

PRO AUDIO REVIEW



Sixpence
Issue 74

The Industry's Equipment Authority

May 2003



LIVE SOUND CONSOLES



Touring Gear
Section!



In This Issue!

CREST X-UCA

AUDIANT AZTEC

Thiel Power Point Surround Speakers

TASCAM DS-M7.1 Surround Controller

\$3.95

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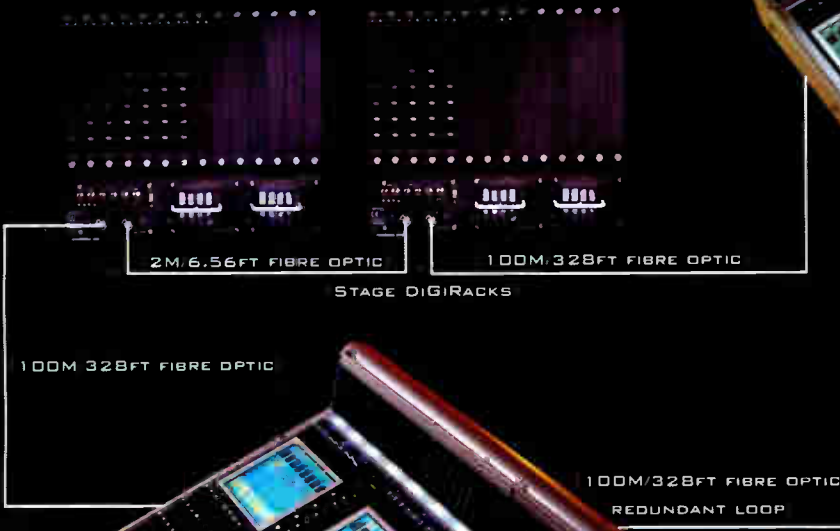


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D5 live 56 FM	2 x 64 channels	1 1 x 56 mic in/8 line out	1 32 analogue in 32 analogue out 8 AES/EBU	1 24 analogue in 48 analogue out 8 AES/EBU	3	0	8	2
D5 live 96 FM	2 x 96 channels	2 1 x 56 mic in/8 line out 1 x 40 mic in/8 line out	1 48 analogue in 48 analogue out 8 AES/EBU	1 24 analogue in 48 analogue out 8 AES/EBU	3	1	8	2

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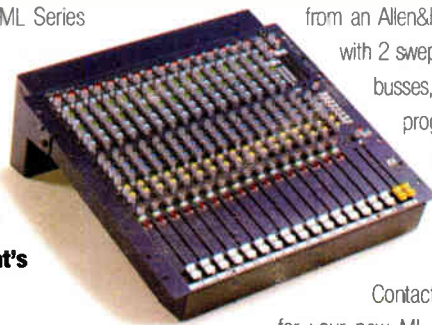
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Evaluating audio products for professionals in commercial recording, broadcast production, audio for video/film, project studios, live sound, contracting and multimedia.

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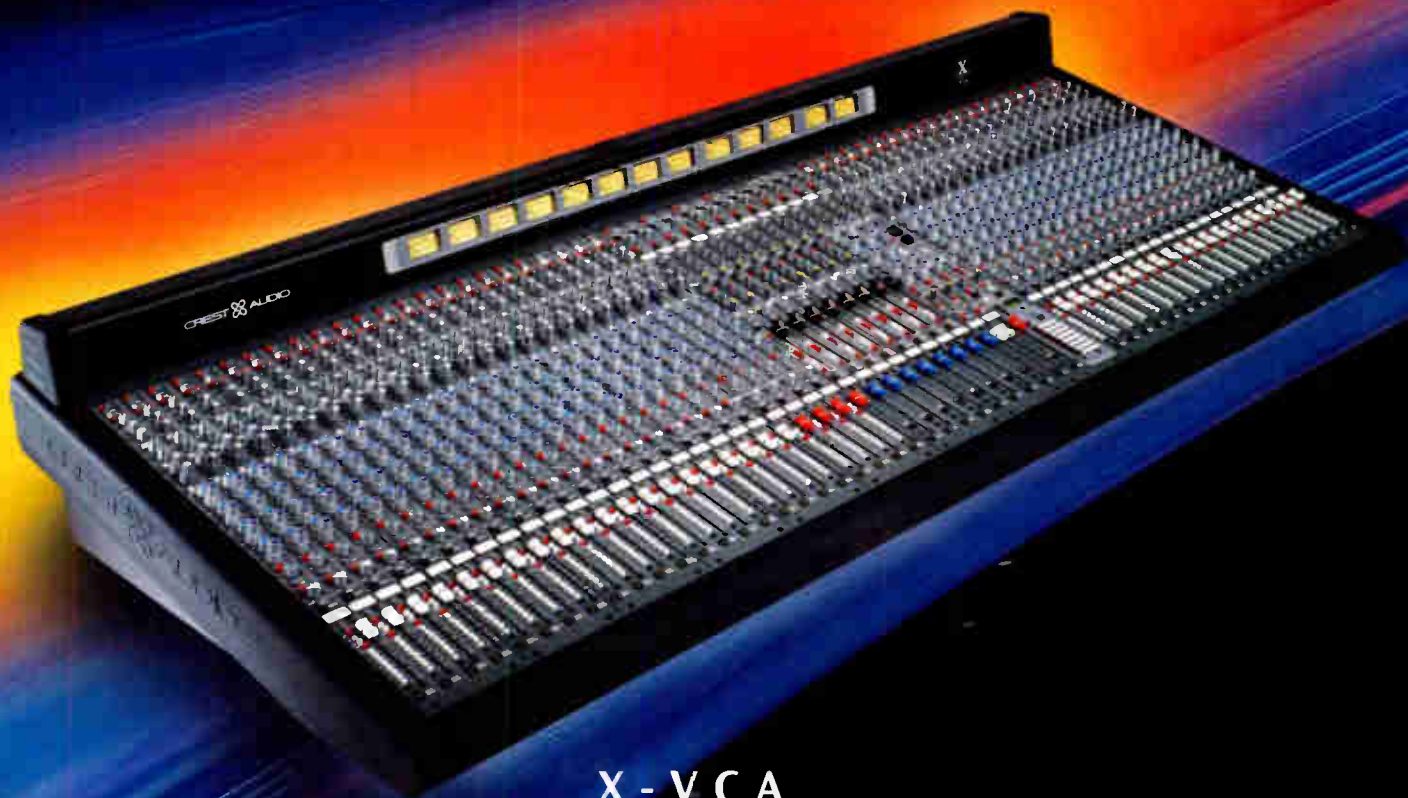
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A FRONT-OF-HOUSE CONSOLE THAT TAKES A BACK SEAT TO NO ONE.



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The X-VCA was designed to satisfy the most discriminating Front-of-House mixing engineer with superior sound quality at every level and a feature set generally found on more expensive consoles. X-VCA is designed for experienced operators requiring the most sophisticated level of performance. Featuring superior VCA performance (Noise/Distortion), the X-VCA uses the finest "THAT" brand VCA elements.

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Touring Gear 2003

PUBLISHER'S PAGE

BY JOHN GATSKI

With the touring season in full swing, *PAR* is proud to offer our Touring Gear 2003

special section. Our "editor-at-large" Steve Murphy, gives a status report on the notable and new gear used in U.S. live sound tours, including the latest consoles, speakers, amps, and microphones.

THE LATEST IN LIVE GEAR

New products to watch include DiGiCo's D5 Live live sound console, Yamaha's first big analog board in several years (digitally controlled of course), the PM5000: a number of new line array speakers and, of course, more powerful amps in smaller packages.

Combine the touring section with our normal May live speaker and console buyer guides and real world evaluations of Audient's Aztec and Crest's X-VCA consoles, as well as Tom Young's hands-on with Meyer Sound M2D speaker system, and you live sound engineers have a pretty good sampling of products.

Speaking of gadgets, SACD (Super Audio Compact Disc) seems to be getting more notice). With much fanfare, Pink Floyd's *Dark Side of the Moon* has been released with stereo and multichannel mixes, and I have found regular pop releases, such as the Beck's *Seachange* now available on SACD.

DON'T JUST PUSH "PLAY"

On the other hand, DVD-Audio has a lot of catching up to do. There are a few titles out there, but not nearly as many as SACD. The same is true with the players. Speaking of players, I recently tested a number of SACD/DVD-Audio video players, as well as DVD Audio/Video only players. And a new trend seems to be emerging: you need a video screen to operate these machines - especially, DVD-A.

Because of the influence of home theater, there are few DVD Audio-only players. This

means that a studio guy who wants to have a reference DVD-A player, will probably buy a video/audio combo unit. But unlike a CD player (and most SACD- only players), where you just toss in a disc and push Play, DVD-A players are a different story.

For instance, I recently tried out a \$1,000 Panasonic DVD Video/DVD-A player. I hooked it up in my studio without reading the manual (do I have to?), inserted my new Eagles *Hotel California* DVD-A and pushed Play. Instead of the expected, near-master quality two-track, I heard a crappy sounding, stereo playback of the disc. "This is DVD-A?", I thought. "It sounds like MP3."

So I started to read the manual, and found that DVD-A soundtracks are divided into Groups and each of these Groups can contain any audio the producer wants to place on the disc, including discrete 24-bit/96 kHz surround and stereo soundtracks, DTS soundtrack and Dolby Digital soundtrack (for DVD Video player compatibility), and commentary soundtrack.

I discovered that simply inserting a disc and hitting Play starts the disc at Group 1, which may or may not (in my case) be the audio you want to hear.

With most of the DVD-A discs that I have, Group 1 is the surround 24-bit/96 kHz version soundtrack. But since I was in a stereo hookup configuration, the machine figured out that only two channels were connected. As a result, it downmixed internally the Group 1 surround soundtrack to stereo. Hence, the crappy sounding, stereo mix at a reduced volume.

Since the playback sounded horrible, I moved the player to a video screen hookup. I then discovered, via one of the many on screen menus, that Group 2 was the 24-bit /96 kHz discrete stereo mix that I wanted. I toggled through the Groups menu, found Group 2, hit Play, and found the excellent-sounding audio that I was looking for.

The moral of this story: you can't just push "Play" anymore.

John Gatski is publisher/executive editor of Pro Audio Review.

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Jeff Rona, M-Powered.

“My studio is a magical place to me, where I choose those tools that best help me convert my ideas and imagination into music. Everything in the path from inspiration to final product should work together seamlessly, from synths to speakers. I’m using the new **BX-8** speakers not only because they sound absolutely brilliant (even after an exhausting 18 hour writing day), but what I hear in my studio comes across exactly as I intended, wherever my mixes go.”

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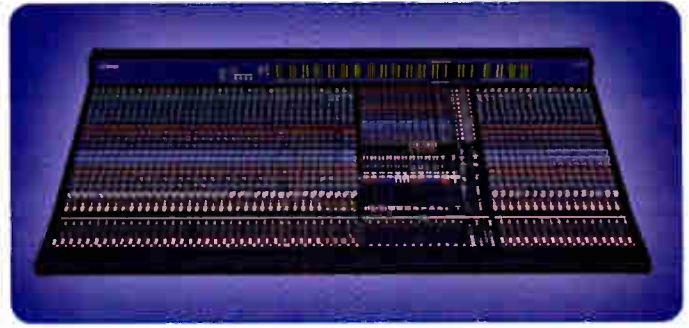


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www.m-audio.com/bx857

Yamaha PM5000 Console

Yamaha's new PM5000 has some big shoes to fill, those of the very popular (dare one say 'industry standard'?) PM4000 live sound console. Channel choices range from 28 - 52 and include four-band EQ, variable high-pass filters, phase control and 26 dB pads. Though it is an analog board the desk will utilize digital memory for instant program setting recall. While the PM5000 is very similar in operation to its predecessors, new is a "Sum Gain" function for putting a prefader pad (attenuator) into the mastering section. Like the PM4000, the PM5000 can handle front-of-house or monitor duties. Contact: Yamaha at 714-522-9011, www.yamahaproaudio.com.



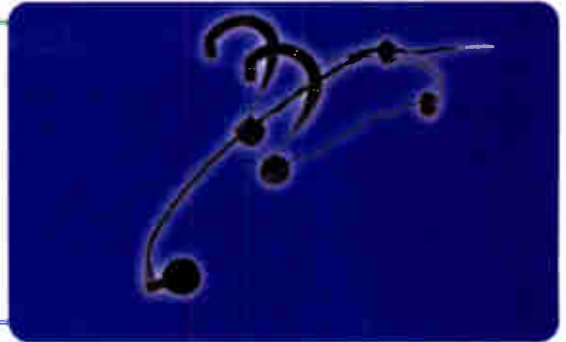
Alesis DEQ830 Graphic Equalizer

Bigger than the average graphic equalizer, the DEQ830 from Alesis is an eight-channel 24-bit 30-band, 1/3 octave digital EQ. Unusual in an EQ, the DEQ830 offers eight channels of ADAT I/O along with the usual 1/4-inch TRS I/O. Also included in the package are MIDI I/O, 100 programmable user presets, 50 factory presets and +4 dBu/-10 dBV operation. All of this is packed into a 1RU box. Price: \$599. Contact: Alesis at 310-821-5000, www.alesis.com.



Shure Beta 54 Headworn Microphone

Bringing Beta to the headworn, Shure's Beta 54 is designed for live sound vocal missions. Promising a capacity of 149 dB, the supercardioid Beta 54 also specs 20 Hz - 20 kHz in performance. The kit includes a snap-to-fit windscreen, detachable boom mount, adjustable headband and a choice of black or tan colors. Available in wired or wireless versions. Price: \$509.65 - \$594.64. Contact: Shure at 847-866-2200, www.shure.com.



Marantz PMD351 Cassette Deck/CD Player

As part of its new and independent operations Marantz Professional has launched the PMD351 cassette deck and CD player. Each section is independently operable. The cassette recorder offers autoreverse and Dolby B and C. The CD player offers playback compatibility with CD-R, CD-RW, MP3 and unfinalized CDs. The unit also includes pitch control, a headphone jack and a remote control. Price: \$749.

Contact: Marantz Professional at 630-741-0330, www.marantzpro.com.

Peavey Color Cue Microphone Cables

Going one step beyond the industry trend of coloring and upgrading mic cables, Peavey is lighting them up. The Color Cue cable system uses phantom power to illuminate colored lenses in the XLR connectors on each end of the cable. Currently the cables are available in 20-foot lengths and in red, green, blue, yellow, white, magenta, purple or orange. Price: \$43.99. Contact: Peavey at 601-483-5365, www.peavey.com.



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Crest X-VCA Console



BY DAVID RITTENHOUSE

In this day and age of new technology can there be a better front of house console? Have we seen all the market has to offer? Should we have analog, digital or some other form of hybrid? Well, Crest answers these and many more questions with their new high end X-VCA console.

FEATURES

Crest's X-VCA is chock full of impressive features starting with a variable configuration frame size of 24, 32, 40, or 48 mono and four stereo channels. Channel inputs offer both mic in on XLR, or line in on 1/4-inch TRS. Inserts per channel are dual point TRS, send and return. The studio quality mic preamp has a frequency response of ± 1

dB from 20 Hz to 20 kHz at +4 dBu from any input to any output. Noise is rated at output as less than -80 dBu with the output fader at 0 dB and 24 channels routed to source. Each input channels features switchable phantom power (48V), a 20 dB switchable pad and a switchable polarity reverse. All mono input channels feature a four band

one will control the level sent, while the knob for 2 will be a pan control for left to right within the stereo field. Aux send 5 - 6 and 7 - 8 are already set up with concentric knobs for ease of use if in stereo mode.

Each channel has its own level meter next to the fader. It is a simple five-segmented LED meter. One green LED at the bottom is

Crest's X-VCA is chock full of impressive features starting with a variable configuration frame size of 24, 32, 40, or 48 mono and four stereo channels.

Applications:

Live sound, front of house, touring or club install

Key Features:

24 - 48 channels; four matrixes, left, right, center/mono; eight VCAs; eight groups; groups and LCR outs have internal dynamics

Price:

Starts at \$19,000

Contact:

Crest Audio at 201-909-8700, www.crestaudio.com.

full parametric eq, while all stereo channels are sweepable in all four bands. Channel EQs feature gain control of ± 15 dB in all four bands with frequency ranges of 40 Hz to 20 kHz divided across the four bands. A high-pass filter is also available with a frequency range of 20 Hz to 400 Hz. There is also a direct output for all mono input channels.

The X-VCA has eight aux sends allowing for a variety of controls. The auxes can be assigned to be pre or post fader in pairs; i.e. 1 and 2, 3 and 4, etc. They can also be converted to stereo pairs from a switch at the master section. This allows for example 1 and 2 to be one stereo send. The knob for

for signal present while the next three represent -6 dB, 0 dB, and +8 dB. The last LED, which is red, is a peak overload indicator. Next to the fader are all of your routing assignments. Simple push buttons allow signal to be sent to any of the eight groups or stereo out, left, right or mono and lastly a left-center-right configuration. This LCR setup uses the mono out for the center send and allows the pan control to distinguish the appropriate levels to all three outputs within the soundfield.

Working your way through the X-VCA you will find the bankroll placed in the master section. Here we have the aux output control, eight group masters, matrix sends

and master control, and eight VCAs. The real motherlode is the dynamics attached to all group outs. This consists of variable ratio compressor/limiter and a downward expander gate that can be use separately or together. There are also output EQs and RMS limiters on the primary stereo and mono outputs. Now all this can be controlled and monitored in the master section via the group dynamics section. The controls consist of threshold, ratio, and soft knee switch, a vox and perc switch for controlling the preset attack and release times, and a gain reduction meter. There is also a concentric threshold and ratio knob for gating control. You are able to link the comp and gate controls for stereo operation across two groups (odd and even) by a stereo link switch. Every mono input, group out, and stereo/mono out have insert capabilities as well as the internal dynamics.

The matrix section features four independently controlled matrixes assigned from the groups, left, right, and mono sends. There is also a post switch to the matrix, which allows the send to a matrix to be post fader - a nice feature if you need more outputs to be independently controlled from one another. Each channel and each output has its own mute control that can be controlled manually or programmed in as different mute scenes. The microprocessor controlled mute scenes can be programmed much like a lighting or theater console to provide up to 128 different scenes. This also corresponds to external MIDI ports to operate midi functions on other external gear such as effect units. There are eight manual (keyed) mute scenes and rest can be sequenced via an up and down paging method with a "go" command key. VCA assigning is done in a similar fashion. By pressing the VCA edit switch you can assign any input or group channel to that VCA. Very easy and efficient.

The master section also features a pink noise generator that can be assigned and routed through the talkback control to main outputs. The talkback has an XLR in and level control with a momentary "soft" switch which can also be latched on. There are talk back in and headphone outs located on the top and front, under the armrest, for ease of use. You can also assign the left, right, center capability to the headphone and

alternative outputs. The X-VCA has alternate output features in line with the main (LCR) and a monitor out. These can become quite useful in big venues for such things as assisted listening devices and closefield monitors or even press/video feeds for a corporate style show.

The entire X-VCA lines of consoles run off of an external power supply, the Crest 5A. Crest, thinking ahead, incorporated the ability to run redundant power supplies so that if one fails (God forbid) the other will take over without interruption. Knowing this should ease the stress of anyone who has ever had a power supply fail... it can be a show ender.

IN USE

At first sight the X-VCA is really impressive, but once you have it sitting at front of house with a full band in front of you it just gleams. I was working with the 32-mono channel version with four stereo channels. It took a little bit of time to understand the

Product Points

CREST X-VCA CONSOLE

Plus

- + Great mic preamps
- + Internal dynamics
- + True LCR capability
- + Sound quality

Minus

- Needs routing status lights
- Crowded rear jack panel

The Score

Overall, this is a great console that is versatile and performs sonically with all the big boys.

routing and layout of the console to get a good feel for its ease of use. The channel strip starts at the top with the gain, pad, and phase reverse as any other console would. After that, the next section down contains the aux sends. Now if you're like me you've gotten used to some of the Japanese consoles that have the EQ section and then the aux. sends. With this said, I liked the layout because that the eq section of the channel is actually closer to the fader since you will reach for that more often (and need to get

there quicker) than the aux sends. The meters are good and bright and placed next to the routing assignments for each channel. It would have been nice to have the routing assignment buttons light up so that you can easily glance at a channel and know what was routed where. One thing I have always liked with Crest consoles is the left, center, right capability. If you have the setup for that configuration it can really sweeten a good mix!

Now for the "meat" of the X-VCA. The mic preamps sound fantastic. Just as good as some of the higher priced British consoles. The output dynamics, which are across all the groups and main outs, are a wonderful feature. For the show that I used the X-VCA on, a corporate gig with a dance band for the entertainment, being able to assign the lectern and vocals across groups that have internal compression was easy and sounded fabulous. I was still more inclined to insert gates on drum channels due to the fact that the gates on the X-VCA groups are not frequency tunable. In the long run, big deal. One single rack space of four gates is easier to lug around than an entire rack of gates and comps. The guest engineer, who had never seen or even heard of the X-VCA, was very impressed. We came to the conclusion that this new generation of hybrid (yet lower priced) consoles is what we'll be seeing a lot more of.

SUMMARY

Through out setup and show all, including myself, were thrilled with the superior sonic quality and versatility of the X-VCA. Previous to this, the last Crest console I had worked on was an old LM series. Crest has since jumped by leaps and bounds to get to the X-VCA. To quote another engineer working at RCI "This console rocks.... We need to own one!"

David Rittenhouse is a senior live sound engineer at RCI Sound Systems and a regular contributor to Pro Audio Review.

REVIEW SETUP:

EAW KF 650 speakers; QSC amplifiers; dbx Drive Rack processor; Shure Beta 98, 58, SM 57, 56, Sennheiser MD 421, AKG 391 microphones.

Meyer Sound M2D Compact Curvilinear Array

BY TOM YOUNG

Meyer Sound, a company established by John and Helen Meyer in 1979, has been known for innovative products for more than two decades. Meyer Sound has always looked beyond loudspeaker cabinet design to create totally integrated, systems-comprehensive solutions that encompass transducer design, signal processing and power amplification. The M2D Compact Curvilinear Array uses these foundations in its design, and at \$7,500 list price, is a powerful product worthy of consideration by anyone in the market for a mid-sized line array speaker system.

FEATURES

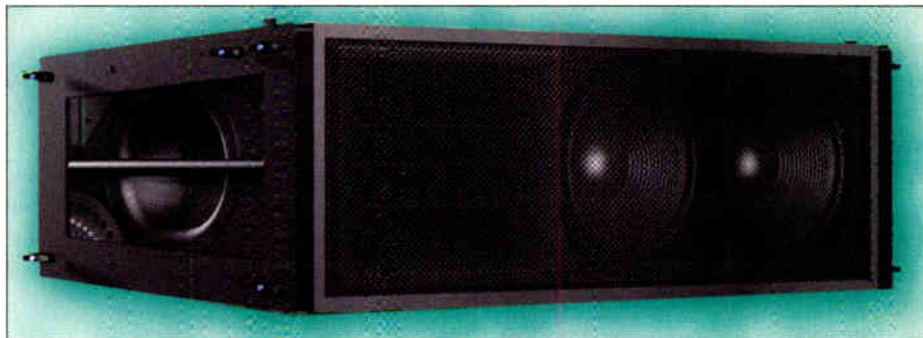
The M series comprises three loudspeaker types: M3D Line Array (large venue), M2D Compact Curvilinear Array Loudspeaker (medium venue), and MID Ultra-Compact Curvilinear Array Loudspeaker for small venue applications. All types of M series loudspeakers come with their own subwoofer product. The M series are self-powered loudspeakers that use Meyer's QuickFly rigging and integrate with most other Meyer Sound loudspeakers. Using traditional linear array principles, these loudspeaker systems utilize advanced engineering to optimize line array

Applications:
Live sound, sound reinforcement

Key Features:
Twin 10-inch drivers; high-frequency compression driver with a 4-inch diaphragm with Ribbon Emulation Manifold technology and 90-degree constant directivity horn; onboard 600W MOSFET power amplifier; QuickFly rigging system

Price:
\$7,500

Contact:
Meyer Sound Labs at 510-486-1166, www.meyersound.com.



performance for consistent, reliable coverage. The RMS (Remote Monitoring System) is standard and weather-protected versions are available for outdoor applications.

The M2D Compact Curvilinear Array Loudspeaker is for medium-scale reinforcement applications where the need of vertical coverage is the main consideration. At physical dimensions of 39 inches W x 12.1 inches H x 17.5 inches D and 116 pounds, it is compact but not in its performance. The M2D is designed to provide a vertical array of up to 16 cabinets having 0 to 7 degrees of splay between speaker cabinets. Operating frequency range is 60 Hz - 16 kHz. The flexible system allows the tailoring of vertical coverage by varying the number of speakers and splay of units in the array while maintaining 90 degrees of horizontal coverage.

The M2D-Sub Compact Subwoofer, flown on top of the array, extends system bandwidth to 30 Hz and increases low-frequency acoustical energy. The M2D is loaded with two 10-inch mid-LF drivers and one HF compression driver with a 4-inch diaphragm. Utilizing Meyer's REM (Ribbon Emulation Manifold), it couples a single compression driver to a 1.5-inch exit on a 90-degree constant directivity horizontal coverage horn.

To maintain the smoothest response in the critical midrange, the M2D uses a complex crossover design where the lowest frequencies are reproduced by combining the 10-inch drivers, while in the mid frequencies the crossover only feeds one of the two 10-inch drivers.

The Meyer M2D uses a MOSFET power amplifier with 700 watts total output capability. Each driver in the subwoofer is rated to

handle 1,200 AES watts with a two-channel MOSFET amplifier. Automatic voltage selection is built into the power supply, which is a good feature that enables the system to work worldwide, with no need to manually select the voltage supplied. This high output compact system is rated at a maximum peak SPL of 136 dB at 1 meter for the array speaker and an impressive 139 dB at 1 meter for the subwoofer — very efficient, indeed.

QuickFly rigging for the system is well-designed. Using front and rear adjustable links splay adjustments are a snap, eliminating the need of a pull-back strap. All rigging connections use quick release pins for quick setup and tear down. Designed with transport and packing in mind, an optional road case accommodates either two stacked M2D Compact Speakers or a single M2D Sub.

With ease of setup and touring in mind, Meyer has offered a Veam all-in-one connection as an option. This outstanding feature replaces the Neutrik AC connector and places AC power, audio signal and RMS data into one multipin, quick make-and-break connector.

IN USE

I used the M2D speakers with M2D subs at the Cerritos Center for the Performing Arts in southern California with Tony Bennett, and Frank Sinatra Jr. and a 42-piece orchestra, which gave me ample time to listen to the system. A typical left and right speaker system was employed with two M2D Subs flown with 10 M2D Curvilinear Array speakers per side. Each cluster was flown off of one point, as that was all that was available at the venue. It

continued on page 16 ►

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There's more than meets the eye to the new instrumental KSM studio condenser microphones from Shure. There's performance, heritage and versatility. The dual-pattern KSM141 switches from cardioid to omnidirectional with the turn of a dial. The studio-workhorse KSM137 powers through percussion and soars with the solos.

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► *Meyer Sound from page 14*

assembly and rigging is well-designed and was quick and efficient to fly and set coverage angles.

The sound system for this engagement was initially designed with the use of the Meyer Sound MAPP Online multipurpose acoustical prediction program design software. It illustrates the speaker's response and coverage with determined speaker angles. This program also provides soundfield and SIM virtual frequency response predictions. It is an incredibly powerful tool to use when designing sound systems for any physical space. After the system was flown, Dave Lawler, the contractor for the Cerritos installation, was on-site to provide SIM System II FFT analysis of the room and setting of initial EQ, gain and delay settings of the various systems.

This was the first time I used a line array system where the cluster was zoned. Using a BSS Soundweb, the M2D speakers split up to provide separate gain control and EQ of the flown subs, top two speakers, next four speakers down, and bottom four speakers in each

cluster. This was critical in achieving consistent coverage and sound quality throughout the whole venue — easy to setup with a self-powered system.

Upon initial listening to the speakers with a CD, I was immediately impressed with the speaker imaging and even quality of the sound while walking the entire theater. Listening to the system with Tony Bennett and Frank Jr.'s vocal microphone capsule — the Neumann KK-105 — I found the system to be very clear and transparent in the midrange and high frequency. After some EQ adjustments at the console to optimize the sound of the vocal microphone, I found it provided everything I would want from a sound system. This compact curvilinear array provides an astonishing amount of punch for its physical size. The flown sub bass is amazing and offers a very tight, full response of sound all the way to the top of the theater.

When listening onstage, I was impressed with the lack of sound that comes off the back of the speaker clusters providing excellent isolation of the PA to the stage sound. When I

stood onstage with the monitors on, I would not have known the sound system was on; the image on stage was perfect. This was even more evident considering I had 68 open microphones used on the orchestra. All of the instruments had a very natural open sound to them, exactly what I look for in a quality sound reinforcement system.

SUMMARY

The Meyer Sound M series takes the company's inventory another step in the right direction. Since the 1980s it has been known to manufacture engineered products that excel. It has been aware of the need to provide horizontal arrays with trapezoidal cabinets. The M Series extends this concept vertically, covering every application where vertical coverage is desired. I would have no reservations about taking out a Meyer M series in the future. Its quality of sound, rigging features and optional Veam connections make this a sure winner.

Tom Young, a regular contributor to Pro Audio Review, is currently the live sound engineer for Tony Bennett.



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Audient Aztec Live Console

BY STEPHEN MURPHY

Founded in 1997, UK audio manufacturer Audient PLC has made quick inroads to the live, studio and post production markets with its short list of well-received products.

Audient's product catalog includes the ASP500-series surround sound and bass management controllers, the ASP8024 studio console and the new Aztec live console, reviewed here.

The Audient Aztec is a fully modular front-of-house (FOH) live performance mixing console that includes several dedicated features to make it configurable as a monitor desk as well.

Company principals David Dearden and Gareth Davies (the two 'D's of U.K. manufacturer DDA) and Martyn Flood have

brought to the Aztec their considerable experience as the original designers of several popular live mixing boards, including the DDA Q and QII, and the Midas XL2000 and Legend series consoles.

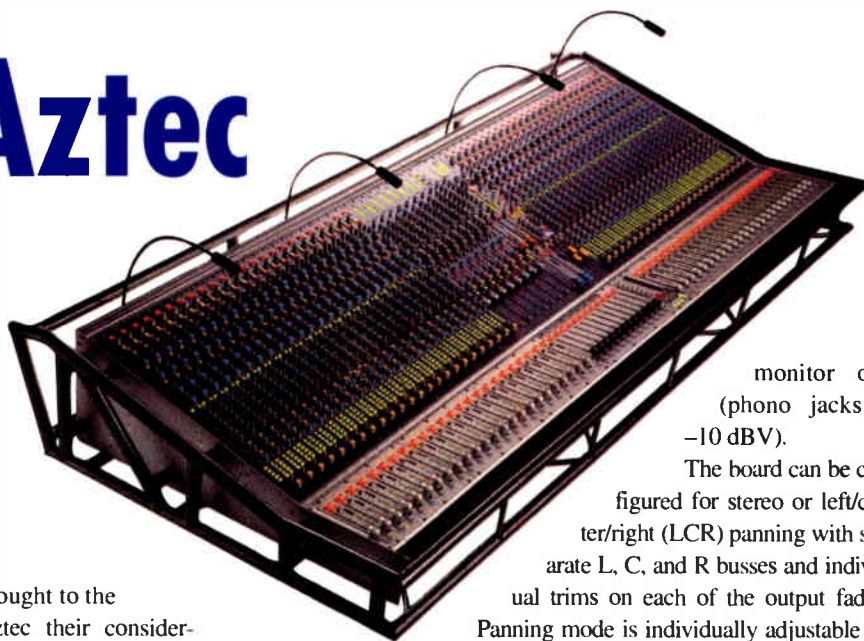
FEATURES

The Aztec is designed for both touring and fixed-installation applications and can be fitted with 32, 40, or 48 mic/line input channels (\$39,700, \$44,800, and \$49,900 respectively). All models include two stereo line level inputs for returns and a stereo "ambience" microphone input to facilitate in-ear monitor mixing. The model made available for review was the 48-input Aztec; unless otherwise indicated, physical specifications refer to this model.

One of the board's most noticeable features is its unique "exoskeleton," a tubular aluminum frame structure that encages and supports the board. The exoskeleton also provides physical protection and easy means for handling and transportation of the desk.

Audient offers optional touring gear for the Aztec including a heavy-duty flight case, redundant power supply units and LittleLite illumination. An optional VU meter bridge is also available.

General features of the Aztec include peak-reading LED output meters switchable between groups, matrix and auxiliary outputs; 12 auxiliary outputs configured as eight mono and two stereo sends; eight subgroup outputs and a 12 x 8 matrix. Each auxiliary, subgroup and matrix output on the console has balanced insert points. All audio connections on the console are +4 dBu balanced, with the exception of a duplicate set of main outs and ext.



monitor outs (phono jacks at -10 dBV).

The board can be configured for stereo or left/center/right (LCR) panning with separate L, C, and R busses and individual trims on each of the output faders.

Panning mode is individually adjustable per input channel via a LR to C blend pot; Audient has incorporated a 3 dB drop at the full center position of the L/R busses.

Control and automation features include 12 dedicated faders for level, mute and solo control of the Aztec's 12 assignable VCA groups. MIDI message output for control of outboard equipment and 999-scene mute and VCA assignment automation is also standard. Up to nine additional scenes can be inserted per main scene (e.g. Scene 1.1, 1.2, 1.3 and so on up to 999.9).

The input channels feature in/out switchable four-band equalization. The high-mid and low-mid filters are fully parametric, and the "treble" and "bass" filters are frequency-sweepable and provide a switch to select bell or shelf modes. All input channels also have a sweepable 12 dB per octave high-pass filter just after the input amplifier stage.

Audio devices inserted on the channel's balanced 1/4-inch insert points can be switched in and out of the audio path via the "Ins In" button. Each input channel has an eight-segment input meter located to the right of the channel fader. Also on each input fader pack is a VCA "Set" button, 12 VCA group LED indicators, an automation "Safe" button and illuminated solo and mute buttons.

According to the manufacturer's specifications, preamps are high-performance transconductance microphone amplifiers with variable gain from unity to 60 dB; line level inputs have a gain range of -10 dB to +25 dB. Mic inputs can take a maximum level of >+21 dBu (>2 k ohms, min gain) and line inputs can take a

continued on page 20 ►

Applications:

Fixed installation and touring live sound

Features:

Fully-modular LCR-capable 32 - 48 channel FOH console; additional features for monitor use; four-band EQ with parametric mids and sweep HF and LF with switched bell/shelf curves; 12 auxiliaries (8 mono/2 stereo); 8 LED input meter on each channel; 8 subgroup outputs; 12 VCA subgroups; 12 x 8 matrix; mute and VCA assignment scene automation

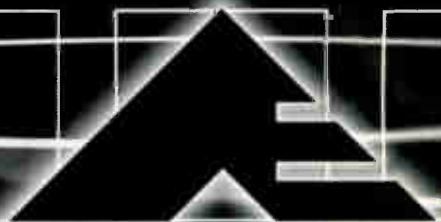
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- On-board Ethernet interface for monitoring and controlling system parameters with included software (5000 Series receiver)
- All transmitters offer rugged, ergonomic metal bodies, programmable features, soft-touch controls, and 10 mW/35 mW switchable RF power

► *Audient from page 18*

maximum level of >+35 dBu (>10 kohms, min gain). Crosstalk and mute attenuation of the main buss assigns and fader mutes is >90 dB (@ 1 kohm).

Audient provides as standard the ability to link the audio busses (on XLR or DB-25 connectors), VCA control (15-pin D-sub) and automation systems (9-pin D-sub) of the Aztec console to additional Aztec consoles and extenders.

The Aztec console boasts many other features not covered due to space limitations. The operating manual, data sheets and brochures can be downloaded from the Audient web site.

IN USE

Evaluation of the Audient Aztec 48-channel console was done in a live performance hall and at an Audient demonstration room.

I first saw and heard the Aztec console at the 9:30 Club in Washington, D.C., a popular 1,200-capacity nightclub that has been host to a wide variety of musical artists ranging from Bob Dylan to Red Hot Chili Peppers to Vince Gill.

9:30 Club Head Engineer Shawn "Gus" Vitale used the Aztec over the course of several weeks during which the list of performers included James Brown, Guided By Voices, Pork Tornado and Paul Weller. Vitale contributed his experience and thoughts to this review.

The board was easy to set up and strike, thanks to its low weight (231 lb.) and exoskeleton frame design – two people could easily and comfortably move console. Vitale emphasized the importance of a board's handling ease in a club like the 9:30, where other touring FOH consoles are swapped for the house mixer on a regular basis.

The flexibility and well-thought out organization of the Aztec's rear panel also contributes its ease of setup. Most audio inputs and outputs are provided on both DB-25 connectors (wired to TASCAM DA-98 analog standard) and individual balanced connectors (most are on XLR, with TRS 1/4-inch jacks for insert inputs and outputs, channel line ins and channel direct outs).

The audio fidelity of the mic preamps, and the mixer in general, was excellent – the board also has very good noise and crosstalk performance specs. One thing to note is that the first units did not have a pad for the mic pre but subsequent builds do have a pad and older models can be retrofitted.

We found the VCA control and scene automation to be both easy to use and well-implemented. The VCA subgroup channel LED indicators provide an quick visual reference. The inclusion of balanced sets of insert inputs and outputs on just about *everything* (channels, mains, subgroups, auxiliary sends...) was a real bonus.

Another handy feature is that the Aztec allows panning between even and odd subgroup pairs by engaging the "SG Pan" button and selecting the appropriate subgroups assigns(e.g. 1/2, 3/4, etc.).

sound check or show for the performer right after recording, or playing back the signals for preliminary set up/sound check in the next venue etc.

Vitale said Phish drummer Jon Fishman and his solo band Pork Tornado put the Aztec's recording features to good use when they made a multitrack digital recording of their 9:30 Club appearance.

We did have a few quibbles with the ergonomics and detailing of certain areas of the board, especially in the channel EQ section. Most notable was the small size of the

We found the VCA control and scene automation to be both easy to use and well-implemented.

Considering there are 12 auxiliary sends, it is understandable that each does not have its own pre/post switch. Audient does provide some flexibility here, especially compared to boards that provide only permanently pre and post sends. On the Aztec, aux sends 1 through 8 can be placed pre or post fader in groups (1, 2/3, 4/5, 6/7/8). Auxes 9/10 and 11/12 are configured as stereo sends, each with a pan and level pot, and each pre or post selectable.

One of my favorite features is the Aztec's built-in provisions for live multitrack recording and playback. Post-preamp balanced direct outputs are available for every input channel on both 1/4-inch and on 25-pin D-sub connectors.

For listening back to a multitrack recording, each channel also has a direct input (in addition to the standard line and mic level inputs). The balanced direct inputs are on 25-pin D-Sub connectors in groups of eight channels. The direct input is routed to the channel strip by pressing the "D In" button just under the Mic/Line switch.

Kudos to Audient for including an independent level attenuator knob for each direct output; this can save lots of hassle – or even the recording – when going into a multitrack recorder. The ability to easily play back the source multitrack recording through the same channels allows for some interesting possibilities like playing back the

frequency adjustment knobs and insufficient labeling of the EQ section in general.

For instance, the low-mid frequency knob is labeled .1 kHz and 2 kHz at its extremes with nothing but dots in between; boost/cut knobs have no dB indication whatsoever. To some extent, one can make the "use your ears" argument, but that does not hold up when trying to make quick live changes or when writing down mix settings or recalling written settings.

SUMMARY

Overall, we found the Audient Aztec console to be an excellent sonic performer with lots of nice features. Physically, the board is very light and easy to handle thanks to its unique aluminum exoskeleton frame, and the well-organized rear panel uses high-quality Neutrik connectors.

The matrix and routing provisions are extensive without becoming confusing, and the additional implementation of dedicated level-adjustable direct outs and "remix" ins makes easy work of multitrack live recording and playback.

Stephen Murphy, contributing studio editor for PAR, is an audio engineer and record producer. Shawn "Gus" Vitale, head audio engineer at the 9:30 Club in Washington, D.C., contributed to this review.

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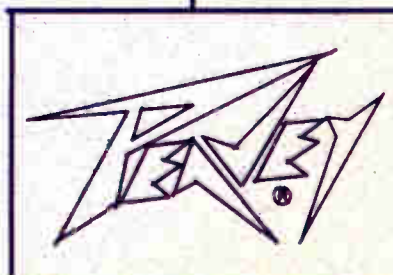
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Groove Tubes Condenser Microphones

BY DANIEL KUMIN

It's true that I'm something of a microphone Luddite. I figure, if I can't get the goods with my aging pair of AKG C1000 condensers and a trio of Shure SM57s, I am doing something wrong. (Hey, when all you've got is a hammer, pretty much everything looks like a nail.) So when the editors asked me to overview a quartet of new Groove Tubes mics, I accepted with alacrity.

Groove Tubes, now distributed for the most part by M Audio, like a number of other makes in recent years, has turned to China for the manufacture of this high-value family. But don't take this the wrong way: This is some serious hardware, and these mics show every sign of having been carefully made using top-grade materials.

FEATURES

There's a lot of ground to cover here, so let's lay out the basics. Groove Tubes' GT33 is a 3/4-inch, gold-evaporated capsule "top-firing" condenser mic with Class A topology, FET-based solid state electronics. You get a very solidly made mic with all-metal internal rails, metal sleeve and screens, respectably heavy-looking transformer and tidy board layout with careful wiring and soldering inside, whose features are confined to switches for sensitivity pad and bass rolloff (both solid-feeling, metal micro-toggles.) GT's paperwork notes the rolloff as working below 75 Hz, and the GT33's pad as 15 dB, which my trials tended to confirm; however, the graphic screened on the mic itself reads "10 dB." The GT33 is packed in a rather fancy, fabric-covered clasp-case, with a classy metal-based standmount.

Next up is the GT44: self-same mic, but with 6204 tube internals. Same capsule, same rolloff and pad switches, same mechanical construction, but finished in silver (even nicer, to my eye) in place of the FET mics' flat-black. The tube version's internal construction is similar to the 33's, with the same trans-



former, but of course with that magical tube in place of the FET stage. The subminiature 6204 is soldered to the board, so tube replacement (if you live that long) would not be for the faint of heart (or near of sight). The GT44 kit is packed with an appropriately-sized, elastic-trap shockmount (again, all-metal save the rubber bands), and, of course, a brick-size (and weight) AC-powered phantom power supply that sends the requisite voltages down the pipe to the GT44's tiny vacuum tube. A 30-foot 7-pin cable is provided to tether the mic to the supply, as is an IEC AC cable.

Move up to the GT57, another FET-based mic, and we are talking a dual-sided 1.1-inch gold-evaporated solid-brass capsule half the thickness of the GT33/44s (3 microns versus 6), with the attendant polar-pattern selector marked with little omni, cardioid, and figure 8 graphics. Groove Tubes integrates a "Disk Resonator" into its large-diaphragm mics for "extended frequency response ideal for accurately capturing the realism of just about any sound source." (Conceptually, I believe that

this is not entirely dissimilar to the "whizzer cone" sometimes used to extend the effective response of a one-way speaker.) The GT57 includes the same pad (10 dB) and rolloff switches as the other GT mics, but the bigger mic comes with an all-metal screw-in stand mount. The 57's innards, though built along more or less the same lines as the '33's FET stage, are completely different, and the larger mic employs a toroidal transformer that I'm guessing features a lot more iron (the 33's transformer is an E-core item, I believe).

Lastly, we come to the GT67, which is, you guessed it, the tube version of the GT57. It is the same mic, but with the 6204-based tube electronics, large, toroidal internal transformer, and packaged with the same power supply and cables as the GT44 single-capsule tube model, but with the addition of a "proper," screw-on, full-suspension cat's cradle shockmount. One other, more technically significant difference is that the GT67 adds a super-cardioid position as a fourth pattern

continued on page 24 ►

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Our new AC 24 combines the power of Rane DSP with straightforward, simple-to-use analog controls.

With rotary knobs on the front and formidable digital signal processing power inside, the AC 24 does things no other stereo 4-way crossover can.

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When you press the Stereo Link button, the left channel becomes the master and the right channel becomes the slave. LEDs show the status.



Separate left and right input controls with overload LED.

Low Frequency Mono button.

The AC 24's internal DSP lets us include a 0 ms to 10 ms delay on each band so you can time-compensate your drivers.

Individual/linkable limiters let you crank out maximum SPLs. Separate dual-band CD Horn EQs optimize compression driver frequency response.

All this with *perfect phase accuracy*, higher reliability than analog units and top notch RFI immunity.

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AC 24

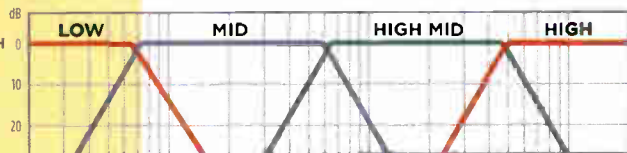
- 4th-Order, 24 dB/octave Linkwitz-Riley alignment
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- Summed output
- Universal internal power supply

Link switch applies the same limiting to all channel bands. Or apply different limiting to each band. LEDs show the status.

Hi-Mid / High crossover point (4-way mode) is variable from 1.25 kHz to 12.5 kHz.

0 ms to 10 ms delay control on each band.

Inside, a universal power supply automatically switches to any local voltage.



Typical 4-way crossover application. Dial it into the AC 24 without hooking up a computer or (dare we say it?) dragging or dropping anything.

Thank you Siegfried Linkwitz (and Mr. Riley, too). They came up with the filter design; we pioneered its use in pro audio. Maintaining Linkwitz-Riley crossovers' phase accuracy at 24 dB per octave is no easy feat using analog components. It also requires proper delay for each transducer. That's the beauty of the AC 24 — it does its work in the digital domain, maintaining perfect filter phase accuracy and allowing the easy addition of individual delays.

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► *Groove Tubes from page 22*

option, selected via a fourth mini-toggle switch.

I messed about with these GT mics for the better part of two months, mostly on acoustic guitar, Fender bass (well, G&L, actually), and vocals. I was more than mildly impressed. There is an enormous palette of sound-shading colors here, but in every case I heard smooth, flat response and very good noise performance. A bit surprisingly, Groove Tubes does not appear to publish full technical specs for these mics in the paperwork accompanying them, nor on the web site. So I cannot list their rated impedance, self-noise, output, sensitivities, or anything else. But none of these mics struck me as noisy in the slightest, and I would not expect them to limit dynamic range. (However, knowing the technical details would be important in critical applications, as careful mic/preamp matching can sometimes gain a precious few dB more dynamic range.)

I did find specs only for maximum SPL and frequency response on the web site of M-

Audio, Groove Tubes' distributor, and they are as follows. GT33: 150 dB SPL maximum with pad, 20 Hz - 18 kHz ± 1.5 dB; GT44: 145 max SPL with pad, 20 Hz - 20 kHz ± 1.5 dB; GT57: 148 dB max SPL with pad, 20 Hz - 18 kHz ± 1.5 dB; GT67: 147 dB max SPL with pad, 20 Hz - 20 kHz ± 1.5 dB. Groove Tubes states that all of these mics are available in certified matched pairs at no additional charge, and that each one shipped, whether in pairs or in onesies, is within ± 1 dB of a "gold" standard reference.

IN USE

So how do these Groovers sound? I can say that, to relate just one example, recording male vocal and acoustic guitar using just the GT67 for the former and the GT57, at a moderately close-in distance on the latter, produced astonishingly good-sounding takes. The balance of guitar plectrum sound to sustained tones, from just the single mic, was the most surprising thing I heard. Overall, the recordings I made this way were entirely record-store-plausible,

with both GTs set to cardioid and both low-cut switches engaged (the guitar in question, a mid-60s D-18, has low-end to die for on its own merits). As to the vocals, the artist (myself) literally never sounded so good: warm and depth-y without excess heaviness, but intimately detailed — now if only he could sing a lick!

I confess to having been a bit overwhelmed by the sheer number and variety of mics confronting me. Consequently, I decided to try something completely different, which I report here with flame suit hanging at the ready. I played a really fine 96/24 recording (not mine!) of a jazz piano trio, mixed to mono, via a single very high quality monitor, and set up a single boom-stand in what my ear judged to be the sweet spot relative to the speaker, to minimize room sound. I then recorded the same three minutes of music with each mic in

continued on page 26 ►

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GT57: Dual-sided 1.1-inch true condenser mic with FET Class A electronics; 15 dB pad; 75 Hz low-cut filter, multipattern (cardioid, omni, figure 8).

GT67: Dual-sided 1.1-inch true condenser mic with vacuum tube electronics; 15 dB pad; 75 Hz low-cut filter, multipattern (cardioid, hypercardioid, omni, figure 8); tube supply, shockmount, and cables included.

Prices:

GT33: \$399; GT44: \$699; GT57: \$799; GT67: \$999

Contact:

M Audio at 800-969-6434, www.m-audio.com.

Fast Facts

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The New RMX 4050HD

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RMX 4050HD rear panel view

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	4 ohms	—
MSRP: \$1,779		*FTC Watts †1 kHz, 1% THD

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- The RMX 4050HD provides improved thermal performance that gives you higher continuous power in 2-ohms stereo or 4-ohms bridged applications
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- 3RU chassis only 16" deep
- 3-year warranty. An optional 3-year extended service contract is available.



HEAR THE POWER OF TECHNOLOGY.

► *Groove Tubes from page 24*

turn (I kept all the mics set to cardioid, with pads out and low-cuts engaged), headed by tones for level-matching. I adjusted mic-placement only enough to accommodate the mics' different physical forms and patterns, printing each "take" to an independent track in Digital Performer (I'm still only 48/16, alas, but that's still enough to resolve most mic differences). The idea was I would then synch up the tracks and normalize levels to the tones. Then, by soloing each of the four tracks, freely, I could "hear" one mic against each of the others.

A wacky idea? Absolutely. Scientific? Of course not! Conclusive? Very doubtful. Interesting and fun? You betcha!

Here's a distillate of my listening notes. Keep in mind, of course, that your mileage will vary, and that these comparisons are only valid for this one trial in this one room on this one system - I'm not even saying anyone else will find analogous differences among these four microphones. But that is, indeed, the nature of microphones, and the crux of the partisan appeal the hold for us.

GT33: Focused; discernibly brighter than the others, and thus with the most exciting hammer-attacks. A little sizzly on big cymbal hits, but tight, in-the-room stand-up bass reproduction. Very snappy on kickdrum hits.

GT44: Not surprisingly, just like the GT33 but warmer, and with a "deeper" feel to midrange timbres. (This is probably frequency response effects at work, but this is why folks love tube mics.) Still very open and involving up top, but a bit more relaxed-sounding.

GT57: Quite different from the GT33/44: a bigger "image" altogether (if such a thing is possible in mono!), and decidedly less bright, at least in this setup, than the smaller diaphragm mics. Really good bass sounds: "tight-yet-warm," "quick," "meaty"; all the good things we dream up to characterize satisfying bass sounds. (The GT57 was my choice for recording electric bass using an amp, too: It made my "house" G&L via my Fender "Vibro-clone" home-brewed Vibroverb record better than I have previously heard it. Nice!)

GT67: Less change from the GT57 than

I expected; a smaller difference, relatively speaking, than that I heard between the GT33 and GT44. A little sexier mids; a bit more "singing" tone from legato piano playing; and a little gooier feel on hi-hat rides and soft cymbal work, but otherwise pretty tough to call. I felt that the GT57 sounded a little snappier dynamically, which I guess makes the 67 "warmer"; this also probably explains why I preferred the FET version on bass.

I want to reiterate, in all seriousness, that I do not mean to suggest this exercise as a scientific way to judge microphones. But it sure was fun and it does prove that mics, like speakers, really do all sound different.

SUMMARY

Bottom line is, I was rather taken by the Groove Tubes mics. It's no secret that some dramatically high-value mics are coming from mainland China today, and these models have got to be near the tops of their classes for price-performance. What's more, the level of fit and finish I observed on these Groove Tubes mics simply was not a whole lot less refined than what I expect from zos' leetle Sviss mic makers in all those Alpine countries. Across the board, the GTs' metal-work and assembly were impressive.

With mics like these readily available prices like these—and the Groove Tubes are not the only examples—unless you've got the stupid-money budget of a big-studio builder, it's got to be awfully hard to force yourself to shell out ten grand for a Schnecklegrüber U-571 (or equivalent). And when I stop to think that the GT57, probably my pick for the best bang-per-buck of this quartet, sells today, in adjusted dollars, for about what a new SM57 cost in 1974 or so, it makes me want to weep. Now, where's my hammer?

Daniel Kumin writes for both consumer and pro audio publications and is a regular contributor to Pro Audio Review.

REVIEW SETUP:

JoeMeek mic preamp; JVC XD-Z505 DAT deck (employed as DAC); Korg 1212-I/O (employed S/PDIF in/out); Mac 9600/G3 running MOTU Digital Performer 2.4; Energy Veritas 2.3 monitors; Grado SR80 headphones.

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Great River Electronics

MP-2NV Mic Preamp

BY TIM BOMBA

With the advent of more and more mic preamps on the market, some of the manufacturers are taking into account that the majority of studios are DAW (Pro Tools 001, MOTU Digital Performer, etc.) home/project studios. Great River Electronics MP-2NV dual-channel mic preamp has addressed these points by delivering great sound, and some very useful functions for the DAW user.

FEATURES

The MP-2NV (\$2,699) boasts several useful features. On each channel there is



an input and an output volume control, accompanied by an input and an output vertical LED meter. (I got used to these meters very quickly.) Each channel has a 1/4-inch (send/return) insert point in the rear panel allowing you to insert outboard gear just before the preamp's final gain stage, and consequently before the output volume control.

The front panel has the usual polarity and phantom switches on each channel. One nice touch was that of the input impedance switch (either 300 ohms or

1200 ohms) which came in handy with older ribbon mics requiring more gain. Also included is an output load switch, which puts a 600 ohm impedance across the output signal. I used this more for tonal purposes than technical.

If you are running a host-based DAW, and are dealing with latency delay while recording, the MP-2NV offers a rear panel secondary output (a mult of the output) on each channel at -10 dB. This secondary 1/4-inch unbalanced output can feed your con-
continued on page 28 ➤



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► Great River from page 27

sole and headphone system latency-free, while the main XLR balanced output feeds your recording system's computer.

IN USE

As I was starting to record the band Rush of Ushers from Sweden's Atenzia record label, I thought this would be the perfect opportunity to try Dan Kennedy's Great River mic preamp. In order to get as much experience with these units as possible, Dan allowed us to use the preamp throughout two entire sessions - on a variety of instruments, with a variety of microphones.

Initially, we used the MP on the two Oktava 012 mics we used as drum overheads in an X-Y pattern. The sound was amazingly very natural. By carefully positioning these overhead mics, we captured a superb drum kit sound, adding only a Shure Beta 52 on the kick drum and the snare's Shure SM57 for definition.

Then on to a Fender P-Bass to test the DI input. Again, a great natural sound with plenty of bottom and a surprising amount of clarity as you played up the neck.

One of the real surprises came while recording the various guitar amps with the Royer 121 ribbon mic, and Royer 122 (phantom powered ribbon mic). The combination was superb. Actually, in speaking with Dan at Great River, and Dave Royer, John Jennings and Rick Perrotta at Royer Labs, I found that Dan had the Royer microphones in mind when designing these preamps. When using the

Royer 121, and most ribbons, a tremendous amount of gain is usually needed from the mic preamp. To address this, adjust the MP-2NV's input impedance switch when using these mics, and gain is no longer an issue.

Additionally, on a second project (Stephanie Richards/Brian Arbuckle), instruments recorded were cellos, violins, acoustic guitars, and Stephanie's vocals. Again, the response to the preamp was



Closeup of the MP-2NV

that it sounded amazingly "natural." Especially with the concert strings. Mics used were the Rode NTK on Stephanie's vocal, and the Neumann U 87 and Audio-Technica AT4041 on acoustic guitar, tambourine, dumbek and zarb and other various percussion.

On the bass guitar, using the direct input, there was plenty of bottom balanced with tremendous detail.

With Stephanie's vocal, we definitely noticed the MP-2NV's "natural" sound, flat response, and additional headroom. Ultimately the detail was once again better on the MP-2NV than with other preamps we had.

SUMMARY

The MP-2NV quickly became the choice for both projects, though we had several other "top" mic preamps available. The "natural" and detailed sound, the input and output meters, and the 'insert' point gave us everything we needed both sonically and technically. Add the secondary output on each channel to eliminate latency, and you'll find that Great River has indeed delivered a great sounding, very well researched and designed, unit.

Tim Bomba is an independent producer and engineer. He has worked with Wilco, James Taylor and the Rolling Stones.

Fast Facts

Applications:
Studio

Key Features:
Two-channel; input and output impedance switches; insert; DI input; phantom power

Price:
\$2,699

Contact:
Great River Electronics at
651-455-1846,
www.greatriverelectronics.com.

Disc Makers ElitePro CD-R/DVD-R Publisher



BY DAVID CHRISTOPHER

In the world of project studios, additional revenue streams can make the difference between survival and oblivion. From voiceover work to commercial jingles, it all adds to the bottom line.

The latest trend takes advantage of the advances in CD-R and DVD-R duplicating technology, allowing studios to offer high quality duplicating to customers who do not necessarily need duplication on a larger scale.

Fast Facts

Applications:
CD or DVD disc duplication

Key Features:
CD-R and DVD-R/RW
duplication with on disc
printing; heavy-duty
construction; onboard
computer with peripherals
included; upgradable; label
design software

Price:
\$4,690 with CD-R, \$5,290 with
DVD/R

Contact:
Disc Makers at 800-468-9353,
www.diskmakers.com/par.

A number of companies have entered this market with models of varying complexity. Some are simple duplicators while others automate the entire process and allow printing directly on the disc. One example of the latter is the ElitePro series by Disc Makers.

FEATURES

At its heart, the ElitePro is a computer with one to four CD or DVD writers, depending on the model. You can choose between 48X CD-R

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► *Disc Makers* from page 29
or 4X DVD-R/CD-R writers.

The PC-based system uses an Intel processor and comes preloaded with Windows XP Home edition. It also comes with a 15-inch monitor, keyboard and mouse as well as a CD printer.

Attached to the frame of the computer is a mechanical picker arm designed to automate the duplication task, allowing the user to work on other projects rather than spend time loading and unloading discs. There are also a series of metal rods that at first glance, look out of place. But in reality serve a very useful purpose. Three are used to hold the unrecorded CDs in position for the picker arm while the fourth becomes the holder for the finished product. You can load the stacker with up to one hundred and twenty five discs for hours of continuous duplication.

The software that controls the process is called DiscJuggler. Designed by Padus, this program takes care of all formatting and processing and allows for many different types of disc to be made, including enhanced CD, VideoCD and PhotoCD. This only scratches the surface of what this software is capable of. Fortunately, it comes with a 154-page manual.

The Autograph IV printer is based on a standard ink jet design with a CD tray replacing the usual paper feed set-up. It prints on printable CDs, which have a coating that allows the ink to adhere to the surface. The design utilizes a single cartridge, which means it makes black by combining all three inks (cyan, magenta and yellow) rather than using true black ink.

This type of system tends to be a resource hog when printing designs with lots of dark colors. You can substitute a black ink cartridge for the color cartridge if you have a mono-color project, otherwise, be sure to factor in the cost of cartridges when figuring pricing for clients.

The unit also includes an upgrade option, which allows the EliteProOne to become a Two. The upgrade kit includes a second burner, as well as the appropriate software, wiring and instructions.

IN USE

Installation of the ElitePro was a fairly simple matter. Plug in the monitor, keyboard, mouse and printer and you're just about done. The only unusual task is the installation of the pick arm, which took all of ten seconds. All the software is preinstalled and other than a minor adjustment of the printer position, everything was aligned and ready to go at power up.

The test system came with the upgrade kit so I decided to install it before I got down to business. The burners use a FireWire connection, which simplified the process. Remove a cover, slide in the new burner, connect the FireWire harness and make the necessary software adjustments. If the alignment is correct, the job is done.

To test the ElitePro, I took a set of mixes I was working on and burned a reference CD on my DAW. This gave me a disc with fifty-three minutes of music on it to use as a master, fairly representative of the average job a studio would get.

Once I had the music, I needed to design the artwork to go with it.

The ElitePro comes with two separate software programs for designing artwork, SureThing and a light version of Discus. Both come with some nice templates and were easy to figure out, but I found myself favoring Discus more and wound up using that for all design work.

I chose a template that I liked and quickly put together the artwork for the disc as well as jewel case inserts (which I printed on a color printer later).

Finally, it was time for the fun to begin.

I opened Discjuggler, chose to copy and print, imported the file for the artwork and told it how many copies I wanted, then clicked on the start button.

And the electronic arm came to life before my eyes, picking up the reference CD, loading it into memory, dropping it onto the output guide and then grabbing the first blank to begin the duplication process. It was a sight to behold... at least the first few times.

Product Points

DISC MAKERS ELITEPRO CD-R/DVD-R PUBLISHER

Plus

- + Impressive build quality and reliable operation
- + Discjuggler software
- + No external computer necessary

Minus

- Inkjet printing less durable than silkscreen

The Score

The ElitePro delivers an excellent result and does it reliably.

Eventually, it blended into the background, quietly going about its business while leaving me free to do other things. I would return later to find a stack of finished CDs on the output guide with a detail report on the monitor that I could review for errors.

The finished CDs looked fabulous and played on just about every system I tried (the lone exception being an early DVD player). While not as durable as the silkscreen printing done by the professionals, the ink jet printer still made a splendid looking product, especially when printing at 1200 DPI. This is definitely an improvement over peel and stick labels.

After 75 discs were finished, I looked at the level of ink remaining and found it at 97 percent. The template I used contained a light background, which meant a minimal usage of ink. Changing to a template with a black back-

ground increased the ink usage substantially as it lost seven percent over the next 25 prints.

SUMMARY

I finished with one hundred CDs duplicated and printed. There were no rejects and the average time per disc was about six minutes, start to finish.

The ElitePro showed itself to be a solid

performer, with reliable duplicating and quality printing. The CD or DVD burner option allows you to tailor the machine to your needs. At its list price it may not be the cheapest option out there, but in this case, you get what you pay for.

David Christopher is a songwriter and producer. He has worked with artists including Eva Cassidy and Yvonne Charbonneau.

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Powered Speakers for Live Sound



FROM
THE ROAD

BY TOM YOUNG

Twenty-five years ago, my first experience with powered loudspeakers was using Anchor speakers as small monitors for sound reinforcement. Today, products are available for everything from small events for 100

people or less to large-scale concert PA systems. And years ago, some major sound companies even experimented with flying amplifiers with the PA but with the weight of amplifiers and no means to remotely control and monitor the system, it never came to fruition. Today with manufacturers like Anchor, EAW, Electro Voice, JBL, Mackie, Meyer Sound, Turbosound, Peavey, Yamaha, to name a few, engineers are embracing new products and technology in design for permanent installations, recording and touring for ease of setup, operation and improved sound quality. There are advantages and disadvantages to powered speaker use.

POWERED SPEAKER ADVANTAGES

Powered speakers were originally introduced for small sound system needs as self-powered monitors and speakers installed in lecterns. With its simplicity of setup - requiring the user merely to plug in a microphone or instrument, turn on the power, and bring up the volume it enabled almost anyone with limited technical knowledge or experience the ability to use it. This concept was expanded on by the introduction of the JBL EON line with passive and active speakers — *JBL EON System* packaged with a small mixer, making a complete PA for small bands. The EON PA was designed as a plug and play system with limited risk of damage due to setup errors.

In larger self-powered speaker systems, the addition of DSP processing including digital crossover, component delay for time adjustment, EQ and compression for safety makes this type of product a powerful cost effective solution in system design. An enclosed amplifier is matched with the proper input sensitivity and wattage for each speaker component. And, with short speaker cable terminations to the amplifier, the damping factor is eliminated in the loudspeaker.

Another advantage worth consideration in touring with powered speakers for a large scale venue is packaging, in that the

entire speaker system can fit within 10 feet of truck space stacked on rolling carts. Without the need of heavy speaker cable trunks and amplifier racks, larger systems are now quite streamlined and typically can load in, setup and breakdown quickly.

Now, most professional powered speakers have remote monitoring from a computer to mute amps and monitor that each speaker is working properly. With power supplies in the amps able to accept any AC line voltage, this type of product is even more advantageous. Some rental companies that have used self-powered speakers comment on how easy it is increase the system capacity by just adding additional speakers. The alternative is using a standard amplifier rack that has more amps than required to operate a small system requiring only two speakers.

DISADVANTAGES

The most apparent disadvantage of powered speaker systems is that if you lose an amplifier you do not have a speaker working. Many designs have built-in compression/limiting for protection, but there are no guarantees that a speaker amplifier will not fail. This presents more of a problem for small system rentals that are dropped off with two speakers and one does not work. You cannot just move the speaker cable to another amplifier channel or connect it to an existing channel and run the system at a lower ohm amplifier rating.

It's a good idea to consider having a spare for bands on an important gig or corporate rentals. Most touring systems have spares of speakers and amplifiers so it is easy to carry backups to ensure success. However, when the system has been flown in an arena and a powered speaker fails, the whole cluster must be flown in to change the speaker. This is not as easy as moving a speaker cable to another amplifier and much more time consuming. Fortunately, in my experience most products are very reliable and can remember only one instance having to drop the PA to change a speaker.

Quality and reliability is key when designing and using sound systems, and I have found self-powered speakers a nice complement for many product lines being offered in today's market. The matched amplifier/speaker system provides smooth, clear sound quality and very astatically appealing specifically when space is at a premium.

Tom Young, a regular contributor to Pro Audio Review, is currently the live sound engineer for Tony Bennett.



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Microtech Gefell M 930 Microphone

BY DR. FRED BASHOUR

Sure, I've read all those Microtech Gefell ads over the past few years — about the fact that they're the “other branch” of the Neumann family tree — but I've never had the opportunity to try one until now. And, wow, was I impressed! As my readers know, I own tweaked-out pairs of just about every vintage Neumann tube mic ever made, as well as a bunch of more modern — yet still expensive — mics. I'll state here, at the outset, that this modestly-priced but beautifully machined set of microphones easily holds its own with the other members of my collection and, in one important aspect, beats them all, hands down.

FEATURES

Think “Honey, they shrunk my M 49!” Well, that's just about what the Gefell M 930 looks like — about one third the size of my vintage 49s, but otherwise very similar. The spec sheet gives its dimensions as 118 mm x 46 mm, but to me, it is three inches long and about an inch and a half across. Tiny! Despite its diminutive size, it contains a full-size 1-inch (single membrane) diaphragm, and amazingly hip electronics. It can be supplied in two different finishes: satin nickel and dark bronze and, as mentioned previously, one can purchase either the cardioid M 930s



(\$2,350), or the supercardioid M 940s.

The Gefell electronic impedance converter
continued on page 36 ▶

FS-96

Format &
Sample Rate
Converter

mLAN™



CONNECTIVITY

ESSENTIALS

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Otari's already popular FS-96 Digital Format Converter is now more versatile than ever. By simply installing the new MADI card, you can now convert up to 24 channels of digital audio from any MADI-equipped device - all with just a single cable. Alternatively, by installing the new IEEE-1394 I/O card, the FS-96 will seamlessly integrate into your existing IEEE-1394 S400 mLAN network. With either option, the FS-96 will easily convert digital audio from pro equipment such as the SONY 3348 DASH* recorder, the SONY DMX-R100* Digital Console,

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Otari's ND-20 audio distribution system, or the Yamaha DM-2000* console to any and all of the standard digital audio formats in use today (AES, TDIF, SDIF and ADAT).

By cascading multiple FS-96 units together, up to 56 channels of MADI can be converted simultaneously. With built-in sample rate conversion from 32KHz up to 96KHz, an easy-to-use operator interface, a routing matrix (with user-definable presets) and a “single input to all outputs” routing scheme, you simply cannot find a more comprehensive conversion needs.

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WE SHIP WORLDWIDE

► *Microtech Gefell* from page 34 (amplifier, to the rest of us) uses a new circuit topology said to reduce the noise floor to an extremely low level while also raising the mic's maximum output capability — giving the M 930 a clean, distortion-free sound over an extremely wide dynamic range. In practice, they seem to need about 7 dB less preamplification than any of my vintage tube mics. Naturally, they are phantom powered.

IN USE

Over the test period, I tried the review pair out on vocals, piano, harpsichord, strings, drums, clarinet, and percussion, and was always impressed. What's more, in most scenarios, I compared them directly with my standard reference mic — a 0.9-micron Stephen Paul Audio-modified Neumann SM 69 stereo unit. The latter mic, which costs more than \$10,000, of course sounded a little airier, and could be used considerably farther away from the sound source before it lost resolution, but the stereo pair of tiny Gefell mics

was definitely in the same ball park, "sound category"-wise.

Both had that "big, bold Neumann" sound, the M 930 actually seemed to have a deeper low end, and was definitely quieter. In fact, it turned out to be the quietest mic I own! The main difference between them lay, in fact, in their reso-

lution attributes. My SM 69 reproduced the very quiet "tick tocks" of the antique mantel clock in my living room with amazing fidelity, while the M 930s mushed them all together into the general ambience.

The M 930's high end is very smooth, though obviously not as extended as that produced by a super-thin 0.9 micron Stephen Paul Audio diaphragm. While most lower-priced mics always sound "tizzy" to me, the Gefell M 930 did not. Rather, it sounded just a tidge dark, but very smooth. I attribute a lot of this smoothness to its single-diaphragm design. The mic took both shelving and peaking EQ very well, never sounding peaky or sibilant. And on bright instruments like harpsichord or twelve-string guitar, it sounded awesome — just right!

Over the past few years, I've become increasingly impressed by modern solid state technology, and the electronics shoehorned into the M 930 were no exception. I couldn't figure out how to get it open (I'm told that the capsule and electronics are manufactured as a single unit), but I can certainly state empirically that the mic sounds both warm and clear, very unlike my long-standing impression of older solid state mics.

Fast Facts

Applications:
Studio

Key Features:
Cardioid pattern; one-inch diaphragm; choice of finishes

Price:
\$2,350

Contact:
Microtech Gefell/C-Tec at
604-942-1001,
www.gefell-mics.com.

STEREO MICROPHONE TECHNIQUES

Since the pair of M 930s submitted for review was matched and supplied together in a nice wooden box — along with both ORTF and M/S stereo bars, and since I use primarily stereo mics for my classical recording projects, I did a lot of my testing in that mode. Gefell's SH 93 stereo bar enables the two M 930s to mount "nose to nose," and be easily angled between 45 degrees and 180 degrees apart via markings engraved into the SH 93's clamps. Setting a pair of them up is quite quick and easy and, in truth, the main difference between this arrangement and the use of a "regular" stereo mic is simply that one needs to rig two standard cables, rather than one special stereo mic cable.

For an ORTF arrangement — in which two cardioid or hypercardioid mics are separated by 170 mm and angled out about 110 degrees — one uses Gefell's TD 93 tandem bar with a pair of M 930s. Combined with a pair of either M 930s or M 940s, Gefell's two

continued on page 56 ►

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The **Mogami Edition Valve Microphone** is a culmination of years of research into what people look for in a Tube Microphone. What do they like about the "vintage" German Mics and moreover what do they dislike about them? It seems universal that "Tube Noise" is the greatest concern, especially when recording digitally. We took care of that by individually selecting time proven 12AT7 tubes and coupling to a newly designed FET output stage. Many dislike the "dark" sonic characteristics inherent in some of those older designs. Our capsule exhibits a brighter characteristic with an airy quality. Also, most agree 4-figures for a microphone is a bit "over the top". The V69 Mogami Edition microphone is reasonably priced in the low 3-figure range. And finally, to insure all of these qualities, end up on the track, the V69 is internally wired with Mogami and is supplied with a Mogami Tube cable and Mogami Microphone cable.

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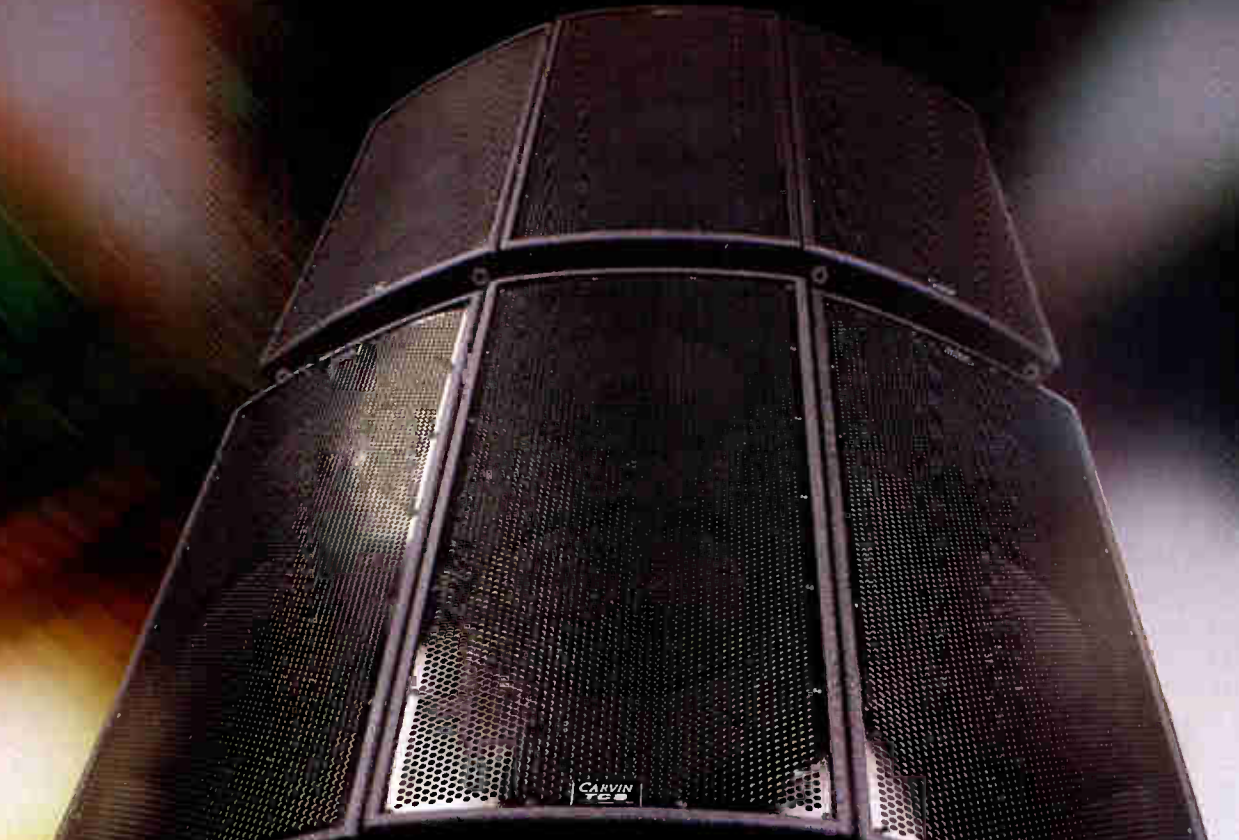


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MUSICIAN'S INSTITUTE chose Carvin sound systems for their Main Concert Stage, Hollywood Passage "Green Room" public concert venue, 14 classrooms, drama theater and rehearsal rooms, etc...



Large Venue Touring Gear

The world of live sound, like other areas of the audio industry, has seen contraction and expansion in the last decade. This has been especially true at the large-venue end.

The number of stadiums, convention centers, forums, theaters, concert halls, churches and the lot has increased over the last decade. Also increasing is the need for good sound in them. No longer does a shrill PA system satisfy patrons. Competition is hot in the entertainment industry and venue owners know they have to compete. Consequently more money is being spent on quality audio systems.

Many companies – speaker makers, mic builders, console designers and amp creators - have come and gone while others have cemented their place in the industry. All of this has happened while parts of the industry have seen significant changes. Wireless microphones have gotten very affordable while quality has increased. Consoles are increasingly seeing the fruition of the digital revolution. Amps have gone lighter, more powerful and reliable. They are even beginning to see the early roots of digital control. And speakers have gone line array crazy in the last two years.

To visit some of these trends Pro Audio Review's Steve Murphy examines Large Venue Touring Gear in the following pages.

Large Venue Touring Gear

Consoles

BY STEPHEN MURPHY

While the general public continues to trim back their expenses during the apparent economic slowdown, they continue to make room in their budgets for tickets to see their favorite artists in concert. This year promises to be a record year according to several knowledgeable sources in the touring industry.

Despite average sales in pro audio products across the board, the sound reinforcement market continues to show promising growth. A quick glance at the amount of live sound products introduced at the recent NAMM and NSCA conventions underscores this fact.

Commensurate with this growth, console manufacturers continue manufacturing the vanguard consoles and introducing new models. Analog, digital and hybrid consoles alike are finding homes in fixed installation venues and on large tour spec lists.

In this overview, *PAR* takes a look at the young upstarts in the front-of-house touring console market, as well as the tried-and-true large-format board leaders.

THE VANGUARD

Polling major sound reinforcement company systems out on tour, one is not surprised to encounter a short list of console names again and again.

A consummate workhorse, the **Yamaha PM4000** continues to define its place in history as possibly the most used touring console since its introduction in 1992. In fact, Yamaha is celebrating the 30th anniversary of the introduction of Yamaha's PM series of live consoles, starting with the PM200 model.

Selling as well as ever, the PM4000 series is available with 24-52 input channels and features eight VCA groups, eight mix busses an 11 x 14 matrix and a total of 12 aux busses (8 mono, 2 stereo). Yamaha, of



A pair of Yamaha PM4000s

course, has several new boards out – including an addition to the PM line – which we'll learn about soon.

If a major touring band is from the UK, chances are good they have packed away a **Midas** console for their working holiday in the 'States. Actually, if the band is from *anywhere* in the western hemisphere, chances are good they'll be using a Midas, as the company accounts for a huge percentage of large-format FOH consoles on tour.

Keeping with the theme, Midas reported in November of 2002 that they were having a banner year in sales, a large percentage of which was due to the popularity of the Heritage and Legend lines. But the King of Midas Boards is unmistakably the XL4.

The XL4 is an analog console with digital automation control of almost all console switches. It features 64 inputs (including 16 effects returns), 16 mono and four stereo aux busses, 16 subgroups, 10 VCA groups and an 18 x 8 matrix section.

Bearing a strong family resemblance, the **ATI Paragon II Production** console continues to gain FOH momentum as it follows in the footsteps of its older brother, the ever-popular Paragon II monitor console.

The console features 64 mic inputs and 12 stereo line inputs, 16 aux busses, eight stereo audio groups, eight stereo matrix outs, eight VCA groups and two VCA grand masters. Each channel features ATI's famous four-band parametric EQ, on-channel gate and compressor, LCR panning with LCR audio subgroup capability.

UPGRADES AND UPSTARTS

The recent NAMM and NSCA shows introduced a bevy of updated and new large-format boards, ranging from workhorse models to top-of-the-line contenders of the throne.

Crest Audio's flagship FOH analog mixer is the V12, targeted for live music and other performing arts applications. The V12

is available with 24 to 48 input plus four stereo-input channels.

The V12 features a four-band parametric EQ plus high pass filter on all input channels, true LCR panning, 12 level/mute VCA groups, eight mono and five stereo output mixes, and programmable muting of inputs and outputs.

Crest's popular 24-48 input X-VCA FOH console provides many of the high-end features of the V series in a more affordable package.

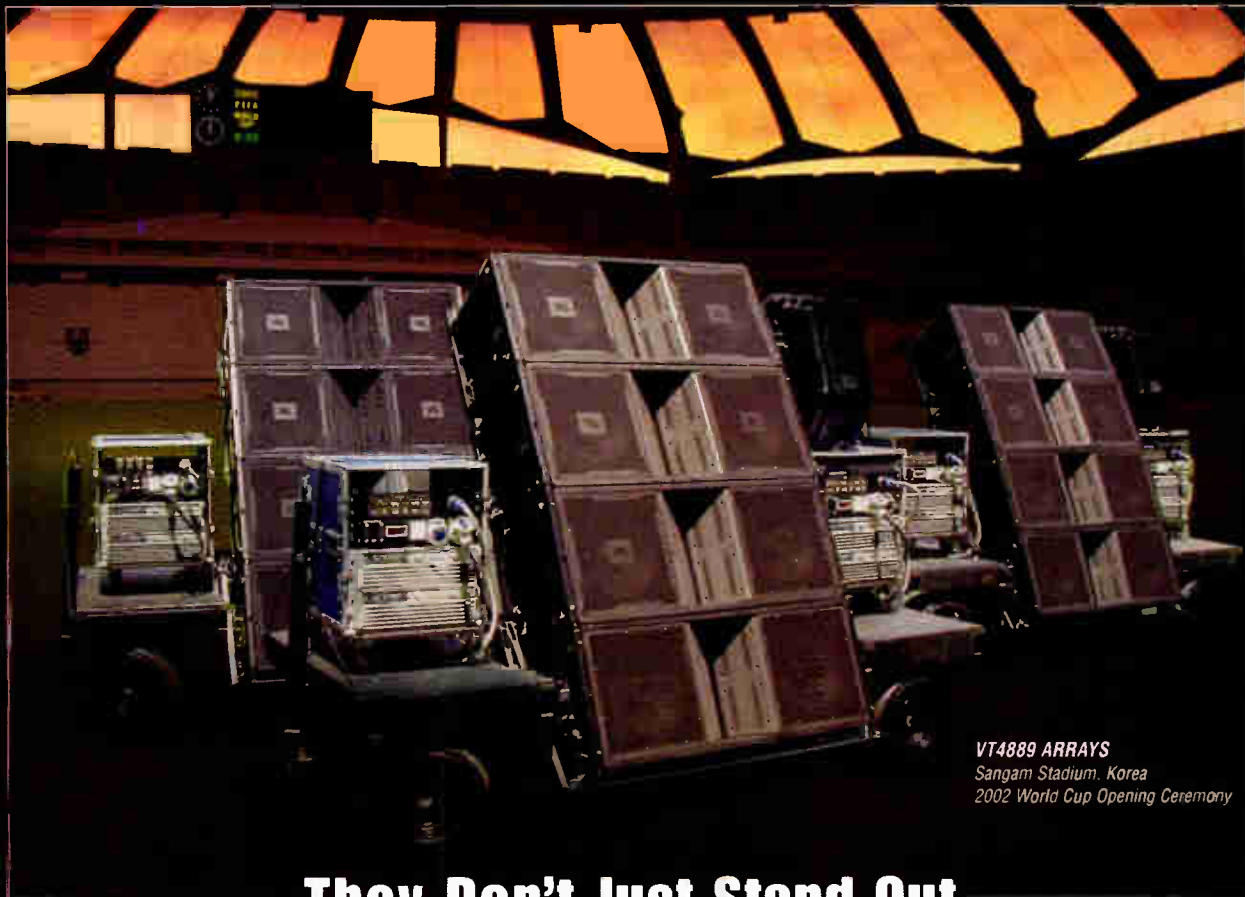
The **DiGiCo D5 Live** is a comprehensive digital mixing system that features some impressive innovations. The D5 Live system mixing controller features a large TFT display and four LCD touch screens that present all controls in a familiar layout. The D5 is available with 56 or 96 mic inputs, with all preamps and respective A/D converters located at the stage. Fiber optic cable connects the stage inputs to the mix controller, reducing the amount of copper wire between the two positions to just a few yards. A FOH-local rack unit provides 40 external I/Os for inserts and effect sends.

The system features total recall of every function, a 38x8 output matrix, 40 multi-configurable internal buses, LCR to 5.1 panning, dynamics processing and comprehensive EQ per input, 24 "VCA" control groups. Anticipating the worst, the board can be rebooted with no effect on audio throughput.

At the other end of the category is the incredible bang-for-the-buck **Carvin S/L56** 56-input dual-inline analog console. Each input channel features an Analog Devices-based discrete preamp, four-band EQ with two mid sweep bands, switchable low-cut filter and eight aux sends. The console comes with a separate 2-space rack mount SLP5600 power supply that delivers 400 watts of power, nearly twice the power required by the S/L56.

Sharing the same housing as the COM-
continued on page 42 ▶

INTRODUCING THE EXPANDED VERTEC LINE FOR...



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Sangam Stadium, Korea
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The measure of a great loudspeaker system is its ability to help you work faster, better and more efficiently. From its inception, that's been the guiding principle for the VERTEC Line Array Series. Now, JBL introduces the expanded VERTEC line, a flexible suite of compatible products for rental companies and entertainment venues. Designed for both corporate presentation and performing arts applications, each continues the JBL heritage of performance and reliability, and has features to make your business less problematic and more profitable. Specify the single-enclosure inventory in the size that suits your line array needs, or mix and match to create the ideal system for your projects. Count on a continuing return from your investment in JBL's Vertical Technology™.



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59 kg (129 lb)



NEW!
VT4888
Midsize 2-12" 3-way line array element.
Frequency range: 48 Hz – 18 kHz
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49 kg (108 lb)



NEW!
VT4887
Compact 2-8" bi-amplified 3-way line array element.
Frequency range: 60 Hz – 22 kHz
787 mm x 279 mm x 406 mm (31" x 11" x 16")
28 kg (62 lb)



NEW!
VT4881
Compact arrayable dual-coil 15" subwoofer.
Frequency range: 18 Hz – 160 Hz
787 mm x 559 mm x 686 mm (31" x 22" x 27")
55 kg (120 lb)

World Radio History

Large Venue Touring Gear

► *Live Sound Consoles from page 40*
PACT Live console, the **Innova SON COMPACT Sy40** console boasts 40 inputs, 12 stereo mix buses and 16 outputs, instant recall of all settings and comprehensive PFL and AFL signal path monitoring. The Sy40 is expandable to 72 inputs/48 outputs using the InnovaSon Stage Box. Each input channel features a digital input gain trim, comprehensive dynamics control, and five or eight bands of parametric EQ.

The Sy40's control panel connects to the stage boxes via lightweight coaxial cables.

At the AES Europe convention in March, Innova SON introduced the even more impressive Sy80, which boasts 80 inputs, 80 faders, 80 outputs and 48 mix buses. Housed in a new chassis, the Sy80 offers comprehensive digital mixing capabilities utilizing its new DSP module and Sensoft 8, the real-time console software manager.

Yamaha recently announced the successor in the PM line, the PM5000, available in 28 to 52 channel versions. Features include: four stereo input modules, LCR panning, versatile 35-bus configuration for FOH or monitor applications, 12 VCA groups and a 4 Stereo + 8 Mono matrix, Variable Sum Gain control and digital scene recall with Recall Safe function.

Recallable parameters include channel ON/OFF, assignments, and fader positions. Because motorized faders, illuminated switches and LED indicators immediately respond to the recalled parameters, console status can be visually confirmed in an instant.

Yamaha's flagship fully digital PM-1D console continues to win engineering fans. Both 48- and 96-channel versions of the PM-1D include 48 mix buses, 24 output matrices and 12 DCAs. Version 1.5 system software adds operational enhancements and new expansion capabilities, including a dual-console mode, system cascade and remote MIDI-control change operation. The PM-1D is capable of controlling up to 384 inputs, 192 channels and 96 mix buses when fully expanded.

The **Cadac R-Type Live Production Console** features the company's unique "plug anywhere" modules, allowing SR companies

to easily redesign the console exactly to match each tour's specification and budget. A typical configuration (using three of the R-Type's 24-slot frames) provides up to 51 inputs in any combination of mono or stereo, a full output section with 16 DC/VCA mas-

eight mute groups, four-band EQ plus hi-pass filter and 128 snapshot memories. The console features extensive PFL/AFL implementation; sidecar and dual power supply options are available.

The LPC-D digitally controlled analog



Midas XL4

ters, 16 mute groups, 32 channel sends, 128 snapshot memory locations and dedicated LCR and stereo output modules.

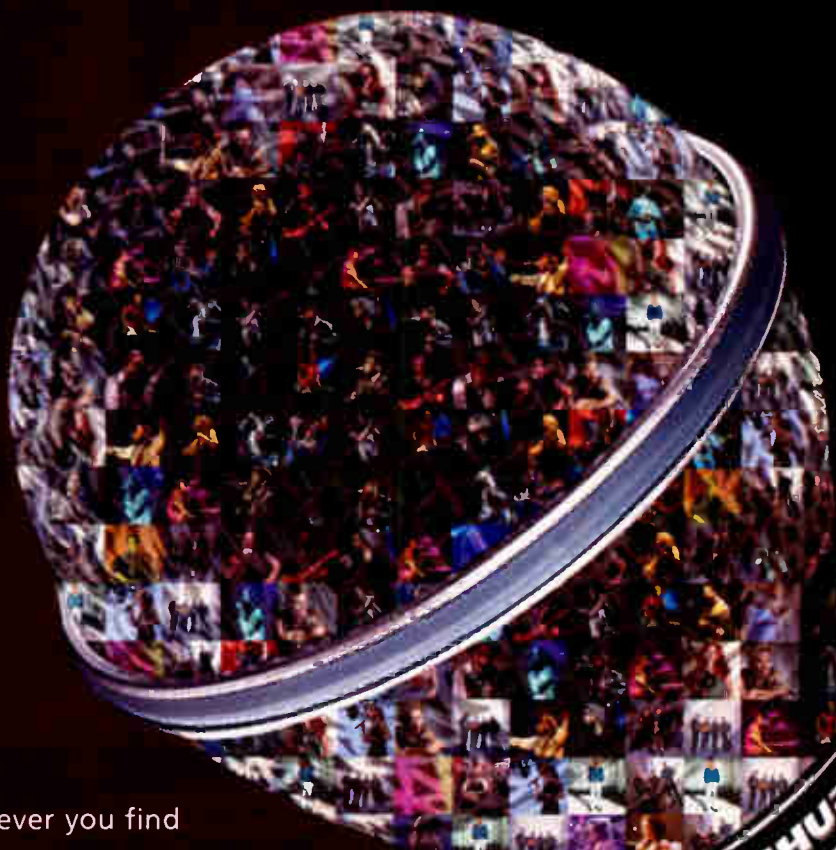
The Aztec live performance console is **Audient's** first live console and can be used both the road or in a fixed installation. Features of the 32 to 52 input desk include separate L, C, and R buses with individual trims on each of the output faders, eight audio subgroup outputs with balanced inserts, two additional stereo line inputs and a stereo ambience mic input, four-band EQ with parametric mids, sweep HF and LF with switched bell/shelf curves plus sweep hi-pass filter and optional full stereo input modules.

Allen & Heath's flagship live console is the 32 to 48 input ML5000 desk. It features FOH/monitor console functionality, eight audio subgroups, eight VCA groups, 16 auxiliary sends, LCR panning, 12x8 matrix,

console from **Harrison/Showco** uses BeOS-based control software to control all audio parameters for up to 720 mic and 240 line inputs housed in stage-local 80-input processor racks. An automation computer processes all instructions from the digital control surface, connected via fiber-optic cabling. Each input channel features four-band EQ, high- and low-pass filters, a comprehensive dynamics section and 32 aux sends.

Soundcraft's Series FIVE line of mixers are available with 24 to 56 inputs (plus four stereo) and feature fully parametric 4-band EQ and sweepable filters on both mono and stereo inputs, 12 aux buses, eight subgroups, 16x10 output matrix, 10 VCA groups and LCR master outputs. MIDI control allows for eight mute groups and up to 256 mute snapshot, plus control of external effects.

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World Radio History

Large Venue
Touring Gear

Speakers

BY STEPHEN MURPHY

It was just a few years ago that the head of a certain major loudspeaker manufacturer told me he would never make a line array model. Whether by market force or internal reassessment, that speaker manufacturer, like most others in the industry, now makes several different flavors of line array configurations. The evolution from huge arrays of massive cabinets to precision-distributed low-profile line array columns is nearing completion, as evidenced by the sheer number of products being introduced.

The general theory is that the geometrical-huge arrays of the past delivered the required SPL, but in the process, cabinets interfered with each other at both the transmission point and the coverage destination. This interference resulted in power inefficiency, difficult challenges for the engineer and an unpredictable listening experience for each audience member.

Well-implemented line arrays allow the system to work with maximum physical and directional efficiency, providing controlled, even coverage with improved imaging. Other typical benefits include a wide listening area with little sound intensity fall off vs. distance, the reduction of floor and ceiling reflections, and improved dynamic range and linearity.

There are always exceptions to any rule, and for certain applications, line arrays may not be practical or productive (small or unusual shaped venues, for instance). For these scenarios, there are a number of other configurations and traditional loudspeaker systems available. In this article, we take a look at some of the major touring loudspeaker systems, both new and updated.

THE VANGUARD

There are a few line array systems that staked out the early ground and quickly rose to the top. But it takes more than being the early adopter to remain at the top.

Popular line array systems that have undeniably proved their staying power and popularity include the original L-Acoustics V-DOSC system, and the comparably recent JBL VerTec and ElectroVoice X-Line speaker systems.

Line Source Array pioneer L-Acoustics US continues to improve and expand its formidable V-DOSC line as the innovative system approaches its ten year anniversary. In recent years, L-Acoustics introduced the smaller-scale DV-DOSC system, as well as several other product lines.

This year, L-Acoustics US introduced its new SB118 high power subwoofer, designed to complement all of L-ACOUSTICS' loud-



speaker systems, including dV-DOSC, MTD and XT. The SB118 features a single 18-inch transducer loaded in a dual-chamber, vented band pass configuration and features a 600W RMS (2400W peak) power handling capacity and response down to 32 Hz. The company also recently debuted two mid-sized coaxial speaker cabinets, the 115XT and the 112XT for smaller venues.

Introduced in 2000, the JBL VerTec Line Array system has easily demonstrated its staying power and its sonic power, showing up on an ever-increasing list of high-profile tours and fixed-installations.



McCauley MLA5

The VerTec line continues to expand with recent additions to the original VT4889 full size line array element: the VT4888 is a mid-size line array element, using 12" woofers instead of 15" units; the VT4887 is a compact line array element, using 8" woofers; and the VT4881 is a compact dual-coil 15" arrayable subwoofer.

Also enjoying broad popularity is the Electro Voice X-Line linear array loudspeaker system, introduced in 2000. Credited with inventing the humbucking coil pickup in 1934, the 75-year old company continues its success in innovation into 2003 with the introduction of its E-V XLC compact line-array system.

Based on the X-Line line-array system, XLC system was designed for acoustical environments where a traditional line array is too large. The compact system comprises three components, XLC 127 main, XLC 124 down fill, and the XLC 118 sub cabinet.

The XLC 127 is a 3-way design that utilizes a 12-inch vented LF, 2 x 6.5 inch MF transducers on a 120-degree horizontal waveguide, and 2 x HF transducers that combine through a new vertical plan wave generator to a 120-degree waveguide. The XLC 124 down fill is a 3-way system using XLC components with the exception of a single HF transducer on a 120-degree x 40-degree waveguide. Solid sub bass extension is provided by the 18-inch loaded XLC 118.

INTRODUCTIONS, ADDITIONS AND UPDATES

The latest addition to Meyer Sound's M Series self-powered line is the MILO High-Power Curvilinear Array loudspeaker. A self-contained four-way system, MILO produces a peak output of 140 dB SPL with exceptionally flat phase and frequency response. The wide operating frequency range (50 Hz to 18 kHz) is complemented by extended high-frequency headroom. Three dedicated transduc-

continued on page 46 ►

**The Paragon II lets Robert Scovill
do something he's always
wanted to do...**



... MIX!

“Tom and the Heartbreakers are out on tour supporting their new record ‘The Last DJ’ and are in rare form... As for my world, the Paragon II is just the greatest addition to my audio arsenal. I am just knocked out by this desk!”

“The Paragon II solves so many feature inadequacies that I have been begging other console manufacturers to address and implement for ages now. Items such as high quality analog dynamics circuits, truly comprehensive solo capabilities, audio delay on the headphone buss, multiple direct outputs per channel, multiple stereo masters, multiple stereo matrixes, stereo inputs routable directly to a matrix and on and on and on. The Paragon II has addressed all these and much much more. It also offers the most elegant center buss implementation I have run into for use in sound reinforcement for music. Given that this is an analog desk, the routing offered on it is simply sensational. All this and you get an exceptional pre-amp and equalizer to boot!”

“You know, in a world where console development seems to be focusing its features around extensive programmability, it’s nice to find a console whose main feature is its exceptional audio path!”

Robert Scovill
Front of House Engineer Extrordinaire
(Tom Petty, Matchbox20, Rush, Jackson Browne)

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Large Venue Touring Gear

► *Live Sound Speakers from page 44*
ers for the high-frequency band (4 kHz to 18 kHz) provide detailed resolution of transient information, even in very long throw applications.

MILO features dual 12-inch neodymium woofers, a 4-inch compression mid with CD horn and a REM (Ribbon Emulation Manifold). For the high end, MILO features three two-inch compression drivers (with REM) on a 90 degree horn. Meyer's RMS Remote Monitoring System, onboard active signal processing and over 3,900 watts amplification are standard.

Following up on their popular full-sized MONARC MLA5 Line Array system, Pacific Northwest-based **McCauley Sound** recently introduced the M.LINE High Mobility Line Array system. The compact M.Line system uses the same rigging system as the MLA5 and is derived from the company's third-generation MONARC technology. The M.LINE series consists of a low frequency module, and both 90 and 120 degree full range boxes.

For those leaving the road, McCauley also debuted its iN.Line compact line array system targeted (and priced) for fixed installations.

The GEO T Series expands on the technologies initially developed for Nexo's first tangent array design, the GEO S. The T4805 and T2820 are new full-range high-output loudspeakers and the CD18 is Nexo's new dual 18-inch Controlled Directivity Sub bass module.

The full-range boxes use 2-inch HF and 8-inch cone mid/lovs, with a Hyperboloid Reflective Wavesource (HRW) reflector for coherent coupling between multiple speakers, even those with different dispersion angles.

Eastern Acoustic Works (EAW) recently introduced the KF730 SLAM (Small Line Array Module). SLAM packs a six-driver, horn-loaded KF Series design into an extremely compact enclosure. The full-sized mid/high horn fills the entire face of the enclosure, ensuring broadband 110° horizontal pattern control.

SLAM features a bi-amplified powering configuration (passive mid/high) and a unique Phase Aligned LF design that extends

horizontal pattern control into the low frequencies. As with the KF760 Series, the size and configuration of a KF730 Series array defines its vertical coverage: users can quickly and easily construct vertical arrays ranging from 4 to 18 enclosures.

Martin Audio's new W8LC is a compact three-way, all-horn line system in the vein of its popular predecessor, the full-size W8L. The W8LC features twin 6.5-inch midrange



JBL VerTec

Hybrid horns, a 12-inch/3-inch coil neodymium LF driver and three 1-inch low-curvature HF horn drivers.

Community Professional's T-Class features five mid/high cabinets with a range of dispersions and throws, and can be matched with Community's line of trapezoidal subs. Optional rigging, fly bars, and alignment fittings are available to construct systems suited to any venue.

Also new in the Community line are new members of the MVP series. The MVPs offer traditional passive boxes for small and medium-sized venues along with stage monitors.

Turbosound, Ltd., makers of the Flashlight and Floodlight speaker systems, is now shipping the passive two-way Qlight TQ-310 and switchable passive/biamped

Qlight TQ-315 loudspeakers.

The Qlight TQ-310 is a compact passive two-way speaker featuring one ten-inch low frequency and a one-inch HF compression driver. The Qlight TQ-315 is a switchable biamped/passive two-way speaker featuring one 15-inch low/mid driver and a three-inch diaphragm high-frequency compression driver.

Also new is the self-powered TQ-308SP two-way speaker with one eight-inch LF driver and one one-inch high frequency compression driver. The on-board amps provide 300 watts to the LF driver and 50 watts to the HF driver. All units offer a number of integral fly points and feature the company's proprietary rotatable Converging Elliptical Waveguide(tm) horn design for both horizontal and vertical use.

Carvin offers the modular TCS Touring Concert System at extremely competitive prices. The TCS speakers fly-integrate for complete array systems from front of house to fills to subwoofers and stage monitors, creating sound reinforcement suitable for a multitude of sound reinforcement applications.

The TCS 15" and 18" low frequency transducers feature DuPont polyamide 4" voice-coils with a uniquely designed center heat sink. The louder the volume, the greater the air flows through the heat sink, keeping the internal driver components cool. Most TCS cabinets feature 1.4-inch thick, 26-ply Baltic Birch baffles to increase driver efficiency and low frequency projection by eliminating cabinet vibrations.

Mackie Designs recently introduced the SWA1801, a high-output, 18-inch active subwoofer for live applications. The SWA1801 is driven by an integral 900-watt RMS high-current amplifier and features a RCF Precision LF driver and a horn-loaded port design. The input panel has a polarity switch and recessed level control for the line-level input, with loop-out connectors and a highpass output to feed full-range speakers and/or amps.

The B-Zero subwoofer system from **Bassmax** points to another expanding area, powerful live sound subwoofers. The dual 18-driver B-Zero is designed to output 140 dB below 80 Hz. There's even a flyable version in development.



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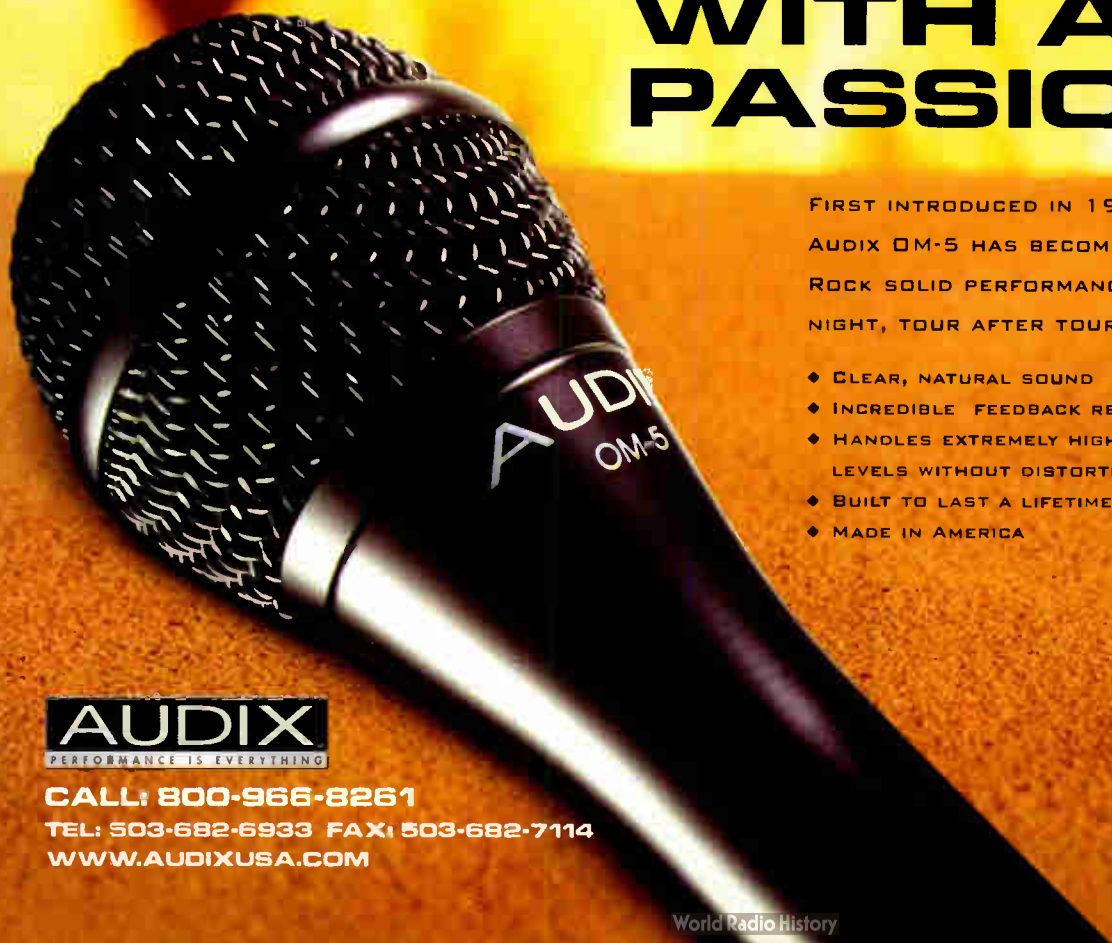


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Large Venue
Touring Gear

Amplifiers

BY STEPHEN MURPHY

While power amplifiers are not in the spotlight as often as big consoles and flying speaker arrays are, everyone knows they are the real muscle behind touring sound systems. They continue on with their work behind the scenes, rarely complaining – though they might get a bit hot under the collar now and then.

Power amps are in the unenviable position where their hard work is generally ignored until something goes wrong. But that's the way it should be: a good amp should instill confidence in the user and should also be one, or ten or twenty less things for the engineer and crew to worry about. As a result, among live engineers I have spoken to, there is tremendous brand loyalty – perhaps more than any other product area – when it comes to amplifiers.

An interesting observation to note is that, unlike other product areas covered in this section, almost all of the major amplifier manufacturers are companies that have been making amps for at least 15 years, with many going back 25 years or more.

POWER TRENDS

So where is there left for amplifier technology to go? The art and science of amplifier design continues to expand towards better efficiency, smaller size, greater power, lower weight, innovative features, cooler operation, increased connectivity and reduced cost.

When it comes to amplifiers, touring sound companies naturally place emphasis on weight and brute strength. A lot of focus in this regard has been on switching power supplies. Despite increased manufacturing cost, use of a switching power supply typically decreases weight, increases efficiency and provides more consistent performance.

Interactive connectivity and remote oper-

ation are on the rise, thanks to the near-universal acceptance of CobraNet and other Ethernet-based communications protocols. This area continues to grow, promising more powerful communications and DSP integration. The wonderful thing here is that disparate systems can be made to communicate with each other through the Ethernet common denominator.

Perhaps one of the biggest trends in power amplifiers is that they are increasingly moving in with the speakers, but judging from the amount of new amplifier releases at recent shows, stand-alone amplifiers continue to be the big sellers.

NEW AND NOTEWORTHY

Crest Audio recently added three new models to its popular Pro 200 Series power amps. The Pro 8200 provides 1,450 watts per channel or 4,500 watts bridged into 4 ohms; the Pro 7200 provides 1,000 watts per channel or 3,300 watts bridged; and the Pro 5200 delivers 525 watts per channel or 1,800 watts bridged. All models are two rack spaces high and weigh just 25 pounds.

Apart from the differences in power, the three new amplifiers have very similar specifications, including a frequency response within +0, -3 dB from 10 to 100 kHz, with hum and noise better than -110 dB, "A" weighted. The input impedance is 15 k Ohms, balanced.

The Pro 200 Series amps feature Automatic Clip Limiting (ACL) to protect connected drivers, while IGM Impedance Sensing automatically modifies the gain to suit whatever impedance outputs are connected. Tunnel-cooled, high efficiency heat sinks and variable-speed DC fans limit the operating temperature, extending the life of the amplifiers. AutoRamp circuitry minimizes the likelihood of power-on "thumps."

Input connections are via XLR on the rear panel, and are actively balanced. Both Speakon and binding post output connections are provided per channel for loud-



speaker connection.

QSC's latest addition to its PowerLight Series is the PL6.0 II. The amp takes advantage of a significantly enhanced version of QSC's PowerWave switching power supply technology. The PL6.0II boasts a number of features including selectable clip limiters for lowering distortion and to protect speakers, plus a standby mode that enables remote AC power control.

The inclusion of QSC's DataPort on the amp's rear panel facilitates integration into QSCControl, QSC's network audio system—enabling remote gain control, the ability to check clipping and thermal status, as well as the monitoring of numerous additional system parameters. This same DataPort also facilitates use of signal processing products such as the QSC DSP-4.

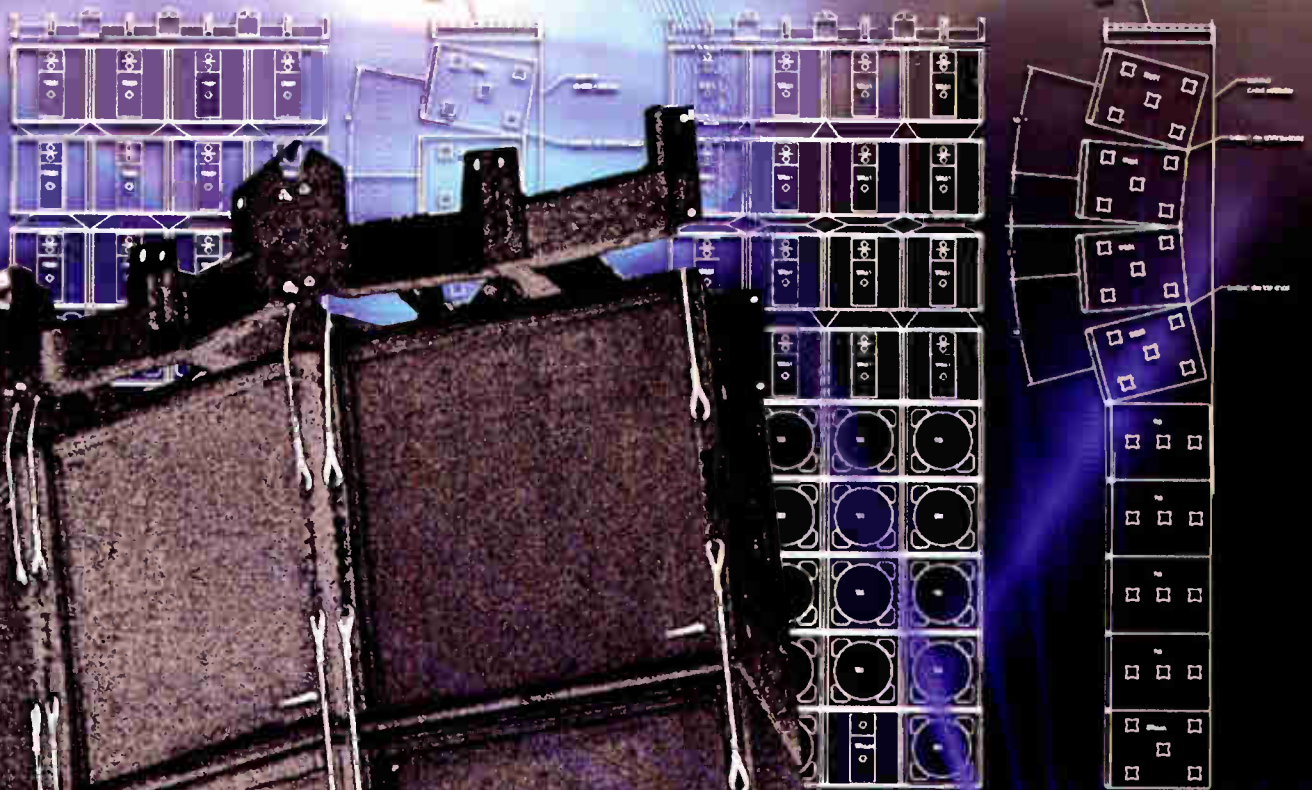
The three rack space PL6.0 II features four-step Class H output and provides 3500 watts per channel at 2 ohms, 2200 watts per channel at 4 ohms, and 1300 watts per channel at 8 ohms (EIA rated). The amp is outfitted with Neutrik Combo (XLR and 1/4-inch) and Euro-style barrier balanced input connectors. Output connectors are Neutrik Speakon and custom-designed, extra large "touchproof" binding posts.

Peavey has debuted four redesigned CS Series power amplifiers: CS 800H, CS 1200H, CS 2000H and CS 3000H. Power ratings go from 800 to 3,000 watts. Each amp channel offers a variable crossover, variable low pass filter and an amp function switch that switches from highs, lows or full range.

The front panel display includes LED input indicators for amplifier active, DDT active, temperature warning and DC output warning functions, plus two fully automatic, dual-speed cooling fans that pull cool air from in front of the rack. The fans activate only when needed, making these amplifiers completely silent at lower levels.

continued on page S0 ►

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Large Venue Touring Gear

► Live Sound Amplifiers from page 48

All are 2U units, with XLR-1/4-inch combo-connector inputs as well as binding post and Speakon output connectors. Other outputs include separate Speakon mono bridge, through, low and high jacks.

Electro-Voice's new Precision Series DSP-controlled amplifiers offer remote control and auditing of up to 250 amplifiers via one or multiple PCs. Central supervision and control of all amplifiers and connected loudspeakers is achieved in real-time with state-of-the-art signal processing (filter, delay, level, dynamics). The new Precision Series also provide display of the acoustical response of EV loudspeakers in real-time via RACE (Real-time Acoustic Cluster Editing) software. Integration with life-safety systems and control of external equipment is seamless.

Precision Series models include the P900 RL, P1200 RL, P3000 RL with output power ranging from 450 to 1300 watts per channel into 4 Ohms.

Crown International has now rolled out improved versions of its popular XLS Series power amplifiers. The newly re-engineered XLS 202, 402 and 602 offer compact 2U (instead of 3U) designs, lighter weights, and lower price points than their predecessors.

The new two-channel amps range from 200 to 600 watts per channel, are housed in an all-steel chassis and employ efficient forced-air fans to prevent excessive thermal buildup. Front panels feature dual, precision-detented level controls, a power switch and four LEDs, indicating clip for each channel, power, and fault conditions. Rear panel connections include two electronically balanced XLR inputs as well as touch-proof binding post and Speakon outputs.

The new XLS models also employ extensive protection and diagnostics capabilities, including output current limiting, DC protection, circuit breaker, and special thermal protection of the units' transformers.

The **Hafler SR2800** and **SR2300** amplifiers continue to be popular in the live touring market. The two-channel fan-cooled amps are rated at 1400 Watts bridged at 8 ohms and 600 Watts bridged at 8 ohms, respectively.

The amps feature Hafler's Trans•nova:

patented output stage which offers simpler front end circuitry, dramatically lower cross talk and noise. They also incorporate Hafler's NOMAD smart protection circuitry, as well as a Class-G output stage.

Balanced Inputs are on Combo XLR and 1/4-inch jacks. "No Touch" 5 Way Binding posts prevent shorting. The amp's regulated switching power supply provides lighter weight and increased efficiency.

Founded in Sweden in 1979, **Lab Gruppen** is picking up steam in the U.S. after being acquired by the TC Group. The company's Ferrite Power Series features four stereo models ranging from 2200 - 6400 watts (bridged, 2 ohms) and one quad model, 4 x 640 watts per channel at 2 ohms.

All models are two rack spaces high and weigh under 22 pounds, thanks to Lab Gruppen's super-efficient switch mode power supply. Speed controlled fans draw

Also featured in the XR Series is Signal Smart standby technology, smooth soft-knee style limiting, and true 2 ohm stability.

TOA's versatile IP Series Dual Channel Power Amplifiers offer high quality sound output suited a variety of live sound system applications. Specially designed for compact proportions and lighter weight, the IP Series amplifiers feature proven power amplification circuitry that ensures outstanding reliability. The IP-600D is 600 watts per channel, IP-450D is 450 watts per channel and the IP-300D delivers 300 watts per channel into a 4 ohm load. A rear panel mode selection switch selects stereo, parallel or bridged operation.

Carvin's DCM150 power amp features four 1000 watt channels (at 2 ohms) and is capable of two channel 2000 watts per channel operation (bridged 4 ohms). Inputs are on XLR and the multiple outputs provided



Lab Gruppen fp2600

air from front to rear. All models incorporate the ALS Adaptive Limiting System and flagship models, fp 6400 and fp 3400, are Class TD, Lab Gruppen's much-improved take on the common class D design. Inputs are XLR and outputs are Speakon. Channel link XLRs are also provided.

Carver Professional recently launched its new XR Series amplifiers. The XR Series is packed with features not commonly found in similarly priced amps. Models range from 300 to 800 watts at 4 ohms and include high pass, low pass, and band pass filtering.

are five-way binding posts, Speakons, and 1/4-inch jacks.

Controls include limiters, ground lift, paralleling inputs, and bridge mode switches, along with recessed level attenuators, clip, signal, protect and power on indicators. The amp features Soft-start power up, DC SpeakerGuard, and thermal and short circuit protection relays. The three RU all-steel housing has dual variable speed fans and weighs 84 pounds. This amp is especially suited for multi-monitor amplification or use with Carvin's TCS loudspeakers.

Microphones



Geddy Lee and Audio-Technica's Artist-Elite mics

BY STEPHEN MURPHY

don't think there is a club, sound stage, rehearsal room, theater, hall or stadium in the western hemisphere that does not have a Shure SM 58 plugged in on any given night. Introduced nearly 40 years ago, The SM 58 is undeniably the biggest selling all-purpose mic in live sound history. This rugged and reliable workhorse, along with the SM 57, are sure to continue their uninterrupted streak well into the new millennium.

Judging from the brisk sales microphones across the board, there is plenty of room for 58-type microphones and the hundreds of other mic designed for a specific use and quality.

Often an extension of the engineer's creativ-

ity, microphone choice can vary as much as musical taste. As the use of the indispensable SM57 and 58 persists, so, too, does the tide of new and noteworthy microphone models released every year. In this section, we introduce some of the latest and most popular microphones in the live scene.

NEW AND NOTEWORTHY

AKG has been making mics for over 50 years, pioneering some of the most popular and coveted microphones ever. Earlier this year, AKG showed several modular live microphones in the Emotion/Tri-Power Series.

The dynamic D 3700 features AKG's Varimotion diaphragm – the first-ever variable-thickness diaphragm – and a redesigned car-

dioid polar pattern for easier handling and higher gain before feedback.

Designed for high-quality live vocal reproduction, the C 900 condenser microphone is now modified to work with AKG's new modular system. The performance mic features a gold-sputtered capsule and a supplied snap-on Presence Boost Adapter. The popular D 880 dynamic mic has also been modified to work in the modular system.

With all three mics, the XLR connector module can be easily replaced with the TM 40 transmitter module for use with the AKG WMS 40 wireless system. An XLR module with an on/off switch is also available.

Audio-Technica's popular Artist Elite *continued on page 52* ▶

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Bob Vonesh, Vertex Sound and Lighting, Toronto, Canada

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►Live Sound Mics from page 51

Series continues growing, recently adding several new products to the line. This is the same series that introduced the unique AE2500 dual-element (cardioid and dynamic) kick drum mic.

The AE5100 is a large-diaphragm end-fire cardioid condenser designed for a wide range of applications, most notably on drum overheads and percussion, acoustic guitar, strings and other acoustic instruments. The mic features an 80 Hz, 12 dB per octave low-frequency roll off and a dynamic range of 137 dB, 1 kHz at maximum SPL.

The AE3000 is a large-diaphragm condenser instrument mic designed to take the highest sound pressure levels encountered on stage such as guitar cabinets, toms, snare, tympani and overheads. The mic features an open-architecture headcase in a side-address configuration with tapered grille for optimum placement versatility. The AE3000 features an 80 Hz, 12 dB per octave low-frequency roll off and a dynamic range of 137 dB, 1 kHz at maximum SPL.

Studio and live mic manufacturer Audix has had great success with its versatile Drum Packs. The DP 2, DP 3, DP 4, DP 5, DP 6 and DP-Elite (see review, *PAR* 1/03) collections include varying numbers of Audix' respected percussion microphones for a variety of applications and budgets.

New from Audix this year is the Micros series. Consisting of two models, M1245 and M1290, the MICROS are the smallest condenser microphones in the world with an integrated preamp and detachable cable. The M1245 is less than 2 inches long and weighs a mere .6 oz while the M1290 is 3.5 inches in length (90 mm) and weighs in at 1 oz. Individual models include a variety of polar patterns to choose from including cardioid, hypercardioid, omnidirectional and shotgun capsules.

The M1245 has a smooth uniform response over a frequency range of 80 Hz - 20 kHz, while M1290 has additional wide response of 40 Hz - 20 kHz. The microphones are packaged in a rosewood case with 12' cable, mic stand



Audix D6

adapter, and snap on foam windscreen.

Shure Incorporated's new Beta 54 head-worn microphone made its industry debut at this year's Winter NAMM show. Available in both wireless and hardwired configurations, the ultra-lightweight Beta 54 features a supercardioid design which delivers excellent ambient rejection, and maximum gain-before-feedback.

The Beta 54 features a smooth response from 20 Hz - 20 kHz tailored expressly for warm and natural vocals. Outfitted with a low-output cartridge enabling it to handle extremely high sound pressure levels (149 dB SPL maximum), the mic is offered in black or tan, and comes with a snap-fit windscreen, detachable boom mount, and flexible, fully-adjustable headband.

Shure also introduced updated versions of the Beta 52 and 56, renamed Beta 52A and Beta 56A. Improvements include a larger adjustment knob, more durable tightening mechanism and a wider mounting base capable of accommodating a larger range of microphone stands.

German manufacturer beyerdynamic has recently expanded its specific-application Opus range to include several new models.

The latest in the line is the Opus 88 cardioid condenser microphone, developed for use with toms and snares, features a high-gain-before feedback and a wide frequency response.

A patented mic clamp with an integrated pre-amp and 3-pin XLR-plug provides a quick mounting of the microphone. The short gooseneck and the horizontal swivel joint allow optimum positioning to the sound source.

An ever-increasing list of top vocalists are choosing the high-quality Neumann KMS 105 supercardioid condenser for use on tour. Introduced a few years ago, the KMS 105 features a unique 4-layer acoustic pop/wind filter, and mechanical and electrical filters for extremely low handling noise.

Meanwhile, Neumann's parent company, Sennheiser, continues to expand its popular evolution 900 Series by adding several top-end models to the line.

The e935 and e945 are vocal microphones easily cut through high on-stage sound levels, feature a fast transient response and are highly insensitive to feedback due to their optimized

frequency response. The mics exclude handling noise and their full-metal casing will take all the inevitable knocks on stage. The e 935 is cardioid and the e 945 super-cardioid.

The e 903 mic has been specially developed for snare drums. Accentuating the high frequencies, this cardioid mic captures the full sound direct from the drum. The e 903 has a high maximum sound pressure level and excellent transient response, so the snare sound is reproduced with direct impact.

The Electro-Voice RE510 is the newest addition to the enduring Electro-Voice RE microphone family. The RE510 is a supercardioid hand-held condenser microphone with the flexibility to adapt to different applications. The RE510 features a broad smooth bandwidth, low distortion, and a wide dynamic range.

The flexibility to adapt to different applications comes thanks to a low-frequency boost switch. In the roll-off configuration, the low end of the RE510 is tailored to compensate for proximity effect. The wide bandwidth and high SPL handling capability of the RE510 makes it equally at home miking an acoustic guitar, electric guitar amplifier, cymbals, or even a kick drum.

The mic features a Warm Grip handle for reduced handling noise and a comfortable feel, a multistage pop-filter to virtually eliminate breath noise, and a Memraflex grille for rugged durability. The RE510 is also available in a wireless head version for use with the RE-1 wireless system.

The Crown CM-311A differoid noise-canceling headworn mic continues its popularity with sound reinforcement professionals and vocalists alike. The CM-311A features an electret condenser capsule and is designed specifically to meet demanding touring sound applications: gain-before-feedback and isolation are key features, as are its lightweight and comfortable headband and adjustable mic boom.

The CM-311A includes battery/phantom powered belt pack with a programmable on-off switch. CM-311AE connects directly to any wireless transmitter. The CM-311AHS mounts on a Sony MDR-V6 or MDR-7506 headphone, making it ideal for singing drummers (God help us...).

McCauley Sound was selected by the AES to present on the subject of technical innovation at the 1st AES Line Array Symposium.



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s o u n d

TASCAM DS-M7.1

Digital Surround Controller

BY STEPHEN MURPHY

I started my foray into surround-format mixing about two years ago. I was not far into the exploration when the need for managing the multiple sources, destinations and level configurations became obvious.

While some project-oriented digital mixing consoles and computer-based digital audio workstations provide multichannel mix implementation, it is rarely more than rudimentary. Unfortunately, dedicated surround controllers with comprehensive multiple format/multiple configuration switching and routing have been prohibitively expensive for many wishing to explore surround.

The TASCAM DS-M7.1 Digital Surround Monitoring Controller (\$1,899) brings professional, full-featured surround control to the project studio price range while, in some areas, outperforming controllers two to three times as expensive.

Since the TASCAM DS-M7.1 surround controller is designed principally to upgrade



digital consoles and workstations to support the many standard surround mix formats, it is natural that the unit performs most of its magic in the digital domain. And therein lies a good part of the cost savings that allow the unit's reasonable price point.

FEATURES

The DS-M7.1 is an eight-in/eight-out digital audio controller that routes the source tracks to both a tracking deck and a mastering deck (AKA stem recorder), and to the surround monitoring system. A return/bus switch routes either the digital mixer's output bus or the return from the mastering deck to the monitor path. A stereo control room input allows an independent stereo signal to be monitored using the same amp/speaker setup without repatching.

The DS-M7.1 provides an eight-channel digital insert on the monitor path for the option of patching in a DTS or Dolby device to audition the effects of the encoding/decoding process without affecting the recording.

The DS-M7.1 supports 24-bit operation at the standard sampling rates found between 44.1 kHz and 96 kHz. Surround formats supported range from LCRS up to 7.1. Standard pull-up and pull-down operation is supported when using an external master clock source.

TASCAM managed to cram eight sets of eight-channel I/O onto the back panel of the three-rack-space-high unit through use of multiple DB-25 connectors wired in standard configurations: TDIF, AES/EBU and balanced analog. A pair of ADAT optical connectors is also included. Conceivably, one could have 66 channels of inputs (including the stereo control

room pair) and 64 channels of outputs simultaneously hooked to an unexpanded unit, so the use of multipin connectors is not only warranted, but very much appreciated.

The DS-M7.1 back panel has three available expansion slots, which can be fitted with optional I/O cards that can be used as an alternative to the unit's standard I/O described below.

Audio inputs and outputs provided as standard on the DS-M7.1's back panel are as follows:

"Slot 1" is a DB-25 TDIF-1 connector for eight channels of audio to and from the digital console or workstation.

"Slot 2" is a DB-25 TDIF connector for eight channels of digital audio to and from the tracking recorder.

"Slot 3" is a DB-25 AES/EBU connector for eight-channel monitor path insert I/O.

"Master Recorder I/O" provides eight channels of digital audio to and from the mastering deck, internally selectable between TDIF, AES and ADAT optical.

"Monitor Outputs" provides eight channels of audio simultaneously on AES and analog DB-25 connectors.

Optional eight-channel expansion I/O cards include the IF-AD/DM ADAT I/O (\$249); IF-AE/DM AES/EBU I/O (\$299), which is eight-channel, high-speed mode compatible; IF-AN/DM analog I/O card (\$499); and the IF-TD/DM TDIF I/O (\$249).

Additional connections on the unit include the aforementioned analog control room inputs on balanced 1/4-inch connectors: a 3.5 mm TRS jack for dim and mute footswitch operation; an RS422 connector for extending the remote use of the detachable front panel;

Applications: Studio, post production

Features:
Detachable front panel; up to 24-bit/96 kHz operation; full down mixing and bass management functions; standard I/O includes Console (TDIF), master recorder (TDIF, lightpipe, AES/EBU DB25), monitor insert (AES/EBU DB-25), monitor output (AES/EBU DB-25, Analog DB-25) and stereo control room input (1/4-inch TRS)

Price:
\$1,899

Contact:
TASCAM at 323-726-0303; or
www.tascam.com.

and an RS232 jack reserved for future use/software upgrades.

IN USE

For such a complex monitoring tool, setting up the ins and outs and getting audio out of the unit was quick and painless.

I fed the TASCAM DS-M7.1 with six channels of digital audio (a 5.1 surround project) using a TDIF cable going from a Nuendo workstation into the TASCAM's Slot 1 TDIF console I/O. Likewise, I used a TDIF cable to go to and from a TASCAM DA-88 via the Master Recorder I/O (I later tested the Master Recorder optical I/O with a 20-bit ADAT).



Rear view of the DS-M7.1

I did not require the use of a tracking deck in this configuration, so those connections went unused (though I did later verify the operation of the interface). For monitoring, I opted for the default routing of 1-L, 2-R, 3-C, 4-Sub, 5-LS and 6-RS for the 5.1 setup.

A DB-25 to eight male XLRs snake was used to go from the DS-M7.1's analog Monitor Output connector to a small array of destinations: Channels 1, 2, 3, 5 and 6 went into the XLR inputs of a Sunfire five-channel amplifier feeding five Westlake speakers in standard surround configuration. Channel 4 went into a Tannoy PS 110 B powered sub.

Which brings me to one of the coolest bonuses I found in the DS-M7.1: In surround setups where six channels or fewer are used, monitor output channels 7 and 8 can be routed to an alternate stereo speaker pair. An "Alt

Spk" button on the control panel lets you switch between the surround monitor setup and an independent two-channel amp and stereo speakers — in this case a Hafler P3000 amp powering SP Technology's excellent Timepiece 2.0 speakers (see review in an upcoming issue of *PAR*).

I followed TASCAM's calibration instructions using the DS-M7.1's internal pink noise generator and a C-weighted SPL meter.

Thoughtfully, there is a menu item "safety lock" feature that must be disabled before you can use the noise generator, thus preventing the premature loss of speaker drivers (and clients) by an inadvertent press of the test button during a high-SPL mix.

The front panel of the DS-M7.1 is detachable from the body of the unit for remote operation. I used a standard 15-foot RS422 extender cable as

continued on page 56 ▶

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WHAT INSTRUMENTS DREAM ABOUT.

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*adjustable from Unity gain to +30dB

ALL TUBE OUTPUT STAGE
The DITTO's second tube gain stage (GT12AU7) drives its custom wound output transformer, balancing and converting your instrument into a powerhouse low impedance signal that will drive 100's of feet of cable, greatly minimizing interference and/or signal loss, and adding loads of tube tone!

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Built tough enough for a world tour, DITTO transforms your high impedance instrument signal into "line-level" ready, thereby bypassing the transistor gain stage of the mixer. DITTO provides enough gain for direct recording into Hard Disk recording formats. Your instruments will sound better than ever, on stage or in studio!

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Product Points

TASCAM DS-M7.1

Plus

- + Lots of connections options
- + Stereo and LCRS through 7.1 surround monitoring
- + Incredible price

Minus

- Surround sound monitoring is complicated

The Score

A bargain for what it does.

Ross says



"I've used my Royer's on every recording I've done since 1998. These mics have made a huge difference to me in my quest for real sounding records. From blues to heavy metal, I keep finding new and effective ways to use the mics and by far they have become my main electric guitar mic. I just finished producing and engineering Ziggy Marley's new record and single and the Royers are everywhere. I used them on the drums, organ, percussion, the four piece horn section and of course the guitars. I brought in my old friend David Lindley to play his arsenal of stringed instruments and he was very impressed with the size and detail translated from the mics. 'Irie!' I don't look back now, only forward and the bottom line is, I won't ever make a record again without these mics."

Ross Hogarth (Grammy winning Producer/Engineer - Ziggy Marley, Gov't Mule, Keb Mo, Coal Chamber, Jewel, Roger Waters, Black Crowes)



Visit royerlabs.com to look in on Ross in the studio and see some of his electric guitar setups.

www.royerlabs.com
818.760.8472

72 m series

► TASCAM from page 55

recommended by TASCAM to place the controls smack in the middle of the desk; the manual also includes specifications for making a longer extension cable to a maximum of 60 feet.

The control panel follows familiar conventions and as such, was easy to use. A 20 x 4 alphanumeric LCD indicates parameter settings, and changes are made using a dedicated rotary encoder and a series of dual-purpose (via Shift key) buttons. A separate rotary control and LED display provide stepped level control and large numeric display of the SPL. A set of nine dedicated buttons and respective LEDs provide visual indication of surround mode and active speakers; a global solo/mute switch determines the function of pressing any of the nine speaker buttons.

The set of five buttons below the LCD display, in conjunction with the shift and two cursor keys, allow easy navigation through comprehensive system setup, multichannel I/O, down mix and bass management menus. As there are a wealth of adjustments and options within the setup menus, I encourage those who are interested to read the lit on TASCAM's website.

SUMMARY

The TASCAM DS-M7.1 earned its keep with its simple multichannel volume control and comprehensive I/O patching abilities. Those features alone immensely reduced tangle-related stress, and probably added years to my career endurance.

Once the DS-M7.1 was comfortably installed in my monitoring setup, the feeling was not dissimilar to getting a Herman Miller Aeron chair and wondering why you'd been torturing your body for the last — *how many?* — years!

Beyond the useful features mentioned above, its abilities to maintain an independent stereo monitoring system with the surround system; to replicate consumer bass management schemes (routing LFE channel to mains or deriving the LFE from the mains); to easily down mix from multichannel surround formats to fewer-channel formats (e.g. from 5.1 to LCRS, stereo or mono); and to insert a surround encoder/decoder in the monitor path push the TASCAM DS-M7.1 into the "best buy" category. For me, it was an obvious "must buy."

Stephen Murphy, contributing studio editor for PAR, has recorded hundreds of records and CDs, including Grammy Award-winning and Gold and Platinum-selling releases.

► Microtech Gefell from page 36

nicely-machined mounting bars offer a cost-effective equivalent to a dedicated stereo microphone. The ORTF method (which combines both time and intensity differences) gives a more spacious stereo result, but without the perfect phase coherence of the true coincident X-Y arrangement. My own trick is often to use multiple stereo mics — employing both setups — and make my imaging decisions in post-production. A pair of M 930s is thus more versatile than any single stereo mic, and their tiny form factor makes various stereo arrangements quite easy to accomplish.

CONCLUSION

I liked the M 930s so much that I bought them. While they are not my most high-end mics I am sure I will use them a lot more than some of my more expensive models. I would not hesitate to use them alone to record classical concerts, or even to spot mic groups of singers in live performances. And the next time I have to record a lute or clavichord (two of the quietest instruments in the world), I sure know which mics I'll be using!

Dr. Fred Bashour is a regular contributor to Pro Audio Review. He holds a Yale Ph.D. in Music Theory, and works as a classical music producer/engineer — with credits on hundreds of recordings.

Product Points

Plus

+ Extremely versatile microphone set
+ Purpose-built X-Y and M/S mounting bars available

Minus

- Cardioid-only (M 930) or hypercardioid-only (M 940) models.

The Score

In my opinion, a pair of Gefell M 930 mics is the lowest-priced "fancy, expensive, German" mic set suitable for world-class recording situations. And it's the quietest mic I've ever used.

Thiel Audio Power Point Speakers

BY TOM JUNG

Accurate monitoring is enough of a problem with stereo, whereas adding three or four additional speakers can make this problem grow exponentially. Surround sound can be a much more involving experience than conventional two-channel stereo, having the capability to take movie and music consumption another level. The biggest problem in setting up a multichannel speaker system is location or placement of speakers. Domestically, getting five or more speakers in a family or living room to coexist with furniture and still be acceptable to wife or significant other can be a real challenge many are not willing to under-

go. While in a professional environment or control room the same problems exists (maybe not the wife or so) with the addition of equipment racks, computers and road cases full of gear. The few remaining big studios, design rooms specifically for surround, but in the real world where much of the work is done these days, smallish rooms with monitor speakers either on stands or placed on meter bridges of consoles is the norm.

FEATURES

Located in Lexington Kentucky Jim Thiel and his brother started building speakers in their garage back in 1977. Today, Jim, along



with co-owner Kathy Gornik, have built the company into a 30,000 square foot manufacturing facility with more than 30 employees. Jim pioneered the principle of time and phase accuracy in speakers with the use of sloped baffles, coaxial driver mounting and phase coherent crossover network design. Thiel is one of a few manufacturers that actually designs and builds its own drivers, which, by the way, are works of art.

The Power Point is a wedge-shaped surface
continued on page 58 ▶

Hear What The Hype Is All About

"The C-3 is THE HIP new guitar mic. It gives your Marshalls that phat-gut-punch we all crave. I'll never cut another record without one."

Scott Rouse - Producer, Grammy Nominee, Nashville, Tennessee

I have a microphone "wish list". You have allowed me to check off both the U87 with the C1 and the C12 with the T3.

Ted Perlman - Producer/Arranger/Composer
Bob Dylan, Chicago, Kaci, 2gether, Young MC

One of the best vocal mics in the world is the \$300 Studio Projects C1. You can spend way more for "one of those" mics from Germany if your ego demands it, but the C1 is certainly the sonic equivalent.

Pete Leoni - Producer Engineer, Tech writer and reviewer



C1
Single-pattern
Cardioid
List \$299

C3
Multi-pattern
Cardioid, Pad, Filter
List \$599

T3
Variable-pattern
Tube
List \$1099

PAR
REVIEWER'S
PICK 2002



All models include shockmount and case.

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toll-free 877 563 6335 fax 310 373 4714
Visit Us Online at www.studioprojectsusa.com
World Radio History



VT-1

Tube Mic Pre, Discreet Class A/B switching,
with variable Tube Drive. List \$299

► *Thiel from page 57*

mountable speaker, housing a coaxial driver mounted in a sealed enclosure that can be affixed to ceilings, walls or even placed on the floor. The PowerPoint uses a very low distortion, short coil/long gap, high output, metal diaphragm 6.5-inch woofer that is coaxially mounted with a 1-inch, high output, low distortion metal dome tweeter. The coaxial driver mounting really works here because the sounds from the individual drivers reach your ear at the same time, regardless of speaker placement or listening position.

Specifications include a frequency response of 3 dB from 75 Hz to 20 kHz, a sensitivity of 89 dB at 2.8 V-1m with a 4 ohm nominal impedance. The cabinet measures 19.75 inches long, 5.5 inches high, and 12.25 inches wide.

The real beauty here is the ability to position these speakers in spaces where it would simply be impossible to place a stand or floor mounted speaker. Many engineers (including myself) are using the ITU speaker set up specification that dictates the surround speakers to be placed at 110 degrees either side of center. This arrangement places the speaker close to the middle of the room in some cases, which is far from ideal and even impossible in many instances. The Power Point has a 45-degree front baffle relative to the mounting surface.

IN USE

Over the past few years I have been experimenting with an overhead or elevated center surround speaker, which can really be a problem when it comes to speaker placement. The Power Point is the most perfectly suited speaker for this application I have found, so when it came time for review I asked the nice folks at Thiel for three Power Points for left, center and

right surrounds.

I first placed the three Power Points on the floor and listened to them with frontal channel information. It was obvious right off that these speakers were not your ordinary 6/12-inch two-way. They sounded very smooth and natural without the usual recessed upper midrange from the very top end down to around 70 Hz where the bottom rolled off very gently. A unique property of this design is the reduced boundary reflections, be it floor, ceiling or wall, whichever boundary the Power Point is upon, that reflection is eliminated, which is the same basic principal of boundary microphones. The result is clarity in the midrange, sort of like removing a sonic blur or cleaning a dirty window.

The Power Points sounded so good on the floor I got out my cordless drill and proceeded to mount them on the ceiling where they really belong. I mounted one directly behind the listening position (center surround), and the other two, 110 degrees from front center to become left surround and right surround. I repatched and routed the surround channels to the Power Points, set levels with pink noise and, Voila! These speakers might just be the ideal surround monitoring solution. With the front speakers at ear level and the surrounds up and behind, the experience is what I feel surround sound is all about. With properly recorded material the ambience retrieval is simply wonderful with the Thiel Power Point ceiling mounted speakers.

SUMMARY

The Thiel Power Point is a great solution to a problem that exists with surround monitoring and home theater playback by using the ceiling as a mounting surface. Not to be confused with other ceiling speakers, the quality of parts and construction here are first rate and the design is as good as it gets both visually and performance wise. Even if you do have the floor space to position floor standing or stands mounted speakers (which is unlikely) the Power Points still have the edge with their smooth accurate uncolored sound and minimized boundary reflection properties. Though they may seem a bit pricey initially, nothing I've seen even comes close to solving this problem. A real breakthrough product.

Tom Jung, founder of DMP Records, is Pro Audio Review's technical consultant and a regular contributor.

THIEL CS1.6 SPEAKERS

The CS1.6 is a 36-inch high floor standing two-way speaker with a two-inch thick slanted front baffle that corrects for phase and time alignment. The unique slotted bass reflex system reduces unwanted port noise while the baffle's rounded edges reduce diffraction effects for improved spatial and transient performance.

The 6.5-inch woofer uses a much larger than normal diameter voice coil to greatly extend the woofer's bandwidth for improved upper midrange performance. The large diameter coil distributes its driving force over a large area of the cone rather than concentrating it at the center, while using a short coil/long gap motor system dramatically reducing distortion. Equally innovative is the woofer's centrally located neodymium magnet that is placed inside the coil, rather than outside, creating an inherently shielded speaker to prevent picture distortion when placed near video displays. A new high efficiency tweeter also uses a short coil/long gap motor system design for reduced distortion.

Amplitude response is rated at 50 Hz to 20 kHz plus or minus 2 dB while sensitivity is rated at 90 dB 1 watt at 1 meter into 4 ohms.

I only had two of the CS1.6s up front so a true 5.0 or 6.0 set up with the Power Points for the surrounds didn't happen. But listening in stereo to the 1.6s you could tell that both models were products of the same great speaker designer Jim Thiel. The right on tonal balance and phase corrected first order crossovers are almost trademarks of Jim's design. The CS1.6 is available in a wide variety of real wood, laminate or painted finishes. Price in studio black is \$1,900 per pair.

— Tom Jung



Thiel CS1.6 speakers

Applications:

Surround monitoring, home theater

Key Features:

6.5-inch woofer; coaxially mounted 1-inch tweeter; ceiling, wall or floor mounting

Price:

\$1,300 each

Contact:

Thiel Audio at 859-254-9427, www.thielaudio.com.

Shure Earphones, Behringer Composer Pro, AlphaSmart Dana

MICRO
VIEWS

BY FRANK BEACHAM

Shure E5c Sound Isolating Earphones (\$499) Shure's E Series "in-ear" earphones first earned a reputation for exceptional sound quality among the touring musicians who used them with the company's popular PSM series of personal monitoring systems. Over time these micro "cans" started showing up off-stage hooked to the portable music players of the same road-weary performers — this time to enjoy personal music while blocking the unwanted sounds of noisy tour buses and planes.

Shure noticed this trend and has now started offering the E Series earphones as stand-alone products ranging from \$99 to \$499. I tried the top-of-the line E5c model (110 ohms).

First — how does Shure justify charging \$500 for a pair of earphones? By offering something totally unique. Each E5c capsule has dual low-mass/high-energy low and high-frequency drivers instead of the typical single speaker to cover the entire frequency range. An in-line electronic crossover optimally blends the outputs of the drivers.

In-ear earphones seal out background noise, allowing the high performance drivers to deliver precise, accurate sound directly to the ear. They also offer natural noise attenuation, allowing lower listening levels in loud environments.

The downside is, depending on the individual, such deep-fitting plugs can become uncomfortable to wear over time. Shure tries to remedy this by including a "fit kit" that allows users to personalize the fit of E Series earphones with reusable, disposable foam sleeves and three sizes of reusable soft flex plugs. If you don't like the feel of the earphones, Shure offers a 30-day money back guarantee.

After a few minutes of experimentation, I found a comfortable, snug fit. With that fit came a first-rate listening experience — something I've never before achieved with such tiny, lightweight (1.1 ounce) earphones. Thanks to the stage performers who let the rest of us in on their little secret.

Behringer MDX2600 Composer Pro-XL (\$139.99) This impressive two-channel expander/gate/compressor/peak limiter with integrated dynamic enhancer, de-esser, tube simulation and low contour filter is one of those Swiss Army knife dynamic processing products that offers tremendous utility for small studios or live installations. And, as with many of Behringer's new generation of products, it offers remarkable bang for the buck.

We observed a record producer use the Composer Pro-XL for mixing CD demos of several newly recorded R&B songs. It worked well

in both the auto and manual modes. Behringer's IKA (Interactive Knee Adaptation) circuit was particularly impressive, nicely smoothing out the compressor's hard attack times.

The unit's IDE (Interactive Dynamic Enhancer) also lived up to its billing, compensating for the compression-induced loss of treble energy. Another feature is the IRC (Interactive Ratio Control) expander which automatically adjusts the ratio setting for inaudible noise suppression, and the IGC (Interactive Gain Control) with dual-stage peak-



Behringer Composer Pro-XL

limiting circuitry that combines a clipper and a program limiter. All tested well.

The new Composer Pro-XL also incorporates a voice adaptive de-esser (VAD) that differentiates between male and female voices. Least impressive was the ATS (Authentic Tube Simulation) circuit that's designed to imitate the warmth of classic tube circuitry.

Behringer's ultra low-noise 4580 operational amplifiers, high quality components and ergonomic design make the Composer Pro-XL a valuable and cost-effective addition to any small studio.

AlphaSmart Dana (\$399) No, it's not really an audio product, but the new Dana can make life in the field much easier for those in audio who use a laptop computer. Dana is essentially a Palm organizer in a laptop's clothing. It does almost everything a laptop PC does on location, but does it with far greater ease and simplicity. It's cheap; ultra-light (under 2 pounds); power efficient (25-plus hours runtime on three standard or rechargeable AAs), super-rugged (ABS case designed to take a four-foot drop), and it offers Internet access, e-mail and Microsoft Word-compatible word processing with a full-size keyboard.

I've been using a Dana in the field to take notes, keep recording logs, look-up phone numbers and occasionally check in for e-mail. It does all of that exceptionally well, while helping keep my gear load to a bare minimum. Since Dana runs on the stable Palm 4.1 operating system, it connects with either Macs or Windows. The Dana is cheap and a great accessory for those who work in the field.



AlphaSmart Dana

For more information contact::

Shure at 847-866-2200, (www.shure.com/earphones/eseries.asp);

Behringer at 425-672-0816, www.behringer.com;

AlphaSmart at 888-274-0680, www.flydana.com.

Marshall MXL V69 Microphone

BY SCOTT BURGESS

"So, that must be a two- to three-thousand-dollar microphone, eh?" Such were the comments that I heard when the Marshall MXL V69 Mogami Edition came out of its case. An impressive looking unit, no doubt. Of course, what matters is the sound, and as I soon discovered, looks were not deceiving. As a vocal and instrumental microphone, the V69 proved to be a capable performer, rivaling much more expensive mics.

Marshall Electronics is the American distributor for Mogami cable and purveyor of numerous products for the pro audio industry. Marshall entered the microphone fray in 1999 with the MXL 2001 (*PAR* 1/00), and has since created a number of condenser and dynamic microphones for professional studio use. The MXL V69 Mogami Edition (\$399) continues its bang-for-the-buck tradition.

FEATURES

As its full name hints, the designed in U.S.A./manufactured-in-China cardioid-pattern tube microphone sports Mogami cable inside and out, including a 15-foot cable to run from the power supply to your mixer. A weighty brass enclosure and a 24K gold-plated grille give this microphone a serious look and feel. There are no adjustments of any kind to worry about. The V69 arrived in a carrying case befit-

Applications:

Studio, project studio

Key Features:

Cardioid pattern; 12AT7 tube; Mogami wiring and cable; ships with shockmount, case and separate power supply

Price:

\$399

Contact:

Marshall Electronics at 800-800-6608, www.mxlmicro.com.



ting the dignity of a quality tube microphone.

The 25mm element design incorporates a 12AT7 tube in a hybrid signal path with a FET. The mic is wired internally with Mogami cable. Marshall claims 20 Hz to 20 kHz frequency response, with no tolerance in dBs listed. Looking at the supplied graph, the -3 dB point on the bass end is about 70 Hz while the mid/treble response is flat to 5 kHz. The response gently rises about 2 dB to 12 kHz, then rolls off as it heads toward 20 kHz, about 6 dB down.

Accessories include the power supply, cables, shockmount and windscreen. The shockmount has a clothes pin-type release that makes it easy to use, although I occasionally found it hard to crank down the angle adjustment thumbscrew hard enough to keep the mic in position.

There is also a printed warning to use the windscreen for vocals in order to protect the diaphragm. That said, the filter is quite effective. Measuring only about a 1/4-inch thick, it does a surprisingly good job of blocking pops and wind noise of any sort. Given the absence of a low-cut switch, this is reassuring. My only qualm with the package is that the case proved not quite sturdy enough to handle the weight of the power supply. When the unit arrived, a couple of the dividers had broken loose. No harm was done to the unit, but if you were to ship it around often, it could become a problem.

IN USE

To compare the V69 against another large-diaphragm microphone in our kit, we put it up next to a Neumann TLM 170 for some pop

vocals that my graduate assistant was tracking for a project. It may not seem like a fair comparison, as the two microphones differ in price by nearly an order of magnitude, but the V69 held its own. There was plenty of air at the top, as its printed curve indicates, and it made for a sound with both warmth and punch. A few of its tracks made the final mix, alongside those of the TLM 170.

The next test was a rock concert. A rather energetic friend of mine was playing a benefit concert at an old movie theater now inhabited by a local church. It was my intention to compare several microphones that I brought along for his vocals. We started with the V69 and never got around to the others. The FOH mixer found that he needed to add only a little EQ for the sound to cut through. Even though the singer was stationed less than 10 feet from one of the main speakers, there was minimal trouble with feedback. I did find myself wishing there was a pad on the unit, as it puts out a strong signal, but it never got too hot for our Millennia Media HV-3 preamp to handle.

The singer was comfortable with the microphone right away, and had no trouble working it to good effect. On tape (okay, on hard disk, but that just does not sound right!) the V69 rendered his voice, a high baritone, with a clarity and subtlety that blended very well with his acoustic guitar and the rest of the band. It was detailed throughout the frequency spectrum,

and from a near-whisper to a wail, the V69 caught every nuance. Final mixes are a ways off on this project, but I suspect that very little EQ will be needed.

The following week brought our school's Jazz Weekend, a festival that gathers some 60 bands from around the state to compete and to hear great jazz from our own ensembles and from some nationally known guest artists. The V69 first found its place with the female vocalist fronting one of our student groups. Her voice has the sort of mellow, easy-to-listen-to character that would be the envy of many a professional singer.

Since this project was a live recording, the V69 again did double duty. The setup required the use of the internal preamplifier on our Yamaha 02R mixer this time, but the results did not suffer greatly for it. The singer was roughly centered between the loudspeakers, which were about 50 feet apart. Filling a hall of 1,200 over a 20-piece big band required a substantial amount of gain, but there were no problems with feedback.

On the recording the vocal is crisp and clear, with the warmth one would expect from this

style of microphone. The relatively wide pattern makes for a fair bit of bleed from the band, which is not a big problem for my style of recording (which relies heavily on the main stereo pair). For other mixing styles, though, it could hamper efforts to do a lot of processing.

For the warm-up combo before the festival finale, I tried it out in front of the saxophonist. It worked well enough that I left it in place for the finale concert with our guest artist, saxophonist David Liebman, and our own top big band. It had been my intention to try it on the piano for the second half, but we liked too much on Dave's saxophones to give it up!

For his alto, it was the only mic, and for his soprano, we used a combination of the V69 at the bell and an AKG C535 aimed at the body. This made for a perfect pickup of all the notes on the instrument, allowing the large-diaphragm tube mellowness of the V69 to balance with the condenser brightness of the C535 as the tunes required. On the recording, the V69's upper-end extension and clarity carried the day again, letting the sax soar over the group and requiring little EQ to make it fit into the mix.

SUMMARY

The Marshall MXL V69 Mogami edition is an excellent microphone, and when you factor in the low, low price, the price performance becomes downright amazing.

At the price, one might wonder about durability, but during my testing I heard and saw nothing that would give me reason for concern. After using it in several different venues under varying conditions, I am convinced that it would make a great addition to any microphone kit.

Scott Burgess is the Audio Production Manager for Central Michigan University School of Music. He has more than 80 album credits, including four Grammy winners.

REVIEW SETUP

Millennia Media HV-3 preamplifier; Mackie MDR 24/96, TASCAM MX-2424 hard disk recorders; Sony DMX-R100, Yamaha 02R mixers; Genelec 1031A monitors.

THE ENGLISH CHANNEL



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Live Sound Speakers

Community Loudspeakers TFR64A Speaker

Features: Three-way; twin 12" ferrofluid-cooled woofers; Community M200 midrange driver; 2" UC2 HF driver; rigging hardware; 13-ply Baltic birch cabinet; TUFCOAT coating.

Price: \$3,325.
Contact: Community Loudspeakers at 610-876-3400, www.loudspeakers.net.



JBL VerTec VT4887 Line Array Element

Features: Three-way; twin JBL 2168 8 Neodymium Differential drive woofers; four JBL 2104 4" midrange drivers; two JBL 2407H neodymium HF drivers; steel grille; DuraFlex coating; PlyMax cabinet; S.A.F.E. suspension system.

Price: \$3,649.
Contact: JBL at 818-894-8850, www.jblpro.com.



Tannoy V15 Speaker

Features: Two-way; 15" Power Dual concentric driver; biampable; birch cabinet; steel grille; onboard mounting hardware.

Price: \$2,150.
Contact: Tannoy North America at 519-745-1158, www.tannoyna.com.



Phonic America PA550 Powered Speaker

Features: Price. Two way 15" woofer; 1" titanium compression driver; onboard mixer; two-band EQ; biamplified; onboard 210W LF amp; onboard 70W HF amp; molded cabinet.

Price: \$549.
Contact: Phonic America at 813-890-8872, www.phonic.com



Bassmaxx B-Zero Subwoofer

Features: 18" Neomaxx woofer with 4" voice coil; 13-ply Baltic birch cabinet; optional flyable version.

Price: \$3,650.
Contact: Bassmaxx/Rhino Acoustics at 866-333-6299, www.bassmaxx.com.



Peavey QW-1 Loudspeaker Array

Features: Two way; twin 10" Black Widow woofers; 4" 44XT ferrofluid-cooled compression driver; Quadratic Throat Waveguide CD horn; Radialinear Planar Phase Correction; rigging hardware.

Price: \$3,649.
Contact: Peavey Electronics Corporation at 601-483-5365, www.peavey.com.



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Bob Katz - Mastering Engineer - Digital Domain, Orlando, FL

The two-channel DAC1 is perhaps one of the more significant recent advances in digital-audio conversion technology.

It provides some of the finest digital-to-analog conversion through 96-kHz, and will play back 192-kHz with a 48-kHz analog bandwidth. The performance of the DAC1 is unrivaled. THD+N is an astonishing -108 dB measured at -3 dBFS, at any playback frequency, at any sample rate, with any degree of input jitter. You can now hear detail that was previously masked by jitter induced artifacts. If the recording was exceptional, you'll hear it; if it wasn't, you'll hear that as well. The secret? *UltraLock™* technology.

The DAC1 is essential equipment for any location that requires uncolored monitoring. Locations such as mastering and recording studios, broadcast facilities and even high-end home audio environments. The price? An unbelievably low \$795. Call today and experience what is certainly one of the finest DACs in the world.



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800-262-4675
www.BenchmarkMedia.com

continued on page 64 ►

THE HEMI-HEADS ARE HERE!



▲ A-48



▲ Area 51



▲ ST



▲ LE



▲ S

"ADK Commemorative Tube Mics are a Gas! We used them with the Cincinnati Pops Orchestra and our Vocals Really Soared!!"

- Tim Hauser, Vocalist, Manhattan Transfer

"I use ADK LE Matched Pairs for recording my toms, and two ADK Transformerless for overheads. Warm and accurate, the perfect complement to my sound!"

- Joel Rosenblatt, Spyro Gyra Drummer

"The sound is huge and wide open when tracking vocals. The accurate and transparent sound reproduction, especially on the acoustic grand piano, is nothing short of amazing!"

- Dale Sticha
Piano Tech for Sir Elton John

"I've now used the A-51s on almost everything including vocals, guitars, and drums. They remind me of very expensive German mics I have tracked with before."

- Adam Kasper, Producer/Engineer, REM, Pearl Jam, Soundgarden, Foo Fighters

"We took ADK Microphones on our Christmas tour last year with Jaci Velasquez. The entire band was totally impressed by the sound! From the violins to percussion, ADK covered it all. We will be using these mics again in future tours."

- Jay Lipschutz, FOH Engineer, Jaci Velasquez

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► Live Sound Speakers from page 62

Yamaha SM115IVS Speaker

Features: Two-way 15" woofer 2" high-frequency driver with a CD horn; steel grille; handles; polyurethane coating. Price: \$435.
Contact: Yamaha at 714-522-9011, www.yamaha.com/proaudio.



Turbosound Q Light TQ-310 Speaker

Features: Two-way; 10" woofer; 1" compression HF driver with rotatable Converging Elliptical Waveguide. Price: \$1,175.
Contact: Turbosound/Sennheiser at 860-434-5220, www.sennheiserusa.com.



Carvin C1588 Speaker

Features: Three-way, 15" woofer; 3" midrange driver; titanium horn tweeter; biampable; recessed handles; metal corner protectors; metal grille; DuraTuff coating. Price: \$600.
Contact: Carvin at 800-854-2235, www.carvin.com.



QSC 102M Speaker

Features: 10" cone woofer 3" titanium HF driver; Compositolite composite cabinet; stainless steel grille; pole mount; rigging hardware; optional rotatable waveguide. Price: \$2,047.
Contact: QSC at 800-854-4079, www.qscaudio.com.



Electro-Voice QRx-115/75

Features: Two-way; DH-7 compression driver with 3" voice coil; Ring-Mode Decoupling technology; rigging points; recessed handles; biampable; modified wedge cabinet. Price: \$1,498.
Contact: Electro-Voice at 866-782-8346, www.electrovoice.com.



L'Acoustics 112XT Powered Speaker

Features: Two-way 12" weather resistant woofer with coaxially mounted 1.4" neodymium compression HF driver; biamped; onboard 290W LF amp; onboard 135W HF amp; compatible with BSS Soundweb and XTA processors. Price: \$1,800.
Contact: L'Acoustics US at 805-604-0577, www.l-acoustics-us.com.



SLS Loudspeakers RLA/2 Line Array

Features: Two-way; twin 8" cone woofers; SLS PRD1000 Push-Pull Neodymium Ribbon HF driver; NeverMar coating. Price: \$2,000.
Contact: SLS Loudspeakers at 417-883-4549, www.slsloudspeakers.com.



MacPherson Monolith Version 2

Features: Three-way; 18" woofer; twin 6.5" mid range drivers; 2" HF compression driver with CD horn; biampable/triampable; still grille; optional road version. Price: \$3,695 - \$4,495.
Contact: MacPherson at 847-674-3535, www.macpherson-inc.com.



Bag End S21E-I Subwoofer

Features: 21" Extend Low Frequency woofer; recessed handles; corner protectors; pole mount adapter. Price: \$1,980.
Contact: Bag End at 847-382-4550, www.bagend.com.



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Contact: FBT North America 800-333-9383, www.fbt.it.



Radian Audio Engineering RMF-1122 MicroFill Speaker

Features: Two-way; 12" woofer; 2" compression driver; biampable; 13-ply Baltic birch cabinet; Duradian finish. Price: \$2,500.
Contact: Radian Audio Engineering at 714-288-8900, www.radianaudio.com.



Martin Audio W8LC Line Array

Features: Three way 12" horn loaded woofer; twin 6.5" midrange Hybrid horn-loaded drivers; three 1" horn-loaded compression HF drivers; onboard rigging system. Price: \$5,999.
Contact: Martin Audio at 519-747-5853, www.martin-audio.com.



Sound Physics Labs SPL-td1/Sub

Features: Twin 12" woofers Baltic birch cabinet choice of finishes, colors; optional ATM hardware. Price starts at \$1,800.
Contact: Sound Physics Labs/ServoDrive at 847-724-5500, www.soundphysics.com.



Nady Systems THS-1515 Speaker

Features: Two way, 15" woofer, titanium horn, recessed handles; reinforced corners; Tolex covering. Price: \$239.
Contact: Nady Systems at 510-652-2411, www.nady.com.



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► Live Sound Speakers from page 64

Apogee Sound AE 5 Speaker

Features: Two way 12" woofer 1" composite ferrofluid-cooled tweeter; Baltic birch cabinet; steel grille; onboard rigging system; biamped. Price: \$2,265.

Contact: Apogee Sound at 707-778-8887, www.apogee-sound.com.



BGW Model 850T Powered Subwoofer

Features: 15" woofer; onboard amplifier, cooling fan, Baltic birch cabinet; 16-gauge steel grille; Tourflex coating; THX approved. Price: \$4,450.

Contact: BGW at 800-468-2677, www.bgw.com.

Behringer Ultrawave B300 Speaker

Features: Two way 15" woofer 1.25" compression driver with titanium dome; onboard two-band EQ; onboard limiter; 230 W LF amplifier; 70 W HF amplifier; polypropylene cabinet. Price: \$799.

Contact: Behringer at 425-672-0816, www.behringer.com.



Fender SPL 1226 Mark IV

Features: Two-way twin 15" woofers 2" titanium compression driver with CD horn; Baltic birch cabinet; metal grille, corner protectors; recessed handles; pole mount adapter; carpeted exterior. Price: \$549.

Contact: Fender Musical Instruments at 480-596-9690, www.fenderaudio.com.



Mackie SA1232 Powered Speaker

Features: Three-way twin 12" RCF woofers 6" horn-loaded mid range driver; 1.75" RCF titanium tweeter; level, EQ, phase, time adjust controls; biamped; onboard LF amp; onboard Class AB mid range/HF amp. Price: \$1,999.

Contact: Mackie Designs at 800-258-6883, www.mackie.com.



Renkus-Heinz TRC 121 Speaker

Features: Three-way CoEntrant/Complex Conic driver system; 12" woofer; 2" Complex Conic horn; biampable; rotatable horns; optional control modules. Price: \$1,875.

Contact: Renkus-Heinz at 949-250-0166.



Celestion CXi1531 Loudspeaker

Features: Three way 15" woofer with 4" voice coil, 1" midrange driver with 2.5" voice coil; CDX1-1750 NoBell Horn high-frequency driver; biampable. Price: \$1,600.

Contact: Celestion/Group One at 631-249-1399.



D.A.S. Audio Compact 1

Features: Three-way; D.A.S. G-354 15" woofer with 4" voice coil; horn-loaded B-6 6" midrange cone; M-5 1" compression high-frequency driver on a CD horn; onboard twin 500W Bang & Olufsen PowerHouse amps. Price: \$1,195.

Contact: D.A.S. Audio at 888-327-4872.



OAP SM-212 Stage Monitor

Features: Two-way; twin 12" woofers; 2" titanium diaphragm driver on a constant directivity horn; 16-gauge steel grille. Price: \$2,518.

Contact: OAP at 800-788-1627.



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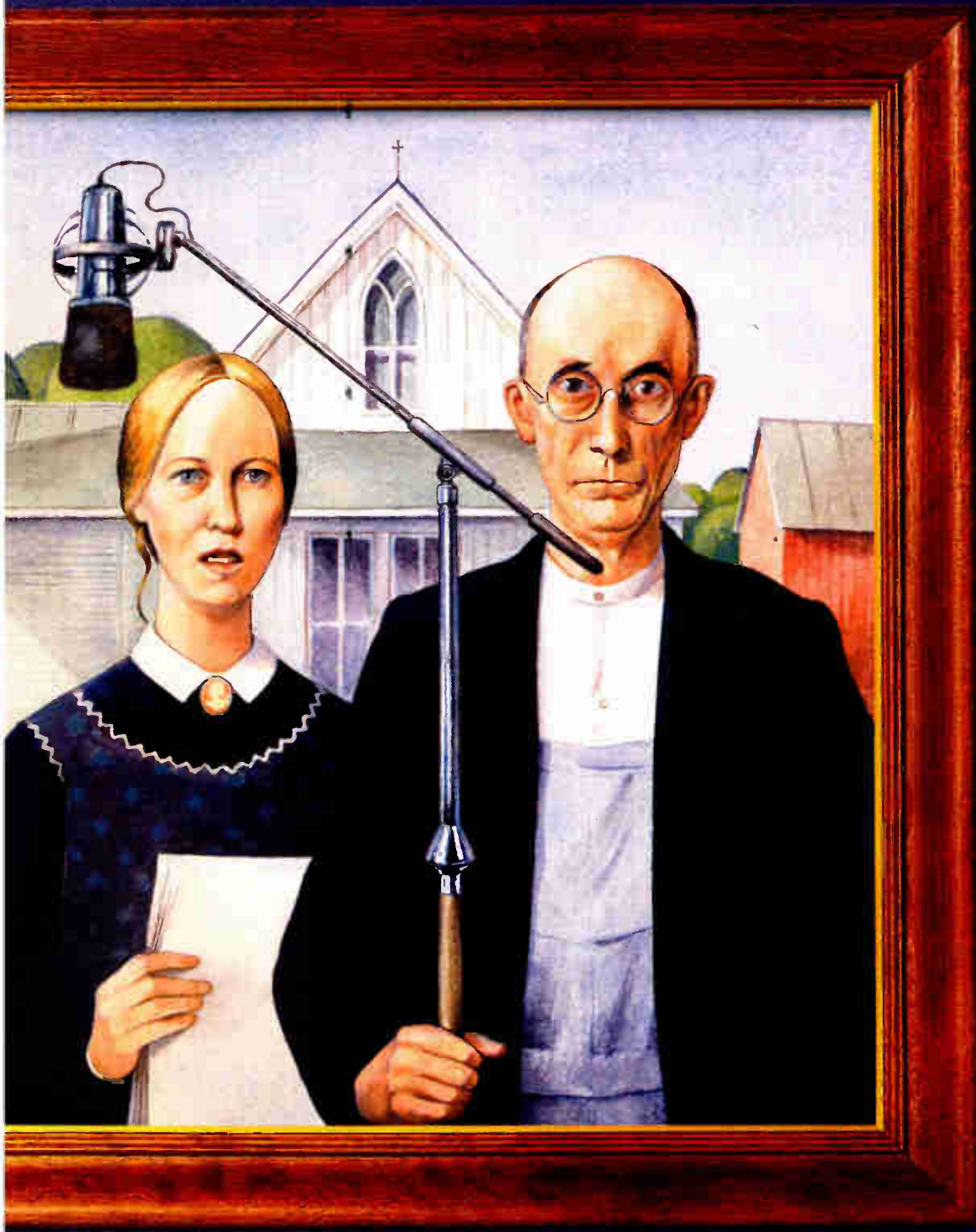
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Live Sound Consoles

Allen & Heath ML5000 Console

Applications: Front of house, stage monitor.

Features: 32, 40, 48-channel frames; four-band parametric EQ; LCR panning; inserts; talkback function; 128 scene memory; VU meters; optional 24-input sidecar. Price: starts at \$24,000.

Contact: Allen & Heath at 818-597-7711, www.allen-heath.co.uk.



Yamaha PM5000 Console

Applications: Live sound installation program mixing.

Features: 28, 36, 52-channel; 26 dB pad; phase reverse; four-band parametric EQ; LCR panning; high-pass filter; 990 scene memory; FLASH memory card drive.

Contact: Yamaha at 714-522-9011, www.yamaha.com/proaudio.



ATI Paragon II Production Console

Features: 48V phantom power; three-band, four-band EQs; high, low-cut filters;

compressor/limiter; noise gate; test tone generator; talkback function; 256 scene memories. Price: starts at \$65,000.

Contact: ATI at 301-776-7879, www.audiotoys.com.



Peavey RQ 2310 FX Mixer

Applications:

Live sound, monitor mixing.

Features: Eight-channel; Recall 48-bit DSP effects; three-band EQ with sweepable mid; nine-band master graphic EQ; Feedback Ferret feedback eliminator.

Contact: Peavey Electronics at 601-483-5365, www.peavey.com.



Carvin C1644P Powered Mixer

Applications:

Live sound, sound reinforcement.

Features: 16-channel; three-band channel EQ; two nine-band master graphic EQs; phantom power; inserts; low-cut filter; four onboard 300W amplifiers; digital effects processors; 60mm faders; top-mounted I/O; mounted in Road Warrior travel case.

Contact: Carvin at 800-854-2235, www.carvin.com.



DiGiCo D5 Live Console

Applications: Live sound mixing, installation.

Features: 64 – 96 channels; six-band EQ; four-band parametric EQ; comp/limiter; gate; 5.1 surround sound; 38x8 output matrix; TFT touchscreens; LED meters; USB port; separate rackmounted I/O box.

Contact: DiGiCo at 44-1372-845-600, www.digiconsoles.com.



Phonic America MR7X Mixer

Applications: Live sound mixing.

Features: 18-channel; four-band EQ; 48V phantom power; 255 digital effects; high-pass filter; pan control; subwoofer output; 100mm ALPS faders; linkable; rotatable

connector pod; rackmountable. Price: \$1,299.

Contact: Phonic America at 813-890-8872, www.phonic.com.



Innova-Son SY80 Digital Console

Applications: Live sound mixing.

Features: 80 input channels; DSP; LCR panning; separate rackmountable I/O box. Price: starts at \$71,000.

Contact: Innova-Son/Sennheiser at 860-434-9190, www.sennheiserusa.com.

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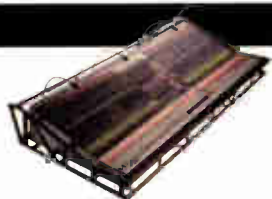
► Live Sound Consoles from page 69

Audient Aztec Console

Applications: Live sound.

Features: 32, 40, 48 input channels; LCR; scene automation; 12 x 8 matrix; LED meters. Price: \$49,900.

Contact: Audient/ATI Group at 301-776-7879, www.audiotoys.com.



Crest V12 Console

Applications: Front of house, monitor mixing.

Features: 24, 32, 40, 52-input frames; four-band parametric EQ; 48V phantom power; pad; phase; high-pass filter; linkable with other V12s; LCR on mono inputs; MIDI mute system; VU meters; talkback function; optional sidecars. Price: starts at \$52,000.

Contact: Crest at 201-909-8700, www.crestaudio.com.



Alesis 12R Mixer

Applications: Installation, live sound.

Features: 12-channel; two-band EQ; phantom power; inserts; 60mm faders; LED meters; rackmountable; Price: \$399.

Contact: Alesis at 310-821-5000, www.alesis.com.



Cadac S-Type Production Board

Applications: Live sound mixing.

Features: 17, 25, 33 input/output channel/slots; four-band parametric EQ; inserts; 10 x 8 output matrix; LED meters; 100mm Penny & Giles faders; expandable.

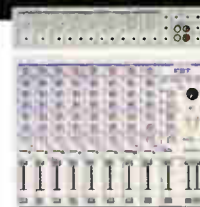
Contact: Cadac at 44-1582-404202, www.cadac-sound.com.

FBT Pickup 88E Mixer

Applications: Live sound.

Features: 8-channel; three-band EQ; 48V phantom power; 16 DSP effects; 60mm ALPS faders. Price: \$649.

Contact: FBT North America at 800-333-9383, www.fbt.it.

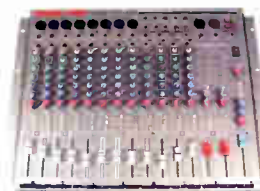


Nady Audio CMX-16A Mixer

Applications: Live sound mixing.

Features: 16-channel; three-band EQ; 48V phantom power; PFL; pan controls; inserts; 60mm faders; top-mounted I/O; rackmountable. Price: \$399.

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Professional Card	\$100	\$95	\$90	\$85
Blind Box	\$25			



Single Slice

BY CHUCK TAYLOR

Sixpence None the Richer's "Don't Dream It's Over"

SINGLE: "Don't Dream It's Over"

ALBUM: *Divine Discontent*. (Squint/Curb/Reprise)

DATE RECORDED: August 2002

ENGINEER: Allen Sides

OTHER PROJECTS: Goo Goo Dolls, Phil Collins, Alanis Morissette

SINGLE SONGWRITER: Neil Finn

SINGLE PRODUCER: Rob Cavallo

STUDIOS: Ocean Way Studios, Los Angeles

CONSOLE: Solid State Logic 9000-J

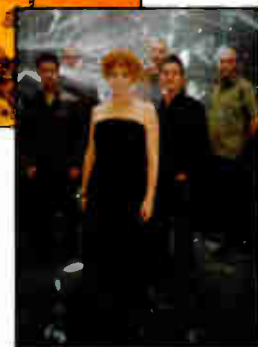
RECORDER: Pro Tools HD

MONITORS: customized for Ocean Way studio

MICROPHONES: Sony C800G (lead vocal), AKG C12 (drums), AKG C12A (toms), Neumann M50 (room), Neumann U 47 (bass drums)

MICROPHONE PREAMPS: SSL 9000-J preamps

PROCESSORS: API 550-A EQs



Engineer's Diary



Rob Cavallo and Allen Sides

It took five years for Nashville-based Sixpence None the Richer to shake free from the legal wranglings surrounding previous label Squint's bankruptcy, but with the release of the aptly titled *Divine Discontent* late last year, at last they were back in the game. Current AC and adult top 40 hit "Don't Dream It's Over," a remake of the classic 1987 Crowded House hit, was a last-minute addition to the album, and the session to record it wasn't exactly luxuriant. "As I recall, we gathered the band together to work on the arrangement, they played, (lead) Leigh Nash did three takes of her vocal, and the whole thing was wrapped up in three days," says engineer Allen Sides, who worked closely with producer Rob Cavallo. "Sometimes sessions just go really smoothly and this one was really fun. Things just worked and we were all really excited when we heard how it came out." The team employed the new HD 96 kHz version of Pro Tools for the recording, which Sides says offered higher overall resolution, in addition to the usual flexibility the technology provides. "We had 80 tracks of stuff and were able to keep every take," he says. "That allowed us to keep everything, which is great when you're trying to find a hook that's long lost after you've punched in 30 times."

Chuck Taylor, a regular contributor to *Pro Audio Review*, is senior editor at *Billboard* magazine in New York.

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April 2003



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