drivers on the back!

### Servo drive bass speakers

No voice coil here, but an electric motor that reproduces the low frequency impulses and pushes a paper cone backwards and forwards via a drive belt. Pretty efficient as low frequency devices go, patented, but unable to reproduce anything over 100 Hz. That leaves a big gap, right in the vocal range, until our piezos kick in! A recent invention superimposes audio frequencies over a high frequency carrier signal, giving excellent directional characteristics, but it is still very much in the developmental stage. And still appears to use speakers to generate the signal in the first place.

Of course, another thing to think about is whether we will still have large sound systems for concerts at all. Given the increasing severity of noise pollution legislation, will the time come in the future where everyone in the audience has their own radio headphones to listen to the performance? At the moment the manufacturing cost of a set of mini headphones has to be \$2 or less (if you don't believe me ask the airlines), so for a 20,000 seat arena that's much less than the cost of a mega system!

No hearing damage litigation, since everyone in the audience can control their own listening level. No neighbour complaints, since the only sound system will be for the band's on-stage sound.

Already in-ear monitoring is commonplace for the musicians; will it become commonplace for the audience too?

If it does, I'm betting that the headphones will still have little speakers inside them!

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# buyers guide::

## PA SPEAKER SYSTEMS

Prices INCLUDE sales tax and were correct on 15th October 1999. All care taken, no responsibility for errors. Four models only are shown in each category although these manufacturers have many more. Indicative only.

### POWERED LOUDSPEAKERS

#### ARX

ARX Systems +61 3 9555 7859

**SPL 12** Integrated compact self powered bi-amped loudspeaker system with Mosfet amps, 24dB crossover and ISC system protection. Rugged all ply trapezoidal cab with rigging points. 305mm Pro series LF driver, 60mm diaphragm Ferro-cooled HF driver. Just connect a signal and AC power. \$4293.  
**SPL 18** Fully integrated Sub bass amp/speaker combination. 460mm bass driver in bandpass cab with high power Mosfet amp, 24dB crossover and ISC system protection. A flexible Sub Bass solution for all applications - just connect a signal and AC power. \$3590.50.

**SPL 10** Integrated ultra-compact self powered loudspeaker system with Mosfet amp, 24dB crossover and ISC system protection. Rugged all ply trapezoidal cab with rigging points. Co-axial 305mm Pro series LF driver, 50mm diaphragm Ferro-cooled HF driver. User-friendly - just connect a signal and AC power. \$3953.

**SPL 12M** Integrated self powered bi-amped stage mon system with Mosfet amps, 24dB crossover and ISC system protection. Rugged all ply multi-angle cab. 305mm Pro series LF driver, 2" (50mm) throat Ferro-cooled HF driver. Fast setup - just connect a signal and AC power. \$4853.

#### AUDIO ASSEMBLERS

Audio Assemblers +61 3 9357 8595

**EBONY EL250P** 250 W 4 ohms. 200 watt 12" bass driver, dynamic horn. XLR balanced mic input, 6.3m.m. jack aux input. Master Bass & Treble. 6.3m.m. jack effects loop(1 x send, 1 x return) 6.3m.m. jack extension speaker output. Ply cab. 2 x 45( angles to allow foldback placement. Black carpet cover. Strap handle. Speaker stand receptacle. \$899 (Extension box available).

**EBONY EE250P** 250 W 4 ohms. 200 watt 15" bass driver, dynamic horn. XLR balanced mic input, 6.3m.m. jack aux input. Master Bass & Treble. 6.3m.m. jack effects loop(1 x send, 1 x return) 6.3m.m. jack extension speaker output. Ply cab. 2 x 45( angles to allow foldback placement. Black carpet cover. Strap handle. Speaker stand receptacle. \$999 (Extension box available).

#### DB TECHNOLOGIES

CMI Professional Products Group +61 3 9315 2244

**DB-EXE 1P** 100w RMS Self Powered Polypropylene cab with a 12" speaker and Piezo tweeter. Freq. Resp. 75hz-15khz / Max. SPL 108 db. \$679.

**DB-EXE 3P** 180w RMS Self Powered Bi amplified, Polypropylene cab with a 12" speaker and Horn. Freq. Resp. 60hz-17khz / Max. SPL 115 db. \$1099.

**DB-L80** 40w RMS Self Powered Polypropylene cab with 2 x 5" Dual cone full range speakers with phase correction. Mic / Line. Soft Clip Limiter. Freq. Resp. 65hz-18khz / Max. SPL 103 db. \$429.

**DB-L160** 40w RMS Self Powered Polypropylene cab with 2 x 5" Dual cone full range speakers with phase correction. Mic / Line. Soft Clip Limiter. Freq. Resp. 65hz-18khz / Max. SPL 103 db. \$579.

#### EASTERN ACOUSTICS WORKS

Production Audio Services +61 3 9415 1585  
**KF400a** A self powered 3-way full range system. Consisting of 15" LF, 8" horn loaded MF & 1.4" exit HF on CD horn. 62Hz-20kHz +/- 3dB. 65"x45" coverage angle. 76.5kg weight. \$14,995.

#### ELECTRO-VOICE

EVI Audio Australia +61 2 9648 3455

**SX300A** 300W power amp, built in processor/limiter, .65 X 65 CD horn, DL12 RMD woofer, DH2010A compression driver 24 kilos net. \$2199.

**SB121A** 300W power amp, built in processor/limiter (monitors condition of woofer to prevent overload and clipping) 22 kilos net. \$1799.

#### FENDER

Fender Australia +61 2 9666 5077

**Powerstage 100** 100W power amp, stand mountable preamp mixer with sweepable HPF, 2 sweep notch filters and EQ enhancement, 12" coaxial speaker, 4 channel, 5 year warranty on electronics. \$1299.

**Xpander 100** 100W power amp and coaxial speaker only with line input for use from Powerstage 100 or mon mix from other mixer, 5 year warranty on electronics. \$1099.

#### JBL PROFESSIONAL

Jands Electronics +61 2 9582 0909

**JBL-EON15 POWERED** 2-way Powered Speaker System: 380mm (15") LF with Dual Coil Drive TM, 90x60 degree Bi-Radial/E Horn, Bi-amped 130W+50W, XLR Balanced Mic or Line Input, Volume Control. \$2,295.

**JBL-EON10 POWERED** 2-way Powered Speaker System: 250mm (10") LF with Dual Coil Drive TM, 90x60 degree Bi-Radial/E Horn, Bi-amped 60W+25W, XLR Balanced Mic or Line Input, Volume Control. \$1,795.

**JBL-EON15 PAK** 2-way Mixer/Amp/Speaker System: 380mm (15") LF with Dual Coil Drive TM, 90x60 degree Bi-Radial/E Horn, Bi-amped 130W+50W; Mixer section with 1 XLR Balanced mic/line & two 6.5mm Jack line inputs; 4 band EQ; line output to additional powered speakers. \$2,595.

**JBL-EON-SUB** Powered Sub-Bass System to suit EON Series loudspeaker systems: 380mm (15") with Dual Coil Drive TM; 250W Amp. \$2,495.

#### MACKIE DESIGNS

Australian Audio Supplies +61 2 4388 4666  
**SRM450** 2-way optimized active system with 400 W of FR Series amplification built in, Damped titanium HF transducer, Finned, exponential horn, Servo-controlled LF transducer, Bal./unbal. mic/line inputs, Level-setting control with LED, Contour EQ & infrasonic filter, Flypoints on all sides, Sideways reclinable as a high-definition floor mon, made in Mackie Europe, Italy. \$1995.

**MAS 1520** High-Output, 2-Way Mackie Active Stage System, 381mm (15") long throw, low freq. transducer with 75mm (3") voice coil, High-precision, 44mm (1.75") diaphragm compression driver, Studio-quality, maximum dispersion horn design, Low impedance compensated crossover (LICC) with full driver protection, Lightweight, portable enclosure design, Integrated pole mount hardware. \$TBA.

**MAS 1530** High-Output, 3-Way Mackie Active Stage System, Built-in monolithic FR Series 300 + two 100 watt amps, 15" long throw low freq. transducer, High-output 6" horn-loaded midrange transducer, Precision 1" compression driver, Wide dispersion, medium throw horn, High-output, extremely low distortion, Electronic: time correction, phase alignment & equalization. \$TBA.  
**FUSSION 3000** Active, high-precision, extreme output, tri-amplified system, High SPL, super low distortion, 1500, 300, and 150-watt amps, Wide dispersion, medium throw, Electronic active crossover, phase alignment, time correction, and equalization, Amp & speaker protection, AC Soft-Start circuitry, Built-in hang points for fixed installations and built-in fly points for regional touring. \$TBA.

#### MEYER SOUND

Meyer Sound Australia +61 7 3252 4495

**UPM-1P** A bi-amped, three way system comprising two 5" low-freq. drivers and a 1" titanium dome on a 100 degree symmetrical horn. 60Hz-22KHz, 123dB peak SPL (1 metre). \$5,225.

**CQ-1/2** A self powered, phase corrected, precise coverage reinforcement loudspeaker available in either high Q (CQ-2) or low (CQ-1). The unit is arrayable and flyable. 40Hz-18KHz, max SPL @ 1 metre: CQ-1 136dB, CQ-2 139dB. \$13,250.

**MSL-4** An arrayable, high-Q long throw reinforcement loudspeaker. It operates with a very flat freq. resp. all the way from 18KHz down to an impressive 65Hz. 40x35 degrees, maximum SPL @ 1 metre 140dB. \$16,000.

**MSL-6** An arrayable very long throw self powered concert speaker enclosure. 2 x 12" speakers and 3 x 4" compression drivers with 4 x 620 watt power amps. 65Hz-16KHz, 30x25 degrees, 145 dB max @ 1 metre. \$40,000.

#### PEAVEY

Audio Telex Communications +61 2 9647 1411

**Peavey Impulse200P** Bi amplified power system (200w to the 12" woofer, 125 w to the 1" compression driver). Freq. Resp. 57Hz to 18kHz, mixed mic and line balanced transformer-less inputs. Separate mic input with phantom power. Volume control, power on/off switch and LED. \$1740.

#### RCF

Group Technologies +61 3 8872 5000

**ART 200A** Self powered speaker box. Bi-amp and self-processed with electronic crossover, limiter and driver excursion monitoring. Ideal FOH or mon box. \$1895.

**ART 200AM** Same specs as 200A, except for the addition of a 3 input mixer, 4 band EQ and comm-link input/outputs with a variety of functions. \$1995.

**ART 300A** Very high output, self-powered system. Fully professional specifications: bi-amp, processed and exceptional sound quality. Incredible performance for a 12" system. \$2495.

**ART 300** Passive 12" FOH/Mon. High power handling with very effective protection circuitry. Tuned for high vocal intelligibility. \$1495.

#### TURBOSOUND

Corporate Audio Services +61 3 9480 5988  
**TQ-440SP** 800w bi-amp 3-way full range. 12" LF, 6.5" MF, 1" HF. 60oh x 40v dispersion. Max SPL 137dB. 18mm birch ply. Flying points, handles, 35mm pole-mount. 39kg. \$8,999.

#### YAMAHA

Yamaha Music Australia +61 3 9693 5150

**MS60S** Powered mon speaker with Yamaha \$B/G (Bs Active Servo Technology for increased bass resp., 60 W, 8 \$B/II (B driver + HF horn, 3 inputs, XLR / phone Mic / line, 20Hz-20KHz. \$1,345 each.

#### ZECK AUDIO

Horwood Australia +61 2 9585 1011

**Vector T2A** active 2-way; 150W + 50W; limiter protection; 900 x 750 dispersion aluminium die-cast 12" woofer with long excursion; 19kgs. \$1999.

**Vector T2AM** same as Vector2A with additional 3-input, 4-band EQ mixer in-built; all Vector speakers are polypropylene; portable system for solo/duo, schools, small venues etc. \$2299.

**Vector T3A** big brother to Vector T2A; 360W of in-built power; 19kg; bass reflex design; can be used for mons. \$2599.

**Vector S3A** powered 300W sub-bass speaker with active crossover; compliments all Vector speakers; 19kgs; PWM3L digital amp. \$2499.

### DEDICATED INSTALLATION SPEAKER SYSTEMS & BOXES

#### ACOUSTIC SOUND SYSTEM

Ashton Admor +61 8 9478 3800

**SP1** Reflex 57 Hz - 20k 92dB 1 watt 1 metre 6.5" bass Ferrofluid tweeter max SPL 112dB 100w RMS. \$719.

**SP2** Reflex 10" Bass 1" Comp driver 70 Hz  $\bar{n}$  20k 100dB 1 watt - 1metre Max 112dB 200w RMS. \$1193.

**SP3** Reflex 12" 1" Comp 100dB 1 watt 1 metre Max SPL 126dB 250w RMS 2 way passive 60 Hz - 18k. \$1410.

**SP4** Reflex 15" Bass 1" C D Horn 50 Hz - 18k 400w RMS Speakon. \$1824.

#### ACOUSTIC TECHNOLOGIES

Acoustic Technologies +61 7 3376-4122

**LG01** compact trapezoidal full range cab. 1 x 6.5" +HF horn. 100W programme. Custom finishes available. Bracket supplied. Nightclub surround, bars, restaurants, churches, boardroom. \$380.

**LG02** compact trapezoidal full range cab. 2 x 6.5" +HF horn. 200W programme. Vocal presence switch. Custom finishes available. Bracket supplied. Nightclub surround, bars, churches, boardroom. \$450.

**LG05** minimum height under balcony full range cab. 2 x 6.5" +2x HF horns. 200W programme. Wide dispersion. Custom finishes available. Bracket supplied. \$495.

**LGB01** compact sub bass cab. 2 x 10" extended range woofers. 300W programme. Custom finishes available. \$595.

#### ARX

ARX Systems +61 3 9555 7859

**Ambience-1** Ultra compact high impact resin installation speaker. Foam rolled sur-

round 5π" LF driver, and a soft dome ≤" HF driver with a 2nd Order 12 dB internal crossover. Available black or white in 8 ohm, shielded or 100v line models; AmbiSub also available. From \$335.00 pair

**Ambience-5** Compact high impact resin installation speaker with. Foam rolled surround 8" LF driver, and a soft dome ≤" HF driver with a 2nd Order 12 dB internal crossover. Available black or white in 8 ohm or 100v line models. Mounting hardware available for both Ambience models. \$783.25 pair.

**MicroMAX** High performance installation speaker in a trapezoidal MDF cab. Pro Series 8" LF driver, and a soft dome ≤" HF driver with a 3rd Order 18 dB internal crossover. Available in 8 ohm or 100v line models. Designed to use the MicroPRO system controller. \$715.00 each.

**MicroSUB** Super efficient Sub Bass speaker for LF enhancement of the MicroMAX system. Dual Pro Series 8" LF drivers in a bandpass MDF cab. Designed to use the MicroPRO system controller. \$1015.50 each.

## COMMUNITY

*Horwood Australia +61 2 9585 1011*

**CPL23** 8" co-axial; 100W @ 8 ohms; 250W program; 50Hz-20kHz; magnetically shielded; with mounting bracket; rigging points; 100 x 100 dispersion. \$595.

**CPL27** dual 8" drivers; 200W @ 8 ohms; 500W program; 40Hz-20kHz; magnetically shielded; with mounting bracket; rigging points; 100 x 100 dispersion. \$795.

**WET228** weather resistant dual 8" 3-way; 50Hz-18kHz; for all outdoor installations; 600W program; 250W @ 4 ohms; optional bracket. \$2500.

## EASTERN ACOUSTICS WORKS

*Production Audio Services +61 3 9415 1585*

**MK2100** 2-way full range system incorporating a 12" LF driver & 1.4" exit HF. Passive or biamped versions available. Horn Flare rotates for side mounting. \$3,480.

**MK5100** A 2-way full range system incorporating a 15" LF driver & 1.4" exit HF driver. Passive or biamped versions available. 90°x45° or 60°x45° coverage patterns available. Horn Flare rotates for side mounting. \$3,795.

**MQ1364** 2-way dedicated Mid/High installation system incorporating a 10" cone driver & 2" exit compression driver. MQ series utilises the same VA4 technology as the JF750. \$8,995.

**MQ2364** Dual version of MQ1364. \$10,995.

## ELECTRO-VOICE

*EVI Audio Australia +61 2 9648 3455*

**XI 1152** EVX155 woofer, DH6 compression driver, RMD, rotatable coaxial H.F. dispersion, 'L' track rigging, extreme high fidelity and reliability. \$4699.

**T251+** 400W bi-ampable 2-way speaker system. Featuring RMD, rotatable 60 X 40 horn dispersion, DH2T compression driver, built in stand mount, HST flying hardware available. \$2499.

**MTH-2.5/64BTCF** manifold technology mid/bass high freq. (full flying) 60 X 40 trapezoidal cab carpeted finish. \$12045.

**MTL-2BCF** manifold low freq. system (full flying) 2 X EVX-180 woofers, trapezoidal cab, carpeted finish. \$8798.

## FENDER

*Fender Australia +61 2 9666 5077*

**115-XP** 300W programme, carpeted, trapezoidal box with metal grill. 1 x 15" and dual piezo horn, 60Hz - 20kHz, 117dB max SPL, 8 ohms. One year warranty. \$599.

**SPL-1211 MkII** 300W programme, carpeted, rectangular box with metal, passive or bi-ampable. 1 x 15" + 1" comp driver, 50Hz - 20kHz, 117dB max SPL, 8 ohms. One year warranty. \$999.

**1275x** 200W programme, carpeted, foldback wedge with metal grille. 1 x 15" + dual piezo horn, 30/60/900 tilt, 60Hz - 20kHz, 115dB max SPL, 16 ohms. One year warranty. \$599.

**SPL-1266 MkIII** 800W programme power, trapezoidal carpeted box. 2 x 15" + 1" comp driver, 38Hz - 20kHz, passive or bi-ampable, 126dB max SPL. One year warranty. \$999.

## JBL PROFESSIONAL

*Jands Electronics +61 2 9582 0909*

**Control Contractor Series** is a range of compact satellite loudspeakers, subwoofers and ceiling speakers ideally suited to background / foreground applications in restaurants, bars & retail shops. Paintable, weather resistant, 90x90 degree horn. Built-in mounting hardware featuring the Invisball mounting system. A wide variety of installation brackets are available for mounting to almost anything, as well as clustering multiple loudspeakers. From \$325 per pair.

**Marquis Series** is a complete range of installation enclosures designed for low power, short throw applications. All Marquis Series loudspeakers have 12 suspension points (M10) except MS26 & MS28 only 2 M10 points; Advanced network topology (where applicable) tamper resistant bi-amp/passive selector (as appropriate); & are Weather Resistant. Designed to cosmetically integrate with JBL Sound Power and Venue Series loudspeakers. From \$1,495.

**Sound Power Series** is a complete range of installation enclosures designed for high power, short throw applications. All Sound Power Series loudspeakers have 12 suspension points (M10); Advanced network topology (where applicable) tamper resistant bi-amp/passive selector or parallel/discrete selector (as appropriate); & are Weather Resistant. Designed to cosmetically integrate with JBL Marquis and Venue Series loudspeakers. From \$3,495.

**Venue Series** is a complete range of installation enclosures designed for high power, long throw applications. All Venue Series loudspeakers have 12 suspension points (M10); Advanced network topology (where applicable) tamper resistant bi-amp/passive selector or parallel/discrete selector (as appropriate); & are Weather Resistant. Designed to cosmetically integrate with JBL Marquis and Sound Power Series loudspeakers. From \$4,495.

## KDM OCTASOUND

*Horwood Australia +61 2 9585 1011*

**SP80A** central point location; features 6.5" driver and four tweeters; 70Hz-20kHz; 108dB SPL; 360 x 180 dispersion; 3kg; covers up to 2500 sq. ft. \$590.

**SP800A** central point speaker with 8" woofer and four horns; 40Hz-20kHz; 117dB SPL; 360 x 180 dispersion; 6kg; covers up to 5000 sq. ft; 75W RMS. \$1185.

**SP820A** central point speaker with 12" woofer and four 1" compression drivers; 35Hz-20kHz; 125dB SPL; 23kg; covers up to 20,000 sq. ft; 150W RMS; weather resistant. \$4335.

**SP840A** big brother featuring 15" woofer and four compression drivers; 30Hz-20kHz; 125dB SPL; 34kg; covers up to 35,000 sq. ft; 250W RMS; weather resistant. \$6900.

## MARTIN AUDIO

*Technical Audio Group +61 2 9810 5300*

**C115** Surface Mount Speaker with 5" ICT (Inductively Coupled Transducer) Driver in weather resistant enclosure. 111dB peak SPL. Unblowable HF Driver. Light Grey/Graphite. Swivel Bracket Included, 100v transformer option. \$295.

**C516** Retail Price: Details: Flush Mount Ceiling Speaker with 6.5" ICT (unblowable HF) driver including grille and back-can. 111dB peak SPL. 80Hz - 20kHz. 100v transformer option. \$325.

**EM15** 2 x 5" ICT (Unblowable HF) 2-way trapezoidal miniature PA speaker. 113dB peak SPL. OmniMount Fittings. Sub-Woofers Option. \$495.

**EM26** 8" 2-way trapezoidal PA speaker with 1" Compression Driver/CD Horn. 117dB peak SPL. 70Hz-18kHz. OmniMount Fittings. Sub-Woofers Option. \$1,495.

## MEYER SOUND

*Meyer Sound Australia +61 7 3252 4495*

**UPM-1P** A bi-amped, three way system comprising two 5" low-freq. drivers and a 1" titanium dome on a 100 degree symmetrical horn. 60Hz-22kHz, 123dB peak SPL. \$5,225.

**HM-1** A compact, self powered speaker system designed for contracting, utilising remote 48V DC power supplies. Magnetically shielded. 42Hz-20kHz 116dB peak @ 1 metre. \$1,500.

**PSW-6** A high output, self powered sub woofer featuring directional (cardioid) polar resp. over two octaves. Ideal for limiting bass spill on stage or into adjoining sensitive areas. \$29,250.

**SB-1** Parabolic, self powered loudspeaker, 8-10 degree conical beam. 500Hz-15kHz 110dB max @ 100m. Ideal for very long throw for concerts and arenas. \$29,250.

## PANASONIC RAMSA

*Ramsaudio +61 2 9477-7377*

**WS-K20** 12cm Full Range Driver, Enclosed/Ported Ceiling Mount with Grille, 80w(RMS) Power Handling, Wide Dispersion. \$442ea.

## PEAK AUDIO

*CMI Professional Products Group +61 3 9315 2244*

**HPS-156R** 600w RMS cab with all Eminence USA driver and 15" speaker. Includes Rigging Points. Freq. Resp. 45hz-20khz / Max. SPL 125.5 db. \$1299.

## PEAVEY

*Audio Telex Communications +61 2 9647 1411*

**Peavey AA IMP2652** 150 watt, high SPL trapezoidal column style speaker system. Uses 2 x 6.5 inch woofers and 1 x 22xt compression driver coupled to a high efficiency horn. Sensitivity of 95dB and freq. resp. of 100Hz - 18kHz. Available in painted or natural finish. Bracket and fly points available. Ideal for, under balcony applications or any situation where speech intelligibility is crucial. \$1220.

**Peavey AA HV1582** Full range two way bi-ampable enclosure with fly points for permanent installations. The two way system comprises of a high power 15" low freq. loudspeaker and 44T 2" compression driver coupled with a constant directivity horn supplying the mid and high frequencies. The freq. spectrum is divided by a 2 way passive crossover providing a smooth freq. resp. from 55Hz to 19Khz. Flypoints are provided. Available in a natural or painted finish. \$2440.

**115TF** Ivory in colour, the 115TF provides a full sound for any location where aesthetics are crucial. Full range, two-way enclosure featuring a 15" "Scorpion" Kevlar impregnated woofer and one 22XT titanium com-

pression driver coupled with a CH3 high freq. horn; vented enclosure, binding posts; passive crossover; eight mounting points for suspension. The enclosure is finished in a painted ivory textured finish. \$1553.

## TURBOSOUND

*Corporate Audio Services +61 3 9480 5988*  
**Impact-50** 200w 2-way passive vented box. 5"LF, 0.5"HF tweeter. 16-ohm. Max SPL 117dB. Injection moulded. Includes adjustable wall bracket. Options 70v/100v transformers or shielded. 2.2kg. \$349.

**TCS-40** 480w 2-way down-fill, under-balcony cab. dual 8"LF, 1"HF. 8-ohm. 100oh x 40v dispersion. Max SPL 128dB. 15mm birch ply. Speaker + terminal strip i/p. Flying points. 19kg. \$2,499.

**TCS-59** 580w 2-way full range trap-cab. 12"LF, 1"HF. 8-ohm. 90oh x 40v dispersion. Max SPL 131dB. 15mm birch ply. Speaker + terminal strip i/p. Flying points. 22kg. \$2,499.

**TCS-118** 1200w active front loaded sub. Single 18"LF. Max SPL 133dB. 18mm birch ply. Speaker + terminal strip i/p. Flying points. 45kg. \$2,899.

## ZECK AUDIO

*Horwood Australia +61 2 9585 1011*

**F42S** 2-way 4.5"/0.75" miniature system with 110 x 110 dispersion; 160W; 4 ohm impedance; 2kg; mounting hardware and transformer version available. \$289.

**F52S** 2-way 5"/1" horn driver; constant directivity horn; 110 x 110 dispersion; 175W @ 4 ohm; 3.9kg; mounting hardware available; transformer version. \$499.

**TSW28L** ultra-compact 2 x 8" tandem sub-woofer; bandpass function; 300W power; 19kg; 40-120Hz; each speaker is driven separately. \$1719.

**F28-1** 2 x 8" with 1" horn; 350W @ 4 ohms; 18kg; 65Hz-19kHz; 90 x 60 constant directivity horn. \$1999.

## STAND ALONE FULL RANGE SPEAKER CABS & FOLDBACK (STAGE) MONS

### ACOUSTIC TECHNOLOGIES

*Acoustic Technologies +61 7 3376-4122*

**FR01** compact trapezoidal full range cab. 1 x 12" +1" horn. 700W programme. Numerous hardware finishes options. Live music, nightclubs, churches, theatres. Entech award winner. \$1961.

**FR03** compact 3-way full range cab. 1 x 12" +1x 6.5" +1" horn. 800W programme. Shape permits FOH and moning applications. Numerous options. \$2195.

**FR07** 2x 15" +2" horn loudspeaker cab. 1700W programme. Extended low freq. resp.. Live sound reinforcement, stage/drum moning, churches, nightclubs, rehearsal studios. \$4169.

**HL03** trapezoidal full range cab. 15" + horn loaded 6.5" +1" horn. 1000W programme. 60° or 100° dispersion. Live music, churches, conventions. \$2995.

### ARX

*ARX Systems +61 3 9555 7859*

**PowerMAX** Powerful and musical, the PowerMAX series brings processor controlled speakers within everyone's range. All PowerMAX high performance Front of House cabs, Subs and Mons are all controlled by the dual channel PowerPRO speaker processor. \$1834.

**922 Concert Series** Trapezoidal active 1 x 15", 1 x 12", 1 x 1" Ferro cooled HF 2 way cab with the improved resp. of a 3 way system. An ultra compact full range concert speaker system.

# buyers guide:: PA SPEAKER SYSTEMS

Uses LSP-2 ISC processor. \$4355.50.  
**215T and M Active 2 way Concert Series cabs** for Front of House and Mons. 15" Ultra series LF driver with 2" throat Ferro cooled HF driver. For all professional stage mon applications. Uses the LSP-2 dual channel ISC processor. \$3942.

**222 Active 2 way Concert Series multi angle** (30, 60 and 90 degrees) very low profile mon wedge. Dual 12" Ultra series LF drivers with 2" throat Ferro cooled HF driver. For all professional vocal mon applications. Uses the LSP-2 dual channel ISC speaker processor. \$4101.

## EASTERN ACOUSTICS WORKS

*Production Audio Services +61 3 9415 1585*  
**SM122e** A passive 12" + 1" horn stage mon. 80Hz - 18kHz. 450 W power handling. The SM122e has a mid range presence control. 22kg weight. \$2,985.

**JH15** 15" 2-way biamp stage mon system. Available mirror imaged (left/right) versions. 800 W LF, 200 W HF power handling, 70Hz-17kHz +/- 0.3dB. 39kg weight. \$7,495.

**FR129z** A 2-way full range system passive crossover incorporating a 12" LF driver & 1: exit HF on CD horn. 90°x45° coverage angle. 79Hz-18kHz +/- 3dB Freq. Resp.. 500 W power handling. 20kg weight. \$1,895.

**LA325** 3-way full range system incorporating 2 x 15" LF in a vented enclosure. 2 x 7" MF drivers & 2" exit HF on waveguide flare passive or biamp operation. 50Hz-20kHz +/- 3 dB. 77.5kg weight. \$7,795.

## ELECTRO-VOICE

*EVI Audio Australia +61 2 9648 3455*

**MONGOOSE** trapezoidal profile, 7-ply pinus plywood, proprietary crossovers, EVX150A woofers, DH1A compression driver, 90X40 & 60X40 rotatable horn, 2000W continuous high powered system. \$5199.

**SX-300** featuring DL12 300W woofer, DH2010A compression driver, 65 X 65 horn dispersion to 25,000Hz. Provides 2db more bass resp. with RMD, 17 kilos net. \$1499.

**T221 Mon** bi-ampable low profile high efficiency mon, curved plywood enclosure, 400W woofer, DH2T Ccompression driver, 85 X 55 CD horn, SPL @ 1W/1M = 101db. \$2299.  
**Eliminator Mon 300W** 2-way mon. Features RMD, new DL15BFH woofer, DH2010A compression driver, 80 X 55 horn dispersion. Plywood enclosure, carpeted finish, 19 kilos net. \$1299.

## ESP TECHNOLOGY

*ELSTA+61 2 9568 2100*

**E-1112** trapezoidal in shape and computer designed to give the optimum sound reproduction performance. All speakers are covered in black carpet with a removable foam front. E1112 is rated at 100w RMS (200 peak) per box and features one 12inch driver and a 400w horn. Size is 400 x 300 x 560 mm, weight is 16kg (each). \$749.00 pr.

**E-2212** rated at 200w RMS (400 peak) per box and features two 12inch drivers and a 400w horn. Size is 420 x 360 x 850 mm, weight is 28kg (each). \$1,099 pair.

**E-2115** all the power of a 15 inch driver in a compact trapezoidal cab. The E2115 is rated at 200w RMS (400 peak) per box and features one 15inch driver and a 400w horn. Size is 480 x 380 x 680 mm, weight is 20kg (each). \$999 pair.

**E-4212** rated at 400w RMS (800 peak) per box and features two 15inch drivers and a 400w horn. Size is 480 x 410 x 1080 mm, weight is 36kg (each). \$1,999 pair.

## GALAXY

*Horwood Australia +61 2 9585 1011*

**HSRG-0000** known as "Hotspot". dual 5"

drivers; 150Hz-15kHz; 200W @ 16 ohms; stand mount for mic stands; portable mon; 123dB SPL. \$349.

**HSVC-0000** "Hotspot" with volme control. dual 5" drivers; 200W @ 16 ohms. \$379.

**HSMS-0000** single 5" drivers; 150Hz-18kHz; 100W @ 8 ohms; serious driver with 40 ounce magnet; 117dB SPL; bracket available. \$279.

**PA5X140** features 100W amp with single 5" drivers; will produce 146W when connected to 2 x Galaxy HSRG-0000; 6kg; 200Hz-18kHz; inbuilt mixer. \$979.

## GEMINI

*Disco World +61 3 9735 0588*

**XRS 1203** 3 way; 220W RMS; Freq. Resp. 55-20000 Hz Sensitivity (1 watt/1 meter); 97 db Impedance; 8 ohm; 12 inch driver; 34mm Titanium Compression Driver; Weight 25KG. \$999 Each.

**XRS 1503** 3 way; 250W RMS; Freq. Resp. 44-20000 Hz Sensitivity (1 watt/1 meter); 99 db Impedance; 8 ohm; 15 inch driver; 34mm Titanium Compression Driver; Weight 34.5 KG. \$1248 Each.

**XRS 3004** 4 way; 475W RMS; Freq. Resp. 40-20000 Hz Sensitivity (1 watt/1 meter); 100 db Impedance; 8 ohm; Dual 15 inch drivers with 34mm Titanium Compression Driver; Weight 52 KG. \$1800 Each.

## JBL PROFESSIONAL

*Jands Electronics +61 2 9582 0909*

**JBL-TR125** 2-way system, 380mm (15") LF Transducer, Fluid Cooled Compression Driver, with 25mm (1") Titanium Diaphragm & 90x45 degree Optimised ApertureTM Horn. 225 watt power handling. Also available in stage mon format (TR105). From \$1,195.

**JBL-MR925** 2-way System, 380mm (15") LF Transducer, 25mm (1") Exit Compression Driver, 44mm (1.75") Titanium Diaphragm Compression Driver & 100x80 degree Flat Front Bi-Radial/E Horn. 350 watt power handling. Also available in stage mon format (MR905). \$1,995.

**JBL-SR4725A** 2-way Full Range PA System: 2226H 380mm (15") LF Transducer; 2426H 25mm (1") exit Compression Driver and; 2370A 90x40 degree Flat-Front, Bi-Radial/E Horn. 600 watt power handling. Available in stage mon format and also with large format compression driver and horn. From \$3,295.

**JBL-Array 4892** 2-way Compact High Performance Speaker System: 255mm (14") Neodymium LF Transducer; 38mm (1.5") exit, 100mm (4") Large-Format, Titanium Diaphragm Compression Driver; 45x35 degree Horn, 35mm (1 3/8") Pole Mount. 600 watt power handling. Also available in stage mon format. \$7,295.

## MACKIE DESIGNS

*Australian Audio Supplies +61 2 4388 4666*  
**C300** 2-Way Portable Composite Sound Reinforcement Speaker System, 300mm (12") long throw low freq. transducer with 75mm (3") voice coil, High-precision compression driver, Studio-quality maximum dispersion horn design, Low Impedance Compensated Crossover (LICC) with full driver protection, Lightweight, portable design, Composite moulded, high impact enclosure, CG-corrected (centre of gravity). \$995.

## MARTIN AUDIO

*Technical Audio Group +61 2 9810 5300*

**W0.5** 8" 2-way trapezoidal PA speaker with 1" Compression Driver/CD Horn. 117dB peak SPL. 70Hz-18kHz. Pole Mount/OmniMount Fittings. \$1,495.

**W3** 15" 3-way trapezoidal PA speaker with 1" Compression Driver/CD Horn and 6.5" horn loaded Midrange. Active 2-Way. 131dB peak SPL. 55Hz-18kHz. Equipped for Flying. \$5,995.

**WMO.5** 8" 2-way miniature wedge mon with 1" Compression Driver/CD Horn. 50° x 70° Dispersion. 120dB peak SPL. 70Hz-18kHz. \$1,495.

**LE700** 15" 2-way active wedge mon with 2" compression driver on differential dispersion horn and 4" voice coil 15" Driver. 130dB peak SPL. 60Hz-15kHz. MX5 Controller Required. \$5,495.

## MEYER SOUND

*Meyer Sound Australia +61 7 3252 4495*

**UM-1/100P** Self powered stage mons with a 12" cone driver and a 3" diaphragm compression driver with phase corrected, optimised electronics and amplification. \$8,995.

**PSM-2** Self powered stage mons with a 12" cone driver and a 4" diaphragm compression driver, multi-faceted enclosure allowing orientations of 35, 55 & 90 degrees. 139dB SPL max @ 1 metre. \$12,900.

**MTS-4** A fully integrated PA speaker, 1 x 18", 1" x 15", 1 x 12" and a 4" compression driver on a seventy degree horn with four 620 watt power amps and control electronics. 26Hz-18kHz, 140dB peak @ 1 metre. \$21,000.

**CQ-1/2** A self powered, phase corrected, precise coverage reinforcement loudspeaker available in either high Q (CQ-2) or low (CQ-1). The unit is arrayable and flyable. 40Hz-18kHz, max SPL @ 1 metre: CQ-1 136dB, CQ-2 139dB. \$13,250.

## PANASONIC RAMSA

*Ramsaudio +61 2 9477-7377*

**WS-AT80E** 20cm 2way, 60 x 60 SCWG Horn, 160w continuous power handling, equipped with thermal protection circuit. \$694ea.

**WS-AT200E** 30cm 2way, 90 x 40 or 40 x 90 SCWG Horn, 300w continuous power handling, thermal protection circuit, Parallel Speakon and Jack inputs, Foldback or FOH. \$1180ea.

**WS-AT300E** 38cm 2way, 60 x 40 or 40 x 60 SCWG Horn, 400w continuous power handling, thermal protect circuit, Parallel Speakon and Jack inputs, Foldback or FOH. \$1449ea.

## PEAK AUDIO

*CMI Professional Products Group +61 3 9315 2244*

**HPS-123** 300w RMS cab with a 1" 100w driver and a 12" Eminence USA speaker. Freq. Resp. 60Hz-17kHz / Max. SPL 125 db. \$599.

**HPS-153** 300w RMS cab with a 1" 100w driver and a 15" Eminence USA speaker. Available in 8 and 4 ohms. Freq. Resp. 60Hz-17kHz / Max. SPL 126 db. \$699.

**HPS-154** 400w RMS cab with all Eminence USA driver and 15" speaker. Freq. Resp. 50Hz-20kHz / Max. SPL 125 db. \$899.

**HPS-258A** 800w RMS cab with all Eminence USA driver and 2 x 15" speakers. Freq. Resp. 50Hz-20kHz / Max. SPL 131 db. \$1299

## PEAVEY

*Audio Telex Communications +61 2 9647 1411*

**112M Foldback Mon** 12" heavy duty speaker and a piezo tweeter have been packaged in a very small enclosure covered with a durable black carpet with a perforated metal grille and dual 1/4" speaker jacks. Level control adds flexibility so unit can be used for multiple applications in any school,

club, church etc. 65 W RMS 8 ohms. \$525.

**SP15M Foldback Mon** 2-way, bi-ampable mon enclosure featuring a 15" 1505-8KADT Black Widow woofer with Kevlar impregnated cone, a 22XT driver/CH3 horn combination with the Sound Guard high freq. driver protection circuit. Great for on stage applications at high SPL whilst maintaining vocal clarity. Dual angle (45° and 30°) and standard tripod stand mounting. 250w continuous 8ohms. \$1329

**SP2G** Two way trapezoidal system featuring a 22XT high freq. driver coupled to a CH941 flat front horn, tuned and ported; direct radiating. Low freq. section with one 15" Peavey "Black Widow" speaker (#1505-8KADT) with Kevlar impregnated cone. Sound Guard high freq. driver protection circuit, stand apapter and 600W program, make this one of the best value boxes on the market. Impedance 8 ohms. \$1330.

**SP4G** Quasi-3 way trapezoidal, high power enclosure engineered for full range or Bi-amp operation. Features two 15" Black Widow speakers with Kevlar impregnated cones; a 22XT high freq. driver coupled to a CH941 horn; high level passive crossover; on board "Sound Guard" high freq. driver protection circuit, carpeted enclosure constructed of high density 3/4" plywood. Frequency resp. 50Hz to 17.5kHz. SPL 102dB at 1W/1M. 1200 W program. \$2099.

## RCF

*Group Technologies +61 3 8872 5000*

**ART 400A** Similar performance as the ART 300A, except 15" bass speaker and high current components. Plastic case braced with birch ply for added strength. \$2895.

**ART 500A** 15" Bass and 2" horn, fully processed, self-powered system, 500 W, bi-amped. World's first plastic, high-powered full production enclosure. All rigging available for flying. \$3495.

**ART 500** Same as 500A, except passive version. Built in protection and very high-powered components. \$2395.

**ART 800AS** Compact 15" self-powered sub system. 400 W, built in protection and electronic crossover. A small box that sounds like a BIG one! \$2895.

## TURBOSOUND

*Corporate Audio Services +61 3 9480 5988*

**TCS-12M mon wedge** 580W 2-way passive mon. 12" LF, 1" HF. 900H x 400V dispersion. Max SPL 131dB. 15mm birch ply. Speakon i/p. 17kg. \$2,399.

**TFM-302 mon wedge** 700W 2-way passive mon. 15" LF, 2" HF. Max SPL 133dB. 15mm birch ply. Speakon i/p. 34kg. \$3,999.

**THL-2** 600w bi-amp 3-way active or passive full range. 15" LF, 6.5" MF, 1" HF. 900H x 400V dispersion. Max SPL 126dB. 15mm birch ply. Flying points, handles. Speakon i/p. 44kg. \$5,999.

**THL-4** 800w bi-amp 3-way active full range. 18" LF, 10" MF, 1" HF. 550H x 400V dispersion. Max SPL 130dB. 18mm birch ply. Flying points, handles. Speakon i/p. 92kg. \$9,599.

## YAMAHA

*Yamaha Music Australia +61 3 9693 5150*

**S112IV** (SM12IV Mon version) 2 way 300W bass reflex speaker with 12" titanium compression driver. 60Hz-16kHz, 97dB SPL, 8 ohm, 19.3 Kg. \$945 each.

**S115IV** (SM15IV Mon version) 2 way 500 W bass reflex speaker with 15" titanium compression driver. 55Hz-16kHz, 99dB SPL, 8 ohm. 27.5 Kg. \$1,095 each.

**S215IV** 2 way 1000 W bass reflex speaker with 2" titanium compression driver.

42Hz-16kHz, 99dB SPL, 4 ohm, 46 Kg. \$2,095 each.

**SM10IV** 2 way 200 W bass reflex speaker with 10" compression driver, 70Hz-20kHz, 95dB SPL, 8 ohm, 10.5 Kg, Foldback mon & FOH applications. \$555 each.

#### ZECK AUDIO

Horwood Australia +61 2 9585 1011

**MS12-1** mon speaker with 12 and horn; 65Hz-18kHz; 300W @ 8 ohms; stand mount for use as FOH speaker; electronic HF protection; radial horn. \$1249.

**MS15-1** same as above but with 15" speaker; 60Hz-18kHz; 400W @ 8 ohms; can be used for main speaker or mons; radial horn. \$1249.

#### HI/MID OR 'TOP' SPEAKER SYSTEM BOXES

#### ACOUSTIC SOUND SYSTEM

Ashton Admor +61 8 9478 1800

**MX600** Long throw 2 x 12 mid + 1.5 entry comp driver on 6040 CD horn 150-18000 Hz mid 109dB HF 110dB 1 watt 1 metre MID 400w RMS H 150 RMS. \$9258.

**MX500** Long throw 2 x 10 MID 2" Compression driver MID 107dB HF 110dB 1 watt 1 metre MID 400w RMS HF 150w RMS 170 n 18000 Hz. \$8461.

**MX350** MED/Long throw 1 x 10 + 2" Comp driver MID 105dB HF 110dB 1 watt 1 metre MID 200w RMS HF 150w RMS 200-18000 Hz. \$5548.

**MX450** Long throw 1 x 12 MID + 2" Comp driver 180-18000 Hz MID 107dB HF 110dB 1 watt 1 metre MID 200 RMS HF 150w RMS. \$6124.

#### ACOUSTIC TECHNOLOGIES

Acoustic Technologies +61 7 3376-4122

**MH01** compact trapezoidal mid-high cab. 1 x 12" + 2" horn. 700W programme. Extremely flat resp.. High efficiency. Numerous options and custom finishes available. \$2398.

**MH03** compact trapezoidal mid-high cab. 1 x 12" + 1" horn. 600W programme. Extremely flat resp.. High efficiency. Numerous options and custom finishes available. \$1961.

**MK-VMH** horn loaded concert system mid-high cab. 2 x 10" + 2" horn. 1200W programme. High sensitivity, narrow dispersion. Flyable and arrayable. Concerts, stadiums, sport arenas. \$5560.

**HL01** compact trapezoidal full range or mid-high cab. 15" + 6.5" horn loaded + 2" horn. 1200W programme. Medium dispersion. Flyable and arrayable. \$3450.

#### ARX

ARX Systems +61 3 9555 7859

**212 Concert Series** Powerful, lightweight 2 x 12", 1 x 2" Ferro cooled Mid/High pack with unique one piece fibreglass flare moulding for maximum strength and accuracy. Common frontal area with the other ARX Concert Series cabs. Uses LSP-2 ISC processor. \$3975.

**122 SK** One piece fibreglass flare moulding Mid/High pack with steel flying frame, containing 1 x 12", 1 x 2" Ferro cooled drivers. Ideal stripped down installation cab for dance clubs and other high spl areas. Uses LSP-2 ISC processor. \$3074.50.

**922 MH** Mid/High section of the 922 cab, with one piece fibreglass flare moulding containing 1 x 12", 1 x 1" Ferro cooled drivers, in a trapezoidal all plywood cab with flying points. Uses LSP-2 ISC processor. \$3169.50.

#### EASTERN ACOUSTICS WORKS

Production Audio Services +61 3 9415 1585

**KF750F** a 3-way triamplific full range concert loudspeaker. Loaded with 2x12" LF, 1x10" Horn Loaded MF & 2" exit HF driver. 48Hz-18kHz +/- 30dB Fq resp.; 14dB HF peak output; 35x35 coverage; 86.5kg. \$13,995.

**KF650e** compact 3-way biamp/triamp, 3-way system consisting of 15" LF, Horn Loaded 10" & 2" CD HF. 65Hz-17kHz +/- 3dB. Suitable for small touring systems or club/theatre installations. 64kg. \$9,595.

**JF260z** compact 12" 2-way passive/biamp system w/- 1.4" exit HF driver, 67Hz-18kHz +/- 3dB. 500W power handling, suitable for corporate, AV, Theatre & Club Applications. \$6,295.

**LA460** 15" 3-way system w/- 8" horn loaded mid & 1.4" exit C.D HF. Passive 3-way system or biamp (LF MF Passive). Switchable 62Hz-20kHz +/- 3dB. 51kg. Suitable for Nightclubs, small live venues. \$7,995.

#### ELECTRO-VOICE

EVI Audio Australia +61 2 9648 3455

**High Q** delivers high freq. resp. from 3500 to 16000Hz,

55 X 35 horn dispersion, inbuilt crossover includes pro circuit protection. SPL @ 1W/1M = 103db. \$539.

#### ESP TECHNOLOGY

ELSTA+61 2 9568 2100

**FRB-15** dual purpose speaker designed for use both as a dedicated mid-hi cab or as a stand alone full range box. It features a built in cross over, one inch throat horn and flare, trapezoidal shape, carpeted, removable foam front and is arrayable. The FRB-15 is rated at 300w RMS (600w peak) per box and is ideal for all applications demanding quality sound reproduction. Multiple can be arrayed for concert and performance applications. Size is 466 x 736 x 379mm, weight 27kg (each). \$2,699 a pair.

**FRB-12** has all the features of the FRB-15 but employs a 12 inch driver instead. As the box is smaller it is able to be flown and is ideal in applications where space is a concern. The FRB-12 is rated at 300w RMS (600w peak) per box, size is 321 x 301 x 612 mm, weight 22kg (each). \$2,299 a pair.

#### FENDER

Fender Australia +61 2 9666 5077

**112 XP** 200W programme, carpeted, trapezoidal box with metal grill. 1 x 12" and dual piezo horn, 60Hz - 20kHz, 115dB max SPL, 8 ohms. One year warranty. \$599.

**115-XP** 300W programme, carpeted, trapezoidal box with metal grill. 1 x 15" and dual piezo horn, 60Hz - 20kHz, 117dB max SPL, 8 ohms. One year warranty. \$599.

**SPL-1211 MkII** 300W programme, carpeted, rectangular box with metal, passive or bi-ampable. 1 x 15" + 1" comp driver, 50Hz - 20kHz, 117dB max SPL, 8 ohms. One year warranty. \$999.

**SPL-1225 MkII** 400W programme, carpeted, trapezoidal box with metal grill. 1 x 15" + 1" comp driver, 50Hz - 20kHz, 123dB max SPL, 8 ohms, passive or bi-ampable. One year warranty.

#### JBL PROFESSIONAL

Jands Electronics +61 2 9582 0909

**JBL-SP212-92** Vented System: 2206H 300mm (12") LF Transducer; 2447J 38mm (1.5") exit Large-Format Compression Driver; 95x70 degree Optimised ApertureTM Horn; Compound Shape accommodates use as a Floor Mon. 600 watt power handling. \$4,495.

**JBL-VS2110** 2-way Mid High System: 200mm (8") Horn Loaded MF Transducer; 2426H 25mm (1") exit Medium-Format Compression Driver; 60x40 degree rotatable waveguide allows pattern control to 240Hz via Optimised ApertureTM Horn; bi-amp/passive operation. 250 watt power handling. \$4,495.

**JBL-VS3215** 3-way Full Range System: 2227H SVGTM 380mm (15") LF Transducer; 2012H 250mm (10") Horn Loaded MF Transducer; 2447J 38mm (1.5") exit Large-Format Compression Driver; 90x50 or 60 x 50 degree pattern control to 500Hz; Low distortion via Optimised ApertureTM Horns. \$9315.

**JBL-HLA-4895** 3-way High Directivity Horn Loaded Positional Array Element: High Technology DCD Transducers; Space frame Ideal Array Element Design; Multiband Waveguide; Simple Rigging System. POA.

#### MARTIN AUDIO

Technical Audio Group +61 2 9810 5300

**EM76** 12" 2-way trapezoidal PA speaker with 1" Compression Driver/CD Horn. 124dB peak SPL. 60Hz-18kHz. 10 x M8 Flying points. \$3,195.

**W8C** 3-way trapezoidal concert system with 1" Compression Driver/CD Horn, 6.5" high-mid and 12" low mid both horn loaded with 55° horizontal dispersion. Active 2 or 3-Way. 135dB peak SPL. 120Hz-18kHz. Fully equipped for Flying. \$8,995.

**W8CT** Dedicated LongThrow HF and High Mid Cab for outdoor/stadium use in W8C Array. 6 x 1" Compression Drivers and 3 x 6.5" Horn Loaded High Mids. Dimensions as W8C, 55° horizontal dispersion. 147dB peak SPL. 750Hz-18kHz. Fully equipped for Flying. \$13,995.

**W8CM** Dedicated LongThrow Low Mid Cab for outdoor/stadium use in W8C Array. 2 x 12" Horn Loaded Drivers. Dimensions as W8C, 55° horizontal dispersion. 142dB peak SPL. 120-750Hz. Fully equipped for Flying. \$8,495

#### MEYER SOUND

Meyer Sound Australia +61 7 3252 4495

**UPA-1/2P** A bi-amped 12" and horn system with 100 degree dispersion (UPA-1P) and 45 degree (UPA-2P), flat phase and amplitude resp. resulting in exceptional system impulse resp. and imaging. Max SPL @ 1 metre 133dB. \$8,995.

**MSL-4** An arrayable, high-Q long throw reinforcement loudspeaker. It operates with a very flat freq. resp. all the way from 18kHz down to an impressive 65Hz. 40x35 degrees, maximum SPL @ 1 metre 140dB. \$16,000.

**MSL-6** An arrayable very long throw self powered concert speaker enclosure. 2 x 12" speakers and 3 x 4" compression drivers with 4 x 620 watt power amps. 65Hz-16kHz, 30x25 degrees, 145 dB max @ 1 metre. \$40,000.

**SB-1** Parabolic, self powered loudspeaker, 8-10 degree conical beam. 500Hz-15kHz 110dB max @ 100m. Ideal for very long throw for concerts and arenas. \$29,250.

#### PANASONIC RAMSA

Ramsaudio +61 2 9477-7377

**WS-AT200E** 30cm 2way, 90 x 40 or 40 x 90 SCWG Horn, 300w continuous power handling, thermal protection circuit, Parallel Speakon and Jack inputs. \$1180ea.

**WS-AT300E** 38cm 2way, 60 x 40 or 40 x 60 SCWG Horn, 400w continuous power handling, thermal protection circuit, Parallel Speakon and Jack inputs. \$1449ea.

#### PEAK AUDIO

CMI Professional Products Group +61 3

9315 2244

**HPS-153** 300w RMS cab with a 1" 100w driver and a 15" Eminence USA speaker. Available in 8 and 4 ohms. Freq. Resp. 60Hz-17kHz / Max. SPL 126 db. \$699.

**HPS-154** 400w RMS cab with all Eminence USA driver and 15" speaker. Freq. Resp. 50Hz-20kHz / Max. SPL 125 db. \$899.

**HPS-123MC** 300w RMS cab with all Eminence USA 12" Coaxial speaker. Suitable as a Mon Wedge or a Vocal Cab mounted on a speaker stand. Freq. Resp. 80Hz-20kHz / Max. SPL 123 db. \$799.

**HPS-153MC** 300w RMS cab with all Eminence USA 15" Coaxial speaker. Suitable as a Mon Wedge or a Vocal Cab mounted on a speaker stand. Freq. Resp. 75Hz-20kHz / Max. SPL 124 db. \$899

#### PEAVEY

Audio Telex Communications +61 2 9647 1411

**DTH4115F** USA Made Concert Sound Series. 800 watt program power handling cab, externally switchable, full range or bi-ampable, two way system. The cab consists of a Peavey 44XT 2" Titanium compression driver with a 80 degree and 40 degree high freq. horn, and a 15" Kevlar impregnated woofer for extended low freq. resp.. Internal flyware included. Sensitivity 98dB/1w/1m. \$3325.

**DTH4215** USA Made Concert Sound Series. 1200 watt program power handling cab, externally switchable, full range or bi-ampable, two way system. The cab consists of a Peavey 44XT 2" Titanium compression driver with a 80 degree and 40 degree high freq. horn, with two 15" Kevlar impregnated woofers for extended low freq. resp.. Sensitivity 98dB 1w/wm. Versions available with and without flyware. \$3550.

#### RCF

Group Technologies +61 3 8872 5000

**GT-1800** Single 18" partially horn-loaded sub-bass enclosure, 600 W continuous. Ideal for club installations, compact and high-powered. \$2495.

**GT-218BP** Very high-powered, dual 18" sub-bass, triple band pass design. Designed for 'electronic' style music, for low bass over extended durations at very high power. 20Hz - 120 Hz. \$3895.

**GT-218FL** Front-loaded sub, designed for big clubs or touring band system. Will sustain very high power over extended durations. 30Hz - 260Hz. \$3695.

**GT-M1200** Wave-Guide foldback mon. 2" horn driver and high-power 12". Bi-amp or passive. Requires no expensive processor to sound great. 15" version also available. \$3495.

#### TJRBOSOUND

Corporate Audio Services +61 3 9480 5988

**TFL-760H Floodlight** 800w 3-way active mid-hi cab. 12"LM, 6.5"HM, 1"HF. 500H x 250V dispersion. Max SPL 133dB. 18mm birch ply. Flying points, handles. EP6 i/p. 60kg. \$13,499

**THL-811** 300w 2-way passive mid-hi cab. 10"LM, 1"HF. 550H x 400V dispersion. Max SPL 134dB. 18mm birch ply. Flying points. Speakon i/p. 36kg. \$4,999.

#### ZECK AUDIO

Horwood Australia +61 2 9585 1011

**Club 12HT** lightweight 12 + horn; 200W; 8 ohms; diecast woofer; 65Hz-18kHz; 90 x 60 dispersion; stand mount; feedback limiter and voltage-controlled limiter protection. \$999.

# buyers guide:: PA SPEAKER SYSTEMS

**Club 15HT** lightweight 15" with horn; 250W; 8 ohms; diecast woofer; 55Hz-18kHz; 90° x 60° dispersion; stand mount; double limiter HF protection. \$1449.  
**Club 15HT 2** x 12" with horn; 400W @ 4 ohms; 60Hz-18kHz; 90° x 60° dispersion; stand mount; double limiter HF protection; excellent for side-fill. \$1699.

## SUB BASS BOXES (FOR C & D ABOVE)

### ACOUSTIC SOUND SYSTEM

*Ashton Admor +61 8 9478 3800*  
**MX1200** Long throw 2 x 15 50-400 Hz Folded Horn 108dB 1 watt 1 metre 1500w RMS 4 ohm Speakon. \$6230.  
**MX1000** Med throw 2 x 15 60 Hz ñ 200 Hz 103 dB 1 watt 1 metre 1000w RMS 4 ohm 66 kilos Speakon. \$5387.  
**SB218H** Long throw 2 x 18 Foldback Horn 50 Hz ñ 400 Hz 106 dB 1 watt 1 metre 1600 RMS 4 ohm 120 kilos Speakon. \$6694.  
**SB212H** Long throw 1 x 21 Folded horn 40 Hz ñ 300 Hz 105dB 1 watt 1 metre 750 RMS 8 ohm 151 kilos Speakon. \$6301.

### ACOUSTIC TECHNOLOGIES

*Acoustic Technologies +61 7 3376-4122*  
**BB01** compact single 18" sub bass cab. 900W programme. exceptional warmth and definition to 40Hz. Easily transported. Live music, mobile DJ's, nightclubs, bass guitar, keyboards. \$2087.  
**BB03** dual 18" sub bass cab. 1800W programme. Numerous finish and hardware options. impact And energy for nightclubs, live music reinforcement, movie theatres, theme parks. \$3479.  
**BB05** dual 18" sub bass cab. 3200W programme. Resp. to 30Hz. Minimm frontal area. Concert systems, sports stadiums, nightclubs, movie theatres, theme parks. \$4495  
**SB03** compact dual 15" bass cab. 1600W programme. Tight, highly defined output to 45Hz. Numerous finish and hardware options. Live music, mobile DJ's, churches. \$1850.

### ARX

*ARX Systems +61 3 9555 7859*  
**925 Concert Series** Trapezoidal 2 x 15" bandpass bass package for LF enhancement of the 922 or for use as a system with the 212 Mid/High pack. Has matching footprint and frontal area for easy clustering. Complete with flying points, optional wheel kit. Uses LSP-1 ISC processor. \$3643.50.  
**218 Concert Series** Reflex loaded 2 x 18" Sub bass package for LF enhancement of the 922 or for use as a system with the 212 Mid/High pack. Uses LSP-1 ISC processor. The 218 is designed for those times when only 18's will do! \$4180.  
**UltraSUB** Dual chamber bandpass 1 x 18" (460mm) sub bass cab for general purpose LF enhancement of any system. All plywood construction, uses LSP-1 ISC processor. \$2260.

### EASTERN ACOUSTICS WORKS

*Production Audio Services +61 3 9415 1585*  
**LA400** Horn loaded single 12" subwoofer. 45-250Hz +/- 3dB. 500 W power handling. 140dB peak output. 80 impedance. 57kg weight, fitted w/- casters. \$3,895.  
**FR250z** Dual 15" vented subwoofer drivers mounted in a push pull arrangement.

1200 W power handling. 40-200Hz +/- 3dB. 137dB peak output. 2 x 80 or 40 impedance. Fitted w/- pole mount for mounting of mid-high loudspeaker. \$2,750.  
**SB250R** Dual 15" vented subwoofer. 38-200Hz +/- 3dB. 2000 W power handling, 137dB peak output, 2 x 80 or 1 x 40 impedance. Available as touring or install versions. 54kg weight. \$4,800.  
**SB1000e** High output, slant baffle dual 18" subwoofer. 30-100Hz +/- 3dB. 2000 W power handling, 128dB peak output. Fitted w/- casters for ease of handling. 86kg weight. \$7,995.

### ESP TECHNOLOGY

*ELSTA+61 2 9568 2100*  
**SUB-400** incorporate leading computer design technology and are made in Australia. The subs are made to exacting air tight specifications ensuring that the maximum power from the amp is converted into sound. ESP subs are based on a band pass system and the ports minimise the possibility of distortion. The SUB-400 uses one 15 inch ESP Technology bass driver and is rated at 400w RMS (800w peak) each box. Size is 510 x 615 x 636, weight 42 kg each. \$2,299 a pair.  
**SUB-300** baby brother of the SUB-400 and is Australia's smallest professional sub bass bin - ideal for applications where space is an issue. The SUB-300 uses one 12 inch ESP Technology bass driver and is rated at 300w RMS (600w peak) each box. Size is 494 x 486 x 486, weight 37 kg each. \$1,899 a pair.

### FENDER

*Fender Australia +61 2 9666 5077*  
**115 SA** 700W programme, carpeted, band pass box, 1 x 15" Eminence speaker with a 2.5" voice coil, 48Hz - 110Hz, 8 ohms, 29.5kg. One year warranty. \$799.  
**SPL 215S** 1600W programme, band pass box of Baltic birch, 2 x 15" with a 4" voice coil, 35Hz - 170Hz, 4 ohms, 40kg, 130dB max SPL. One year warranty. \$1699.  
**118 SA** 900W programme, carpeted, band pass box, 1 x 18" Eminence speaker with a 2.5" voice coil, 42Hz - 110Hz, 8 ohms, 39.5kg. One year warranty. \$899.  
**SPL 118S** 800W programme, trapezoidal front loaded box with steel grill, equipped with fly points, 1 x 18" speaker with a 4" voice coil, 32Hz - 400Hz, 8 ohms, 124dB max SPL. One year warranty. \$899.

### GEMINI

*Disco World +61 3 9735 0588*  
**GSW-15N** 250 W RMS Continous; Freq. Resp. 32-130 Hz Sensitivity (1 watt/1 meter); 98 db; 15 inch driver with high temperature voice coil; 8 ohm Impedence 35mm stand top hat; Weight 33 Kg. \$899 Each.

### JBL PROFESSIONAL

*Jands Electronics +61 2 9582 0909*  
**JBL SR11, Marquis, Sound Power Series** Choice of Single 460mm (18"), Dual 380mm (15"), or Dual 460mm (18"). Features 600 watt VGC "I" low freq. transducers. Power handling from 600 W 1600 W. From \$2795.  
**JBL-Array-4893** Compact Subwoofer System: Dual 2217H 355mm (14") Transducers. Rectangular 13 ply hardwood enclosure. 38Hz ñ 400Hz. 1200 watt power handling. \$4,895.  
**JBL-VS125HS** Horn Loaded Low Freq. System: Dual Horn Loaded 2226H 380mm

(15") VGC Transducers; 36Hz to 470Hz; Rectangular Enclosure. 1200 watt power handling. \$6,095.  
**JBL-HLA-4897** Low Freq. Array Element: Very high output; Dual 800W SVG Transducers; Integral Composite/Space frame Linear Dynamics Aperture Vent Design; Simple Rigging System. 34Hz ñ 150Hz. 1600 watt power handling. P.O.A.

### MARTIN AUDIO

*Technical Audio Group +61 2 9810 5300*  
**WS2** Double 15" Direct Radiating Floor Standing Sub for use with EM76 or W3, 38-120Hz, 132dB Peak, Wheel Mounted. \$4,495.  
**WSX** Details: Single 18" Long Excursion Driver on 7' Folded Horn, Very HighImpact 105dB/w/m, 105Kg Wheel Mounted/Floor Standing. \$6,895.  
**W8CS** Single 15" Port Assisted Folded Horn, Long Excursion 800w Driver, 40-200Hz, 138dB Peak SPL, MAN Flying Fittings, Matched Dimensions with W8C, 66Kg Wheel Mounted. \$6,995.  
**W8S** 15" Folded Horn with 18" Direct Radiating, 40-150Hz, 137dB Peak SPL, MAN Flying Fittings, Matched Dimensions with W8F, 82Kg Wheel Mounted. \$9,495.

### MEYER SOUND

*Meyer Sound Australia +61 7 3252 4495*  
**UMS-1P** A 2x10" self powered, phase corrected sub woofer. A perfect match for UPM-1P speaker installations. Feature (like all Meyer self powered product) Intelligent AC, mains voltage autosensing and switching. \$5,500.  
**650-P** a self-powered, tuned, bass reflex subwoofer that uses 2 18" drivers, capable of long excursion with minimal distortion. 28Hz-120Hz. \$9,750.  
**USW-1P** self powered 2x15" subwoofer, that provides flat, low freq. resp. in the range 32Hz-180Hz. Ideal for use below UPA series enclosures. 135dB SPL max @ 1 metre. \$7,650.  
**PSW-2** A self powered, dual amplified, 4th order, bass reflex subwoofer which is arrayable and flyable. 2 x 15" speakers, 35Hz-120Hz 136dB peak @ 1 metre. \$9,050.

### PANASONIC RAMSA

*Ramsaudio +61 2 9477-7377*  
**WS-AT250E** 30cm Sub Bass, 800w Continuous Power Handling, Parallel Speakon and Jack input, Designed to compliment WS-AT200E. \$1037ea.  
**WS-AT350E** 38cm Sub Bass, 800w Continuous Power Handling, Parallel Speakon and Jack input, Designed to compliment WS-AT300E. \$1275ea.

### PEAK AUDIO

*CMI Professional Products Group +61 3 9315 2244*  
**HPS-151S** 400w RMS Subwoofer with a 15" Eminence USA speaker mounted in a Band Pass Cab. Includes Hi and Low Pass Filters. Freq. Resp. 45hz-150hz / Max. SPL 127 db. \$899.

### PEAVEY

*Audio Telex Communications +61 2 9647 1411*  
**DTH215B** USA Made Concert Sound Series. Dual 15" Kevlar impregnated woofers for low extended freq. resp.. 1400 W program handling, anti-axial driver arrangement, Neutrik 4 and 8 conductor input. Sensitivity 100dB 1w/1m. \$2468.

**DTH218B** USA Made Concert Sound Series. Dual 18" Kevlar impregnated woofers for low extended freq. resp.. 2000 W program handling, anti-axial driver arrangement, Neutrik 4 and 8 conductor input, heavy duty built in castors. Sensitivity 100dB 1w/1m. \$3049.

**SP118SUB** single 18" subwoofer, loaded with a direct radiating 18" Black Widow with a field replaceable basket. This black carpeted box marries perfectly with the rest of the Peavey SP family and will take any demanding application. 4 ohm impedance, sensitivity 98dB 1w/1m. \$1299.

**AA IMPSUB** Two channel bandpass style enclosure with a stereo "sub woofer to satellite" passive crossover built in. Designed to compliment the Impulse 6 speakers in extending the low freq. output of the system. 50 W continuous, 8 ohm. \$529.

### TURBOSOUND

*Corporate Audio Services +61 3 9480 5988*  
**THL-818** 800w active horn loaded sub. Single 18"LF. 8ohm. Max SPL 130dB. 18mm birch ply. Speakon i/p. 55kg. \$5,299.  
**TFL-118** 800w active horn loaded sub. Single 18"LF. 8ohm. Max SPL 130dB. 18mm birch ply. EP-6 i/p. Flying points to suit Floodlight flyware. 65kg. \$6,999.  
**TSW-718** 1600w active horn loaded sub. Dual 18"LF. 4ohm. Max SPL 140dB. 18mm birch ply. EP-6 i/p. 110kg. \$9,999.  
**TSW-721** 1200w active horn loaded sub. Single 21"LF. 8ohm. Max SPL 133dB. 13mm birch ply. EP-6 i/p. Flying points to suit Flashlight and Floodlight flyware. 90kg. \$10,999.

### YAMAHA

*Yamaha Music Australia +61 3 9693 5150*  
**SW118IV** 500 W bass reflex sub woofer with 18 driver, 30Hz-2KHz, 96dB SPL, 8 ohm, 32.4 Kg. \$1,295 each.  
**SW215IV** 1000 W bass reflex sub woofer with voice coils, 33Hz-2KHz, 98dB SPL, 4 ohm, 63.5 Kg. \$1,895 each.

### ZECK AUDIO

*Horwood Australia +61 2 9585 1011*  
**Club 15 Sub** single 15 sub; 600W @ 8 ohms; internal crossover; 24kg; 40Hz-300Hz; small and portable; stand adaptor; long-excursion speaker. \$1299.  
**Club 18 Sub** single 18 sub; 600W @ 8 ohms; internal crossover; 30kg; 35Hz-250Hz; portable; stand adaptor; long-excursion woofer. \$1499.  
**Sub 18E** single 18" sub-woofer; 800W @ 8 ohms; 35Hz-300Hz; 101-127dB SPL; equipped with transport wheels and handles. \$3029.

next month::

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# LIVE

## PRODUCTION REPORTS

# Alanis & Garbage

## TEST OUT THE SUPERDOME

"Look like we're both having a virgin tonight," said Shirley Manson lead singer of Garbage. She was, of course, referring to Sydney's latest rock venue the Superdome which is located at Homebush and during the Olympics it will be home to basketball.

Garbage were supporting every angst-ridden teenage girls heroine Alanis Morissette at the first rock gig to be performed at the Superdome. The venue had it's share of teething problems, which were to be expected, but the general opinion was favourable. The main problem was the absence of phone lines backstage which caused quite a few production headaches.

### LIGHTING

Both bands have been on the road for well over a year and this is the second time they've come together for a tour. The lighting rig is designed by Alanis' lighting designer Andy Proudfoot but Carl Burnett, lighting designer for Garbage, has added some of his own lights to achieve a totally different look.

"I've added 17 Icons, 15 Studio Colors, 14 5K's with colour changers, 16 Deathstars in doubles with colour changers, 16 Par 36 ACL's all on separate channels and a front truss," Carl said. Added to Andy's Vari\*Lite's this is definitely a tour to keep moving light manufacturers happy. Missing from this tour was Garbage's backdrop which is inflatable and weighs 850kg so only a black is used.

Carl admits that when he first heard that Garbage were to support Alanis he thought it was a strange choice.

"I had met Andy before and, luckily, I'd been nice to him!" laughed Carl. "So he's been very



nice back. On the American tour I used only his lights."

"You couldn't meet a nicer bunch of people than Garbage," said Andy with sincerity. "They're very undemanding and can't come with any agenda about what they need. Personally, I envy Carl because he has a band that have no desire to be lit at all. When you have that kind of freedom and don't have people who freak out the moment they lose sight of their guitar fret, you get his kind of light show which is really dynamic. Back lighting Garbage works really well. Although it wouldn't work for Alanis because she likes to see the audience and is quite specific about it. She's very visual and you have to keep her well lit. It's an interesting mix of styles."

In the States Andy was using 16 VL7's, 17 VL5's, 16 VL6's and the first 4 prototype VL6b's before they went into production.

"We exercised all the bugs for about six months," said Andy. "We have pretty much the same rig here although we've dropped a few VL5's and VL7's and all of the VL6b's, due to budget. That's the dilemma you have when you're the production manager as well as the lighting designer - you really have to cut your own lighting before you can think about cutting sound!"

Added to Andy's Vari\*Lite show were a few 8-lites with Colourset scrollers, some Terrastroses and par cans.

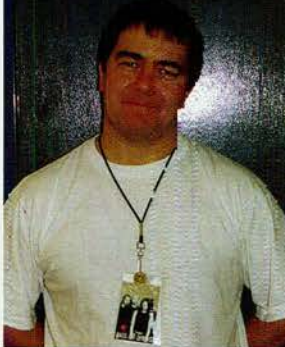
"In the States I was using ETC Source Four Pars which are really bright but I decided to use pars here, not because of budget, but because you can still get an 'in-your-face' light look with the focus even when squeezed for space," said Andy. "When you want a show to look like

*continued on next page*

Andy Proudfoot



Carl Burnett



# Alanis & Garbage

continued from previous page

a rock show, nothing works better than a par can. The Source Four par is a really good instrument but it just doesn't rock."

Control was two Jands Echelons called Ike and Tina - they have to be kept apart.

"Last time I was in Australia I did a guided tour of Jands and they showed me their new console which really impressed me," Andy elaborated. "I liked the fact it did everything the Hog did for half the price. I told our lighting vendor in the States about it and he promptly went and ordered two of them. They've been pretty trouble free on this tour, only the occasional glitch due to rough handling.

"Of course Carl is using an Icon console which in the cool look stakes makes the Echelon look like a slab of cake. His looks like something out of a Batman movie. It's bigger too and there is that chick-thing about digging a big console."

The set design includes a marl floor and an intricate Moorish-inspired wall consisting of a bi-parting set of panels on a traveller track. The design is based on the tree of life, and the cut-out design allows for some interesting looks. As well as lighting through the cut-outs, Andy also rear projects video behind the closed panels for an alternative look. Either side of the set are scrims onto which Moorish inspired designs are projected.

"We can light from the back, play video from the back, use light and gobos from the front - basically make the tree go through the four seasons in one song," said Andy.

Andy wasn't sure what to say about the Superdome.

"I've got this feeling that if we talk about the gig and tell it like it really is, in a few months time when this article comes out it'll be a highly polished, well-oiled machine and everyone will walk in here expecting it to be awful and then think I've been smoking crack all day!" he explained. "I'm sure it'll get

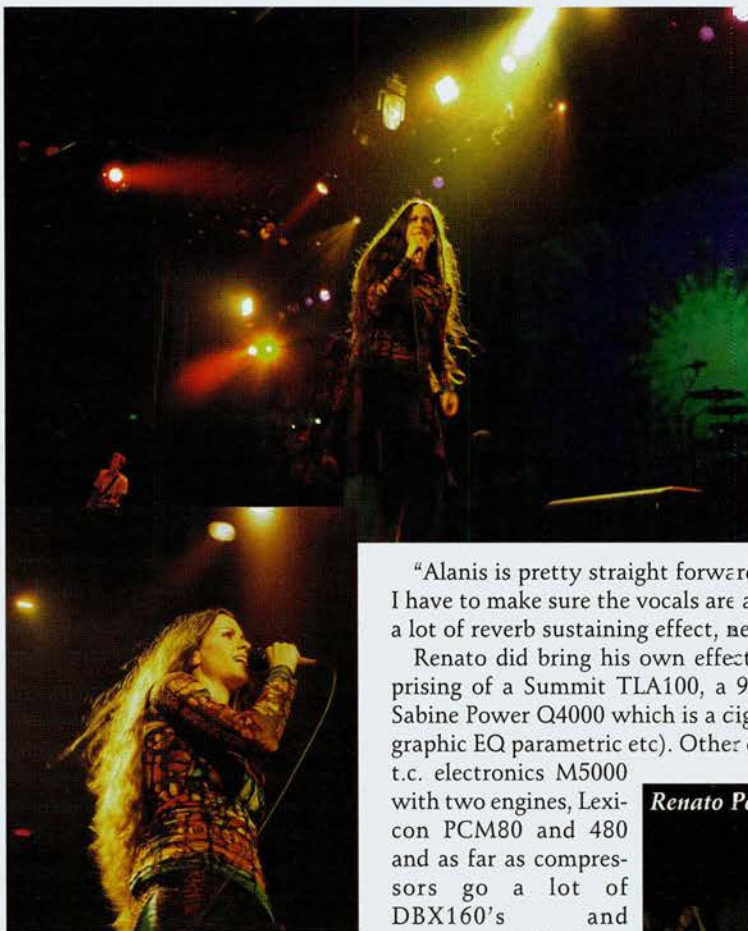
there. The main problem is that the steel is so far up in the air, they could do with a mother grid even if it was supported on 2 tonne motors, they steeled it into the roof but left the two tonnes on so they had the capacity to move it. Chains are only so long on the motors and if they totalled up the cost of bringing in the additional steel every time they put a show in, a mother grid becomes a viable option. It's scary that high up, I wouldn't want to be a rigger. Then again, I wouldn't want to be a rigger, full stop!

"There's a myriad of other things, like finding out who is responsible for what, although I think the design of the building is fine. The score board is huge and I imagine it'll be a pain to rig



around if you have a show in the round. Maybe it's cunningly designed so it drops down and folds open into a stage, wouldn't that be a concept!

"There's lots of backstage space. The spots are a long throw and I think they could do with a spot bridge, maybe lowered behind the score board."



## AUDIO

Sound engineer Renato Petruzzello, like Alanis, hails from Canada. In the States he had been using a Showco Prism system but had to settle for Jands' Clair Brothers system in Australia.

"I used it on our first tour, it worked out well and I liked the Jands people," said Renato. "I have 64 S4 boxes in all, we also have some P2's groundstacked.

"I'm mixing with a Midas XL4 with full automation. I program the board with my song bank and make a song list out of that.

"Alanis is pretty straight forward to mix for, everything is live. I have to make sure the vocals are above the mix and she does like a lot of reverb sustaining effect, never echoes."

Renato did bring his own effects rack for Alanis' vocals comprising of a Summit TLA100, a 901DSS Denon equaliser and a Sabine Power Q4000 which is a digital unit all in one (eliminator, graphic EQ parametric etc). Other effects include H3000, SPX990, t.c. electronics M5000 with two engines, Lexicon PCM80 and 480 and as far as compressors go a lot of DBX160's and Drawer 1960. Gates were all Drawmers.

Monitor desk was a Midas XL3 with an extender whilst the monitors themselves were Clair Brothers 12AM's. The drummer also had a subwoofer added on to give some extra low end. All the EQ's were

continued over

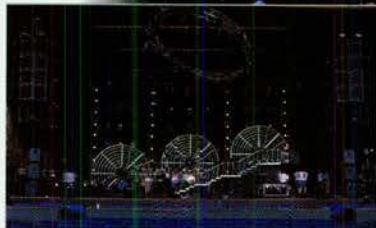
Renato Petruzzello



EA<sup>4</sup> 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 1999, 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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Write in Reader Service Number: 108

# Festival season starts with Glenworth Valley

## Sydney region site promises more shows

**O**ctober long weekend saw the first of this season's Festivals, not counting river rock which is scheduled for mid winter in Darwin.

Glenworth Valley is behind Peats Ridge, up the freeway from the northern edge of Sydney, inland and before Newcastle.

The riding ranch known as Glenworth Valley Ranch took a commercial decision to work with music promoters, and the first festival was run last year. This year promoter Steve Pav took the October long weekend booking and ran the three day festival.

While the property owner has invested heavily in temporary sewage, site camping facilities and water, the infrastructure required for the festival was still formidable. Production Manager Garry Brokenshire was hired several months prior, and he was responsible for the event component of the site.

One delightful aspect was the horse manure, which with several hundred of the beasts working at the site, amounted to a lot. Two workers were assigned to horse pat removal, with shovel and wheel barrow.

Three stages were used, the main stage 'Greenfields' accommodated acts of the stature of The Offspring and Foo Fighters. 'Big Top' handled acts like Ben Lee, while 'Cinema Stage' ran acts like Jimmy Little and 78 Saab.

World Stages were on site weeks before to start construction, and production was contracted to Norwest Productions (Audio) and Chameleon (Lighting).

### AUDIO

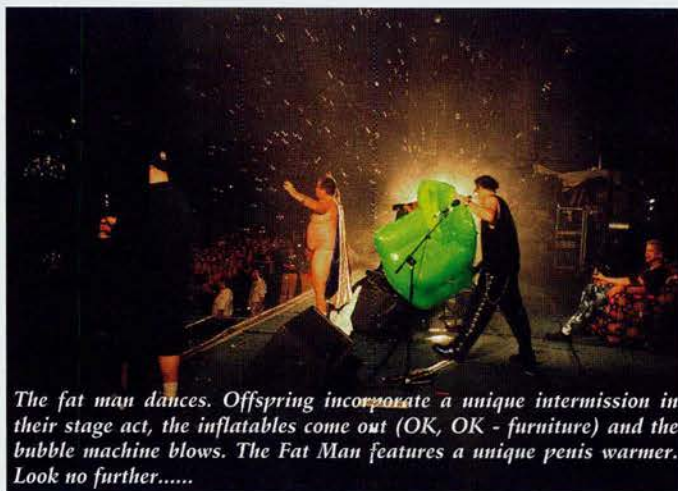
Chris Kennedy has done a remarkable job building Norwest Productions from the remains of A1 Audio in just a few years. A1 was blighted by partnership capital problems and never really overcame these. With Norwest, Kennedy at first concentrated on corporate theatre, which remains the staple diet of the firm, who have a good reputation supplying crew who understand the need to communicate effectively.

Norwest have a close working relationship with Compact Monitor Systems, whose head Bill Richardson was the audio account manager for Glenworth Valley.

The main stage was serviced with an EAW KF860 line array, eight cabinets per side were supplemented with EAW sub woofers - 4 x KF940 super subs downstage centre, and six SB 1000's either side. This seemingly small system delivers 65,000 watts and was quite capable of blowing grass flat on site!

With 96 channels from the stage, Midas XL4 and Soundcraft Series Five mixing consoles were used FOH. An eighteen send Compact Monitor Systems rig was driven by Midas XL3 and XL250 desks.

The main stage PA had its own generator, providing 100 amps per



*The fat man dances. Offspring incorporate a unique intermission in their stage act, the inflatables come out (OK, OK - furniture) and the bubble machine blows. The Fat Man features a unique penis warmer. Look no further.....*

leg. A decent buffer and a strong neutral are required when driving a big sound system.

Setup involved flying the eight KF 860's each side in a vertical stack, producing the line array combination that allows all boxes to assume one giant point source. The multicores needed to be buried, so Bill had arranged a Ditch Witch med digger. Sadly it had been governed to operate at a snails pace. Needing to dig a 60m trench, Bill went for the toolbox and souped up the device, which then needed several loaders to control. Mind picture of machine digging off into the sunset.....

The multicores and FOH power cables were wrapped in plastic before being buried, more to avoid mud than moisture.

Norwest had three tours out at the same time as Glenworth, but nevertheless supplied the two minor stages and the dance tent as well. The second stage, 'Big Top', had 16 Martin RS 1200 composite boxes, and features Allen & Heath mixers, a GL 4000 on FOH and GL 3300 on monitors- with 8 sends.

The Cinema stage was contracted out to Frank Madzin of Madzin Sound (Sydney). It featured 8 EAW KF 650 and 8 V4 subs, driven with a GL 4000 desk. A Soundcraft Spirit Monitor Desk provided 7 sends.

Down in the dance tent, more Martin RS 1200's and some EAW subs did the deed late into the night.

Norwest filled two Birkart semi's with PA and hit the site on Thursday, the day before festivities began. Rain in the preceding weeks had made site work difficult, and production manager Gary Brokenshire had to contend with bogged and jack knifing semi's along with mud and all the horrors that a 3.5 kilometre dirt

*Mist, dew, wet ground. Who would want to work three days and three nights at a festival anyway?!*



access road can bring.

The festival went off without a hitch, with just a small rain shower on Sunday. But mist and dew made conditions wet underfoot, adding to the mosh pit festivities!

After three days the last band unplugged before midnight on Sunday, and the whole sound system was trucked out at 0800 on Monday.

**LIGHTING**

The Offspring's LD Phil Ealy brought in his own Avolites Pearl 2000 console, as he has said before "I'm really comfortable with my own console". The long-time Avolites user had been in regular contact with Chameleon's Graham Walker who organised everything from the "Chilly Willy" gobos, a global chasing game for 4, that ends happily through to translating the system into "Australian Terms".

"Dimmer Land was at stage right about 30m from the FOH position and we needed to keep the maximum of separation from the audio cabling, trenched between the tower and the stage and our own data and power runs by catenary cable a direct and convenient route, and judging by the 60M audio trench 50% shorter, said Mike Tanner of Chameleon.

Equipment supplied for the Main Stage included: 9 x Martin Mac 500; 10 x Martin Mac 600; 4 x Altman UV 703 400W UV 10 Inch Fresnels; 100 x Par 64; 8 x DWE Molefay 8 -Lite c/w Colorsette Scrollers; 3 x LSC 48 Way Touring Rack; 1x Jands Echelon 1k; plus assorted Shakespeare profiles as "specials", High End Data Flash strobes and a Patt 23 (you can't have a good rig without one!)

*continued on next page*



**Alanis & Garbage**  
*continued from previous page*

t.c. electronic with a remote. Alanis and her guitar player were utilising Shure in-ear monitors.

Alanis used an Audix OM5 mic with a Shure SM91 on the kick and 98's on the toms.

"I use an Audix on the snares to give me a nice, tight punchy sound," elaborated Renato. "For guitars it's all AT450's and the rest is a mixed bag."

Renato described the Superdome as a great venue.

"I like the soft seating so that the sound doesn't change drastically, from day to night, not a lot of reflection bouncing around the room," he said. "I'm totally happy with the acoustics and I'm sure it's going to be a great venue."

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With the extra accommodation they were able to rotate crews rest periods to keep every one fresh and each area operating seamlessly. Notwithstanding the mud (many stories involving trucks and Winnebago's), the in and out went quiet well.

All systems for Glenworth Valley were prepped at Chameleon and drew on all sections from the ALE metal construction team (Peter, Simon, Zeng and Matt), tech room (Gwyllyn, L1 and Cat), Scan Land (L1 and Simon) Admin etc. Greg the roadie, Chris, Mike Penny & Danniella) of course all under the watchful eye of Tony Davies.

Chameleon Touring Systems staff at Glenworth: Damien Oxeley; Graham Walker; Danny North; Luke Wallace "L1"; Luke Radin "L2"; Pat Clark; and Tony Strybis.

Equipment for the Secondary Stage (Tent) included 4 x Martin Mac 500; 64 x Par 64; 1 x Mirror Ball; 2 x Moefay Due: (Blinders); 1 x LSC 48Way Touring Rack; 1 x Jands Hog 600; plus assorted Shakespeare ellipsoids, and 4 way ground rows.

● Julius Grafton



Eight EAW KF 860 boxes make one virtual line array (VLA) - a virtually single point source. They act together with more gain than the sum of the parts.

## Glenworth Mischief

- Headline band The Offspring have intermission antics. Out comes the inflatable furniture. The Fat guy dancing is front the crew. He does his thing while bubble machines and confetti throwers do what they were designed to. At Glenworth, The Offspring crew decided to fire hose the crowd - with an industrial strength firehose! The Festival crew were horrified, but not a drop of water went near the gear!
- Then there was the local band whose stage routine involved the lead singer putting on a boxing glove - and hitting himself continually on the face! Great! Saves anyone else doing it!
- The catering gets the crew thumbs up: from More Than A Morsel.
- The crew caravans were too close to the second stage PA, driving some crew to commute an hour to the nearest Hotel!
- Crew accommodation was limited and forced Chameleon into providing additional accommodation which took the form of a "Winnebago". This 4 berth "WHALE" from Maui Rental Australia provided a level of luxury for select Chameleon crew (you know who you are) appointments included Chemical Toilet, Shower (with hot!!! water), Microwave, Sink, Fridge, Gas Stove and GPS (a gaff "X" saying "You are here"). Unfortunately the crew on the in parked this behemoth too far away from the fresh water supply so the hot showers didn't last too long.
- Those who braved the crew ablutions block still cringe at the thought of cold showers, especially those who who actually showered. It appears that the site shed used had had a faulty hot water service (pays to check these things!!!!) bbbrrrrrrrr. Note to management: Next year the crew, lead by management will stage a "shower-in" immediately after the load in!
- Cool things - Offspring's "Chilly Willy" Gobos
- Bad things - Crews "Chilly Willies" from cold showers.

## SHOWS WE'VE SEEN LATELY

### A Punter's Perspective

### HAPPY DAYS

Happy Days, The Arena Mega Musical, has the lot. Lucky this magazine only really deals with production values, because this show has the richest. The best, brightest and biggest lighting design we've seen in a long time, by John Rayment. Eight circular rings each have a followspot inside, and there are enough VL7s and every other variety of Vari-Lite to do almost anything. Rayment is master of the subtle look too, the bit where the cheer leaders come up the ramp ever so slightly underlit is great!

Then there is the stage, StageWeld have come up with a monster that is clearly the star of the show. It has a central unit including a revolve that can be split in half, can revolve in both directions, and raise 2 metres above the rest of the stage. There are 14 separate sections in this centre section that can raise and lower independently of each other.

Costumes? Great. Choreography? What would I know. The moves looked good, obviously Anthony van Laast knows his stuff! Banc? World class. Ensemble? 44 bright and sexy people.

Sound was designed by Wyn Milson, who has an innate understanding of the Clair Brothers S4 composite speaker system. He made this almost obsolete design function incredibly well, there are 6C of them with extra down and front fill boxes. The HeadMics worked well the mix by Greg Rossman was great too - with plenty of drums.

Jands supplied lights, sound and crew.

Production design by Brian Thomson draws together all the elements,

and is this effort is worthy of an award of some kind.

The cast are all good too, Craig McLachlan was better than I thought he would be and almost camps up the Fonz thing. Good old Doug Parkinson puts that great soul voice to work, and Human Nature are actually good singers.

The big but is that the storyline is worthlessly bad. There is zero interest, even a six year old will find it incredibly corny. In a nutshell, Al's dinner is threatened with redevelopment, the city has a shifty sex goddess try to slime the Fonz, and Jo Beth Taylor is a misguided blonde gone wrong. Jon Stevens is the bad guy on the bike, and oh so stereotyped. The wholesome kiddies who seem to live in the hamburger joint decide to arrange a concert to save the place. Oh please! It is the worst schmuck.

Why didn't the writers try to do something better? This show is a songlist looking for a script.

I hope the show works, I really do. There are a lot of great talents working on and back stage. The pressing marketing problem is that Happy Days doesn't

evoke any identification with any particular songs, indeed the song list is just stuff that has nothing to do with the show. Which makes Grease, Superstar, and Mamma Mia all infinitely more bankable.

Good luck Paul Dainty, and congratulations on your production values! Maybe you should have got the cast album out three months before the show.....

● Julius Grafton



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## THE BEAST MASTER

architectural fittings used to light film

Schusters Lighting, run by Steve Alberts, has supplied the lighting for the film *The Beast Master* which takes up a sound stage at Warner Brothers Movie World on the Gold Coast. Along with the usual array of film lighting stock, Schusters supplied Given architectural fixtures 'the Kolorado' to light the large cyclorama around the main waterfall set.

"We would have needed 60 Studio Colors to do the job of the 12 Kolorados," explained Steve. "They're mainly being used for colour change on the cyc - sunsets, open white, and different blues for the day shots. Then we use all the deep blues into purple for the night shots."

Being an architectural fixture, fan noise had not previously been an issue in the unit's normal application, but on the film set the combined noise of the 12 fans was enough to alarm the Canadian crew. A combined effort between distributors Universal Lighting and Audio, Schusters Lighting and the manufacturers, Given, saw the problem addressed. The units were adapted so that the fan circuits could be bypassed thereby eliminating the noise problem. With the fan disconnected, and most shots being no more than two or three minutes, the lamps performed well without intercal cooling.

• ULA opened their Melbourne office, headed up by Justin Knox, last month - +61 3 9310 4999, Fax +61 3 9310 4655, freephone 1800-648-111.

## SELECON ANNOUNCES FORMATION OF UK MARKETING & SALES COMPANY

Jeremy Collins, Selecon's MD announced that effective from October Selecon would take over the sales and market support for their product in the UK. "As the UK is one of the major world centres for our industry it is important that we maintain and build on our strong market position in this key market," he said. "This is a move to strengthen the support we can offer to our dealer network which now covers the country and the UK lighting industry"

The Company is led by Graham Eales, Selecon's International Sales & Marketing Manager who is based in London. Andy Trevett joins Selecon to continue his role as UK Sales Manager.

## INSIDE LIGHTING



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PRODUCT COMPARISON:  
1K ZOOM  
PROFILE SPOTS

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BUYERS GUIDE:  
FOG MACHINES

## John Barry range continues to grow

John Barry, distributors of film and television lighting, continue to expand their range. They are now dealing Mole Richardson and ITM specialist film lighting equipment as well as Kino Flo, Sunray and Power Gem ballasts. They are currently in negotiations to distribute yet another major manufacturer in the New Year.

Andrew Ball, formerly of Miller Professional, joins John Barry this month as their National Sales Manager.

John Barry are owned by Panavision Group Asia Pacific as are Panavision Lighting, the film and TV lighting rental company. Panavision Lighting will move into new, larger premises in the New



Year. Call John Barry +61 2 9439 6955

## MY FAVOURITE GEL COLOUR

**BEN COBHAM**

theatre lighting designer



"I don't want to tell you my favourite gel colours - I think it's wrong. It's like when you tell someone something personal about yourself and from that they assume a whole lot of things about you. I always laugh when I read in an article what a certain lighting designer's favourite colours are. Just write 'Ben is very fond of beige'."

# Lighting::NEW PRODUCTS

BY::Cat Forcer

## NEW FROM JEM

One of Jem's most popular foggers has received a new stylish makeover. The new **Techno-Fog FX-2** has the same modern housing design as Martin's new CX-2 colorchanger and continues the same stylish line that began with the MX-1 scanner earlier in the year. The Techno-Fog FX-2's contoured outer shell is made from a specially formulated high temperature poly-carbonated material which offers strength as well as lightweight compactness. It contains a fluid capacity of 1 litre and a compact hand held remote control offers the user an auto-timer circuit as well as output level control.



The Jem Roadie saw service on some of the decades classic tours such as U2 and Pink Floyd. Now Jem offers a new version, the **Roadie X-Stream**, a high powered industrial specification smoke machine. Like its forerunner, the Roadie X-Stream is capable of projecting everything from a controlled haze to a high density fog over a very large area. The output and length of projection is largely due to Jem's unique "X-Stream" air-flow system.

It is a must that a smoke machine withstand the heavy treatment associated with today's tours as well as operate in an open air environment. The Roadie X-Stream's high output and strong and durable construction make it suitable for all outdoor events - even in bad weather. Call Show Technology +61 2 9898 1111.

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Contact Dr. Wayne on 02-9807-1444 or fax 02-9809-7136 or email sales@flo.com.au <mailto:sales@flo.com.au>

## LIGHT VISION VISION-SLIDER

The Vision Slider is a new promotion projector, specifically designed for sales environments, exhibitions, clubs. The Vision Slider can accommodate up to 5 (5x5 format) slide mounts or metal/ glass gobos (size D=53.5 mm). The display time can be set via interval timer from .5 to 5.0 sec. Continuous display is also possible. The lamp is a low cost, long life HQI-150W lamp with 6000 - 8000 hours life. Other features include: 12,000 lumen light output; double condenser lens for uniform illumination; high aperture 1.7/ 100 mm lens; and mounting is uncomplicated, directly on the wall, ceiling or via adapter to an electrical grid.



This unit is a complementary product to the Vision Lite projector, which is now available in 150/ 200 and 250 W. Vision slider has a sales price of \$1830 incl. tax.

For more information contact Norbert on 02 9555 7221.

## NEW FROM ABSTRACT

New from Abstract following release at PLASA in September are the ClubScan, ClubRevolution, and ClubColor, building the success of the VR and CE series intelligent fixtures, the Club Series is an economical range of products that will be ideal for smaller venues. Features include extruded aluminium body, VR series electronics, on board sound-to-light, master slave linking, DMX, high quality stepper motors and dichroic colours throughout

Contact ULA on free phone 1800-648-111

## NEW ANIMATION DISKS AND ROTATORS

Clearlight Shows Pty Ltd and Mastercut Australia are now producing an extensive range of animation disks and rotators. Water, Fire and Snow effects are all part of the range.



Disks are available in:

220mm @ \$176.90; 365mm @ \$323.30; 465mm @ \$396.50. Rotators are available for: 220mm disk @ \$237.90; 365mm disk @ \$392.85; 465mm disk @ \$392.85. All the above prices include 22% sales tax.

Please contact Clearlight Shows on 03 9553 1688 for more details.

## THE KF-10

The KF-10 intelligent light by Light Emotion is built from heavy duty, heat resistant, multiple coloured plastic casing. Using high precision stepper motors the KF-10 will work smoothly and quietly. It features 7 colours plus white, a separate gobo wheel with 5 gobos, strobe effect, and uses an inexpensive 24v 250w bi pin lamp (such as long life EVC or EJJ) The KF-10 can operate in stand alone mode or controlled via DMX-512. It is designed to fit into any environment and within almost any budget. The KF-10 is available in 5 colours - black, pink, orange, yellow and purple. It retails for \$899. inc tax.

Call Elsta (02) 9568 2100.

## AVOLITES VISUALISER

The Avolites Visualiser system is now available for laptop, opening up wider possibilities for use of this visual rendering system. Visualiser also the lighting designer and operator to programme in advance their console without the need to actually set up moving lights, by visually displaying moving lights on a computer monitor. This is a product which actually saves you money!

Contact ULA on free phone 1800-648-111

## MY FAVOURITE GEL COLOUR

### TOBY HARDING

currently working on a shopping complex in Hong Kong



"I really like Lee 161, it's a nice cool blue which comes up well on architecture as well as people on stage. When it comes to corporate functions, Lee 116 and Lee 126 combined is another favourite of mine. They work well together and are handy for when you're stuck in the situation where you have to pick a two colour mix. They're good for when you're using moving lights.

"Congo Blue is good for corporate work especially for first impressions when you walk into a ballroom with all the white table cloths and silver service."

# VARYSCAN » 6 « 575 HMI

## Moving Head Projector



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Colour wheel including 7 dichroic colours and white

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## COLORTRAN INNOVATOR 24/48

**T**he Colortran Innovator is a powerful hybrid lighting console designed specifically to deal with both conventional and moving lights. The Innovator is available in four models: 24/48, 48/96, 72/144 and 600 channels. To get a user's opinion on the features of the Innovator, I spoke to Lighting Designer Peter Bingley.

Peter has worked in the industry for over fifteen years and most recently he has become a consultant to Millennium Lighting dealing mainly with architectural lighting; however Peter still has time for his design work. I caught up with him at Stonnington Theatre where he was using the Innovator 24/48 on a production of Jesus Christ Superstar for Marcellin College.

### FIRST IMPRESSIONS

"I first saw the Innovator at Mediavision when I went in to buy some gaffer and some filter, and I saw its predecessor The Encore. They told me there was a new model and showed me the 'one off' glossy brochure for the Innovator. Just from the specs alone I was very impressed. It was due to come out in early 1998 and in its original state it was nowhere as large as it is now and slightly cheaper because of the exchange rate."

### TWO CONSOLES IN ONE

"I've found since I've been doing larger shows, where I had to design the rig and then choose the control method, that once I integrated automated fittings into an incandescent rig, I had one problem to solve - what do I run it on. Do I try to run automated fittings off an incandescent type light console, or do I bring in an automated console and try to run the incandescents off that. Or do I bring in two consoles, and have two operators and run two different data streams, and two different operating philosophies. 'I've been doing all of those for the last four or five years. And every time I did it I'd say to myself 'I wish someone would just put an incandescent type console and a moving light console into a bucket, stir it twice and pour it out', so when I saw this, that was the first thing that interested me, the fact that it is a mixed marriage of the two concepts. Then when I looked into the power that it offered for the price I was very impressed."

### EASE OF OPERATION

Peter found the Innovator extremely user-friendly and within hours of being introduced to it he was able to program and perform complex functions.

"This is the only console I've ever touched where in the first day of reading the manual and having a play I actually recorded macros and found them good fun. Because every other console that has macro ability they have been a last resort, and in most cases you actu-



ally had to write the syntax for the macro. The Innovator uses pretty much the same macro reading and writing application that we'd find in normal PC software. You can go as elaborate as you want with macros on it - you can write a macro that plays back 100 effects all at once. You can even write a macro that will program effects and download submasters, and do softpatches. Anything you can do on the desk, you can record a macro to do it, and you can record it in real time or in instant so there's no times relative to it. Best of all you can actually do it without having to keep going back to the manual."

### LAYOUT

The 24/48 has 48 channel faders plus 24 submaster faders, two pairs of assignable playback faders, and a grandmaster. For moving light control, the Innovator features seven encoders wheels for attributes and a trackball.

"When I've been looking around for a realistically ideal moving light console that will deal with incandescents I wanted the instant ability that channel faders and flash buttons had, and I wanted some assign or sub masters that I could load some components into to be it a cue or a chase.

"That's what is so good about the Innovator, the fact that you've got instant incandescent access on faders and bump buttons, and then you've also got instant moving light access with trackball, encoder wheels and the correct software. They haven't tried to make you use the one philosophy for the other - that's one of the main benefits of the console.

"In my little wish list I always wanted a console that was fairly user friendly so that I could quickly grab a light and bring it up, that I could grab a moving light and bring it up and wiggle it around if I had to, but if I had a show where I had to program complex situations it would deal with it. And at this point in time, this is the only console that I've come across that can do all that and isn't in a ridiculous price range."

### HARDWARE

"The hardware is great, it's very well made. You can lean in the middle of it and it doesn't drop like some consoles do. I've been lugging this one around for about five weeks in its cardboard box and there haven't been any problems with it."

One of the things Peter liked most about the Innovator when he was first introduced to it was the fact that the monitor, desk lamps and floppy disk drive are all included in the purchase price.

"I've always thought that a really good lighting console should have a monitor, so therefore you shouldn't have to pay for it. There's a second video option and a handheld controller option, and others which are true options, but



## Lighting::PRODUCT REVIEW

BY::Mandy Jones

personally after being in the industry for 15 odd years I get sick of hearing that when you buy a desk there are video and floppy disk and desk lamp options that are all ridiculously priced. It's like buying a current car and the radio is an option, even air-conditioning in a car isn't an option these days. So I believe those sort of fundamentals are not an option on a lighting console.

"And anyone who buys a console these days and doesn't get some form of disk backup included in the price is really being told 'thankyou for buying something made in the 70s'. So I was pleased that you could pay your dollars and get the whole package. And you could walk in the day you picked it up and do a show on it the next day - and that's what I did. And I had all the things I needed, rather than wishing that I'd bought the monitor as well."

### IMPROVEMENTS

Peter explained that most of the areas in which the Innovator can be improved will be addressed by the new version of software. The console is currently running the second version of the operating software, however the full version will be implemented by the end of the year.

"The only other thing that only could be added to this console would be the use of button palettes for moving lights. The benefit of button palettes is they give absolute instantaneous access. And once you've chosen your group of automated devices, as long as the software applies to those buttons the right attributes, you can instantly pick what you want. In this console they have created what they call 'virtual palettes' where soft keys are used to pick the palette and the submaster bump buttons become those palettes. So it's a great way adding that function without introducing more hardware onto the console."



Peter Bingley with the Innovator 24/48 in the control room of the Stunington Theatre

### CONCLUSION

"We are now entering a realm where you don't look at a desk by the size of its channels, whereas we've always had to do that. We've been paying around \$10,000 for a 96 channel console and what it could softpatch out to was irrelevant. We now have a 1000 channel console, plus an extra DMX card which will actually go out to 1536 dimmers, and the final software is going to allow it to go to two DMX streams of automated fittings so that's 1024 of automated and 512 of incandescents. So that makes it even bigger but all still within the same price.

"It's what we've all been wanting - why pay \$200 per channel if you can pay \$50. And considering these days people are using more and more automated fittings, and the automated fittings are using 10 - 15 channels each, so the channel size of your desk is no longer a deciding factor. You shouldn't be forced into going up a model because you need another 12 channels. You should be deciding between the number of DMX streams you need - an extra 500 channels not 12 or 24.

"To be able to run up to 1024 cimner outputs for a desk that's sitting at around the \$11,000 mark including tax, is a step forward that we've all wanted to see."

### SPECIFICATIONS (24/48)

Dimensions: 114.3cm (W) x 48.2cm (D) x 14.8cm (H), Weight: 20.4kg  
24 channels x 2 scenes (manual) or max 384 channels (memory), 600 cues max per show, 500 groups max per show, 512 moving light channels, 48 channel faders, 24 submaster faders with 8 pages (max 192 submasters), 1,536 dimmers, max 256 automated devices.

Manufactured by: Colortran (a division of NSI Corporation)

Distributed by: Mediavision Australia +61 3 9807 5133, +61 2 9816 4055

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# Smoke Taming

The traditional warning to avoid working on productions involving children and animals is starting to show its age. A version for the third millennium would almost certainly include atmospheric effects in the list of production elements to avoid. Sure, low fog looks really great, and the beams of light from all those expensive robotic lights wouldn't look like much at all unless there was smoke or haze hanging in the air, and yes, it probably *is* true that no-one would consider walking into a club where you could actually see across the room; but just how reproducible are atmospheric effects?

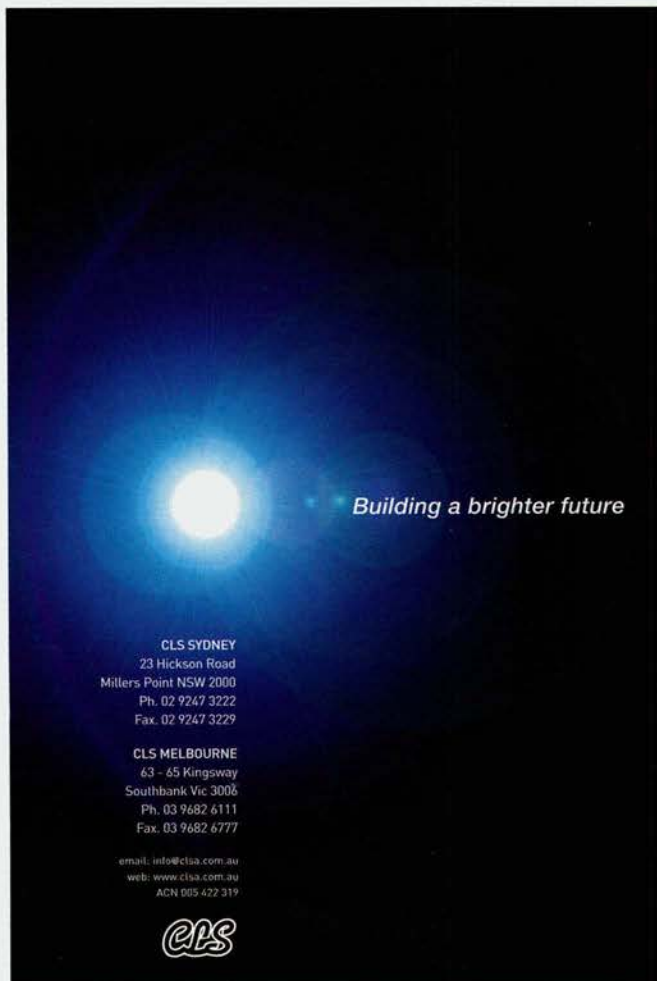
You spend days at rehearsals getting the fog, smoke or haze exactly right. You have finally satisfied the director that their precise requirements can be met, and prove it with a perfect technical run. Then, for the entire fourteen month run of the show, despite all of the extra technical rehearsals that the stage director calls, the effect never looks that way again. The problem is quite simple and could be solved by any undergraduate physics student with access to every supercomputer in the world that is currently being used for weather forecasting. What it comes down to is simply the variability in the performance of the effects equipment and the variability of the air currents in the venue. It's like the case frequently quoted in the dozens of confused television documentaries about chaos theory. You know the one I mean: A butterfly flapping its wings in Africa can start a chain of events that eventually brings on a tornado in Kansas. In our case though, it's probably that front of house person inserting slips in

programmes at the back of the box office who triggered a slight breeze in the orchestra pit which caused the fog to go upstage and into the carpark, instead of rolling majestically downstage like a glacier, the way it was rehearsed.

Essentially we have two problems connected with atmospheric effects, those associated with generating and delivering the smoke, fog or haze, and those associated with the environment into which the effect is being inserted. Recent years have seen steady improvements in the production of fog and smoke and the introduction of the more subtle haze into our repertoire of effects. The first smoke machines in general use were either the Mole fogger, which was an adapted pesticide fumigator with variable performance, or the Concept Genie which was the forerunner of the oil-based smoke machines. Smoke was produced in the Genie when a mist of paraffin oil was driven by carbon dioxide gas from a cylinder through a heating chamber where it was cooked into smoke. If the gas pressure was set too high the oil would emerge uncooked, depositing a coating of oil over everything in sight. If you used air instead of carbon dioxide it was possible to use the smoke machine as a flame thrower (ie. fuel plus oxygen plus ignition temperature equals fire). Surprisingly enough it wasn't those problems which saw this type of machine fall into disuse, it was the fact that the smoke produced was carcinogenic and moderately toxic.

Replacing the oil with a less toxic and less flammable fluid enabled the use of air to propel the smoke (which was now called mist or fog to avoid any association with the health effects of smoke) and led eventually to the current generation of foggers. Some of the problems of the original design remain. Uncooked mist can be produced if the air pressure is set too high or if the heater is allowed to cool off, either by attempting to produce fog for long continuous periods or by not having accurate temperature control. Many of the more sophisticated current-generation fog machines are designed to overcome these problems with multiple heating elements and complex temperature, pressure and gas-flow regulation systems, but simple foggers may not be suitable for continuous output and may give you wildly varying results.

Heavy Fog, the current name for what used to be simply known as Fog, is the heavier-than-air ground-hugging stuff that rolls down staircases, across the stage and sometimes even into the orchestra pit. Traditionally fog was produced by dropping dry ice (frozen carbon dioxide) into a container of very hot water which produced a mixture of water vapour and carbon dioxide gas. The problem




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## MY FAVOURITE GEL COLOUR

### PETER NEUFELD

currently lighting a conference in Singapore



"I think instinct has a lot to do with it. Too much consideration is a bad thing. I think LD's, like any artist, use what they feel instinctively to be right for that piece. That includes jumping into the deep end with new choices or combinations. Invariably they work better than one had hoped. Recently for a show I used Lee 245 (half plus green) and 236 (HMI to tungsten) in some side booms and they worked really well with each other. Added to that 142 (pale violet) and 161 (slate blue) with 63 (pale blue) and 248 (half minus green) and I was set!"

with this process is that when you drop extremely cold objects such as dry ice into hot water, the water doesn't stay hot for very long and hence the output of such a device tends to fall off after a while. There have been many attempts to stabilise the water temperature by using multiple heating elements and temperature regulation systems, but it is very rare to find a device of this type that can produce a continuous flow at a good volume.

The newer liquid nitrogen based devices now available appear to be capable of sustained output, although the business of storing, transporting and reticulating the liquid nitrogen is still fairly hard work. An alternate approach to low fog has been to chill the output of a standard fogger. One method is to pass the output of the fogger through a chiller box, usually something filled with dry ice, while the other method is to take the output from the fogger and feed it through what is essentially the refrigeration unit of an air conditioning plant. The latter method has proved quite successful for sustained high volume fog production.

Hazers, which are a more recent entry in the field of atmospheric effects, have generally been designed from the ground up for continuous operation at a moderate output to produce a sustained ambient haze, often using mechanical rather than thermal techniques to produce a very finely divided mist.

Foggers, heavy foggers, low foggers, smoke machines and hazers all send their output into the venue or performance space where the air movements are pretty much unpredictable. A late audience arrival, front of house staff popping out to check the foyer, someone in the wings nipping backstage for a pee or even the flys operator enthusiastically turning the pages on her form guide can change the air movements sufficiently to vary an effect radically from its intended appearance. There are some variables that we

can set about controlling. We can specify which doors will be closed backstage at the time of the effect. We can make sure that the air conditioning settings for rehearsals are as close as possible to performance conditions. We can notify front of house as to which entrances must be opened, closed or locked at crucial points in the performance and finally we can run some technical rehearsals with audiences to allow for the thermal and movement effects of the bodies. But in the final washup, no matter how careful we are with our planning, if that dog in the laneway behind the venue breaks wind at the wrong time, there may be no clouds around the drummer for his five minute solo tonight.

Responses, suggestions or personal abuse to  
TechTalk@kilowatt.com.au

## NEWS PIECE

### NEW FACES AT SHOW TECHNOLOGY

Due to Show Technology's continued expansion and increased dedication to service the Show Technology team has been expanded with the addition of 2 new trainee technicians, Jan Rod and Alex Maggot. "This brings the total number of engineers and technicians in our service department to six - something I am proud of" says Managing Director Emmanuel Ziino. "We are also pleased to announce the promotion of long servicing engineer Phillip Ngay to the newly created position of Service Manager".

Show Technology are Australian distributors for Clay Paky, Martin, Geni and Numark, to name a few. Contact Show Technology Service Department at [service@showtech.com.au](mailto:service@showtech.com.au) or toll free 1-800-649 999.

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Write in Reader Service Number: 106

## Product Comparison: Cool "One Kilowatt" Zoom Profile Spots

Just ask any old-timer and they'll cheerfully tell you that lighting equipment just isn't what it used to be. Most of us just nod indulgently at this point and leave them alone to nod off over their cocoa, but when it comes to the current generation of one kilowatt professional profile spots they're absolutely right. For a start, many of today's "1kw" profiles actually have compact filament 575w, 600w, 750w, 800w lamps instead of the more traditional 1kw or 1.2kw variety. All of the profiles in this comparison also employ dichroic reflectors, variously named *Cool Beam*, *Cold Mirror* and *Cool Light*, to reduce infrared output. Rather than look at the entire range of profile spots available, this comparison examines zoom profiles as practice in Australasia tends more towards the European use of zoom profiles, rather than the North American insistence on fixed focus luminaires.



### Luminaires Tested:

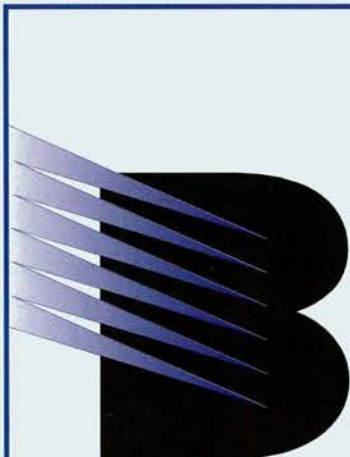
- Altman Shakespeare Series 15-35
- Altman Shakespeare Series 30-55
- ETC Source 4 25-50
- Selecon Pacific 12-28
- Selecon Pacific 23-50
- Strand SL 15/32
- Strand SL 23/50

The tests were carried out on a truss rigged over the forestage of the Perth Concert Hall with help from Jerry Reinhardt (Tech Manager, PCH),



Selecon Pacific

Matt Cawrse (Head Electrician, PCH), Andrew Thompkins (Head Electrician, His Majesty's) and Jonathan Davey (Electrician, His Majesty's). Just to give the test a little historical perspective we also rigged an ancient Stranac Harmony 15/28 which was sitting backstage. On unpacking and testing the luminaires before rigging them the glass envelope from a lamp was found to be floating about inside the lamphouse of the Shakespeare 15-35. It took two technicians twenty minutes with screwdrivers and Allen keys to remove the four screws and two hex head



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Write in Reader Service No: 101

# Lighting::PRODUCT COMPARISON

BY::Andy Ciddor

Strand SL

bolts required to gain access to remove it, a task made more difficult by the absence of any documentation with the Shakespeares we received. This experience made us all the more appreciative of the of the exploded diagrams supplied with the equipment.

Whilst on the topic of documentation, Strand Lighting should be highly commended for the loose half-sheet of paper which is included with the documents for the SL which bears the message

### CAUTION!

**Do not use the rear handle to lift the luminaire.  
This handle is for adjustment purposes only**

The implications of this notice are downright frightening: the obvious, logical place to pick up the luminaire, and the only point at the rear of the luminaire that won't be too hot to touch if it has been running, is not strong enough to be used for its apparent purpose. The only warning is a piece of paper which we didn't find until we had the luminaires rigged and which will never be seen by any of the casual or touring crews that pass through the venue. Strand will apparently remedy the handle problem in future batches of the SL.

The two technologies which are at the heart of this generation of profile spot are the compact source lamp which enables more accurate light collection and control, and the dichroic reflector, a device which reflects one part of the spectrum and transmits the rest. The dichroics used in these profile

spots transmit infra-red (heat) and reflect the visible part of the spectrum, effectively gathering cool visible light and sending it out through the front of the luminaire whilst letting all of the heat pass out behind the shutters or gobo. The down side of this technology is that almost all of the heat produced in the luminaire

is directed to the rear half of the unit, the place where the operator has to hold it when focussing, a small step for gobos but a great leap backwards for technician-kind's fingers.

The photometric data (beam angles, field angles) in the table is that supplied by the manufacturers, as duplicating their work ought to be unnecessary as they all claim their data to be accurate and honest. It should be noted that some manufacturers use field angle rather than beam angle figures for their products. Where data is available both measurements are shown.

Spherical aberration is the distortion caused by the fact that lenses have curved rather than flat surfaces. It is evident in shutter edges that are curved rather than straight edged. The test was performed at the worst case point for each luminaire: at full wide zoom and sharpest focus.

The halation noted in gobo projection is a result of imperfections in the optics of the profile spot and relatively small details on the gobo in relation to the size of the lamp filament.

All of these luminaires are improvements on their predecessors and each has good and bad features:

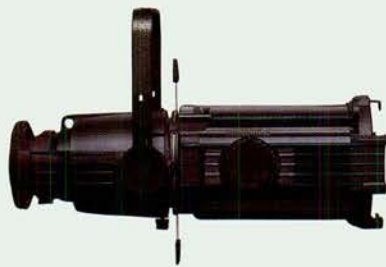
The SL's ability to rotate the body within the yoke is a great asset for venues that are constantly changing formats but the hot rear handle and the jamming shutter (which apparently has only ever happened in one of the test luminaires) take off some of the gloss.

The Source Four is great optically but the focus mechanism is not very helpful once it starts to show signs of wear.

The Shakespeare is a good all round performer, a little longer than some of the other luminaires, but excels nowhere in particular.

The Pacific has a huge range of light source options and wonderful shutters but the barbecue hotplate on the rear of the luminaire makes it unsuitable for some applications. At around 30% cheaper than most of the other fittings, it certainly represents good value for money.

Comparison Chart on next page



## THE NEW 1200 SL

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Write in Reader Service Number: 173

## Product Comparison: Cool "One Kilowatt" Zoom Profile Spots

Name	Source 4 25-50	Shakespeare 30/55	Shakespeare 15/35	SL 23/50	SL 15/32	Pacific 23/50	Pacific 12/28
Manufacturer	ETC	Altman	Altman	Strand Lighting	Strand Lighting	Selecon	Selecon
Distributor	Jands Electronics	Chameleon Touring Systems	Chameleon Touring Systems	Bytecraft	Bytecraft	Selecon	Selecon
Phone	(02) 9582 0909	(02) 9310 5333	(02) 9310 5333	(03) 9587 2555	(03) 9587 2555	(02) 9664 8237	(02) 9664 8237
RRP inc	\$1,495.00	\$1,342.00	\$1,342.00	\$1,249.00	\$1,249.00	\$878.40	\$878.40
Lamps & watts	HPL 575	HPL 575	HPL 575	GKV 600/GLB 600	GKV 600/GLB 600	500/650/800/1kw	500/650/800/1kw
Lamp Hours	400 (3200K)	400 (3200K)	400 (3200K)	300 (3200K) /	300 (3200K) /	300 (3200K) /	300 (3200K) /
(Col Temp)	1500 (3050K)	1500 (3050K)	1500 (3050K)	1500(3050K)	1500(3050K)	1500(3050K)	1500(3050K)
Beam Angles	21-32	13 - 15	9 - 15	N/A	N/A	N/A	N/A
Field Angles	25 - 50	30 -55	15 - 35	23 - 50	15 - 32	23 - 50	12 - 28
Evenness of field	ok	acceptable	acceptable	not great	not great	acceptable	acceptable
Shutters	excellent, full closure on top, slight gap on sides	a little stiff, no closure top or bottom	a little stiff, no closure top or bottom	reasonable movement, full closure but side shutters jam out of plate	reasonable movement, full closure	excellent	excellent
Lamp adjustment	good peak/flat & separate centring	centring	centring	nifty but hot knob/ not very useful	nifty but hot knob/ not very useful	3 way centring and peak/flat. too flexible, can cause problems	3 way centring and peak/flat. too flexible, can cause problems
Shutter Handles	slightly hotter on top blade	ok	ok	slightly hotter on top blade	slightly hotter on top blade	excellent	excellent
Hot Handles	Cool all around	hot spot on handle where posts attach to body	hot spot on handle where posts attach to body	hot rear handle. too hot for prolonged focussing	hot rear handle. too hot for prolonged focussing	cool handles	cool handles
Body temperature - Rear	too hot to touch	just touchable	just touchable	burns on touch	burns on touch	severe burns from heat sink	severe burns from heat sink
Body temperature -Front	cool	cool	cool	warm on lens tube	warm on lens tube	very cool lens tube	very cool lens tube
Gobo focus	excellent	slight halation	v slight halation	noticeable halation	slight halation	excellent	excellent
Gobo Access	thumbscrew slot & accessory access	thumbscrew slot & accessories access	thumbscrew slot & accessories access	philips screw, slot & accessories	philips screw, slot & accessories	philips screw, slots for gobo & accessories	philips screw, slots for gobo & accessories
Spherical aberrat on	very good/ imperceptible	acceptable	only at edges	fairly severe, particularly at the edges	fairly severe, particularly at the edges	noticeable	acceptable
Focus mechanism	dual knob, difficult to use, doesn't lock well	a little stiff on sliders	a little stiff on sliders	great knobs but stiff movement	great knobs but stiff movement	smooth	smooth
Tilt Lock	dual	dual	dual	single	single	single	single
Lamp access	twist lock	thumb screw & bayonet	thumb screw & bayonet	bayonet, very sharp snap as it locks	bayonet, very sharp snap as it locks	thumbscrew and bayonet	thumbscrew and bayonet
Lens access	good/ twist locks	access panel, thumb screws	access panel, thumb screws	2 clips and a twist lock screw	2 clips and a twist lock screw	easily removed from tube	easily removed from tube
L x W x H	600 x 340 x 410	630 x 300 x 430	760 x 300 x 430	550 x 302 x 453	592 x 302 x 453	580 x 250 x 440	600 x 250 x 440
Weight	7.6kg	9.9kg	9.5kg	6.9kg	7kg	8.5kg	9.5kg
Comments	There is also a 15 - 30 zoom luminaire (same price) which was not tested here			Rotating body makes for a very flexible unit	Yoke can be located forward to balance for scrollers	Available for 2 types of Metal Halide lamp, GY9.5 base and G9.5 base lamps	Available for 2 types of Metal Halide lamp, GY9.5 base and G9.5 base lamps



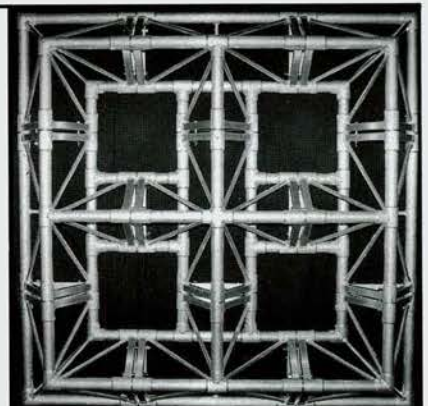
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## FOG MACHINES

### FOG MACHINES

#### ACME

*Universal Lighting & Audio 1800-648-111*

**Acme IFM100 750W** a mini smoke machine which is light weight and very low cost. Using reliable on board electronics and control available via 0-10V remote control. Ideal for small bands and mobile DJ's. \$161.56.

**Acme IFM200R** the big brother to the IFM100, offering a 1000W heater and powerful piston pump. Supplied complete with wireless remote control. \$354.34.

**Acme Thunderhead One** New generation 1000W Smoke machine supplied complete with wireless remote control, features ECO thermal control system and continual fogging. \$293.76.

**Acme Thunderhead MEGA** \*\*NEW\*\* The Thunderhead Mega features ECO thermal control system, multifunction timer remote control, powerful industrial pump, as well as large output and DMX512 as standard. \$722.64.

#### ADJ

*Show Technology Australia +61 2 9898 1111*

**GT351** Another famous "street machine" the GT 351 is fast, a 700W quick warm up heater block provides all the fog you need (2500cuf/min). This small portable fogger caters for the mobile DJ, band, theatre group or exhibition display. Comes with remote control and Australian type mains plug. \$163.11.

#### ANTARI

*ELSTA +61 2 9568 2100*

**F-120E** equipped with a PC board and a powerful ECO thermal sensor temperature control and is designed to keep up with heavy usage. It features a 700w heater, 2,500 cubic feet/min fog output, 4 minute warm up time, tank capacity 1 litre, size 315 x 160 x 130mm, weight 4.5kg. Optional accessories include:- FC-7E wireless remote, FC-8E timer remote, DMX-3F DMX adaptor. \$204.10.

**F-250** features a durable pump and heater, and an EGO thermostat for accurate temperature control. It features a 1,000w heater, 5,000 cubic feet/min fog output, 4.5 minute warm up time, tank capacity 1.5 litre, size 380 x 200 x 140mm, weight 6.5kg. Optional accessories include:- FC-5 wireless remote and FC-4 timer remote. \$327.05.

**Z-800** part of the Antari Z series. All Z machines feature Antari's new uncore heater design. The

heater core and the nozzle are one piece of aluminium and can be easily removed for cleaning or replacement without disassembling the machine. It features a 750w heater, 3,000 cubic feet/min fog output, 4 minute warm up time, tank capacity 1 litre, size 360 x 183 x 120mm, weight 5kg. Optional accessories include:- Z-5 wireless remote, Z-4 timer remote, DMX-3F DMX adaptor. \$286.07.

**Z-1500** part of the Antari Z series. Features Antari's new uncore heater design, has built in DMX and comes with timer remote. It features a 1,500w heater, 25,000 cubic feet/min fog output, 11 minute warm up time, tank capacity 6 litre, size 640 x 298 x 190mm, weight 14kg. Optional accessories include:- Z-3 wireless remote. \$818.85.

#### DYNAMITE

*Disco World +61 3 9735 0588*

**DM600** High Output Smoke Machine Includes remote control. 600 Watt Heater Block includes a piston vibration pump 2.5 Litre Fluid Container. \$245.

**DM1200** Very High Output Smoke Machine Includes remote control. 1200Watt Heater Block with piston vibration pump 2.5 Litre Fluid Container. \$405.

#### FX RANGE

*Coemar De Sisti Australia +61 3 9467 8666*

**F70** Lightweight, high performance smoke machine. Complete with 0-10v cable remote control or optional radio remote control. Standard yoke for truss mounting. 700w heater, 4 min warm up time, on-board 1 litre fluid tank, 2500cuf/min output. Weighs only 4.5kg. \$155.

**Thunderhead Megz** Powerful, lightweight, high performance smoke machine. Complete with DMX Timer remote control and featuring ECO thermal control system. 700w heater, low-liquid level detector, powerful vent fan allowing quiet operation. \$767.

#### INFINITY

*Universal Lighting & Audio 1800-648-111*

**IFM100 750W** a mini smoke machine which is light weight and very low cost. Using reliable on board electronics and control available via 0-10V remote



control. Ideal for small bands and mobile DJ's. \$161.56.

**IFM200R** the big brother to the IFM100, offering a 1000W heater and powerful piston pump. Supplied complete with wireless remote control. \$354.34.

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**Infinity Thunderhead MEGA** \*\*NEW\*\* The Thunderhead Mega

features ECO thermal control system, multifunction timer remote control, powerful industrial pump, as well as large output and DMX512 as standard. \$722.64.

#### JEM

*Show Technology Australia +61 2 9898 1111*

**Techno Fogger** Tiny, but tough with the latest in technology, including SMD Electronics and the revolutionary Direct Thermal Protection device (DTP) which prevent overheating. The compact hand held remote offers auto-timer as well as ability to alter smoke density level. \$572.95.

**ZR12-AL** ZR12-AL enhanced output to 1kW vaporising chamber. The continuous dense smoke is controlled by JEM's new multi-functional on-board remote. A unique 8 x mode expands the auto-timer functions beyond those normally found on smoke machine remotes. \$786.06.

**ZR22 DMX** ZR22 is equipped with DMX512 as standard as well as multi functional analogue controller. Features include variable output timer, plus a new feature 8 x mode. First machine to feature the new "D-TEC" vaporising system which guarantees double the smoke output of conventional systems and a much longer run time. \$1,146.72

**Club Smoke System 20** A totally unique system, the heating chamber can be separated from the fluid tank section to allow mounting of the heating chamber head above dance floors while fluid tank remains at floor level. This allows for 10 litre fluid capacity and the unique electronic Fluid Sensing protects against running the machine dry. \$2,458.20.

#### LE MAITRE

*ULA 1800-648-111*

*continued over*



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Write in Reader Service Number: 178

# buyers guide:: FOG MACHINES

**G100** features Le Maitre's Genesis patented block and electronics complying with EC regulations. The G100 is robustly constructed, yet compact and modern in form. Quality machine ideal for mobile use and smaller venues. Supplied complete with variflow remote. \$1215.52.

**G150** Le Maitre's replacement for the ShowMist, the G150 is a fully digital smoke generator with microprocessor control. The G150 is capable of continuous operation and is supplied complete variflow timer remote allowing for the setting of duration and interval in addition to output flow. A DMX interface is also available as an option. \$1615.88.

**G300** technically advanced fog machine that doubles as a water based haze machine. Extensive facilities are available from the remote handpiece, which features on LED display, and the rear of the unit. The G300 is the choice of theme parks and larger venues all over the world. \$3772.37.

**MiniMist Turbo** accepts fluid aerosol canisters, allowing for the unit to be used away from mains supplies. The MiniMist Turbo is a high output machine, complete with carry handle and has a durable gun metal finish. \$1422.66.



## MARTIN

Show Technology +61 2 9898 1111

**Magnum Pro 1000** Capable of 8 hours of smoke generation from its 1 litre capacity. The Pro 1000 offers programmable output or can be manually controlled via remote. Built-in thermocouple sensors for overheating protection add to the unbeatable capabilities of this reputable machine. \$572.95.

**Magnum Pro 2000** No need to refill! The 9.5 litre smoke machine is a totally independent club and disco fogger. The host of features include: variable smoke output and pressure control, plug-in remote control, DMX interface, electronic and mechanical

overheating protection. Comes complete with truss mounting brackets and carrying handles for mobile and fixed installations. \$1,228.68.

## MDG

Bytecraft Pty Ltd  
+61 3 9587 2555,  
+61 2 95503955

**MM Series** The mini machine with maximum fog performance. Micro Max outputs up to 35m3 per minute, Mini Max - 56m3 per minute, Mega Max - 100m3 per minute. Uses only MDG Medium and dense fluid, an glycol-based fog fluid. From \$1470.

**MAX 3000 APS** New and improved. This unit outputs up to 85m3 per minute, perfect for creating an atmosphere for theatre, TV, studio or venue. Carbon dioxide bottle is installed outside the generator. Uses MDG Neutral fluid, an oil-based fog fluid. From \$4570.

**MAX 5000 APS** New and improved! The right machine where more fog/smoke is needed like film, TV, concert. Stationary unit outputs up to 300m3 per minute, touring version up to 405m3 per minute. Carbon dioxide bottle is installed outside the generator. Uses MDG Neutral fluid, an oil-based fog fluid. From \$5560.

**TF Series** Industrial Class Fog Generator. No rain, snow nor summer heat will stop this range of heavy duty and extremely reliable fog generator from performing. Weather resistant, outdoor-indoor use, automatic purging system, 3 types of fail-safe systems, external display monitoring status and maintenance free. Uses MDG Neutral fluid, an oil-based fog fluid. From \$5880.

## ROSCO

Rosco Australia +61 2 9906 6262

**Alpha 900** economical machine with 1000W+ heater. Remote control, weighs 6kg. Ideal for schools and small theatres. Consumption 1 litre/hour. \$495.

**1600** adjustable output from wisps of fog to billowing clouds. Optional DMX interface available. Remote control facility. Consumption 2.5 litre/hour. \$1450.

**4500** highest output of any Rosco machine. Produces dense clouds of realistic stage fog. Suitable for outdoor and safety use. Consumption 5.25 litre/hour. \$4500.

**IFS** designed for permanent or long running installations with minimum maintenance auto system. Will run 24hr day dispensing fog at volume needed at the exact time needed. Self purging. No clogging. \$POA.

## TAS

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**Mini Smoke Machine** Enormous output from one of the smallest units available. Complete with mounting yoke for grid mounting, approx. 2.5 min heating time, 1.5 litre internal tank, 7.8kg weight. Simple to maintain and service and finished in attractive silver scratch-resistant finish. \$644.

**Windy Fan** accessory suits all brands of fog and haze machines. Compact, truss or floor mountable, with variable speed fan control. Allows for accurate directional dispersion of smoke. \$1106.

## HAZE/CRACKERS/OTHER FOGGERS

## ANTARI

ELSTA +61 2 9568 2100

**Z-300 Fazer** NEW from Antari - uses standard fog fluid to produce Haze in a similar fashion to regular haze machines. Does not use an air compressor, runs silently and produces a steady output of haze. Output volume is variable, power 700w, 4 minute warm up time, output 2000 cubic feet/min, tank capacity 1.3 litre, weight 9kg, size 525 x 207 x 173mm. Optional accessories include Z-7 wireless remote and DMX-300 DMX adaptor. Comes with Z-6 variable remote. \$531.97.

**HZ-100** comes equipped with an efficient oil-free, permanently lubricated air compressor, a sophisticated haze transfer mechanism and a specially designed tank. Uses water based haze fluid and has no warm up time. Specifications include:- 30 psi air pressure, 1,000 cubic feet/min haze output, 2.5 litre tank capacity, weight 12kg. Optional accessories include the HCR-1 wireless remote and DMX-1F DMX adaptor. Comes with HC-1 timer remote. \$572.95.

**HZ-120** a split hazing system which allows the compressor to be installed remotely from the haze generator. Ideal for venues where quiet operation is paramount (such as theatre for example). Specifications include:- 30 psi air pressure, 1,000 cubic feet/min haze output, 2.5 litre tank capacity, size 395 x 250 x 195mm (haze generator), weight 14.5kg. Optional accessories include the HCR-1 wireless remote and DMX-1F DMX adaptor. Comes with HC-1 timer remote. \$818.85.

**HZL-1** is 1 litre of water based Haze fluid. No need for oil based liquids anymore. HZL-1 is non-hazardous, non-irritant and odourless. Suitable for all Antari Haze machines (except the Z-300 which uses fog fluid) and most hazers of other brands. \$20.45.

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**Technohaze** features a low fluid cut off system and several hours of continuous operation at full output. A dispersal chamber controls the internal condensation. Also features a continuous loop fluid system. \$1,064.75.

**KUPO**

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**Silk Hazer** uses no heat at all and features long last mist, no oil residue, low fluid consumption, instant start and build-in fan for quick dispersal of haze. \$736.88.

**MDG**

Bytecraft Pty Ltd +61 3 9587 2555, +61 2 95503955

**Atmosphere APS Series** – New and improved non-stop haze maker with automatic purging system. These noiseless units are designed and built for the professional user and have a 10 year warranty. Available as a stationary version or touring unit. Uses MDG Neutral fluid, an oil-based fog fluid. From \$4900.

**REEL EFX**

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**DF50 Diffusion Fogger** The original and the best. Industry standard and used by almost every major production company and many major TV studios in Australia and OS. Almost silent operation, 3+ hours hang time, One teaspoon of fluid per hour @

5000 sq. m per hour. Compact, simple to operate, environmentally safe, instant haze. \$5040.

**ROSCO**

Rosco Australia +61 9906 6262

**Hazemaker** creates a non-oil based atmosphere to accent focussed light beams. Fine haze is invisible to viewing audience. Safe for sensitive electronic equipment. Consumption 1 litre/57 hours. \$3500.

**Rosco Chiller** creates low lying fog with regular ice and a standard fog machine. Variable Speed output. \$750.

**Coldflow** creates low lying fog by manufacturing 'dry ice' using liquid carbon dioxide (LCO2). For use with standard fog machine. Available December. \$2000.

**TAS**

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**Bubble Machine** Continuous output of bubbles for use in a variety of venues. Truss mountable, with fully self-contained fluid reservoir. Suitable for production use. \$375.

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**SELECON**

**PERFORMANCE LIGHTING COLUMN**

**SIMPLE AS ABC!**

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& LIGHT DISTRIBUTION**

Adjusting a burning white-hot lamp to achieve the light distribution you want has always been a challenge. With today's compact filament lamps this adjustment is critical. Selecon's design engineers recognised this and set themselves the goal of creating the simplest, fastest and safest adjustment system.

The result is the Pacific's unique planetary gear, a simple half turn delivers peak or flat performance... as simple as ABC!

With the Pacific's active heat management system the operator is always guaranteed that the controls are cool to operate even after hours of operation.

The initial lamp set up is also a very simple operation. The lamp-mounting cup includes a reference line for setting the correct position before you even turn the lamp on.



Simply insert your chosen lamp, check the reference line, and make whatever adjustments are necessary using the three screw knobs. Mount into the luminaire, turn on and make the final peak/flat adjustment to get your required distribution.

Optimising the performance of your luminaire or achieving a true peak or flat field has never been simpler!

Add to this the spring mounted base (to reduce vibration to the lamp filament), mains power disconnection, with the lamp base and wiring all situated in the coolest part of the luminaire – we're confident you will agree that our designers achieved their goal of delivering the simplest, fastest and safest means of adjusting the lamp in today's profile luminaires!

**WHY DID THE MANITOBA  
CENTRE FOR THE ARTS  
CHOOSE SELECON PACIFICS?**

Find out for yourself what one of Canada's leading lighting designers and the Centre's staff found after extensive tests of all leading brands. They have published their results on the web, follow the link from our home page – [www.selecon.co.nz](http://www.selecon.co.nz)

**THREE-YEAR GUARANTEE**

Furthering Selecon's commitment to its products and customers we wish to advise that our warranty has been extended from the usual twelve months to three years. This change is effective from July 1999 and is applicable from the date of purchase by the first customer. The usual conditions will apply.

CONTACT YOUR SELECON DEALER OR SELECON FOR FULL DETAILS

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- QLD – THE PRODUCTION SHOP, Ph 07-3216 1340, Fax 07-3216 1376
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**NEWS PIECE**

**MAC SALES**

Martin Professional Australia report strong sales and continued demands for their SMALL MACS the 250 and 300.

"Since we launched these products at our dealer conference in April they have been an instant success" says Managing Director Emmanuel Ziino. The recently released MAC250+ has added to the sales momentum that has now seen more than 300 units hit the market on active duty.

Recent sales have seen MACs perform in some of Australia's premier nightclubs such as ARQ in Sydney, Discovery in Darwin and Chevy's in Sydney.

email [martin@showtech.com.au](mailto:martin@showtech.com.au) or call 1-800-646 666.

**LIGHTMOVES MELBOURNE**

Lightmoves Melbourne have expanded their service department with Lee Heyward taken on as Technical Manager. Lee has a long history within the lighting industry (cutting his teeth in the Strand Lighting service Department) and has extensive 'hands on' experience on many types and brands of equipment. His immediate role will be to expand and oversee the already busy Lightmoves service department.

Call Lightmoves +61 3 98132955.

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WHERE IS ORLAND? Michael is having a break from his writing, and invites feedback for new PA PAGE ideas. Email him at T.PAC@bigpond.com.au or call +61 2 9799-7219



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CE Series amplifiers are professional tools designed and built for professional use. Engineered and manufactured by the same teams who build our acclaimed Macro-Tech and K Series amps, the new CE 1000 and CE 2000 have the rugged heart and soul that has characterised our amplifiers for over 30 years. Rather than make a cheap amplifier and hang all sorts of semi-professional features on it, we focused on providing powerful, reliable performance with many of

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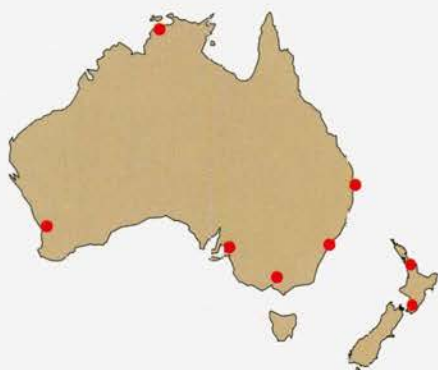
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