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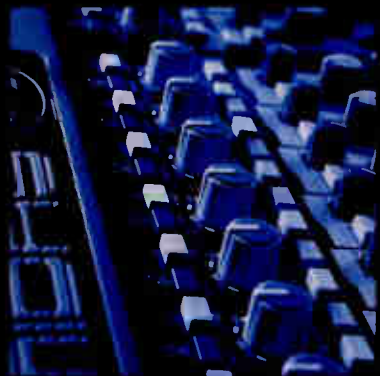
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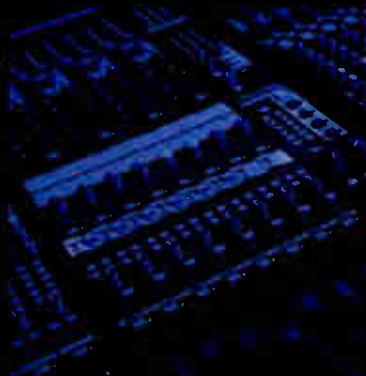


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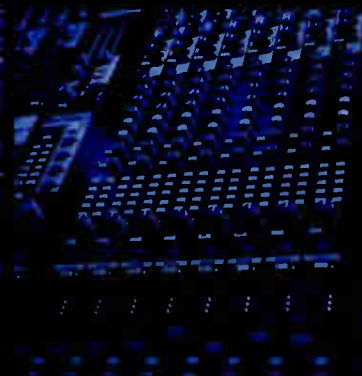
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8 AUX BUSSES 8 GROUP BUSES  
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76 64 INPUTS  
8 IN STEREO LINE MIX



170MM SELF-ALIGNING  
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# High-Res Pros/ Low-Res Listeners

BY JOHN GATSKI

It is amazing to me that in today's age of high-resolution audio recording — DVD-A and SACD — that the public standard for audio playback is now compressed audio via MP3 players.

Never before has the gulf between what music is produced on and what music is listened on been so wide. Sure, there are still some diehard audiophiles who spend the bucks to have the most realistic sound reproduction possible, but the lowest common denominator seems to be winning in the middle of the market and down.

## SOUND QUALITY FIRST

As a guy who sold hi-fi to help put me through college in the late '70s and early '80s, I remember all my college buddies always tried to buy the best system we could afford (spending that tuition money at the beginning of the semester). In those days, affordable good sounding systems were aplenty, including Advent speakers, NAD amps, Onkyo receivers, Boston Acoustic speakers, BIC turntables and cassette decks, Pioneer, Yamaha — the lists goes on and on.

This stuff was not cheap, but not expensive, and its impressive sound quality meant that the general population — not just frugal audiophiles like me — came in to the stereo shops and bought it as well. Manufacturers were proud of their reasonable priced/high performance reputations.

Today, it seems that the audio quality is no longer the driver. Technology has given us the potential for better-sounding audio products, but, in the end, the technology advances have offered more convenience and less quality at a lower price.

For example, MP3 players, like the iPod and others, are wonderfully convenient. Pay a buck or less and download a song from the web. It sure beats going to the local Tower right? But what does it sound like? Well, it does not sound that good. To my ears, a good cassette sounds more natural. But hey, MP3 is cheap, convenient, and it sounds good enough, right?

The college student who had small Advents, a BIC turntable and a Scott receiver in the '70s is now a student who merely

has a stubby looking, muddy sounding, little CD/MP3 boom box. Ain't it cute?

If the audio listening consumer were just using MP3s to sample music and then went to Tower to buy a CD, or perhaps an SACD or DVD-A of the same music, then I could rationalize an iPod. However, people are using these things as their main source for music!

And this trend toward worse-sounding playback goes beyond MP3 players. Even the more established products, such as CD players, many DVD players and receivers, don't sound as good as they used to. Again, for convenience and lower cost, a \$100 receiver that claims a 100 watts across five channels cannot even meet the 20 Hz - 20 kHz at under .5 percent distortion spec in stereo that was easily obtainable in the 1970s. I have a CD portable from ten years ago that sounds better in stereo than any of the \$79 DVD/CD decks produced in China I have heard.

For the consumer, I believe that there is less choice in the middle of the audio product market than there was 20 years — or even ten years ago. The reasonably priced, good quality products have all but disappeared. In the 1990s, I could buy an excellent performing CD players \$200-\$250. Or a decent preamp and amp combo for under a \$1,000. And most manufacturers made similar kinds of products.

Today, the middle of the market has dried up. You either have the low-end stuff or the high-end products. You can hardly even buy a decent \$250 CD-only home deck at all any more. Technology and convenience have combined it with the DVD player and usually they are not that great sounding until you get to \$1,000 retail. And some of those don't even sound good.

There are still great-sounding audio playback products being made and incredible music being produced by the pros (i.e. high-res surround). Let's hope that high-res surround audio is the savior that pulls the audio-listening consumer back out of its low-res sonic doldrums and gets them interested enough to demand more better sounding products — not just cheaper ones

*John Gatski is publisher/executive editor at Pro Audio Review. The MP3-player on his Palm Tungsten E remains unactivated.*

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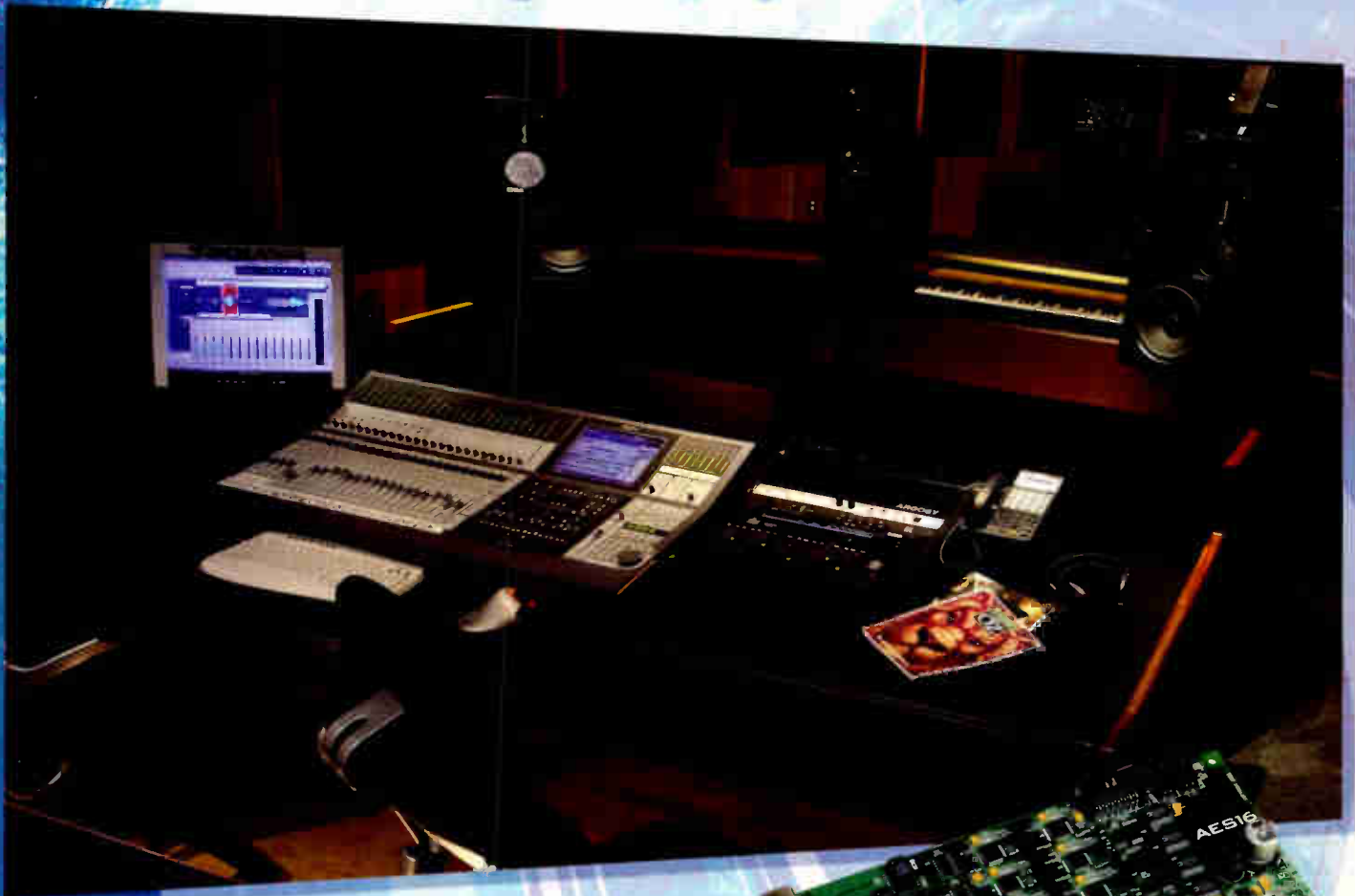
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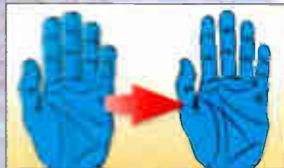
# With the New AES16, the Biggest Part of Your Digital Audio System May Be the Smallest



You have invested a lot of time, money and commitment into your digital audio system, with the best in digital mixers, converters, digital audio workstations, software and recorders. All you need now is the final piece to tie the entire system together - the AES16™ from Lynx Studio Technology.

Working in single-wire mode, the AES16 offers 16 channels of 24-bit AES/EBU I/O at 192 kHz using Windows or Macintosh computers. You can also use dual wire devices for eight I/O channels. The AES16's software controls its internal sixteen-channel mixer, routing your signals just about anyway you can think of with virtually no latency.

In addition to being the ultimate digital audio router, the AES16 features a new Lynx technology SynchronoLock™. Basically "jitter control on steroids", SynchronoLock provides extreme jitter tolerance at all inputs. By coupling statistical analysis with low-noise clock generation techniques, SynchronoLock extracts a very clean clock with 3000:1 jitter attenuation from AES signals affected by long cable lengths and other noise sources. The clock output of SynchronoLock can also be used as a very accurate word clock source for other studio devices.



Need more than 16 channels? No problem. Up to four AES16 cards can be installed in a single computer, for a total of 64



inputs and 64 outputs. You can also add 16 channels of ADAT Lightpipe I/O with the optional LS-ADAT LStream card that attaches to the AES16.

The AES16 was developed with your facility in mind. The AES16-XLR model with two six-foot cables and professional XLR connectors may be the best option for you. For added convenience, we offer optional twelve-foot cables with D-sub connectors for Apogee, Benchmark, Yamaha, Mackie and other top digital audio brands. Plus the AES16's PCI interface is designed for either 5V or 3.3V signaling, making it totally compatible with the new Macintosh G5 models.

Please visit our website at [www.lynxstudio.com](http://www.lynxstudio.com) to learn more about how the AES16 lets your computer become the control center of your digital audio system.

Now that's big news in a small package.

*Lynx*  
**STUDIO  
TECHNOLOGY**

**AES16**



# NEW PRODUCTS

If anyone thought the broadcast industry was short of money they haven't been paying attention to big console sales lately.

**Euphonix** has sold System 5-B digital broadcast consoles to: the Canadian Broadcast Corp. (their second), WCPO in Cincinnati (their second), the Tonight Show (their second) and Western Mobile Television (their third). Max Air consoles have been procured by KUTV in Salt Lake City, KVUE in Austin, Tex., Tu Universo Television and WIPR (both) in Puerto Rico, CNN in Atlanta and New York, KRON in San Francisco, WEDU in Tampa, Fla. and the Tribune Studios in Los Angeles.

**Calrec's** first US Zeta 100 is at KJRH in Tulsa, Okla. (see picture of Dale Vennes, KJRH engineering manager). Calrec also



placed two 60-channel S2 consoles with NEP Super Shooters, a remote truck outfit based in Pittsburgh.

In other parts of the globe, **Studer** has two OnAir 3000 digital radio broadcast boards – one to Belgium's Bel RTL and the other Zurich's Radio 24. An even larger OnAir 5000 went to the Lugano, Switzerland-based studios of Radio Sizzera Italiana, the Italian language service of Swiss Public Broadcasting SRG. In France, France 3 took delivery of an analog 928 console for remote TV truck use.

## Rycote Microphone Windshields Modular Windshield System

They call them windshields over there but we call them windscreens. Whatever, Rycote, from over there, has a new, modular system for building a windscreen to suit the job. The new Rycote Modular Windshield System is not just a furry zeppelin on a stick but rather an extensible system with zeppelinesque sections for controlling length. Acoustically inert materials such as nylon and Hytrel are used in construction of the harder parts such as the rings and the spine while improvements in netting and construction deaden other "noisy" suspects. Prices: full package starts at \$580.

Contact: Rycote/Redding Audio at 203-270-1808, [www.reddingaudio.com](http://www.reddingaudio.com).



## Symetrix AirTools Studio Matrix

Aimed at small to mid-sized broadcasters, Symetrix's Studio Matrix system is the latest addition to the



AirTools family. The system consists of several CAT-5 Ethernet networkable digital modules. The center of the system is the Iliad router. Source signals coming into the system come in through the Icarus analog input, Narcissus digital input or the Homer studio interface (duplex) box. Outputs are the aforementioned Homer interface and the Ulysses analog output and Oedipus digital output boxes. The digital format is AES31. The whole system runs under PC control. Prices: Iliad - \$3,049; Icarus - \$4,199; Narcissus - \$2,549; Homer - \$1,649; Ulysses - \$3,799; Oedipus - \$2,599.

Contact: Symetrix at 425-787-3222, [www.symetrixaudio.com](http://www.symetrixaudio.com).

## Fostex FR-2 Field Memory Recorder

Though Fostex is phasing out of the PD-4 it is wasting no time in introducing a new field recorder and one with two faces. The FR-2 records to Compact Flash cards or PCMCIA hard drives (both Type II). The FR-2 is a two-channel 24-bit digital recorder sporting a variable sample rate from 22.05 kHz – 192 kHz and a BWF format. It also has phantom power, high-pass filters, and a USB port computer interfacing. Naturally all of this is battery operable. A timecode option is expected later in the year. Price: \$1,499.



Contact: Fostex at 562-921-1112, [www.Fostex.com](http://www.Fostex.com).

## Omnia-6EX Broadcast Processor

The new Omnia-6EX digital broadcast processor has a dual life – it operates as a traditional FM broadcast processor and it operates as a new HD Radio/DAB processor. This dual nature allows it to parallel process for broadcasters transmitting in both formats simultaneously. The FM signal path has final limiting and pre-emphasis while the HD/DAB path has a multiband look-ahead limiter. Several new processing algorithms, along with bass management have been added to the earlier Omnia-6 settings.



Contact: Omnia at 216-241-7225, [www.omniaaudio.com](http://www.omniaaudio.com).



# If price were the only factor, it wouldn't matter which name is on the console.

If a live sound mixing console were a commodity purchase, every console at a given price point would deliver the same performance. But would you trust your clients' system performance to just any console?

## Price is important, but even more important is value.

Price means nothing unless it is backed by true sonic performance. As a live sound engineer or contractor, you can't afford to sacrifice sonic integrity, but you must keep the overhead low. You need value. Enter the Crest Audio HP-Eight.

## Crest Audio was built on delivering the best in sonic performance.

Since we introduced the Gamble EX Series in 1988, Crest Audio consoles have established a well-deserved reputation for quality and innovation. Our latest creation, the HP-Eight professional mixing console, builds upon the legendary, high quality audio designs of past Crest Audio consoles while planting a firm foot forward into the future.

The new HP-Eight mixing console bridges the world between high quality audio designs and efficient, modern construction techniques to offer several frame configurations. You can choose the ideal size, from easily portable 24- and 32-channel frames to installation-size 40-, 48- and 56-channel frames, to fit a variety of medium-capacity live performance venues and houses of worship.

## It's not a commodity ... is it?

If we were producing a commodity, we would've built a console that mimics other products in its price range. Instead, we've created an invaluable tool for live sound

professionals. No other console offers as many sought-after features as the HP-Eight:

Four-band, double-swept mid EQ; eight analog subgroups; two-channel matrix; full talkback and monitor systems; four manual mute groups; plus 10 aux sends on each mono input channel; fader flip function for use as a full-function monitor mixer; and five stereo line input channels with EQ, buss assignment and aux sends. All at a price that defies logic.

## A console that will exceed your expectations.

The HP-Eight adheres to the same high standards of engineering design, production and components that built the Crest Audio legacy. That's why our pro audio products continually show up on concert tour riders and in project specs.

For performance and reliability you can count on gig after gig, installation after installation, be sure to choose an instrument that will exceed all expectations—not a commodity that mimics the rest.

Contact your Crest Authorized Reseller for the latest HP-Eight information and prices.



*The HP-Eight is also backed by our solid five-year warranty*



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Fair Lawn, New Jersey 07410

**CREST  
AUDIO**

BY JIM STANLEY

If you have been into professional audio for any amount of time, you are sure to have come across the ubiquitous Shure M67 mic mixer, and its more modern cousins, the M367 and FP42. These venerable workhorses have “been there and done that” in the pro audio world for decades, and have pretty much been the portable “mixer of choice” for those of us in radio and television broadcasting.

With that said, I had the pleasure recently to review a product from Sony that is sure to make broadcasters and other portable mixer users sit up and take notice; a state-of-the-art digital mic/line level mixer with a full set of professional features that will give old style analog mixers more than a run for their money the Sony DMX-P01 (\$2,800).

## FEATURES

The DMX-P01 is a portable four-channel mixer designed for electronic field production (EFP) and electronic newsgathering (ENG) applications. The mixer's stature is modest; just 10 1/2 inches long, by 8 1/8 inches wide, and 2 3/4 inches high. Weight is just a touch over 5 pounds, with eight AA batteries installed in the internal battery pack.

The Sony DMX-P01 supports both analog and AES digital operation, and as such bridges the last analog gap in an otherwise modern all-digital television news/EFP environment. Radio broadcasters, electronic cinematographers and other field users will want to have a look at this mixer, too; the feature set on the DMX-P01 is perfect for many of their applications as well.

The mixer accepts up to four analog

# Sony DMX-P01 Digital Portable Mixer

microphone or line inputs, and is equipped with dual outputs — stereo analog and AES/EBU. Audio processing is 24-bit, with sampling rates switch selectable between 48 kHz and 96 kHz. Menu-selectable digital limiters are available for each of the inputs, and a fully adjustable, built-in compressor/limiter can be applied to the output signal as well. Inputs and output connections are made via professional-grade XLR connectors, with each of the mic inputs capable of providing phantom power to microphones that require it. Power for the mixer can come from either an external 10 - 15VDC power supply (Sony provides both a conventional DC power jack and four-pin XLR male connector), or from eight AA batteries, which fit inside the unit. In my tests, the battery pack lasted more than four hours, and Sony provides two battery holders with the unit, so extended operation with batteries is definitely a viable option.

In perusing the detailed instruction manual included with the unit, I found this little mixer to be literally filled with neat features. One of the more interesting ones is the “Cascade” option; Sony has provided a means of linking together multiple mixers via a digital interconnect, for field mixing applications that require more than four inputs.

The DMX-P01's LCD panel displays audio levels, battery status, and cumulative time in use, and provides the user interface to the mixer's built-in control menus. The level meter can be configured to display standard VU, dBf or one of several PPM weightings. In order to assure accuracy during cold weather operation, the liquid crystal display is automatically heated — just one of the nice attentions to detail that is reflected throughout the mixer.

Today's digital technology allows manufacturers to really pack in the features, even in a device this small. Utilizing a four-position Function switch and a volume control-



style digital encoder knob, the DMX-P01 gives users extensive control of almost every mixer parameter. The menus allow users to store and recall mixer setups via internally stored scene files, monitor camera return output (when the mixer is connected to a camcorder), adjust low-cut filter settings, switch on the built-in limiters and output compressor, select the type of meter for audio monitoring and more.

A panel lock feature allows you to lock out individual (or almost all) controls, which makes this unit a great one for sending out with less experienced personnel.

Ruggedly built, the Sony DMX-P01 mixer is made of heavy-gauge anodized aluminum, with bump-protected switches and knobs. This is one tough unit that will easily be able to stand up to the rigors of news and field production use.

## IN USE

Begin by plugging mics or line sources into the XLR inputs on the left side of the mixer. Mic/Line switches are located just below each input jack. On the front panel, input gain controls are located just below the main level knobs. The main level controls for each of the four channels have a range from 0 to +10 dB. Next select the sampling rate - either 48 kHz or 96 kHz - with the switch located just below the external power connector on the right hand side of the mixer.

If you are operating in a high-noise environment, you may want to switch in one of the built-in low-cut filters. Accessing

*continued on page 12 ►*

## Fast Facts

### Applications:

Field, broadcast

### Key Features:

Four-channel; 24-bit; 48 kHz, 96 kHz sample rates; battery operation; onboard limiters; choice of metering; linkable

### Price:

\$2,800

### Contact:

Sony at 800-686-7669,  
[www.sony.com/professional](http://www.sony.com/professional).



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TO GO.**

**3000 SERIES**



**ATW-T310**



**ATW-R310**



**ATW-T341**

Audio professionals demand certain things from a wireless system. Like long-term dependability. Like true diversity protection from RF hits and dropouts. Like easy setup and operation. Like great sound. The new 3000 Series wireless delivers all these and more.

With 200 selectable UHF channels, True Diversity operation, and advanced digital Tone Lock™ squelch, the 3000 Series offers versatile, professional performance that you can count on. The receiver features soft-touch controls and an LCD information display with step-through menus, balanced and unbalanced outputs, and included rack-mount adapters. There's even a transmitter battery-life fuel gauge on the receiver.

The versatile UniPak™ body-pack transmitter features a secure 4-pin locking connector that is compatible with a wide range of lavalier, headworn, podium and instrument microphones, as well as a guitar

cable. Plus, the transmitter's easily-accessible control panel has a 3-position sliding cover, useful for preventing accidental shut-off or channel-switching.

The handheld transmitter features the stage-proven Artist Elite® **AE4100** cardioid dynamic element, robust metal construction and slim ergonomic design.

Add to all this a very competitive price tag, and you've got everything you demand from a wireless. Whatever the venue, whatever the application, with 3000 Series wireless systems, you're **GOOD TO GO.**

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World Radio History

► Sony from page 10

Menu 4 from the Setup display, users can adjust low frequency cutoff between 50 and 400 Hz. There are both "A" and "B" settings available on the front panel LCF switches, so two different filters can be configured simultaneously to meet individual miking needs. Filter rolloff is fixed at 12 dB per octave.

Submenus 6 and 7 under the Setup heading give users access to the mixer's input limiters and output limiter/compressors,

respectively. The four input limiters are individually adjustable between 0 and +20 dB (0 and -20 when the display is set to dB FS). The output compressor is completely configurable, and allows adjustment of threshold, ratio, attack and release.

Next, access the Meter Select sub menu from the main Setup menu, and select the type of monitoring desired. Users can select from six different settings. Default setting for the mixer is dB FS; PPM1 provides BBC-type weighting, while PPM 2 yields

DIN-style metering. Conventional VU ballistics are available as well.

When you change the metering function, the front panel scale needs to be changed as well. Sony provides six different scale templates with the mixer. Two screws over the LCD display hold the scales in place; once again Sony gets high marks for using mounting screws that are captured, so they cannot be lost. Changing scales is super easy; the plastic templates just drop in.

Next, just below each pair of level controls is a switch labeled "Link/M-S." This switch, in conjunction with the CH LINK/M-S submenu (under Setup) allows the mixer operator to link two channels together as a stereo pair or to configure the mixer for Mid/Side recording (useful for adding stereo presence when recording).

Finally, set the output levels. Master output levels are adjusted with two small potentiometers, located just below the LCD display. Peak reading LEDs are mounted above each of the controls. At the analog output jacks, (located on the right-hand side of the mixer), switches allow you to select either +4 dB, -20 dB or -60 dB for 0VU.

After loading eight AA batteries into the mixer, I selected Setup mode on the front panel Function switch, then dialed up menu 11, Hours Meter, which tracks battery time. Turning the multifunction control one click to the right highlighted the Reset command in the LCD display. A push of the knob, and the meter was reset. The Sony manual says that users should get approximately five hours of operation off of the internal battery; my experiences with battery operation were close to that figure.

For its first test, the DMX-P01 was taken out to cover a press conference. At the location, a single microphone was mounted on a podium, with its output fed to a distribution amplifier/breakout box for reporters' use. The podium mic was fed to Input 1 on the mixer, a reporter's wireless mic attached to Input 2, and a third omnidirectional microphone connected to Input 4 for nat (ambient) sound. In this case, I used the discreet L and R stereo outputs of the mixer to feed the photog's camcorder. (Sony provides a special multipin connector with the DMX mixer that allows the user to make up a custom audio cable for interconnecting a professional camcorder to the mixer, but I did not use this during my testing).

*continued on page 50* ►

**THE ONLY WIRELESS SYSTEM WITH A FUTURE.**

**Sabine 2.4 GHz Wireless**

**UHF: HERE TODAY, GONE TOMORROW**  
 You read all about it these days. Digital television is gobbling up UHF frequencies. Just when you need more wireless mics, government restrictions squeeze the UHF band tighter and tighter. Mics you buy today may well be useless tomorrow.

**2.4 GHz: THE CLEAR ALTERNATIVE** Here's the solution. Sabine's wireless operates in the globally approved, license-free 2.4 GHz band, beyond any interference from UHF or VHF (including all those wireless mics), as well as TV, emergency broadcast, or cell phones. And by international law, all devices sharing this band must be low-powered, so they won't interfere with anything outside their immediate vicinity.

**SMART SPECTRUM: MORE SIMULTANEOUS SYSTEMS** Smart Spectrum gives you the built-in agility to set up to 70 systems in one venue with clear channels always available. Now you can add as many channels as you need, and take your production into any city without fear of high-powered UHF interference.

**SABINE: REDEFINING EXPECTATIONS** Sabine's SWM7000 systems offer the sonic quality of the finest wired mics. And every system comes with a patented FBX Feedback Exterminator®, Compressor/Limiter, Adaptive De-Esser, 10 Parametric filters and exclusive Mic SuperModeling™. It even includes a built-in recharging system so you'll have money left over to invest in the future of wireless.

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# NEW! US-2400

## The plug-and-play DAW controller with 2.5 motorized faders per finger.

Now you can use your mouse and keyboard for what they're good at... interfacing with on-screen graphical interfaces — and use the wide-body US-2400 for what *it's* good at — mixing and hands-on control.

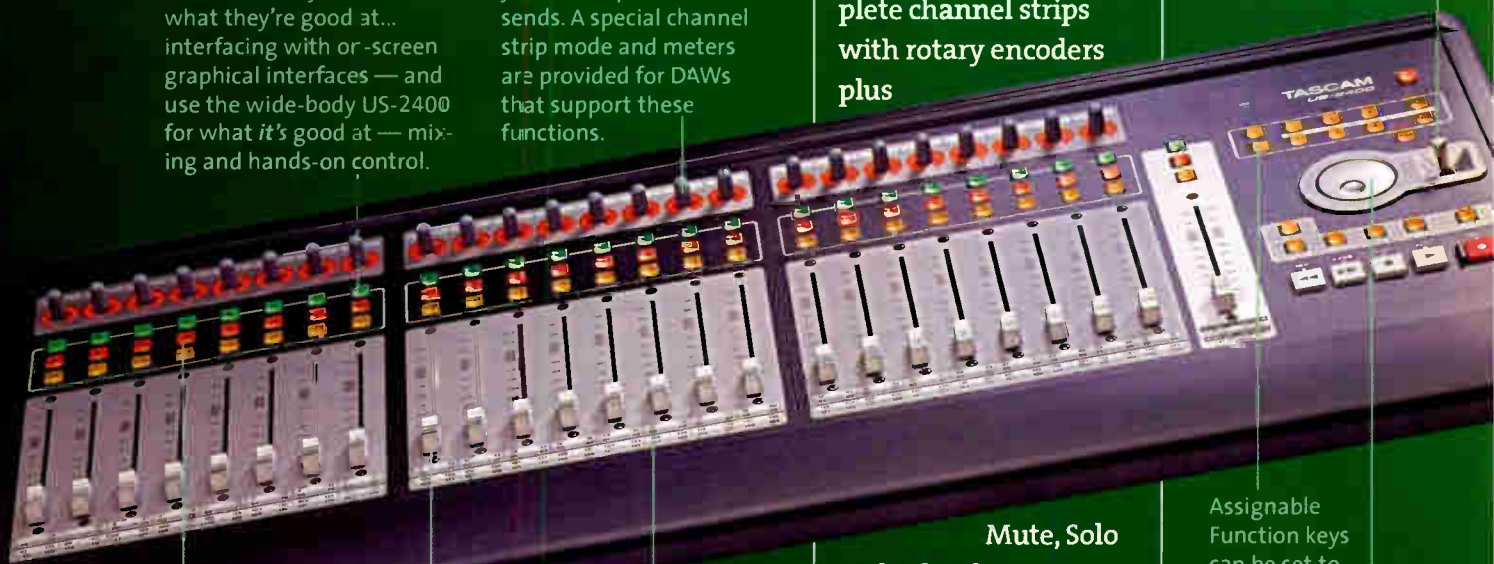


LED ring encoders give you hands-on "analog" of your DAW's pan and aux sends. A special channel strip mode and meters are provided for DAWs that support these functions.

Twenty-five, 100mm touch-sensitive, high-resolution motorized faders.

Twenty-four complete channel strips with rotary encoders plus

Joystick for surround sound panning.



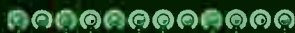
Mute, Solo and Select buttons on every channel beat the heck out of trying to mouse and click on-screen icons.



Touch-sensitive motorized faders have 10-bit resolution — FOUR times finer than many competitors' control surfaces. You get ultra-smooth, big-cor-sole-quality fades. Hit the FLIP button and the faders can be used for writing automated pan or aux send moves while channel levels remain accessible on the LED rotary encoders.

With 24 hands-on channel faders, bank switching is kept to a minimum. But for *really* big projects, the US-2400 is ready to control up to 192 channels!

- ▶ Footswitch jack for punch-ins
- ▶ In/Out point buttons
- ▶ Mac OS X and Windows XP compatible



- ▶ Adjust DAW software parameters such as 4-band EQ via the rotary encoders

Mute, Solo and Select buttons.

The new US-2400 is fully mapped for instant use with any DAW that supports HUI® or Mackie® Control protocols.

For more info on the first DAW controller with enough faders to handle a typical recording session without lots of bankswitching, e-mail us for a brochure at [tascamlit@teac.com](mailto:tascamlit@teac.com) or visit a TASCAM dealer.

Assignable Function keys can be set to Autopunch, Record arming, Undo, etc.

Recessed jog/shuttle wheel and solid-feeling transport controls.



# TASCAM



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BY ALAN R. PETERSON

**W**atch most any political talk show on cable TV. Mixing audio for more than one volatile guest — say as many as four to eight in some circumstances — is daunting to say the least.

Mics left open lead to feedback situations and emphasize the hollow ringing of room tone when someone is speaking. Worse, phase cancellation from adjacent mics cause comb filtering, causing voices to sound tinny and lack character.

A set of outboard noise gates goes a long way in taming such a situation, but is not always the answer. Gates need to be properly tuned for each participant's response, which could result in gate chatter on soft voices. And of course, when everybody starts shouting, there is no real control of overall gain.

Enter the Dan Dugan Sound Design Model D-2 Automatic Mixing Controller (\$11,200), which offers intelligent control of multiple microphones with minimal (or no) intervention from an audio technician.

Television roundtable talk applications are by no means the extent of the D-2's usefulness. Radio talk, sports broadcast, unattended PA for hotel conference halls, theatrical use of multiple-miked actors, and dialog recording on TV or movie sets can all benefit from the presence of a D-2.

Less obvious but other ses could be controlling multiple microphones for Webcasts and Internet teleconferencing. Too often, more emphasis is placed on video image than audio quality, and an expensive Webcast session may have little more than a boundary mic in the center of the table to pick up everyone. Web productions are fraught with bad audio.

A D-2 allows a mic for everyone, with much finer and faster control than can be offered by an A/V technician.

# Dan Dugan Sound Design Model D-2



## FEATURES

The Dan Dugan Sound Design D-2 replaced the earlier Model D and D-1. This is a two-unit system consisting of a control head and the processor itself, connected by a 10-foot, five-pin XLR cable.

On the back panel of the control processor are eight sets of XLR inputs and outputs, all analog. The D-2 uses internal DSP to do its magic, but does not take on AES-EBU digital audio. Also on the rear panel are MST (Music System Threshold) input jacks A through C, ADAT optical ports for linking additional D-2 processors, a serial port for remote control via PC, a logic port and an Ethernet port.

The control head offers an almost bewildering selection of buttons, indicator lights and gain meters. It quickly gets fairly familiar, and offers fast and simple control over the mics being controlled.

Typical noise gates require the setting of threshold sensitivity and downward expansion delay (fast or slow gating action). In some cases and with some voices, these can be touchy adjustments.

However, the D-2 is not gate-based. It follows the action on all microphones in use, constantly varying the level on one or all. In Speech Mode (more on this in a moment), the ambient sound of one mic open always remains, rather than causing the impression of being jettisoned into the soundless vacuum of outer space, as a gate will do.

All you need to do is dial in how much weighting you wish to give particular channels (or just set them all to 0) and the unit does the rest.

As on conventional mixers, channels may be muted, overridden and even bypassed. They may also be assigned to one of three Groups for global control over depth and gain limiting, essentially making the D-2 act like three automatic mix controllers. Groups can span linked units.

It is helpful to locate the processor unit close to the audio console you wish to feed into; you will be connecting the D-2 through your console's insert loops, so you may as well keep the cables short.

As the D-2 is not a gate system, it also is not an automated mixer *per se*. It does not combine all eight inputs plus music and mix it down to a dedicated master output. What it does is intelligently control audio levels going through it and pass them back into the mixer of your choice.

## IN USE

What gives the D-2 a wide advantage over typical noise gates is its ability to ride gain on the entire production. It looks at the total number of mics in action, boosts those mics that show activity and throttles back on all inputs so the total gain is kept in check. If you get several participants who talk at once, the overall gain is ducked slightly and remains

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consistent instead of banging into the red.

Speech mode got its due a few paragraphs ago. In Music Mode, the D-2 offers soft gating that rides along the top of the overall ambient level, detected and regulated by a reference mic that listens to everything, plugged in to one of the Music System Threshold input jacks on the rear panel. A band in performance could duck background vocal mikes when not in use, automatically shifting the threshold when the band plays loud or soft, referenced to the remote sensing microphone.

If you wish to bypass the process and run mics hot into the console, each channel on the D-2 has a bypass relay that straight-wires the input to the output. The remote interface on the rear panel will not do bypassing, but can instead mute desired channels. The serial port, however, will allow automated bypassing with the use of a computer.

Speaking of the logic port, it will allow you to interface the D-2 with a video switcher for video-follow-audio production of roundtable talk shows. This allows rapid automated switching of cameras when a participant speaks, avoiding the dreaded on-screen images of heads that don't talk when the technical director is slow on the uptake.

### FAST FACTS

■ **Applications:**

Broadcast, installation

■ **Key Features:**

Acts as three processors by Grouping; Music and Speech settings; remote port; ability to chain processors; video-follow-audio capability; feedback immunity

■ **Price:**

\$11,200

■ **Contact:**

Dan Dugan Sound Design at 415-821-9776, [www.dandugan.com](http://www.dandugan.com).

If you wish to control more than one D-2, several units can be ganged via ADAT optical cables. The units need to be connected in a ring; the final unit's optical out plug must be connected back to the optical in of the first processor.

Is the external switching power supply much of a problem for some? Okay, so it is another line-lump to reel in and deal with. But it also means Dugan did not have to design a power supply for the D-2, putting most of the R&D muscle into the product itself.

If there can be only one complaint to mention, it is the strobing of the indicators on the control head. In a totally dark control room or remote truck, the lights leave tails in the air when the eyes move rapidly.

### SUMMARY

After your console and recorder, the Dan Dugan D-2 may be one of the more expensive outboard devices (\$11,200) in your setup or control room. But what it does it does very well.

TV production houses that do roundtable talk will want one of these for each studio. Theaters and opera houses that mic their talent with wireless units absolutely need one of these. And companies that produce video and audio Webcasts should rent one of these for a week and hear what well-produced multimed audio for the Net is supposed to sound like.

*Alan Peterson teaches broadcast production for the Connecticut School of Broadcasting, Washington, DC campus and is an engineer for Radio America.*



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BY MARK ULANO

**A** mass proliferation of prosumer/consumer DV camcorders and nonlinear editing (NLE) capability has occurred. Sociologists may be picking apart the implications of this event for generations to come, and although it may be the modern equivalent of a Gutenberg printing press in every home, the mysteries of achieving decent production sound chronically escapes the not-so-silent majority. There is constant demand for a “sound thing widget” that will automatically solve the annoying need for a real sound person. Inescapably, the answer to achieving good sound is much more about skills and experience than about hardware.

From another perspective, professional sound people are being thrust more and more into situations where they must apply their craft in nontraditional environments, i.e., prosumer/consumer devices are becoming the mastering medium in many situations. This is an irresistible tidal wave, so beyond recording backup on simultaneous professional portable media, what is a poor sound jockey to do? Breathe deep...

This frequent need to use consumer gear in a professional context has created a kind of subindustry and a class of equipment designed to interface the two formerly alien worlds. In fact, there is a certain satisfaction in being able to successfully use professional sound gear with consumer stuff. I find my need to do so in professional environments has been expanding constantly.

Into the fray enters the Canadian company, BeachTek, and its product line aimed at professionalizing the audio of all these video camcorders.

## FEATURES

BeachTek's earlier product, the DXA-4 (still in production) and its variations, provide a

### Fast Facts

- **Applications:**  
Field, location
- **Key Features:**  
48V phantom power; battery power
- **Price:**  
\$299
- **Contact:**  
BeachTek at 416-690-9457,  
[www.beachtek.com](http://www.beachtek.com).

# BeachTek DXA-6 Phantom Power XLR Adapter

sturdy, simple, camera-mountable box allowing users to split their inputs to camcorders and using balanced XLR inputs for professional microphone and mixing equipment.

The DXA-6 is an extension of this concept with some important additions. It is a bit larger than the DXA-4, but not by much, and provides phantom power at both inputs for the use of professional film and video microphones. This little box eliminates the kludge-monster of additional cables, Velcro, power supplies and/or mixers needed to use this gear with your prosumer/consumer camcorder. What it does not do is professionalize your approach to gain control or microphone selection and placement. These are up to you.

The box is simple enough; flat black aluminum, rectangular, (5.25 inches x 3.5 inches x 1.25 inches) it mounts directly to the base of your camcorder with a standard 1/4-inch mounting bolt. On the bottom is a female 1/4-inch mounting point so you can still secure the camera on a tripod support. All this is shimmed with a 1.5 inches x 3 inches piece of rubber matting. The overall build quality is very good. This is true inside and out as the components are, for the most part, of a high standard.

At the connection end of the box are a pair of high-quality Neutrik XLRs for left and right balanced microphone or line level inputs. Nestled between these is a female mini (3.5 mm) input jack labeled R Aux. The brief documentation tells us that this input “allows you to attach wireless microphones that use standard mini jack connectors. This signal is sent to the right channel.” This aux input is an understandable nod to some of the consumer wireless equipment out there but strikes me as a negative. The idea is good, but the execution is not so hot. Set up as a balanced mono, this jack is not wired in a way standard to most mini plug sound gear and can create serious phase or damage to your sound recording if not connected to compatible equipment. There is no warning of this on the instruction sheet. The build



quality of this mini jack is not so great either.

(Editor's Note: BeachTek says it has upgraded the aux jack and redesigned the circuit to address the reviewer's comments.)

Also on this side of the device is a hard-mounted output cable terminating in a molded gold-plated male stereo mini plug. This is the sole output cable and would be subject to the most wear of any of the interconnects. This also worries me, for if it fails, you are into a field repair situation or shut down. I would prefer this to be a high-quality, locking mini jack so I could quickly replace the cable with another if a problem should arise. And, picking a nit, I think that so important a cable should not be molded but accessible for repair.

Along the side of the box is the battery compartment for a standard 9V cell. This is nicely done with a slide-out drawer for easy access and quick change. BeachTek claims about four hours of continuous use as typical.

At the control end of the box are the following: a phantom power on/off slider switch with a red LED indicator for battery power; the left and right channel attenuator pots with 10 click steps of padding; a pair of mic/line switches that engage 50 dB pads for line level inputs; a mono/stereo switch which allows you to split tracks or send a single signal to both, and finally, a G1/G2 switch which is a ground lift (you are advised to set it to 'the position that gives you the least amount of noise'). This is nice considering the variables from one camera manufacturer's grounding scheme to another.

*continued on page 52* ►



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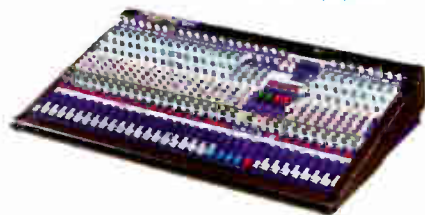
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BY MARK ULANO

Since the mid 80s, Lectrosonics has been providing wireless technology to the film and television industry. Their first products in this market were notable for their simplicity, reliability, excellent build quality and affordability. (In fact, I still use some of their VHF units from this era for PL back from my boom ops on the floor. Solid performers that keep on ticking.)

As my primary wireless systems are from another manufacturer, I had not taken a really close look at developments in the Lectrosonics line for some time. Also, we recently had a burglary making the need to evaluate the current SOTA in wireless more pressing, so, when the magazine asked me to do a review on the 400 series equipment, I was up for it.

When it comes to wireless microphone equipment, I consider several key issues:

How does it sound?

How is the RF?

How well is it built?

What is the compatibility and convenience of the overall physical design and application?

# Lectrosonics 400/411A Series Wireless Systems

What is the accessibility of the company for support and discussion?

What are the price/performance issues?

Only a few products can really stand up to this gauntlet of expectation and I believe the Lectrosonics UCR411A (\$2,575) receiver and 400 series transmitters are now in this group.



## FEATURES

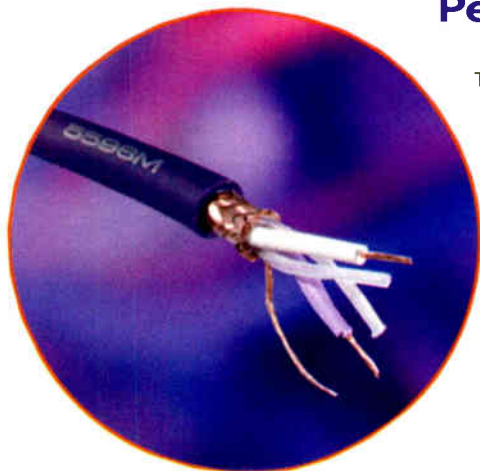
Upon first inspection, the hardware looks very much like all the earlier, ubiquitous Lectrosonics designs and indeed uses the same robust baked powder black finished cases, connectors and battery implementation we have all become familiar with. I also appreciate the engraving of primary operation instructions right on the case metal of the receivers. I wish

more manufacturers would be as considerate.

Appearances aside, under the hood of these machines are some very new things. There has been a design paradigm shift to the DSP model. The company is calling this "Digital Hybrid Wireless" as they are using DSP in both their transmitters and receivers while transmitting in the FM analog realm. At first, I thought this meant that they were sending ones and zeros over the air, but in fact, the digitizing occurs within the DSP engine and is sent as proprietary encoded analog audio to be decoded in the DSP at the receiving end.

Further advances have been made in Lectro's pilot tone/squelch/muting scheme, enhancing differentiation from frequency to frequency regardless of some bully RF signal landing on the carrier frequency of the system. Without the correct pilot tone, the receiver will stay muted. Lectro is calling this Smart Squelch and says it waits for words or syllables to complete before squelching and significantly enhances the usability of "otherwise" *continued on page 20* ▶

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## Fast Facts

**Applications:**  
Field, broadcast, film, live sound

**Key Features:**  
UHF system; 256 frequencies; Digital Hybrid technology; Smart Squelch squelch; Smart Noise Reduction; limiter

**Price:**  
UCR411A - \$2,575; UH400 - \$1,090; UM400 - \$1,250

**Contact:**  
Lectrosonics at 505-892-4501, www.lectrosonics.com.



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There are more than 33 million home surround systems in use today, while the remaining 150 million or so TV's are stereo or mono. The only way to ensure that your audio is compatible with all of them is to listen in each format prior to transmission or distribution, or simply analyze it, at-a-glance, with **SpiderVision**.

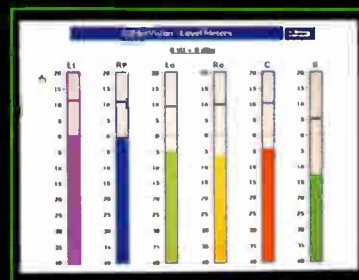
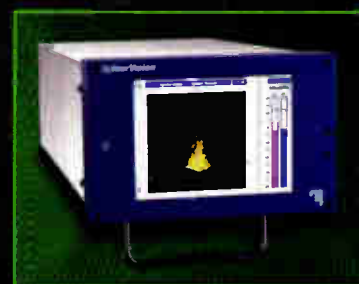
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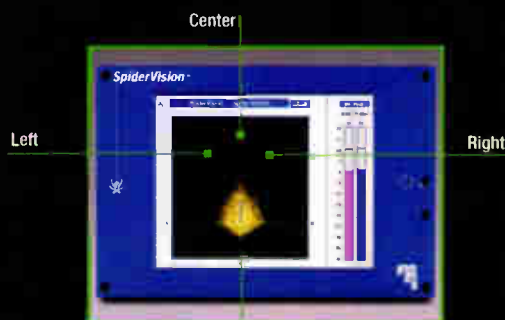
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► **Lectrosonics from page 18**

unusable signals.” These units are frequency agile with 256 frequencies available within the 25 MHz spread of the individual system. They use the traditional Lectrosonics block system for frequency identification.

Lectrosonics’ literature tells us the transmitters have “digitally controlled” analog audio limiter with a dual release (fast/slow) envelope. There is a 30 dB range with this limiter. This limiter works very well with low distortion and very good transparency. However, take warning: as with any wireless, properly setting the transmitter level is critical to the whole system sounding good. This goes for setting too high or too low! The transmitter’s level setting is independent from the main levels set between the receiver and your mixer. You set the transmitter level first, then the receiving end. Don’t use the transmitter as the system volume control.

The transmitters also have an adjustable, 18 dB per octave LF rolloff ranging from 35 Hz to 150 Hz. This is relative to the mic you happen to be using and is a helpful thing to have at this point in the chain of transmission. Good

battery life: five hours on alkalines for the transmitters and similar for the receivers.

**IN USE**

As they have a patent pending for the actual design of this Digital Hybrid technology, the specifics are not easily forthcoming but, as an end user, my interest is more focused on actual results rather than debating how many angels are on the head of a pin so I begin with: How does it sound?

Well, damn good. Full bodied and neutral, and certainly different than any Lectrosonics product I have listened to in the past. I listened to Sanken CS3, Schoeps MK 41, Neumann 81 and 82 microphones as well as Sanken, Sonotrim and Countryman lavaliers. I used these under the duress of actual production in both noisy and quiet environments. The sense of constriction in the upper midrange that I had formerly associated with Lectrosonics was gone, replaced by a definite transparency that, for me, represents the sound of a hard-wired mic. Of course, the elimination of compander technology from the transmission chain is a large part of this, not to mention getting rid of pumping and breathing. Also, the absence of

pre-emphasis/de-emphasis shows how good the signal to noise ratio has gotten. Another contributing factor is something called Smart Noise Reduction. This algorithm has three settings of Off, Normal and Full and seems to be quite a bit more than a fancy low-pass filter. It is aimed at mic noise or hiss with minimal impact on important high frequency elements like sibilance and voice tones and is quite effective.

How was the RF? Well, I have always had a bias towards “true diversity” in UHF transmission, which means two real receivers. But I experienced a phenomenal display of Lectrosonics capabilities while shooting a Paramount project at the defunct Sybil Brand Women’s Prison in Los Angeles. With only the flexible rubber duck antennae on the receiver, Adam Blantz, one of my friends and boom operators, walked his stick with a Sanken CS3 mic up three storeys above me in a prison cell block of concrete and steel before I experienced an audible wireless hit. We performed further walk tests with the system and consistently were able to achieve distances of 1,000 to 1,200 feet with or without obstructions and without

*continued on page 60 ►*



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# NEW PRODUCTS

Engineer Tom Soares used a **Brauner VM1 Klaus Heyne Edition (KHE)** for several tracks on Erykah Badu's *Worldwide Underground* album.

Torrance, Calif.-based mediaHYPERIUM, a specialist in high-end audio production and mastering, purchased the first **API**



Vision console in the US. The Vision is a native surround mixing console. See picture of mediaHYPERIUM's Herb Wattl with the board.

**Telarc's** US operations have installed a Z-Systems z-64.64r Detangler digital router system to connect its numerous digital audio workstations together.

Sound Images, a multipurpose production house in Cincinnati, has installed an **APT WorldNet Tokyo** ISDN codec for downloading remotely recorded material of all types.

Southern Tracks Recording in Atlanta used a new **ATR Services ATR-102** two-track one-inch reel-to-reel analog tape recorder for several new projects. Studio owner Mike Clark notes the big analog machine "certainly does wonders with Pro Tools." How ironic.

In mid-town Manhattan Vibetribes Productions has installed **ATC 150A** studio monitors into its new facilities.

## Mobile Fidelity Sound Labs OML-2

A blast from the vinyl past! Mobile Fidelity Sound Labs is now in the speaker business! The OML-2, along with the smaller OML-1, are the first entrants in a speaker line from the venerated mastering house. The OML-2 is a three-way system with 6.5-inch mica and Kevlar-impregnated paper cone woofers covering the low and mid frequencies and a 1.25-inch silk dome tweeter for the highs. Spec'd at 35 Hz – 22 kHz, the OML-2 has several hi-fi features such as pretty wood cabinet, floor spikes and a space for adding sound dampening "mass." Price: \$3,000 per pair.

Contact: Mobile Fidelity Sound Lab at 707-829-7772, [www.mobilefidelity.com](http://www.mobilefidelity.com).



## Crest Audio CPL-1288

At home in the studio or on the road, the CPL-1288 from Crest is a dual-channel multiprocessor. Processing sections include a compressor, expander and limiter. Also added in are a de-esser, low-cut filter, bypass, side chain and LED meters. As a dual-channel model the CPL-1288 can act as two single channels or as a stereo model via the stereo link. Price: \$480.



Contact: Crest at 866-812-7378, [www.crestaudio.com](http://www.crestaudio.com).

## ClearSonic Sorber S5-2L Baffles

When you think "convergence" you think "digital" but you might want to think occasionally about good old analog acoustic treatment. Such is the case with ClearSonic's latest Sorber baffles, S5-2L – perfect for studio, live or broadcast use. Available in light or dark gray, each panel measures 24 inches x 66 inches x 1.6 inches and a single unit is made of a hinged pair. The inner material is compressed fiberglass while the exterior is a Velcro-receptive cloth. Handles are sewn onto the units for easy transport. Price: \$180.

Contact: ClearSonic at 800-888-6360, [www.clearsonic.com](http://www.clearsonic.com).



## M-Audio Octane 8-Channel Mic Preamp

M-Audio moves up-market with the Octane, a new eight-channel mic preamp/A/D converter. The Octane features eight full XLR and 1/4-inch connected mic preamps along with two 1/4-inch front panel instrument inputs. Each channel has a 20 dB pad and four channels have phase reverse. Also added into the mix is an M/S matrix, ADAT lightpipe



and 48V phantom power. The converter is a 24-bit operation with 44.1 kHz or 48 kHz sample rate (with a 33 kHz – 59 kHz external sample rate chase). Price: \$749.

Contact: M-Audio at 626-633-9050, [www.m-audio.com](http://www.m-audio.com).





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BY MEL LAMBERT

# Solid State Logic C200 Digital Production Console

There can be no denying that the transition to digital has proceeded at different speeds in different market segments. For the broadcast market, the appeal of control surface and routing flexibility has impressed a growing number of networks and call-letter stations. And in post, the ability to reset a complete console topology quickly and accurately means that a digital-capable facility can move sessions in and out of the room more efficiently. For music studios, however, there has been more reluctance, based on sonic performance and user familiarity.

Given Solid State Logic's unarguable mastery in console design, and its conspicuous attention to ergonomics and user convenience, the new C200 Digital Production Console offers not only enhanced 24/96 performance with high-precision converters, but also makes fewer demands on the operator by mimicking the well-proven control surface layout from its analog predecessors.

## FEATURES

The new C200 and first cousin, the broadcast-specific C100, utilize new SSL magic: the proprietary Centuri processor that operates at a sampling rate of either 48 kHz or 96 kHz, and provides options for between 32 and 96 in-line signal paths, accommodating 12 programmable main outputs, 48 MTR (multitrack) buses, 96 direct outputs, 12 auxiliary busses and 12 stereo effects returns. And, unlike competitive designs, the Centuri retains all of its bussing and input/output capabilities at either sampling frequency. (The C200's Centuri processing technology is also 192 kHz enabled.) In addition, the C200's new engine provides enhanced operational benefits, including self-healing

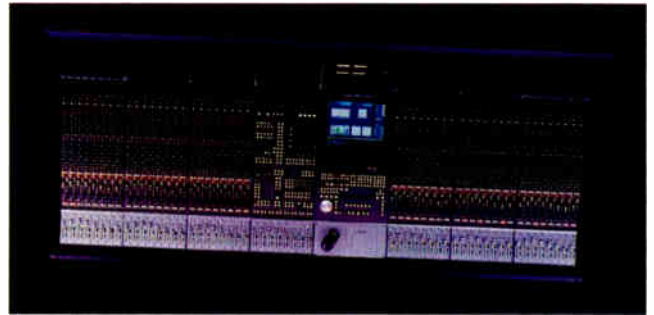
DSP, a feature that is said to have been designed specifically for live mixing.

The C200 console emulates the popular – and compact – in-line approach, with two banks of dedicated small and large faders providing simultaneous access to enhanced numbers of live, replay or mix sources. The in-line design provides two independent signal paths per processing channel: main Channel/large-fader and secondary Monitor/small-fader, each with dedicated input, output, motorized fader, cut, AFL/PFL/solo and multiformat pan. Three master status settings – Record, Replay and Mix – determine whether the large or small faders control Channel or Monitor paths, providing instant switching between tracking, overdub or all-input mix modes.

The typical C200 control surface comprises six, eight-channel sections plus a dual-bucket control section, for a total of 48 dual-path (small and large fader) channels controlling 96 signal sources, with two layers per control path for a total of 96 simultaneous on-surface faders. The C200's Channel Banking provides fast access to two layers of channels with global and individual channel A/B access buttons. For smaller control surface configurations, Virtual Bays provide additional layers; a console as compact as 16 channel strips may access all in-line DSP channels.

It's a snap to use the C200's Multiformat Mixing assignment to designate any of the 12 main busses as multiple 5.1 and/or stereo groups for conventional and/or stem-style mixing. Full-function 5.1 and stereo monitoring paths include insertion points for matrix encoders and decoders, as well as selection of external sources. The combination of fully-configurable, mono or stereo channel strips that operate at any physical position on the control surface means that the C200 provides an impressive amount of mono and/or stereo and/or 5.1 flexibility.

The C200's design philosophy of dedicated "knobs-per-function" is particularly appropriate for mixing applications — including music pro-



duction and live performance – where operators need to achieve simultaneous, instant access to a large numbers of controls. And the C200's dedicated channel strips provide a familiar operational interface for both in-house and freelance engineers. It is great to have immediate access to everything you need, with a complete overview of all console settings – you just reach for the control and change it. Two innovative color-coded meter displays enable operators to view only large-fader or only small-fader signals as required, or all 96 large and small faders.

Front-to-back console dimension is dramatically less than conventional analog (and most digital) designs. Even the vertically challenged operator should be able to reach the most distant controls from a seated position; console rake is also shallower than on other SSL designs, further enhancing the C200's ease of use. A special "mobile" configuration, with a custom developed center section, is available for multi-purpose studios or remote installations. Using a single-bay center section, up to 48 in-line C200 channel strips (105 faders) can be fitted across the width of a standard mobile.

In many ways, the new C200 incorporates all of the automation and recall benefits of SSL's existing 9000 Series analog and MT Plus digital consoles, but with a host of new capabilities. These include scalable DSP and complete layer and signal-path metering, plus integrated DAW control (such as Digidesign Pro ToolsHD; others to come) via a VGA display and USB interface option that enables audio editing functions from the center-section sweet spot using the C200's keyboard plus pen/puck and tablet interface. The console's automation offers off-line mix editing and on-line mix compare, plus other useful modes. And for broadcast production, the C200 incorporates

*continued on page 26* ►

## Fast Facts

- **Applications:**  
Studio, post production
- **Key features:**  
Up to 96 channels; 24-bit, 96 kHz performance; four-band parametric EQ; Centuri processor; 5.1 surround sound
- **Price:**  
starts under \$300,000
- **Contact:**  
Solid State Logic at 212-315-1111,  
[www.solid-state-logic.com](http://www.solid-state-logic.com).



# Oh, we forgot something.



## The New ISA 430<sub>MkII</sub> Producer Pack

When we designed the original ISA 430 Producer Pack we wanted to include all the best features and circuits from the Focusrite ISA product family since 1985. And so we did! However, in the past three years we have had a few more great ideas. So the ISA 430 MkII is born. Have we forgotten anything? All we can think to add is a cherry on top!

### • Principle Feature Set: •

- Classic ISA transformer-coupled mic-pre; now with four switchable input impedances and inductor-induced "air". Extended version of the original ISA 110 EQ.
- Multi-format Compressor; a vintage optical circuit, as well as Focusrite's transparent VCA design.
- Unmatched flexibility with an incredible variety of insert points, "split" modes (for separating modules), and variable signal path arrangements.
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- More features than the original and at a great new price.

*"I can't think of anything negative to say about the ISA430 MkII — it really is that impressive. Committed recording engineers now have a new British standard-bearer when it comes to high-end analog recording channels."*

— **Hugh RobJohns**, *Sound on Sound*, January '04

*"It sounds fabulous on everything, although I must add that I particularly love the vintage compression on drums and vocals."*

— **Len Davies**, *Audio Media*, February '04

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► *SSL from page 24*

redundant DSP capabilities, status lock and backstop PFL, plus third-party router integration that provides communications between an external router and the built-in digital router.

Compared to other control surface designs, which require the operator to remember where on several possible layers a targeted input or master buss may be assigned – and which can make system setup a shade complicated — the C200's knob-per-function is a snap to master, yet doesn't hamper the system's undeniable versatility, while full scalability at either sampling rate enables large-format production.

In terms of signal processing, the C200 shines. All channels provide high and low-pass filters plus four-band parametric equalization profiles, including highly realistic digital equivalents of SSL E and G Series EQ emulation. Full dynamics control with independent compressor/limiter and gate/expander sections is also available on each signal path – a direct corollary of older analog E and G Series dynamics sections. SSL designers even included a digital emulation within the center-section compressor that offers the sonic performance of the popular G Series "Quad Bus" compressor. Because signal processing is dedicated to every channel there is no need to assign resources at the start of console setup.

The C200's 12 aux busses can be configured as mono or stereo, and are fed from both fader paths with independent send levels from large/small faders. A nice touch: Aux balances can be set quickly using the Set Aux to LF or Aux Flip to Faders functions. Three directs are provided per channel strip, with post-fader channel and monitor paths, plus the pre-fader and pre/post-processing insert from channel or monitor path.

Connection to microphone sources is via fiber to separate C-SB stage boxes that can be located up to 1,500 feet (optionally 1 mile) from the processor core. A total of 48 remote-controlled mic sources occupy a single 14U chassis. Alternatively, SSL's new C-SuperPre remote preamplifier is fitted with SuperPre analog circuits, analog inserts and high-speed 96 kHz NiTech A/D converters; it uses the same chassis and fiber system as the C-SB and provides 24 channels per 14U chassis. Elegant features include a low-level buffered output per channel (useful in live application for monitor-mixer feeds); over 90 dB of click-free gain; plus four DACs and GPIOs for communication and signaling. A fully loaded modular Centuri core provides up to a staggering 512 assignable

inputs and outputs at 48 kHz (256 inputs/outputs at 96 kHz). I/O card options include analog, AES/EBU Digital and MADI, all at 24-bit with sample rate conversion. A 60-channel GPI card provides programmable machine starts, cue lights, and the rest.

## IN USE

In use, the C200 is a dream. Access to key controls is instant and obvious, and setups can be stored and recalled at the touch of a button. Bay Swapping enables remote sections to be brought to the sweet spot's designated central master bay – or wherever you choose to work – while the center-section controls provide a minimum of clutter but a maximum of sensible, color-coded functionality. For C200 consoles with a reduced number of on-surface controls, a Virtual Bay feature provides additional layers thereby enabling a compact console with 16 channel strips to access all in-line channels. A choice of servo or VCA-style fader grouping is available; both large and small faders are motorized to provide moving-fader grouping. (And the familiar VCA-style fader grouping enables balance and adjustment of slave positions while a group master fader is adjusted.)

## SUMMARY

All in all, the SSL C200 Digital Production Console offers a great deal of sonic punch in a remarkably compact package. All front panel controls are well labeled and extremely easy to find; I predict that anybody reasonably familiar with an analog SSL console would be up and running on the C200 in a remarkably short period of time. The integration of workstation controls via USB ports is outstanding, and will ensure that mixing and editing functions can be performed from the sweet spot rather than off to one side. With 24/96 audio performance becoming de rigueur these days, the combination of hard disk workstation and C200 has a lot going for it. And with clients working on multiple projects at a time, facilities need a console that offers complete recall automation.

My thanks to the crew at Underdog Entertainment, Hollywood, co-owned by Harvey Mason, Jr. and Damon Thomas, for kindly providing access to their new C200 Digital Production Console. The first music studio to install a C200, the console serves as the centerpiece of Underdog's main recording and mix room.

*Mel Lambert heads up Media&Marketing, a consulting service for pro-audio firms and facilities; [www.mediaandmarketing.com](http://www.mediaandmarketing.com).*



# IR-1 Convolution Reverb

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- LX 48L- Halls
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BY ALAN SILVERMAN

Lavry Engineering, the company formerly known as dB Technologies, made their reputation providing “gold” converters for best-of-class studios and scoring stages. Not every facility can afford the gold series at \$4,000 per channel, but Lavry AD122 and DA924 converters are frequently found in rooms that can. With his new “blue” series, designer Dan Lavry has successfully ported key high-end features into an economically priced product with outstanding results. Novel and rigorous design principles and modern parts combine to make the LavryBlue well worth the attention of studio engineers.

### FEATURES

The LavryBlue system (AKA LE4496) begins with a 1RU modular chassis that accommodates up to four stereo converter cards plus a master sync card. Modules currently available are the M-AD-824 A/D, M-DA-824 D/A, M-BY2 synchronous sample rate converter and the M-SYNC clock. Modules can be installed in any combination and the master sync card is only required if there is at least one ADC module installed. The supported sample rates are 44.1 kHz, 48 kHz, 88.2 kHz and 96 kHz, plus a varispeed mode that extends the usable range to 38 kHz – 102 kHz. Additional modules may be offered in the future, such as a possible stereo mic preamp card that the company currently has under consideration. My review model came with an M-SYNC, an M-AD-824 and an M-DA-824. Construction is solid and I experienced no technical problems at all in working with the system, including the installation of cards, which was simple and straightforward.

## Fast Facts

■ **Applications:**  
Studio

■ **Key Features:**  
Modular system; 24-bit, 96 kHz A/D-D/A conversion; CrystalLock; varispeed

■ **Price:**  
Two channels start at \$1,680

■ **Contact:**  
Lavry Engineering at 206-381-5891,  
[www.lavryengineering.com](http://www.lavryengineering.com).

# Lavry Engineering

## LavryBlue Converter System



The DAC module offers a number of design concepts that up until now have only been found in the uppermost class of high-end converters. The most significant concept, in my opinion, is the CrystalLock buffer. Clock jitter has probably created more confusion and myth regarding digital audio than any other single factor. Jitter is inherent in the medium of transmission, not the message, and so identical digital files can sound mad-deningly different depending on the condition of the clocks, cables and transports used during playback.

All of these factors are sources of jitter, even though they are all external to the data being transmitted. Retransmit the data under different circumstances and the audible signature of the jitter can be different even though the numbers are not. CrystalLock completely removes transmission jitter from the equation.

The M-DA-824 reads the incoming data into a small temporary buffer while proprietary DSP analyzes the incoming data rate and sets a custom “pullable” oscillator to read the data back out to the converter stage at a matching speed but with the pico-second precision and stability of its own timing circuitry. The DAC is therefore completely isolated from any jitter in the source. Lock time is also very fast and free of digital noise.

If all DACs functioned like this there would be a lot less controversy about various workstations, CD-Rs and pressed CDs sounding different while playing the same files. The effects of passing a jittery clock along to a DAC are most noticeably a lack of solidity and definition in the bass and reduced clarity and impact over all. These problems are not exhibited by the LE4496.

Another high-end concept employed is the use of two converter circuits and two anti-imaging filter chips per channel. The net effect is to increase dynamic range by 3 dB while simultaneously reducing artifacts.

Upsampling of single rate sources to double rate before conversion is also implemented, and optimized output buffers provide a final touch of finesse.

The DAC board also allows two additional clocking modes - “wide” and “narrow.” Wide is intended for nonstandard and varispeed digital inputs, but its lack of jitter reduction stands in strong contrast to CrystalLock and provides a quick study in how critical a stable clock is to conversion. The narrow mode allows for incoming speed variations just beyond the lock range of CrystalLock, yet still sounds very respectable. These extra modes make the DAC module a problem solver for difficult sources. The DAC module also includes a set of internal jumpers for synchronizing multiple cards to prevent multichannel phase shift. An additional jumper set configures the output stage for unbalanced operation. All in all, the DAC provides not only exemplary sound quality, but also Swiss Army knife utility. One tiny nit is that the digital pre-emphasis bit is not recognized. This obsolete issue never comes up in modern work, but as a mastering engineer, I have encountered it on the extremely rare occasion in very early digital sources.

The ADC module handles 16, 20, and 24-bit conversion at sample rates from 44.1 kHz to 96 kHz. Flat dither and two types of noise-shaped dither are provided. Clock speed is derived from the required M-SYNC module, which in turn can be set for internal or external. The M-SYNC also features a rear panel 2X switch that allows double-speed clocking to a single-speed word clock input, a very helpful feature to have when multiple sample rates are needed.

The M-AD-824 also offers two types of soft limiting, which Lavry describes as analog soft saturation and digital soft saturation

*continued on page 30 ►*



# POST-PERFECT LOCATION SOUND



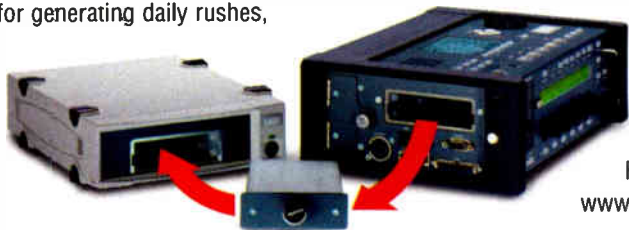
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► *Lavry from page 28*

tion. Digital soft saturation adds 6 dB of level to the converted signal in the digital domain followed by a nonlinear transfer function to prevent values over full scale. The intent of digital saturation is to model tape compression and to add apparent loudness. If not pushed too far it does its job well. I tried digital saturation on rock, jazz, and even classical mixes with clean results. Although the unit does not give any indication of how much gain reduction is actually taking place, I gauged about 3 – 5 dB before noticeable distortion occurred.

In contrast, the analog saturation mode is designed purely to reduce the occurrence of unintended overload distortion. An analog nonlinear transfer function kicks in at -3 dB but can also be internally jumpered for -6 dB. The analog protection circuit is clean and provides a safety margin of about 2 - 3 dB before audible artifacts set in.

A single toggle switch is used to both select and set the ADC's various functions. This arrangement is a little fiddly at first, but once you get the feel of it, the desired settings are quick and easy to achieve.

Metering is accomplished with a double row of LEDs giving reference level, peak level, and over level indication. I was able to calibrate the converter's input level to 1/10th dB accuracy by lowering the 20-turn front panel pots until the LEDs for the target level just turned off.

### IN USE

The thing that struck me within the first few seconds of hearing the LE4496 DAC was a surprisingly analog-like sense of ease. The sound was open, meticulously detailed, and effortless. Bass and kick were rock solid and I could literally feel the airspace forming between the cymbals of the high-hat as the drummer closed the pedal. Vocals sounded live in-the-room without a trace of harshness. This was absolutely first-rate conversion. Likewise, I found the sound of the ADC to be completely comparable - remarkably transparent and well balanced.

Of course, the inevitable question for any converter set is how accurate? As an acid test I played some digital sources through my workstation's AES output into the LE4496 DAC, looping the DAC's analog out back into its

own ADC, and captured the digital results for an easy A/B against the original files.

Beginning with a 44.1 kHz source and returning through the D/A/D loop at 24-bit 44.1 kHz, the end product of this double conversion was practically indistinguishable from the source. I repeated the test starting with a 96 kHz file (in this case, a new high-resolution recording of the Gorecki Third Symphony with orchestra, mezzo-soprano, and chorus) and redigitized to a 24-bit 96 kHz end product. In a blind test to distinguish the 96 kHz looped file from the source, let's just say that I scored poorly.

### SUMMARY

The LE4496 series seems to be as close to the ideal balance of cost versus function that I have seen in a piece of pro audio equipment. Lavry Engineering has created a converter that performs far beyond its price. Dan Lavry has done a service to engineers by creating an affordable converter set with all the hallmarks of the high-end.

*Alan Silverman is founder of Arf! Digital, a 96/24 and 5.1 mastering facility in NYC; www.arfdigital.com.*



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### SHURE BETA SERIES MICROPHONES

**Beta 98 Miniature Supercardioid Condenser Mic**  
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**Beta 91 Cardioid Condenser Kick Drum Mic**  
A high performance condenser microphone, the Beta 91 is designed for kick drum applications. The Beta 91 features a cardioid pickup pattern that gives you high gain before feedback and excellent noise rejection of unwanted noise. It also includes an on-board preamplifier that gives you 18 dB phantom power. Finally, an optional corded cable is also available, allowing you to easily adapt the mic to different applications.

**Beta 989AC Mini Condenser Cardioid Mic**  
Designed specifically for live and stage applications, the Beta 989AC is a high performance condenser microphone. The Beta 989AC features a cardioid pickup pattern that gives you high gain before feedback and excellent noise rejection of unwanted noise. It also includes an on-board preamplifier that gives you 18 dB phantom power. Finally, an optional corded cable is also available, allowing you to easily adapt the mic to different applications.

**Beta 52A Features**

- Precise response design specifically for kick drums and tom-toms
- Built-in Avance balancing network with integrated 18 dB on-board preamp
- High quality performance with a wide high-intensity pickup pattern
- Super cardioid pickup for high gain before feedback and excellent noise rejection of unwanted noise
- Handheld and stand grills that mount rear and front
- Adjustable preamp, 18 dB, mount to rear of microphone
- Handheld and stand grills that mount rear and front
- Mounting bracket for high gain before feedback and excellent noise rejection of unwanted noise
- Low impedance to mixing desk

**Beta 56A Features**

- Latest Super-X program provides dynamic amplified performance and better high frequency response
- Built-in wind shield with Avance balancing network and 18 dB on-board preamp
- Ultra sensitive pickup pattern for high gain before feedback and excellent noise rejection of unwanted noise
- A unique design reduces stage noise
- Handheld and stand grills that mount rear and front
- Adjustable preamp, 18 dB, mount to rear of microphone
- Handheld and stand grills that mount rear and front
- Mounting bracket for high gain before feedback and excellent noise rejection of unwanted noise
- Low impedance to mixing desk

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### SHURE BETA SERIES MICROPHONES

**Beta 52A & Beta 56A Supercardioid Dynamic Instrument Mics**  
The Beta 52A is a high output dynamic mic with a balanced frequency response designed specifically for kick drums and other bass instruments. It provides superb attack and "punch" and delivers distortion-free sound even at extremely high SPL sound pressure levels.

**Beta 56A Features**

- Latest Super-X program provides dynamic amplified performance and better high frequency response
- Built-in wind shield with Avance balancing network and 18 dB on-board preamp
- Ultra sensitive pickup pattern for high gain before feedback and excellent noise rejection of unwanted noise
- A unique design reduces stage noise
- Handheld and stand grills that mount rear and front
- Adjustable preamp, 18 dB, mount to rear of microphone
- Handheld and stand grills that mount rear and front
- Mounting bracket for high gain before feedback and excellent noise rejection of unwanted noise
- Low impedance to mixing desk


Model	Price	Weight	Dimensions	Impedance	Output
Beta 52A	\$119.00	1.1 lb	1.5" x 1.5" x 3.5"	150 ohms	150 mV
Beta 56A	\$119.00	1.1 lb	1.5" x 1.5" x 3.5"	150 ohms	150 mV

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## Audio-Technica ATH-M20 Headphone

Retail price: \$69 • Info: [www.audiotechnica.com](http://www.audiotechnica.com)

Audio-Technica has always offered good value/high performance products, including their main staple microphones, and the ATH-M20 is a surprising full-fidelity pair of headphones at a very low price of \$69.

The M20 is a closed-back design with 40mm neodymium magnets. It has a padded headband, adjustable ear cups and utilizes a heavy-duty coiled cord. Rated frequency response is 30 Hz to 20 kHz (no plus or minus tolerance listed as with most headphone specs).

The M20 approximates a top-end headphone pretty well with a nice balanced, warm bass and extended high response with a hint of crispness, but never sharp. Stereo separation is good as well. The ear cups were cushy, but a touch snug on my head until they broke in. The headband is plenty comfortable. Though they are closed design, they are not as effective as high-end

headphones keeping out outside noise, but hey, what do you want for under \$70? Overall, the ATH-M20 is a bargain headphone suited for almost any professional use including broadcast, project studio and general studio use.

—John Gatski



## Aphex 1404 Punch Factory

Retail price: \$199 info: [www.aphex.com](http://www.aphex.com).

There is something magical about compressing an amplified instrument before its signal enters an amplifier. Unfortunately, the number of high quality stomp box compressors is limited, and historically, the high quality options are accompanied by a high price tag. The new Aphex 1404 Punch Factory is a reasonably priced yet wonderful sounding optical compressor that provides transparent and clean compression for any pickup equipped instrument.

The 14-ounce (with 9V battery) 1404

series pedal measures 4.75 inches wide x 3.75 inches deep x 2.5 inches high. The pedal can be powered by either a 9V battery, 48V phantom power or an external power supply (not included). A high quality alkaline battery provides 150 - 200 hours of continuous use. On the pedal's rear panel, a 1/4-inch jack provides audio input. A second 1/4-inch jack provides instrument output (1000 ohms) and a male XLR connector provides DI



output (150 ohms). The Active/Passive switch sets the input impedance to either Active (50,000 ohms) or Passive (10,000,000 ohms). When activated, the ground lift switch lifts the ground on the XLR output. The Wet/Dry switch determines whether the pedal's processing is applied to the XLR output (wet) or not (dry). Both outputs operate simultaneously. A foot switch on the top of the pedal allows the pedal's processing to be bypassed. When the pedal is activated, the foot switch LED indicator illuminates. The bypass is a true bypass with no electronics in the circuit when in bypass mode. The 1404's optocoupler is custom made for Aphex and has unique characteristics that work exceptionally well for instrument compression.

Two knobs provide control over the compression. The Drive knob determines the amount of compression and the volume knob determines the output of the box. The 10-segment LED bar graph display displays the gain reduction in decibels.

I found that the transparent sound of the 1404 works in virtually any situation. Over the past several weeks, I've used the box with bass guitar, electric guitar and acoustic guitar and I've always been pleased with the results. One of the strengths of the 1404 is its complex attack characteristic. The attack adapts to the sound creating punch and providing detailed articulation of the sound.

—Russ Long

## Groove Tubes Soul-O Single Guitar Amp

Retail price: \$1,099 • Info: [www.groovetubes.com](http://www.groovetubes.com)

We normally do our guitar amp reviews on our web site, but the Soul-O Single is so cool, I just had to put it in the magazine.

Aspen Pittman and company have designed probably the most versatile, single-ended, low-power guitar amplifier I have ever heard! In its Class A single output mode, the Soul-O Single, the amp puts out 6 to 12 watts based on which output tube you use — six watts with a 6V6GT, 10 watts from a 6L6 or 12 watts from a 6550. It is taller-than-your-normal small power single output tube amp and can house a 10-inch or a 12-inch speaker.

The amp comes standard with a Jensen P10R alnico magnet speaker. Controls are simple: drive, volume, bass and treble. It also has a line out and an effects loop. The amp has a vintage look that exudes quality — with its wheat grille and shiny silver front. With the lighter, alnico magnet speaker, the amp is quite easy to carry.

The best part is the sound. I have played all kinds of single-ended output tubes amps over the years: tweed Champs, black/silverface Champs and some of the newer vintage clones. I have found most to be lacking low bass and a smooth high-end. They tend to sound hard and shrill when cranked. Good for certain overdrive sounds, but not much versatility.

Thanks to the oversized power and output transformers in the Soul-O Single, this amp gets loud without all the breakup of the normal vintage 3 - 5 watt single-end amps — and it has bass! In the clean settings, I actually got a pretty good Princeton tone out of the Single. Yet turning up the drive, you can get that overdriven, tweed Champ flavor, but with less mid shrillness and more bass. Every studio should have one of these amps. Right, Aspen?

—John Gatski





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BY RICHARD KING

The early to mid '90s brought about the first widespread use of the rewritable/quick access magneto optical disc in the audio industry. Sony produced the PCM 9000, which recorded two tracks on a proprietary MO disc with great success.

Genex emerged shortly thereafter with the GX8000, an eight-track magneto optical disc-based recorder that used standard computer MO discs (cheaper!), and allowed digital multitrack recording with quick access at a time when hard drives were physically very large, very expensive but lacking storage capacity. Genex later developed an eight-track model, GX8500, and more recently the GX9000 Eight-Channel System to record onto any SCSI device at high sample rates in PCM and in DSD - Direct Stream Digital, a single-bit sigma-delta conversion at 2.8 MHz.

With all the latest hard disk recorders to emerge in the last few years, we are provided with the usual options - various digital formats, sample rate, editing functionality, standard file format, etc. Basic quality of sound is sometimes overlooked as many people assume that all "digital recorders are created equally." Internal analog converters must be carefully auditioned as required, and the digital in and out must be tested for transparency when considering any audio storage medium. It is also important to consider the ability to record both PCM and DSD, depending on the requirements of the project. The Genex GX9048 promises to be an all-in recorder with few limitations.

## FEATURES

The newest Genex is the GX9048 48-track recorder, capable of sample rates from 32 kHz

### Fast Facts

**Applications:**

Studio, post production

**Key Features:**

48-track; hard disk; multiple media/removable drives; 24-bit/192 kHz; basic editing software; DSD/SACD-compatible

**Price:**

Starts at \$19,000

**Contact:**

Genex Audio at 310-828-6667, [www.genexaudio.com](http://www.genexaudio.com).

# Genex Audio GX9048 Multitrack Recorder



up to 192 kHz at 24 bits PCM, and also DSD. Timecode (internal or external), video sync, word clock I/O are all standard issue. The unit records to hard drive, MO disc or DVD-RAM but for multitrack recording, the hard drive is really the default storage medium. The unit reviewed was fitted with a Kingston-type bay for SCSI hard drive recording, with an expansion SCSI chain on the back of the unit for additional drives, AIT tape drive for backup, etc.

It is possible to record 48 channels of audio to a single SCSI hard drive, running DSD or PCM up to 2fs/96 kHz. At 4fs/192 kHz, it is still possible to record 48 channels, but two hard drives are required to run simultaneously.

It should be noted that many other hard disk recorders on the market will lose tracks as the sample rate increases, i.e. a 24-track recorder at 48 kHz might become a 12-track at 96 kHz, and only a six-track recorder at 192 kHz - not the GX9048. The record modes include the following three options: expansion disk mode, where files can be recorded continuously across two drives for greater capacity (i.e. longer record time); insurance disk mode mandates that audio is recorded to a hard drive while simultaneously writing an MO disc or DVD-RAM in case the internal buffer becomes too full (the disc is then updated from the hard drive at the end of the recording pass).

The third option is mirror mode, which records the same information to two drives at once, creating a live backup of the audio - a great time saver. The hard drives can be formatted as Genex (proprietary) or FAT32, the latter allowing file sharing with other FAT32 PC-based systems such as the Merging

Technologies Pyramid, etc. In FAT32 mode, the project file format is a standard AES31 style "ADL," or audio decision list. In PCM mode the GX9048 records standard-format WAV files, and either AES31DSD or DSD IFF in DSD mode. Recorded files are opened for playback by selecting the ADL file to be accessed, at which time all of the associated audio files are opened onto their corresponding tracks.

The machine automatically names each recorded file, and creates a new file folder every time the machine is stopped and started in insert mode. This can be somewhat cumbersome, and may require some housekeeping of ADL file names during recording. If file sharing is not an issue, the Genex disk format can be used, which is much simpler in terms of record, locate, and playback operation since it treats the hard drive like a linear reel of tape. Depending on the requirements of the user, the GX9048 can be fitted with AES, SDIF, MADI, or analog I/O. This particular review unit was fitted with three eight-channel DSD I/O cards (Channels 1-24) and three eight-channel analog I/O cards (Channels 25-48). The DSD cards can read either AES-format for PCM recording or SDIF for DSD recording, and the analog cards can record DSD or PCM.

## IN USE

The setup menu on the machine face is similar to the Genex GX8500 and GX9000 in terms of navigation, using the jog wheel and value up/down and enter buttons. Genex provides software to run the machine from a PC (laptop) via USB port, and it can run with a

*continued on page 38* ▶



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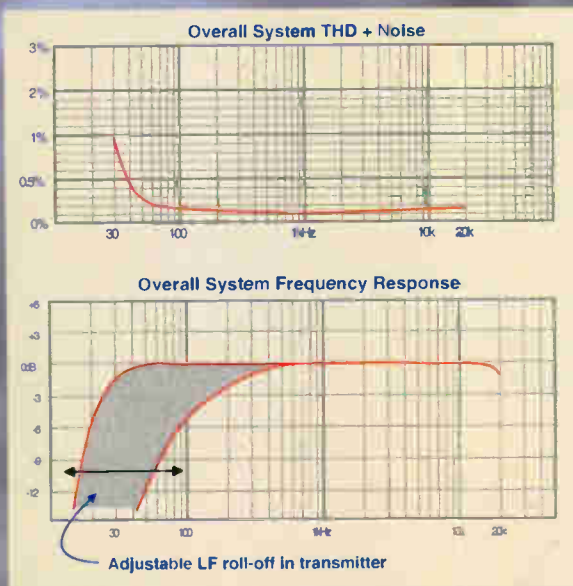
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► *Genex from page 34*

modified GXR48 remote via nine-pin D-sub connector. In fact, due to space limitations on the front panel, the only way to arm the tracks for recording is through the use of a laptop or the remote (the recorder manual carries no mention of the laptop operation or remote option). Much of the setup can be accomplished with the laptop, such as time code rate, drive format, audio format, opening ADL files, but for some reason the date and time update function doesn't seem to take unless entered directly on the face of the machine. The laptop can be also used to rename recorded ADLs, which greatly aids in file management. Punch recording is possible during playback, with rehearsal and auto punch modes as options.

Edit software currently exists in a Beta version, which can do basic editing tasks (cross-fades, etc.) but it is not planned to include any mixing desk or plug-ins. The software will be able to create waveforms in the same format as Pyramix so that the hard drives could be moved from one format to the other without spending time drawing waveforms before working. The official release version of the editing software should be out this April.

The A/D converters were auditioned against several other popular DSD and PCM 192 kHz converters, and the Genex GX9048 did very well. The 192 kHz PCM option sounded very true to the original source, in fact one of the four engineers that listened heard no difference between the two. In DSD mode the converters were slightly colored, but in a positive way, which I find typical of the one-bit system. It translates as a high-frequency presence lift or sparkle, although it is fairly subtle. Both DSD and 4fs/192 kHz PCM had a stable image, solid center, good high frequency extension, and very satisfying low frequency response.

Our most recent project using the GX9048 was a remix of a Mahavishnu Orchestra live concert from the early 1970s. Source was an eight-track, 1-inch non-Dolby tape at 15 ips. The thought was to transfer to a multitrack DSD platform with timecode so that the mix could be automated, and so that the source tapes would be played back only once during the transfer rather than over and over during mixing. Once the file system of ADLs had been sorted out, the operation of transferring the two analog reels went quite smoothly. The assistant on the mix date was quickly familiarized with

GX9048's operation, and his prior knowledge of the model GX8500 made for a quick introduction. The Genex GX9048 then ran smoothly for two days of mixing without a hitch, happily chasing timecode from the mixing console transport panel. In my opinion, the source material was slightly enhanced by going on and off the DSD recorder – just a little extra sense of air in the top end.

**SUMMARY**

The GX9048 is already a very capable multitrack hard disk recorder and, in the true spirit of Genex, it is still evolving. The option of either using the very high-quality Genex A/D converters or outboard units with slightly different characteristics makes the unit very flexible in the field or at the studio. Running 48 tracks of DSD or 192 kHz/24-bit was heretofore considered a science experiment at best – at this point I think we're OK to remove the lab coat and safety goggles, and get to work.

*Richard King is a Grammy-winning recording engineer specializing in the recording of classical, jazz, and film scores, and has worked with Yo-Yo Ma, Chick Corea, Billy Joel and Tan Dun. He is based at Sony Music Studios.*

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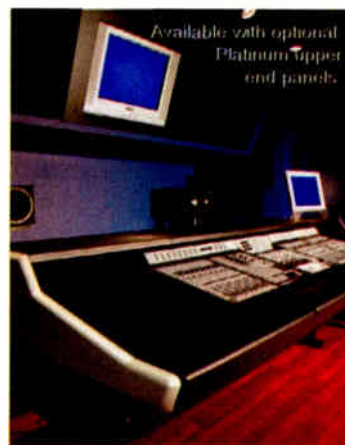


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BY JOHN GATSKI

# JBL LSR6328P Powered Studio Monitor

Once upon a time, JBL was the king of the mountain when it came to studio and broadcast monitor speakers. In the age of powered speakers, however, JBL got left behind a bit, and other companies stepped in with innovative speaker designs and they gained a healthy share of the powered speaker market.

JBL entered the powered monitor game with its LSR series about five years ago. But with the introduction of its latest generation powered monitors, JBL is making a bold statement that the company is serious about restoring itself to the top perch in professional speakerdom.

## FEATURES

The LSR6328P reviewed here lists for \$2,678 per pair and features JBL's latest amp, crossover and driver technology, plus the handy Room Mode Correction (RMC) speaker analyzer/analogue EQ that allows you to tune your speaker's bass to almost any room. JBL also sent along a new subwoofer, the \$1,499 LSR6312SP, which sports a 12-inch woofer/250 watt amp system and is said to reach down to 26 Hz.

The first thing you notice about the LSR 6328 is how modern looking it appears. It definitely looks state-of-the-art. The speaker contains an eight-inch carbon fiber composite active woofer (with JBL's patented dual voice coil Differential Drive technology) that is crossed over to a one-inch titanium composite tweeter that is integrated with JBL's Elliptical Oblate Spheroidal (EOS) wave guide that is said to ensure maximum dispersion in most studio environments.

A sixth-order 1.7 kHz Linkwitz-Riley

crossover is used. The low-frequency driver is powered by a 250 watt Class AB discrete amplifier. The high-frequency power is handled by 120 watt Class AB amp, but is not discrete. (A more conventional amp-on-a-card design.)

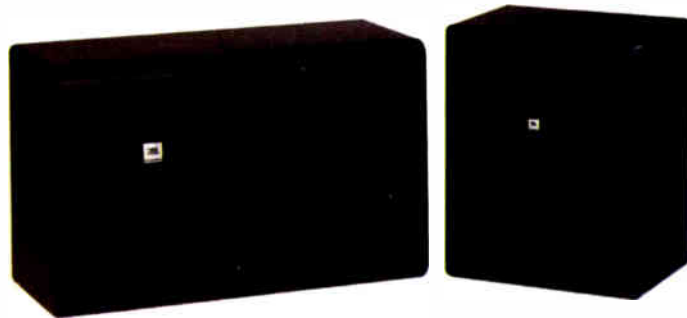
All tone-tailoring and boundary compensation and level controls are rear-panel mounted. They include the power button, input trim, eight DIP switches (input trim activation, +4 dB input sensitivity, +8 dB input sensitivity, Very Low Frequency (VLF) protect, -1.5 dB low frequency attenuation and -3 dB low frequency rolloff attenuation boundary compensation (engaging both switches delivers a -4.5 dB attenuation), -1 dB high frequency attenuation cut above 2 kHz, and a +1 dB high frequency boost above 2 kHz.

The Room Mode Correction's manually-operated controls are also on the rear panel (width, frequency and depth) as are its activation, enable and bypass connections. Main input is via a Neutrik Combi balanced XLR/1/4-inch connector.

The necessary-to-operate RMC calibration kit came included with the subwoofer, but is free of charge when you order the LSR6328 P/Pak, which includes the speaker pair and the RMC kit. It can also be purchased separately.

The speaker design incorporates a rear-mounted port inside the amp cooling fins. Being Class AB the speaker does generate some heat, but never to the point of being too hot to touch. The 3/4-inch MDF cabinet measures 16 inches wide, 13 inches high and 12.8 inches deep. Weight is about 40 pounds. The handy carrying handles make transport much easier. The cool-looking graphite finish also give the LSR a modern touch.

JBL's 12-inch LSR6312SP powered subwoofer is an amazingly good performer that will kick clean bass out to 26 Hz and it is not that big or heavy. The LSR6328s can go down to 40 Hz with decent output, but the subwoofer allows deeper low-end reproduction for that 20 Hz to 40 Hz octave that comes into play with



electronic music and surround LFE effects. Crossing over the low-bass duties to a sub also makes for a cleaner-sounding woofer reproduction of mid-bass to midrange frequencies.

## IN USE

Having heard several demos of the LSRs at a recent trade show, I could not wait to try them out in my studio. I set them up as main monitors in a closefield configuration. I mounted them on custom Apollo speaker stands with the speakers slightly toed in. Since the 6328s had impressive bass on their own, I decided to use them mostly without the sub.

I used a number of preamps to pass signal to the LSRs — including the Bel Canto Pre6 5.1 preamp (using two channels unbalanced), RE Designs SCPA-1 surround preamp (using two channels unbalanced) and a Legacy High Current preamp (using two channels balanced). Alpha Core Goertz balanced XLR cables were used with the balanced connection and Kimber Cable RCA cables with RCA-to-1/4-inch adaptors were used with the unbalanced preamps. I also used a Midas Venice 320 mixer as an analog source router.

Most of the audio came from high-resolution sources, including DVD-A and SACD. Sources included a Sony SCD-777ES- SACD player, an Integra 8.3/Universal SACD/DVD-A player, Alesis MasterLink and Panasonic RP91 DVD-A player. All PCM sources (16-bit, 44.1 kHz through 24-bit 192 kHz) were digitally output through either a Bel Canto DAC-2 upsampling DAC or Benchmark Media DAC1 D/A converter. Source analog and digital interconnects were provided by Kimber Cable.

The speakers were placed in the center of the room on the Apollo stands. The speakers

*continued on page 40* ►

## Fast Facts

### ■ Applications:

Studio, post, broadcast

### ■ Key Features:

LSR6328P - 1-inch titanium composite tweeter; 8-inch carbon fiber woofer; Room Mode Correction (RMC), 250 watt LF amp; 125 watt HF amp; LSR6312SP - 12-inch active subwoofer with RMC

■ Price: LSR6328P - \$2,678 per pair; LSR6312SP - \$1,499

### ■ Contact:

818-894-8850, [www.jblpro.com](http://www.jblpro.com).

► *continued from page 39*

were about six feet apart and the listening distance was about five feet away. In my set up, I ran a room analysis of my room using the Room Mode Correction kit that came with the subwoofer. Since my room is rather long with hard concrete floor and a light carpet covering, I do not have much of a standing wave problem to correct at the closefield/midfield listening position. (There is some loading up at the far wall where far-field listening is done, but listening positioned was never used.)

I did want to witness the RMC in action so I purposely put them against the wall and moved my listening position to see if the bass would load up; it did peak with a maximum rise of +7 dB, according to the RMC measurements. After calculating the amount of EQ needed, I engaged the RMC and presto, the bloom was gone, thanks to the RMC's analog EQ. (Check out the sidebar for full details of the RMC's operation.)

After testing the RMC, I moved the room back to my normal setup distance. I first sampled a CD of various acoustic guitar cuts from my '73 Martin D-35 (recorded with Audix SCX-25s through The NightPro PreQ3 pre-amp). The audio was very real-sounding with a

smooth, airy, open quality that reveals the nuance and harmonics of the aged guitar and bronze strings. Imaging was just as about as good as my Legacy Classic II monitors and the D-35's prominent bass was reproduced cleanly without artificial boom.

Next up was some high-resolution material — courtesy of Tom Jung and other SACD producers. First up was T.J.'s SACD production of percussionist Steve Davis' *Quality of Silence*. The impeccably recorded drum cymbals sounded incredible! The inner detail of the transients were there but never overly bright or harsh. Even at loud levels, the cymbals did not fatigue the ear.

I sampled another SACD, The Anthony Wilson Trio *Our Gang* (Groove Note). The live-to-two-track recording is a simple jazz trio: hollow-body guitar, drums and Hammond B-3 (how analog can you get?) — and man, did the JBLs shine. The Hammond B-3 sound envelopes you through the JBLs just as the recording does through speakers at three times the price.

I also found the LSR6328s equally adept at handling SACD classical recordings (strings, brass, woodwind) with the same silky smoothness. Piano from several recent

Telarc classical SACDs and a demo DAT that was recorded by a local musician showed the LSR6328s to be first rate — no cabinet ringing or hollowness that lesser speakers deliver with the instrument.

A word about the tweeter; JBL's titanium composite tweeter is amazingly smooth compared to other metal dome tweeters I have heard. For a powered speaker, violins sounded about as smooth as I have ever heard. Ribbon-based systems from Legacy, Genelec and ADAM may be a touch smoother, but the ribbon models I have auditioned are more expensive than the LSRs.

I also have to say a word about JBL's biamp system. In my room, it provide as much level as I needed and it never got harsh or distorted. Since I am primarily a passive speaker/amp guy, I have to admit that powered speaker amps, such as the LSRs, are getting better and better.

In the pop genre, I listened to some mid-bass heavy, hip-hop music, which can sound terribly muddy on lesser speakers, but again, the JBLs handled the thumpin' bass lines just fine. Just amazing bass control from a woofer that is only eight inches. Of course, the sub

*continued on page 42* ►



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► *JBL from page 40*

added more low-frequency extension and is a necessity if you work with LFE effects, but I mostly used the LSRs without the sub.

Aurally, I found nothing to complain about the JBL system. The speakers are a tad heavy, with its sturdily built cabinet and a beefy amplifier, but the heft is not unreasonable. Besides, JBL included the built-in handles for easy transport.

The only real quibble would be a desire for a front-mounted power switch.

### SUMMARY

In a nutshell, JBL is back. The new LSR series, powered closefield speaker is definitely one of the next-generation studio monitor lines to watch. At a reasonable price with studio-flattering looks, the LSR 6328 speaker sounds accurate with all kinds of audio. And its easy-to-use, room tailoring controls and the optional Room Mode Correction make it a system that can work just about anywhere. Since the speaker goes pretty low for an eight-inch woofer, the subwoofer is just gravy.

*John Gatski is publisher of Pro Audio Review.*

## THE ABCs OF RMC

JBL's Room Mode Correction (RMC) is a handy, easy-to-use set of tools that allows for reduction of the effect of the standing waves that can make the sound boom and muddy. Some degree of standing waves are unavoidable in most rooms because of the boundaries, room size dimensions, etc. The effect of the standing waves can be controlled.

Built into the new line of LSR speakers, JBL's RMC processor is an all-analog - basically a cut-only EQ, with adjustable frequency, width and depth controls. The optional RMC kit includes a custom dB meter with 9V battery, a test tone CD, a frequency chart for plotting the results of the pre-RMC measurement, a tool for adjusting the speaker-mounted RMC controls, a width template for ascertaining the broadness of the peak (or dip), and a bypass remote control to audibly confirm the unequalized vs. the equalized or "corrected" sound. The bypass remote connects via a 1/4-inch connector cable, which unfortunately is not supplied with the kit. JBL does supply a Y-cable to allow the bypass switch to operate all speakers with RMC.

The manual is straightforward and offers excellent advice and techniques on how to "fit" the speaker into a room with the boundary controls on the LSRs as well as how to make the RMC measurements and adjustments.

The RMC is easy to use: pop in the test CD (make sure the RMC controls are disengaged), play track 1 to set the reference level to -7 dB on the dB meter, and then proceed to play the bass tones

that descend in order — from 126 Hz to 20 Hz. Simply plot the dB level for each tone from the meter on the frequency chart. Once the tones are finished, draw a line to connect the dots. That is your bass response curve in your listening room.

If the line is within  $\pm 3$  dB of the reference level at each frequency, your room is okay. If it is more, then you probably need some room correction.

The adjustment equation's key numbers include the peak's center frequency, the level in decibels (the difference from reference to the actual peak level), and the width of the peak. The latter is determined by placing the width template over the chart and matching the template curve to the peak. The peak's width value is assigned a percentage as figured from the template.

To make the RMC adjustments for correction, simply turn the width, center frequency and depth controls clockwise to the dial-designated positions figured from the chart in the instruction manual. The depth control attenuates in -1 dB steps to -14 dB. The frequency adjustment ranges from 24 Hz to 96 Hz.

After the adjustments are made, play the test tones again, and the peak should be reduced so that the audio sounds more natural when real audio is played.

Since the LSR6328 does not have as much lower frequency content below 40 Hz, JBL recommends using the LSR6312SP subwoofer (flat to 35 Hz and audible response even lower), which has its own RMC. The sub/main speakers can be adjusted in tandem with the sub's RMC. Using the LSR sub also allows RMC with other speakers.

— John Gatski

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# NEW PRODUCTS

## RackFrame The Cube

The Cube is RackFrame's attempt to make the simple rack even simpler. Designed to run from sizes of four rack units high up to 43 rack units in height, The Cube is a standard 19 inches wide. According to the folks at RackFrame, The Cube has 79,507 different sizes (we'll take them out their word). The Cube starts with three basic steel parts but options such as wheels, drawers, covers and sliding trays add flexibility. Price: starts at \$159.

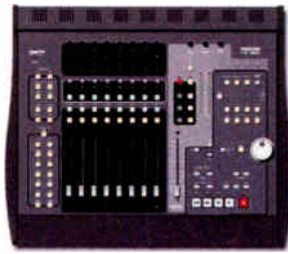
Contact: RackFrame at 888-214-8363, [www.rackframe.com](http://www.rackframe.com).



## TASCAM FW-1884 DAW Control Surface

Joining TASCAM's growing family of DAW control products is the FW-1884, a FireWire-based DAW interface/controller. The 1884 has eight mic preamps, ADAT lightpipe I/O and MIDI I/O to go along with its fader complement. The faders are motorized and touch-sensitive. Additional features include four-band EQ, tape-style controls and a jog/shuttle wheel. Digital audio conversion, courtesy of Frontier Design Group, is 24-bit/96 kHz. The FW-1884 is compatible with most major DAW programs. Price: \$1,599.

Contact: TASCAM at 323-726-0303, [www.tascam.com](http://www.tascam.com).



## Primera Technology Bravo II Disc Publisher

Primera's original Bravo Disc Publisher CD duplicator/printer was one of those products like a fax machine - once you had it you wondered how you ever lived without it. Now Bravo II steps up to the plate. Like the original it is a way-too-easy automated CD duplicator and printer. Load it with blank discs - select CD content and a disc image for printing and forget it. Improvements include sturdier hardware, an improved suite of tools (which were great themselves in the original Bravo), a USB 2.0 interface, better printer and faster overall performance. A DVD-R version is also available. Price: \$2,195 (CD-R), \$2,695 (DVD-R).

Contact: Primera Technology at 800-797-2772, [www.primera.com](http://www.primera.com).



## Lavry Engineering (formerly dB Technologies)

LavryBlue Conversion



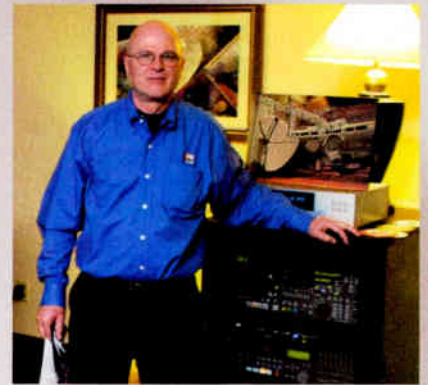
**Features:** Modular A/D-D/A system; up to 8 Channels per rack; 44.1, 48, 88.2, 96KHz sampling; Varispeed; Set word length with Acoustic Bit Correction; Soft saturation; Tape emulation; Reference bridge.

**Comments:** "I have been a fan of your wonderful products for many years." Frank Filipetti

206-842-3552 [www.lavryengineering.com](http://www.lavryengineering.com)

**Bob Moog's** cute little Minimooog Voyager analog synth has upgraded its operating system to 2.0. Top changes involved reworking the Master Mode and Edit Mode features. The upgrade is available for free at [www.moogmusic.com](http://www.moogmusic.com).

And from one famous audio person to another, Ray Kimber used a **Genex Audio** GX9000 hard disk multitrack recorder for experimental recordings using his IsoMike



multiple mic array system. The array utilized a pair of **Neumann M 150** and a pair of Neumann TLM 150 mics along with interconnects from **Kimber Kable**. See picture of Ray and the recorders.

One of the favorite books of audio engineers who have way too much time on their hands is **Rycote's** Microphone Data - an encyclopedic collection of graphs, polar patterns, specs and whatnot. Now, a good thing gets better - [www.microphone-data.com](http://www.microphone-data.com)!

**Digidesign's** recent acquisition of the assets of Bomb Factory has yielded a bonanza - free plug-ins! See [www.Digidesign.com](http://www.Digidesign.com).

Amp-O-Matic, a guitar amp simulator program for the Chameleon rackmounted digital processor, has been upgraded to a full 1.0 (meaning it is now safe to use). Lots of new effects. Free from **Soundart!** See [www.soundart-hot.com](http://www.soundart-hot.com).



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World Radio History

 **MERGING**

BY RUSS LONG

I jumped for joy when my editor asked me if I wanted to review a fully maxed out version of the Apple Power Mac dual-2GHz G5 running Mac OS X v10.3 "Panther." This new machine, built around the IBM PowerPC 970 processor, is quite possibly the closest thing to a perfect computer ever made. It is available in dual-2GHz, dual-1.8GHz and 1.6GHz models and features a newly designed case, revamped internal architecture and a list of cutting-edge technologies that embody Apple's biggest makeover since the introduction of the G4 four years ago.

The G5's new 64-bit architecture won't be completely beneficial until Apple releases a 64-bit operating system. But even running the 32-bit OS X, the system is lightning fast. At this point, the real advantage of the G5 is the higher memory ceiling. A 32-bit system (either Mac or PC) can address a maximum of 4 GB of RAM, and no single application can make use of more than 2GB. The 64-bit G5 supports 8 GB of RAM. As applications add 64-bit addressing support, the ability to run longer, more complex instructions will improve the performance of data-intensive tasks such as encoding and playback of higher sample rate audio.

## FEATURES

Towering over older Macs, the new G5 is 20.1 inches high, 8.1 inches wide and 18.7 inches deep. Despite their size, the new G5 has less room for internal expansion than the older G4, allowing only one empty bay for an extra hard drive and three PCI (in the 1.6GHz

## Fast Facts

- **Applications:**  
*Studio, project studio, broadcast, post production, sound reinforcement*
- **Key Features**  
*(as tested): Dual 2GHz processors; 160 GB serial ATA hard drive; 2GB RAM; PCI-X buss; OS X Panther; front panel USB 2.0 and FireWire ports; Ethernet; 23-inch Cinema Display LCD; SuperDrive DVD drive.*
- **Price:**  
starts at \$1,799
- **Contact:**  
Apple at 800-692-7753,  
[www.apple.com](http://www.apple.com).

# Apple Power Mac G5 Dual-2GHz Workstation

model) or PCI-X (in the other two models) card slots. Later model G4s included three extra hard drive bays and four PCI slots. The G5 I reviewed (running OS X v 10.3) included a pair of 2.0GHz G5 CPUs, 2GB of PC3200 memory, a 160GB hard drive, a Radeon 9600 graphics card, and the 4X SuperDrive. All of the new G5 systems are equipped with AGP 8X Pro and Serial ATA.

The G5 is equipped with a 56 kbps modem and an Ethernet port that can handle speeds up to 1,000 Mbps. There are internal slots for the optional AirPort Extreme and Bluetooth wireless cards. The box also includes a FireWire 800 port, two FireWire 400 ports (one on the front panel and one on the rear), and three USB 2.0 ports (USB 2.0 runs up to 40-times faster than USB 1.1). The front panel mounted FireWire 400 port, USB 2.0 port and headphone jack are extremely handy. Why didn't Apple think of this before? The G5 also includes analog line-in and line-out jacks, S/PDIF I/O via Toslink cables for connecting to devices such as standalone converters, digital instruments or 5.1 surround sound speaker systems.

The G5's case is a fantastic design. Adding or removing cards is a snap. When a rear panel catch is flipped, the entire side panel pops loose. Inside the box, the clear air deflector panel can be removed to give access to the card slots and drives. Replacing the original hard drive or adding an additional drive is simple. Four guide screws install on the side of the drive and then the drive simply slides into a cradle near the top of the machine. Next, a tab rotates to hold the drive firmly in place. Installing additional RAM is just as simple, the fan assembly slides out and then the RAM drops into the slots. This air deflector panel is worth mentioning as it allows air to be passed through the box to cool the processor but without disrupting the hard drives and DVD/CD drive. Every computer I've ever owned has had the problem of sucking airborne crud into the DVD/CD drive, eventually clogging it up and requiring extensive cleaning. Finally, with the G5, this potential problem has been completely eliminated.



While the G5 is not a silent computer, it is fairly quiet (especially considering the dual-processor model is equipped with nine fans). The computer is equipped with a network of temperature sensors and software that work together to operate the fans, ensuring that they operate only where and when necessary.

To take full advantage of the speed of the G5's processor, Apple developed a high-speed system controller and front side bus that connects the controller to the processor. This bus runs at up to 1GHz which is six times faster than that of the latest G4s. The G5 has plenty of storage space boasting an 80GB hard drive in the low-end G5 and 160GB drives in the other two models. All of the drives operate at 7200 rpm and are supported by 8MB of cache memory.

While Apple's move from PCI to PCI-X is a good move, it is also a move that has potential to cause complications. The PCI-X slots can have nearly eight times the throughput of standard PCI slots but they use a 3.3-volt signaling format that isn't compatible with the PCI cards of some third-party manufacturers.

*continued on page 48 ►*



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# APHEX

### ► Apple from page 46

Most manufacturers offer card upgrades to fix compatibility issues but it is important that the compatibility of existing PCI cards be checked with the manufacturer before assuming that they will work. The 1.6GHz G5 has three PCI slots operating at 32 or 64-bit/33MHz. The other two G5s feature three PCI-X slots, one operating at 64-bit/133MHz and two operating at 64-bit/100MHz. PCI cards that use 5V or 12V signaling won't work in any of the G5s, even the 1.6GHz model that lacks the PCI-X slots.

The still relatively new Mac OS X was built ground up to be the ultimate platform for audio professionals. Mac OS X Core Audio integrates a range of audio functionality directly into the operating system in ways never before possible. The Core Audio HAL (Hardware Abstraction Layer) provides ultralow latency communication between applications and I/O devices. The Core Audio HAL allows multiple applications to share the same device, a feature new to Mac OS X. This means that Channels 1 through 6 of an eight channel output device can be assigned

to a DAW such as Logic Pro 6 while leaving a virtual instrument like Reason with channels 7 and 8. Mac OS X Core Audio offers a scalable platform supporting 32-bit high-resolution audio, a plug-in architecture called Audio Units for DSP and Virtual Instruments, and plug-and-play connectivity for modern and legacy audio gear. Mac OS X Core Audio enables developers to offer audio plug-ins in a more centralized manner (called Audio Units), simplifying system management. Apple includes several Audio Units plug-ins with Mac OS X, including a Velocity Engine-optimized reverb and a sample rate converter.

Previously, Mac OS required third party software to manage and control electronic musical instruments via MIDI and some archaic MIDI management program such as Free MIDI or the never great OMS. Mac OS X integrates MIDI Services directly into the operating system for increased stability and performance. Audio MIDI Setup allows you to easily manage your MIDI needs and define a system-wide MIDI configuration that is available to all of your applications. Mac OS X includes a Velocity Engine-optimized

Virtual Instrument compatible with both the industry standard Downloadable Sounds (DLS) format and SoundFonts. The Mac synthesizer provides applications with high quality, low latency sample playback as well as control for filters and envelopes.

The computer I reviewed included a 23-inch "Cinema" display that truly makes long hours in front of a monitor a pleasure. The screen looks fantastic and has amazing resolution.

### IN USE

The word that most effectively describes the performance of the G5 is smooth. The speed of the processor doesn't always translate to the user simply as speed but rather as efficient, smooth and reliable operation. I initially put the G5 to work running Pro Tools to track a concert by the group Mercy Me and had wonderful results. During my tests several days before the concert, I had problems getting the system to record more than 40 continuous minutes. After some troubleshooting, I discovered that in the G5 Energy Saver control panel the processor speed defaulted to "automatic." I changed the setting to "highest" and the problem was solved. I recorded the 90 minute concert to 46 tracks and had no problems at all. I also recorded a dress rehearsal to another 46 tracks, ending up with 92 tracks, each 90 minutes long. I mixed the show as one complete audio file and I wanted to have the dress rehearsal in the same session so I could have an optional performance if there were any mistakes. I discovered that with 92 tracks running 1.5 hours, the system performed better than my G4 running a 5 minute, 32-track session. One minor complaint I have with the G5 is its new keyboard layout. All of the function keys run together as opposed to my G4 keyboard which has a space between F4 and F5 and between F8 and F9. I constantly use function keys F1-F8 while working in Pro Tools and even after three weeks of work on the G5, I still can't get comfortable with this new layout.

The G5 I reviewed included the latest version of Logic which I put to work on a Chris Mosher remix and was thoroughly pleased with the performance. I anticipate that Apple's ownership of Emagic will improve the Mac's ability to work with music applications and music applications (especially those released by Emagic) ability to work with the Macs. I used Logic with the built-in digital I/O and it

*continued on page 50 ►*



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► *Apple continued from page 48*

worked wonderfully. The digital I/O is accessed through CoreAudio, so all audio applications (except for ProTools) can use it. When it was all said and done, I had successfully installed and run Pro Tools, MOTU DP4, Steinberg Nuendo 2.0 and Logic on the G5 without any complications at all. I also had perfect results using the TC Powercore with the G5.

One feature that I liked on my G4 that is missing in this G5 is the ability to turn the machine on from the keyboard. I keep my computers and tape machines in a machine room and love being able to turn the computer on by pressing a switch on the keyboard.

**SUMMARY**

The dual 2GHz G5 is the best computer that I've ever used. The machine is lightning fast, it's quiet and it has built in digital I/O making it the ultimate machine for audio professionals. OS X is designed for optimum performance with the G5 processor, providing a seamless transition to 64-bit power.

*Russ Long owns The Carport recording studio in Nashville.*

► *Sony continued from page 12*

With all controls set properly, we began the shoot. The press conference went off without a hitch. Recorded audio was crisp and clear, and the ability to mix wild sound with the podium and reporter mics added a sense of "presence" to the recorded piece.

Next, the DMX-P01 mixer was substituted for a venerable old analog mixer in a studio sound booth. This booth is manned each morning by two professional translators, who interpret a television morning news broadcast in Spanish for real-time insertion on the station's SAP (Secondary Audio Program) channel.

I removed the old mixer and its associated A/D converter from the booth, and installed the DMX-P01. The AES output of the mixer was then connected directly into the station's digital router.

As the users of the mixer are not particularly "technical," I utilized the device's Parameter Lock feature to "lock out" adjustments they would not normally require. This was actually appreciated by the announcers, as it gave them one

less thing to worry about while doing their translating! Input limiting was enabled on each of the two microphone inputs, along with a modest amount of output compression and limiting. After the morning's newscast, both translators reported a perceived improvement in the overall quality of their audio, compared with the old mixer. The only issue the announcers mentioned was the difficulty in viewing the LCD display off axis; even when viewed straight on and backlit, the display is less than sharp.

**SUMMARY**

With the exception of the LCD display issue, I found the DMX-P01 to be simply an outstanding audio mixer. Rugged and feature-packed, this mixer is sure to become a favorite with the EFP and ENG crowds, and will probably become the new "mixer of choice" anywhere high quality and portability are required. If you have made the jump to digital recording, be sure to give the Sony DMX-P01 a try.

*Jim Stanley is chief engineer for a television station in Atlanta.*





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Xs4300	200	300	N/R	700	N/R	2	28

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► *Beachtek rom page 16*

As the instruction sheet accurately points out, "Most camcorders use automatic gain control (AGC)," so setting level for them is an exercise in gross generalization. The instructions tell you "...the adapter can still be used to adjust the input levels, but will not override the AGC circuitry." Hmm... Okay, whatever. You are then advised to set the controls "...as high as possible to achieve the maximum signal-to-noise ratio. You may have to turn the volume controls down if you are using very sensitive microphones or are feeding in high-level signals from a mixer." How will we determine this? I guess record some and play it back. In these important areas, I find the documentation skimpy and a bit unclear, but that should not dissuade you from using this very helpful tool.

### IN USE

The DXA-6 has been evolving as its first incarnation only offered phantom power on one input. The latest version offers dual 48V phantom power. Clearly BeachTek is con-

tinually working at improving its products and responding to its customer base.

I would guess that the people who would be most interested in phantom power are the same group that will gravitate toward the prosumer camera side of things, such as Sony VX and Canon GL series cameras. Fortunately, these tend to be camcorders with the ability to manually set input gain levels. I would urge BeachTek to offer a reference tone oscillator in the next version of this unit as this would greatly facilitate line-up for proper levels.

It sounds good, with approximately an 80 Hz to 20 kHz spread and pretty quiet inputs. Certainly within the realm of the designated recording devices the DXA-6 will be hooking up to. It sounds far superior to whatever onboard mic arrangement any of these camcorders could give you.

This is a great little box that lets you put your real gear into your toy's ears — reasonably priced, well built and for the most part well-thought out.

Dual regulated phantom 48V power shrinks your load and kludge, streamlining

the whole process. Also, this is a useful tool for other types of consumer audio equipment such as computers, MD and DAT recorders, etc.

On the more negative side, the aux-in is a bit below par as is the main output cable arrangement. Also, I find the documentation sparse and unclear on certain points. I really miss a simple, onboard 1 kHz reference tone generator.

### SUMMARY

The constantly blurring line between what gear is professional and what is not smears on and these definitions have really begun to lose meaning as the real answer is being derived from the end use rather than the product category. BeachTek's DXA-6 box significantly raises the bar in this niche area and helps smooth the process. This is one of the most concise ways of hooking your regular kit into the consumer world and is probably the best product in this class.

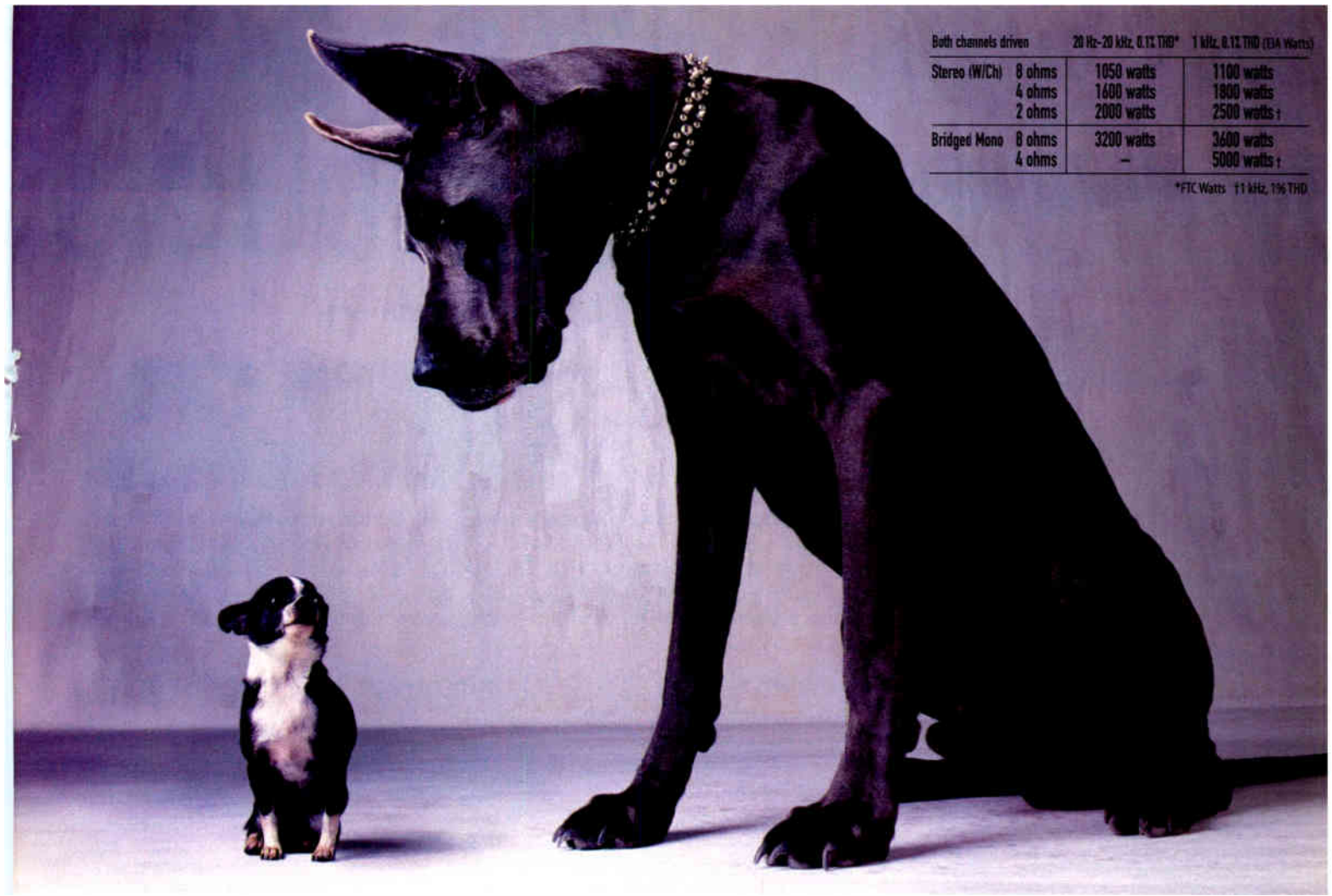
*Mark Ulano is an Academy-award winning film and production sound engineer and regular contributor to Pro Audio Review.*

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\*FTC Watts 1 kHz, 1% THD

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David Bowie's recent tour utilized a **Yamaha PM1D** digital mixing console. And thought the PM1D can handle many duties, engineer Pete Keppler also uses **Focusrite Red 1** mic preamps, **Tube-Tech CL-1A** limiters and **BSS DPR901** MkII processors. Speakers for the tour are **JBL VerTecs**. And speaking of JBL VerTecs, Eric Clapton's recent tour used VerTecs. Those were handled by Concert Sound of Luton, U.K.

The U.K. also saw the first sales of the new Verona console from **Midas**. Surrey-based PMI Ltd. (not to be confused with



the US distributor of Joemeek products) snagged one of the first available (see picture of PMI's Peter Maciuk and the board). Over on our side of the pond CP Communications bought a Verona 480.

Using studio stuff on stage isn't so unusual – just ask Brian Munrone who is using **Metric Halo's** Mobile I/O 2882 digital audio interface with Tom Jones on stage. Munrone is the band's guitarist and the band's Halo guru. Keyboardist Frank Strauss is using another unit to run computer loaded with Native Instruments synths.

Other studio goodies making it in the live world – **ATC** speakers in a night club. New York's The Living Room has SCM150s in the main room and SCM20s scattered throughout other rooms.

Zoologist Angela Stoger-Horwath has been using **AKG** mics (C 480, CK 69 and CK 2 capsules) to record the elephants (including a baby elephant) at Vienna's Schoenbrunn Zoo. The project is a study of the pachyderm's language.

# NEW PRODUCTS

## Inter-M Americas L Series Amplifiers

Inter-M's new L Series amplifiers range in power from 830 watts to 2,400 watts. The basic family features are the usual, two-channel, clip limiter, thermal protection, high-pass filter per channel (30 Hz or 50 Hz), on/off muting along with more specialized features such as binding posts and Speakon connectors. The group also offers front-to-back fan cooling, bridging and two-ohm operation. Prices: L-800 - \$779; L-1400 - \$940; L-1800 - \$1,090; L-2400 - \$1,210.



Contact: Inter-M Americas at 610-874-8870, [www.inter-m.net](http://www.inter-m.net).

## Furman Sound SB-1000 Uninterruptible Power Supply

Not normally thought of as a basic piece of musical equipment, Furman Sound has designed an uninterruptible power supply for musicians and studio engineers, the SB-1000. The SB-1000 is a single rack unit UPS with a minimum of three minutes of juice and around 30 minutes for typical loads - plenty of time to power down keyboards, effects racks and computers. Capacity is rated at 1000V A/600W. It includes an overload alarm, switchable line voltage and is UL listed. Price: \$699.



Contact: Furman Sound at 707-763-1010, [www.furmansound.com](http://www.furmansound.com).

## Turbosound TXD-12 M Wedge Monitor

Coated in the familiar Turbo blue, the new TXD-12 M is a small two-way wedge-style stage monitor. The TXD-12 features a 12-inch woofer and a one-inch high-frequency compression driver with a 40 degree by 70 degree horn. The HF section has overload protection. The birch plywood wedge cabinet has a pole mount socket, handles and rubber feet. The metal grille, following a recent trend, has a slight curve to it. Price: \$693.



Contact: Turbosound/Sennheiser at 860-434-5220, [www.turbosound.com](http://www.turbosound.com).

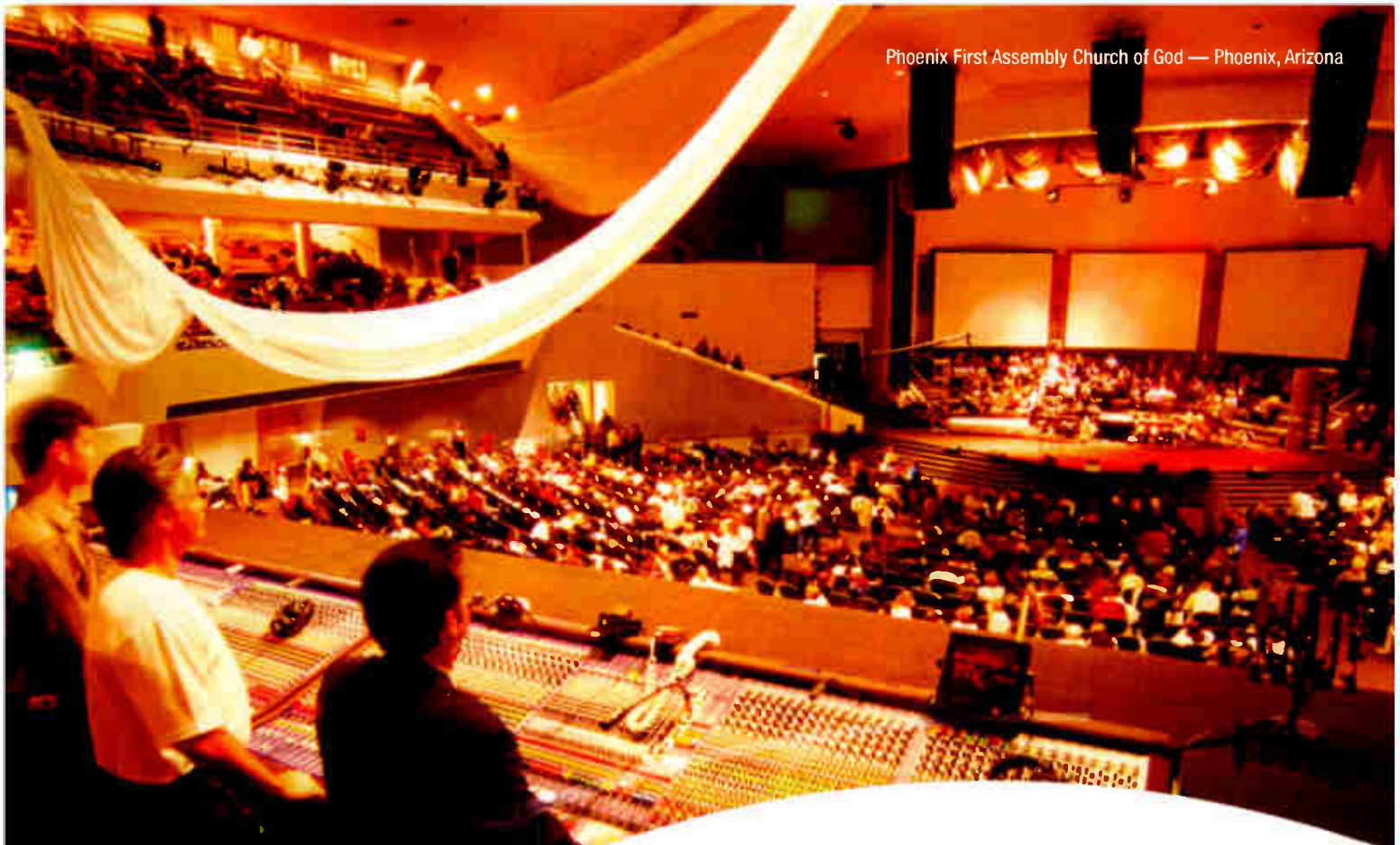
## HME PRO850 Wireless Intercom System

As wireless technology improves the lowly intercom system is increasingly becoming full-featured, much like



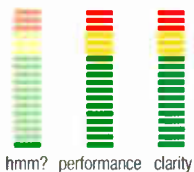
its wireless mic system brethren. Witness HME's PRO850 system. The PRO850 is a frequency agile UHF system with full computer interoperability (via RS232 or USB connections). Other featured include source mixing, remote belt-pack control options, programmable belt-pack controls, PDA functionality and security lockout. Contact: HME/Systems Wireless at 800-542-3332, [www.swl.com](http://www.swl.com).





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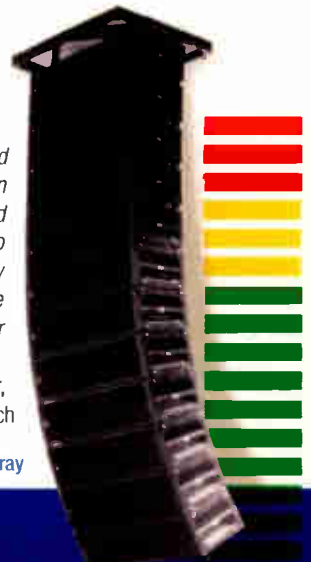
hmm? performance clarity



*"Spoken word is the most important. And the spoken word has never been heard clearly since the church was built in 1984. We just went through an extensive remodel to try and clear things up... but it was apparent that we needed to upgrade our sound system. Our congregation is very important to us, and they deserve a great system. I invited the major sound manufacturers to come in and show me their best systems. Meyer MILOs won the shootout."*

Tommy Robertson – Sound Department Manager,  
Phoenix First Assembly Church

MILO High-Power Curvilinear Array



BY ANDREW ROBERTS

If you think computer technology is progressing at a breakneck pace, you should take a look at wireless microphone systems.

In the last few years, wireless manufacturers have brought us high-quality compact UHF systems loaded with usable pro features - all at prices that seem incomprehensible compared to similar systems of a decade ago. Recently, Audio-Technica unveiled three new wireless systems, 3000, 4000 and 5000. These are considered professional grade with 200 UHF channels. I received the 3000 Series system with a handheld transmitter (\$799) that features A-T's new AE4100 element (*PAR*, 1/03). It also comes paired with a bodypack transmitter for use with a variety of transducers.

## FEATURES

The 3000 Series receiver is a half-rack affair that weighs 2.4 pounds not including the external power supply (boo, hiss). The unit comes with a pair of mounting ears for single system use or two receivers can be mounted in a single rack-space with the purchase of an adapter plate (AT8630, \$30). The system features true diversity operation and 200 PLL-synthesized UHF channels (541.500 MHz - 566.375 MHz and 655.500 MHz - 680.375 MHz) that are selectable via soft-touch controls on both the receiver and the transmitter. The receiver has an LCD screen that displays conventional parameters like RF level, operating frequency and audio signal level as well as transmitter battery level. The receiver also has an alert indicator that flashes if the transmitter battery gets low (nice), the RF level drops, the transmitter is in mute or edit mod or when the level is close to clipping. Outputs are via unbalanced 1/4-inch or balanced XLR that is equipped with a ground lift switch to combat hum.

The 3000 Series handheld transmitter is

# Audio-Technica 3000 Series Wireless Microphone System

built around their superb new AE4100 cardioid dynamic mic. Both the handheld and bodypack transmitters feature a switchable output power of either 10mW or 30mW. Like many new RF systems, the 3000 transmitters use AA batteries, which, according to A-T, last between six and eight hours. At the end of the handheld chassis



is a recessed power switch (when held for more than two seconds) that doubles as a mute switch I when depressed for less than two seconds). The transmitter also has an LCD display that normally displays power status, operating frequency, mute status and battery level.

## IN USE

My first use of the 3000 Series system was by far the most demanding. I was doing sound reinforcement for a three-day Christian event that featured speakers, bands, choirs, etc. While it was hinted that the preachers get pretty "excited" during their sermons, it was not an apt description of what followed.

Immediately the 3000 handheld transmitter (which was serving as the pulpit mic) was subjected to a torrent of relentless screaming, spraying and breathing that would send any microphone to an early grave. Unfortunately, this barrage created some periodic clipping in the transmitter which was unaffected by downstream gain reduction and compression. Eventually, we found an opportunity to swap out it with another RF unit (properly trimmed and adorned with a foam windscreen). By that point, though, the 3000 handheld's element was drenched, resulting in diminished LF and causing me to expect the wrath of A-T when the unit was returned in a coffin. Alas, it was not to be. I laid the mic in front of the exhaust port on one of my power amps (AKA the hair dryer effect). Within hours, we had the 3000 back onstage (with a foam windscreen and some serious trim reduction performed via the unit's soft touch controls) delivering clear, crisp, intelligible sound. I was particularly impressed with the ATW-T341 transmitter's

sonic character. On a stage full of high-quality wired vocal mics it held its own, delivering a pleasing yet appropriately aggressive sound.

The next test for the 3000 Series was an event featuring presidential candidate Senator John Kerry. Kerry was speaking to about 100 people at a private event in Washington, D.C. With the Senator's good mic technique and the 3000's superb sound, all in attendance could hear perfectly. It was in this setting that I noticed the unit's lack of handling noise and smooth high-frequency response. While this area was RF congested, I did not have any trouble finding clear frequencies and switching both transmitter and receiver over.

## SUMMARY

In the weeks and months that followed, I used the 3000 Series receiver, its handheld transmitter and a lavalier with the bodypack transmitter in a wide range of situations. In all instances, I was treated to superb sound and bulletproof performance. This is clearly a professional unit that can perform anywhere from small clubs to arenas. My only beef? I wish the power supply was internal — there is nothing like a rack full of wallwarts to wreak havoc. At the same time, I applaud A-T for revamping its RF line. Although the 3000 Series is "budget priced" (\$699 with UniPak and \$799 handheld), its performance is equal to or better than the brand's former flagship, the 7000 Series. With the 3000, 4000 and 5000 Series, A-T (which had drifted toward the back of the RF class in recent years) is once again in the front waving its hand for a chance to show off.

*Andrew Roberts is a sound reinforcement and recording engineer.*

## Fast Facts

- **Applications:**  
Live sound
- **Key Features:**  
UHF system; handheld and lavalier packages; 200 channels
- **Price:**  
\$799
- **Contact:**  
Audio-Technica at 330-686-2600,  
[www.audio-technica.com](http://www.audio-technica.com).



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BY WILL JAMES

**W**ith the advent of in-ear monitor systems, many performers have been in need of a monitor mixing system that will allow each individual performer in a group to have personal control of their monitor mix, and be able to adjust each input to their own taste, without having to rely on an additional engineer. The Aviom Personal Monitor Mixing System is just that.

## FEATURES

The Aviom system actually consists of several parts, including the A-16 Personal Mixer, the A-16T Transmitter and several CAT-5 cables, similar to Ethernet cables. The system essentially allows up to 16 channels of audio to be fed into the central transmitter, and then the transmitter joins up to as many A-16 Personal Mixers as you want or need (one mixer for each person in the band), allowing individual control of the various inputs.

The Aviom system uses a proprietary Ethernet-based protocol, A-Net, that eliminates the usual 5 to 10 millisecond delay associated with most analog to digital conversions. If you have ever been involved with A/D (analog to digital) conversions, then you know that the time delay can be a little disconcerting, as well as causing what appears to be time/phase-related incoherence. It usually takes a few microseconds for the digital device to acknowledge the analog signal, then recognize it, and finally convert it to a binary code. While the initial step in the Aviom is decidedly a conversion process, it is a very quick process, then sped up via the A-Net connection, much faster than an ordinary analog signal path, thus keeping the actual process of microphone to in-ear speakers, or ear "buds" fairly quick.

The Aviom A-16T Transmitter, is truly the

# Aviom Personal Monitor Mixing System

heart of the system. It is a one-rack-space unit, with 16 channels worth of in and through TRS connectors on the back panel. On the front are one A-Net connector output and a series of level indication LEDs and attenuation switches.

Attenuation of signal is achieved at the input of the A-16T by use of a selector switch that has preset input levels of 22, 4, 0 and -10.

It can be fed the line signal from a console's direct out jack at each channel, or from a group, containing composite signal information. The outputs of the console connect to the Aviom transmitter via 1/4-inch TRS inputs.

The A-16T transmitter also offers a "through" connector, allowing you send signal to the transmitter on its way to the actual audio console. The next step is connecting the actual individual mixers of the A-16 system.

(Editor's Note: Aviom says, 'The A-16T Transmitter will be discontinued and replaced by the AN-16/i Input Module. The AN-16/i Input Module has virtually the same features as the A-16T, but is fully balanced and can be used in our distributed network audio system.')

The rackmounted A-16R Personal Mixer has fairly simple to use controls. The front panel contains the master and channel volumes, bass/treble EQ controls and a pan control. There are also 16 channel select keys. Each unit can also facilitate 16 programmable memory settings.

## IN USE

Most of the touring-level musicians/entertainers I work with are quite satisfied with the presence of a full-time monitor engineer, but many entertainers at the fair/festival-level were fairly open to trying the Aviom system.

At several fairs, we tried the rig with solo performers, as well as bands. The kit includes a nifty little bracket that allows you attach the A-16 Personal Mixer to a microphone stand, thus putting the mixer's controls directly in front of the performer.



We wired the outputs of the mixer to wedges (via the power amp driving the wedge), to headphone amplifiers, to hot spot type monitors and a few in-ear rigs. In each case, the players felt that the Aviom Personal Monitor system gave them an edge and the ability to really dial up their individual mix. They truly enjoyed having their own controls directly in front of them. The most prevalent reason was, that they don't know exact frequencies, and always found it difficult to convey to a monitor engineer what tones they wanted adjusted, and their own mixer allowed them the flexibility to do it "their way." We tried the system in several different locations in the system, creating a variety of scenarios and in all cases, the users found the controls to be very friendly, and offered good parameter control.

## SUMMARY

The Aviom Personal Monitor Mixing System is just the ticket for the fair/festival-level performer looking to enhance their own monitoring experience. The controls are simple, thus not being intimidating to non-technical types, or audio novices. The system seemed to really enrich the in-ear monitors, as changes to tone and volume were more noticeable, and not as potentially EQ problematic for the EQ novice possibly using a conventional monitor speaker. I examined the internal workings and layout of the various devices in the Aviom system, and found all the parts to be of good, road-worthy construction.

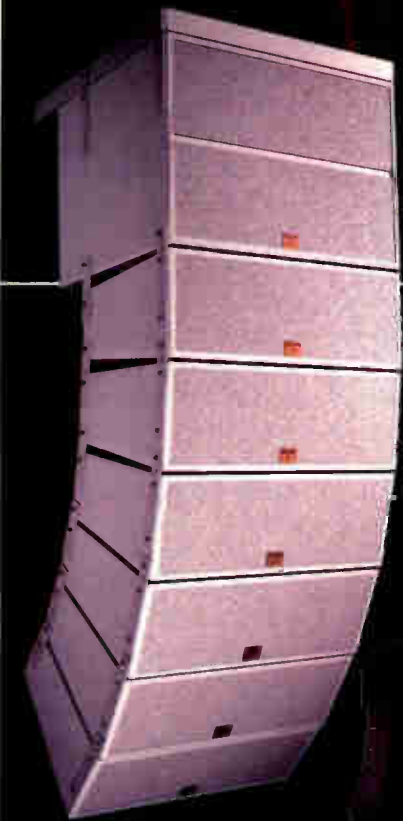
*Will James is owner and chief engineer of Atlantis Audio and Lighting in Scottsdale, Ariz.*

## Fast Facts

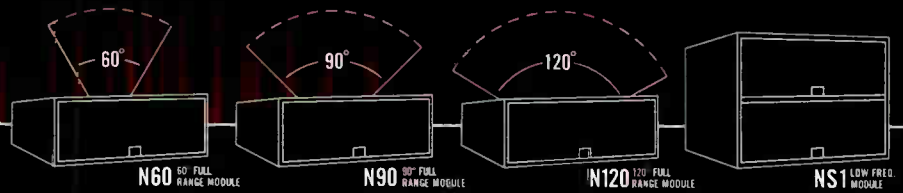
- **Applications:**  
Live sound, studio, installation.
- **Key features**  
Proprietary Ethernet network
- **Price:**  
A-16 Personal Monitor - \$439; A-16R - \$799; A-16T - \$749
- **Contact:**  
Aviom at 610-738-9005,  
[www.aviom.com](http://www.aviom.com).



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## "This is not your *ordinary, average* microphone."

*Joe Walsh - guitarist for The Eagles & just an ordinary average guy*

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The introduction of this new product line marks the birth of the new **PROLINE** division at Heil Sound, Ltd. It is documented in recent product review's that the new Heil dynamic microphone element has raised the bar for dynamic microphone technology.

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► *Lectrosonics from page 20*

any fancy antenna system enhancements. Before this, I had experienced this kind of range consistency with only one other manufacturer's product. Again, this is very impressive.

The build quality is also terrific and considering the types of transmitters available, presents a very unified systems approach to building a wireless package for motion picture work. In addition to the primary UM400 (\$1,250) belt-pack transmitter, Lectrosonics offers several other important designs: the

UH400 (\$1,090) plug-on transmitter is an excellent update of a venerable design as it is the DSP version of a phantom powered transmitter for boom or handheld use, the UT400 versions of dedicated hand held mics and the very sexy MM400A miniature transmitter. The MM400A is a watertight housing with a super hard Teflon nickel finish almost half the size of the standard transmitter. I wish I had these on *Titanic* instead of the bulky waterproof bags I was limited to. My only complaint about these waterproof gems is the

choice of a 2.5mm subminiature connector. Although it provides very effective waterproofing, it limits you to a two-wire connection, albeit minor in the scheme of things.

All great stuff and it gets better, these receivers have a Frequency Scan Mode, which is a spectrum analyzer. You can scan within your 25 MHz spread to find the holes! There is a graphic representation as you scan your band and you just stop the scanner when you get to a space that is in the clear. The display then zooms in to a more detailed view, you choose the clear spot and the receiver then tells you what switch positions to set on your transmitter, all in a matter of a few seconds. This is very effective technology.

This is all very nice, but on top of this comes something I consider terrific. Because of the DSP design, this equipment is capable of full backwards and forward compatibility or more accurately, emulation. Both the transmitters and the receivers have user selectable menus for emulating most of the UHF historical product line Lectrosonics has produced all the way back to the 190 series. This means that you don't have to make your package a pastiche of obsolete items. Everything is cross-compatible and more interesting is the compatibility with other manufacturers' transmitters and receivers. A very cool thing if your talent has favorite mics for handheld performance work or more cool if you want to unify your receiving systems without having to purchase all new transmitters at one time. This concept will be dramatically enhanced by late spring/early summer of this year as Lectrosonics is planning to release their new line of Venue receiver systems which will allow you to have up to six 4IIA style receivers in one single rack space unit for a substantial reduction of the cost of current receiving systems without sacrificing quality. I will be doing a full review of the Venues when they become available.

*"When asked by Front of House magazine what don't I leave home without, my answer was the Carvin PA1200 triple powered mixer. It goes everywhere with me whether I'm doing a big or small show. It has been the saving grace for my audio reinforcement needs. I firmly believe it's the greatest mixer/amp in it's class."*

*-Tim Williams, Urban Audio-Credits: Sheryl Crow, Goo Goo Dolls, Toto*

**PA1200C** • 12 CH • 1000w 3 amps-333w ea • Two effect sends  
• Two effects processors • 1/4" & Speakons • Road Warrior™ case



**Concert C1644P** • 16 CH 4-bus • 1200w 4 amps-300w ea • Four Monitor & two effect sends • Two effects processors • 1/4" & Speakons • Road Warrior™ case

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## SUMMARY

These are very serious tools for sound work, great sounding, excellent RF capabilities, built brick house tough, priced fairly, all from a company open to contact from any end user who wants to participate in the process of their ongoing evolution. The documentation is also very well done and is available as PDFs on the Lectrosonics website: [www.lectrosonics.com](http://www.lectrosonics.com).

*Mark Ulano is an Academy-award winning film and production sound engineer and regular contributor to Pro Audio Review.*



# STEP UP TO ADK!



▲ A-48



▲ Area 51



▲ ST



▲ LE Vienna



▲ Hamburg

"I have become a huge fan of ADK Mics lately. After hearing the ADK TT, I was not surprised that Ray Charles and Johnny Matthis selected two of the TT tube mics for their vocals. The fact that the TL Decca-Tree set-up works well on Grand Piano was a nice bonus. But what surprised us the most was how many uses we found for the original model A-51s. Tracking Guitars for James Taylor to Drums and Horns, these mics were everywhere!"

**-Terry Howard, Recording Engineer: Ray Charles, James Taylor, Michael McDonald, Willie Nelson, Pancho Sanchez, Ellis Hall.**

"The Vienna is an absolutely beautiful sounding microphone! It has all the warmth of a rare vintage mic, but adds a slight presence boost in the high end that just screams 'expensive'!"

**-Ted Perlman, Producer, Arranger, Composer: Ron Isley, Bob Dylan, Burt Bacharach, Young MC, Chicago, Kellie Coffey**

"I've now used the ADK Model "S" 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, Cat Power, REM, Pearl Jam, Soundgarden, Foo Fighters**

"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**

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BY STEPHEN MURPHY

**W**ill new generation small-format multi-layered digital mixers and multifunction controllers ultimately relegate the big consoles to the history books? Despite the general trend towards smaller, computer-based recording systems in project studios and even some first-class studios, large-format consoles still rule the roost in the world-class studio, broadcast and film markets.

In addition to the many innovative large-format digital consoles being introduced for these markets, interest in DSD/SACD and high-resolution PCM delivery formats has sparked resurgence in the introduction of high-quality analog consoles by the major manufacturers.

In the top studios, live broadcast facilities and film-production houses there is no substitute for the no-compromise components, ergonomics, familiar layout and sheer muscle of today's large-format production consoles. A brief scan through the following survey of selected latest-generation large-format production consoles confirms this.

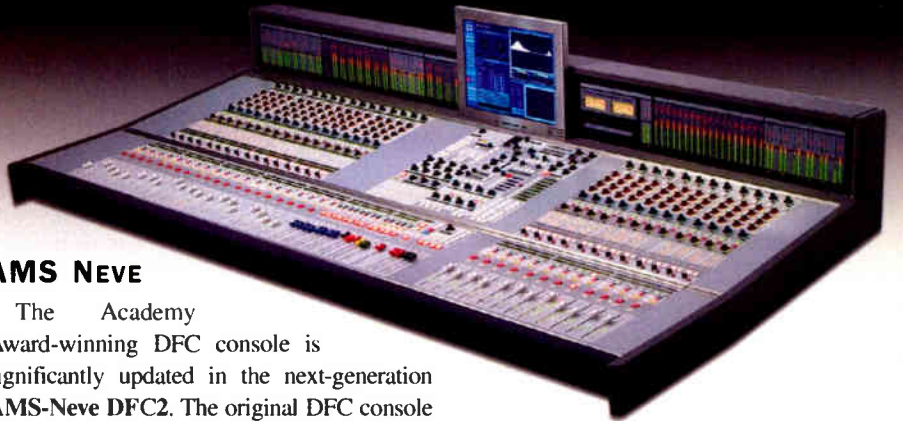
### SOLID STATE LOGIC

SSL, a manufacturer whose name is virtually synonymous with large-format A-room consoles continues to attract major studios with its latest generation of consoles. The **C200** Digital Production Console boasts many of the features that have made SSL's analog consoles a mainstay in studios worldwide: freelancer friendly analog-style controls, dual faders (large and small) per channel strip, in-line channel configuration, 48 multitrack busses with gain trims, independent pre- and post-fader direct outputs, total dynamic automation and dedicated processing per channel strip. The C200 also features full facilities for 5.1 surround mixing including dual program outputs for stereo and surround, per-channel PanPoint joystick-style panning and support for two sets of 5.1 outputs for separate near- and far-field monitor setups.

Addressing the limitations of digital in producing for high-resolution formats, SSL's **XL 9000 K Series** is the first analog console designed by Solid State Logic to provide the dual benefits of a full 5.1 surround architecture and the increased bandwidth and resolution needed for DVD-Audio and SACD. It is also SSL's first new analog console since the introduction of the J Series in 1994.

See [www.solid-state-logic.com](http://www.solid-state-logic.com)

# Large-Format Production Consoles



### AMS NEVE

The Academy Award-winning DFC console is significantly updated in the next-generation **AMS-Neve DFC2**. The original DFC console proved to be an unprecedented success with film mixers, and the new DFC2 appears poised for a similar reception. The new console offers major enhancements in automation, control surface features and DSP capability and includes the latest I/O Suite from AMS Neve.

The music production-oriented **88-R**, the first large-format Neve analog console introduced in almost 20 years, features the latest-generation Neve mic amps, 5.1 monitoring standard with optional 7.1 scoring panel, spectral formant EQ, Encore automation with moving small and large faders and fully integrated Recall with photo-realistic graphics. Addressing the needs of hi-resolution recording, the 88-R features audio performance beyond 24/192 digital and no-VCA signal paths.

See [www.ams-neve.com](http://www.ams-neve.com)

### WHEATSTONE

Wheatstone manufactures digital and analog consoles targeted primarily for television and radio broadcast/production markets. The company's new large-format console, the **Wheatstone D-5.1**, boasts innovative features designed for live stereo and surround television production, including: 5.1 surround inputs, outputs and monitoring; complete recall of all control parameters; two hot-key sources per fader; talkback to any output; up to 82 mix-minus feeds

See [www.wheatstone.com](http://www.wheatstone.com)

### AMEK

AMEK's flagship recording console is the **AMEK 9098i**, designed by Mr. Rupert Neve. According to AMEK, the large-format analog

console boasts a signal path that "achieves performance known to be unreachable in the digital domain, and considered extreme even for analog engineering." Available in frame sizes from 16-120 input channels, the 9098i inline console features Mr. Neve-designed classic mic amps and 4-band EQ/filter sections, 5.1 mixing and monitoring capabilities, Supertrue automation, 16 automated aux sends, balanced inserts and 48-track routing matrix.

See [www.amek.com](http://www.amek.com)

### API

Revered console maker API has also enjoyed the renewed general interest in analog consoles and high-resolution recording. Highest-quality discrete analog circuitry has always been the company's mantra, and the results can be heard in its flagship console, the **API Legacy Plus**. The Legacy Plus features 24 main busses, three stereo busses, 12 aux busses, dual input (inline) configuration and dual-row 200 series frame.

See [www.apiaudio.com](http://www.apiaudio.com)

### AUDIENT

Audient is a relative newcomer in the market, but company founders David Dearden and Gareth Davies from the former UK console maker DDA bring a wealth of design expertise to the consoles. The **Audient ASP8024** is an inline analog production console available in 24- to 60-input frame sizes, and features 24-track routing, 14 aux busses, split-able EQ sections and multiple monitor outputs.

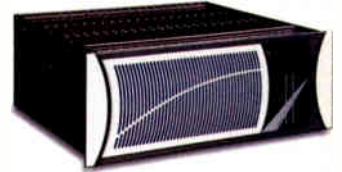
*continued on page 64* ►



Digital Audio Network Router

# The Bridge

**The Bridge Router** can hold all the electronics you'll need for a small console: I/O cards, mix engines, and DSP processors. Naturally it can also have automatic fail-over DSP and CPU cards to keep you on-air. You can expand the system with a simple cage-to-cage interconnect.



## It's not just a Digital Console, It's AN ENTIRE AUDIO INFRASTRUCTURE

**YOU CAN START** with a simple AES router with analog and digital inputs and outputs. From there you can add logic I/O cards and scheduling software; you can link multiple master bridge cages together to achieve thousands and thousands of I/O ports; you can create a custom system that includes multiple smaller remote satellite cages— with everything interconnected via CAT5 or fiberoptic links.

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It can route, generate and monitor 5.1 surround signals and produce simultaneous 5.1 and stereo master signals for your dual broadcast chain. The console also provides extensive, rapid communication paths throughout your entire Bridge system. Motorized faders and control setting storage and recall make show-to-show transitions fast, easy and accurate.



**Wheatstone Knows Live Audio.** The D-5.1 is loaded with MXMs, foldbacks, and clear easy-to-read displays. You'll have all the power you need when the news breaks! Its intuitive layout helps your operators work error-free, and it can handle and generate all the 5.1 content and simultaneous stereo capability any large or medium market station could need.

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World Radio History

► continued from page 62

### YAMAHA

In addition to live sound, Yamaha's flagship PMID digital audio mixing system has also won many fans in the audio-for-broadcast market. The modular mixing system is comprised of the **DSP1D** mix and process engine (48 or 96 channels total), the 48-fader **CS1D** control surface and a range of user-specified digital interfaces and analog I/O boxes (featuring 28-bit AD and 27-bit DA conversion.).

See [www.yamaha.com](http://www.yamaha.com)

### STUDER

The **Studer Vista 7** production mixer is the first to incorporate its patented Vistonics technology for integrating rotary controls and buttons within a flat screen display. The expandable digital mixing system features Studer's intelligent Virtual Surround Panning, full machine control options and comprehensive routing capabilities. A Vista Remote Bay is available for simply adding additional control channels to an installation, or for remotely controlling all available channels and functions of

the Vista 7 console from a distance.

See [www.studer.ch](http://www.studer.ch)

### TRIDENT

John Oram and Trident Audio recently updated the popular 1970s-era Trident Series 80 console for the requirements of modern production. The console, reborn as the **Series 80-5.1**, features full 5.1 surround mixing, PPM channel meters, VU master output, 8 aux sends, 8 stereo returns (with routing). The console is outfitted with classic Trident mic pre and EQ sections, and features an all-new master processing section that includes Oram's Hi-Def EQ and mastering compressor.

See [www.tridentaudio.co.uk](http://www.tridentaudio.co.uk)

### SOUNDTRACS

British digital console maker Soundtracs recently introduced its latest major console, the **DS-00**, aimed at the post and broadcast markets. The DS-00 console system features as standard a 17-fader control surface (expandable to 49 faders) and 64 channels of processing (expandable up to 160 channels), stereo through 7.1 surround mixing, a 40x8 monitor

matrix and full dynamic and snapshot automation and recall.

See [www.soundtracs.com](http://www.soundtracs.com)

### HARRISON (GLW)

Harrison has updated its industry standard large-format film-mixing console, the MPC Motion Picture Console. The new **MPC3-D** features 192 digital channels, sub-frame accurate automation, plus dedicated eight-band EQ and dynamics control per strip. Harrison has also incorporated plug-in processor support; specialized plug-ins available include de-esser, camera noise filter, buss limiter, crossover and leveling EQ and telephone filter.

See [www.glw.com](http://www.glw.com)

### EUPHONIX

Euphonix continues to be a pioneering force in digital consoles for the post, broadcast and music production markets. Its **System-5M** digital recording and postproduction console is fully expandable and is easily configured to meet end-user needs. The console system features per-channel four-band EQ and dynamics, up to 48 groups and mix busses, full surround sound mixing and monitoring capabilities (up to 7.1) and both dynamic automation with moving faders and instant recall snapshot automation.

See [www.euphonix.com](http://www.euphonix.com)

### FAIRLIGHT

Fairlight's new **DREAM Constellation** integrated digital audio mixer and editor has been attracting significant attention from film and post mixers. The Constellation offers up to 192 channels returning to 48 mix busses, with full 6-band EQ and two-stage dynamics processing on 96 inputs. The system fully supports surround mixing and monitoring formats up to 7.1, with integrated fold-up and fold-down modes supporting independent monitoring systems.

See [www.fairlightau.com](http://www.fairlightau.com)

### DIGIDESIGN

Digidesign has jumped into the fray with its new **ICON** integrated console. The large-scale controller, expandable to 80 faders via optional 16-channel modules, is designed to integrate tightly with Digidesign's Pro Tools software. The ICON system is capable of supporting 24-bit/192 kHz in 7.1 surround and features touch-sensitive controls, a wide range of visual mixing feedback, dedicated center section and per-channel control over all processing functions and routing, global automation capabilities, and full studio and control room monitoring.

See [www.digidesign.com](http://www.digidesign.com)



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# Buyer's Guide

# Studio Consoles

## TASCAM DM-24 Digital Mixing Console

**Features:** 24-track; 24-bit/96 kHz; four-band parametric EQ; onboard DSP effects; third party DSP effects built-in; 100mm motorized faders; jog wheel; LCD screen; machine control. Price: \$2,999.  
**Contact:** TASCAM at 323-727-7617, [www.tascam.com](http://www.tascam.com).



## Yamaha DM2000

**Features:** 96-channel; 24-bit/96 kHz; onboard DSP effects; LCRS, 5.1 surround sound; joy stick; onboard Pro Tools control; 100mm motorized faders; LCD screen; talkback functions; linkable; Windows/Mac PC control software. Price: app \$20,000.  
**Contact:** Yamaha at 714-522-9011, [www.yamaha.com/proaudio](http://www.yamaha.com/proaudio).



## Crest Performance CPM-2462

**Features:** 16/24-channel; four-band EQ; low-cut filter; PFL; 60mm faders; rackmountable. Price: \$1,240.  
**Contact:** Crest Audio at 866-812-7378, [www.crest-performance.com](http://www.crest-performance.com).



## Phonic America MRS1-20 Surround-Sound Mixer

**Features:** 20-input; three-band EQ; 5.1/six-bus; surround panning; talkback mic; LED meters. Price: \$1,699.  
**Contact:** Phonic America at 800-430-7222, [www.phonic.com](http://www.phonic.com).



## Sony DMX-R100 Digital Audio

**Features:** 48-channel; 24-bit A/D-D/A; 48V phantom power; four-band EQ; 44.1, 48, 88.2, 96 kHz sample rates; 5.1 surround monitoring; SMPTE, MIDI time code; word clock; motorized faders; LCD touchscreen. Price: \$16,000.  
**Contact:** Sony at 800-472-7669, [www.sony.com/professional](http://www.sony.com/professional).



## API Legacy Console

**Features:** Up to 64-channel; API 212L mic preamps (48V phantom power, 20 dB pad); API 550L four-band EQ; API input module; test tone generator; talkback function; optional processor modules. Price: starts at \$140,000.  
**Contact:** API at 301-776-7879, [www.apiaudio.com](http://www.apiaudio.com).



## Millennia Media Mixing Suite

**Features:** Rackmounted modular channel design; up to 80 channels; input, aux, master, parametric EQ, compressor/limiter modules available; high-pass filter; True-Mute talkback function; test tone generator; LED meters. Price starts at \$5,000.  
**Contact:** Millennia Media at 530-647-0750, [www.mil-media.com](http://www.mil-media.com).



## Manley Laboratories 16x2 Mixer

**Features:** Rackmounted mixer; 16 inputs; mic, mic/line or line only configurations; linkable; phantom power (mic versions); pan controls; VU meters. Price: starts at \$9,000.  
**Contact:** Manley Laboratories at 909-627-4256, [www.manleylabs.com](http://www.manleylabs.com).



## Audient ASP8024 Console

**Features:** 36-input; 48V phantom power; four-band EQ; compressor/limiter; pan; inserts; talkback function; dual-fader configuration.  
**Contact:** Audient/ATI at 301-776-7879, [www.audiotoy.com](http://www.audiotoy.com).



## Behringer Eurorack SL3242FX-PRO Mixing Console

**Features:** 32-channel; IMP mic preamps; three-band/four-band channel EQ; nine-band graphic EQ; 24-bit onboard effects processors; FBQ feedback reducer; talkback section. Price: \$629.  
**Contact:** Behringer at 425-672-0816, [www.behringer.com](http://www.behringer.com).



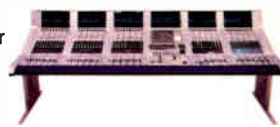
## DiGiCo D4 Console

**Features:** Modular; up to 320-channel; 16 - 96 100mm motorized fader frames; 48 - 96 kHz sample rates; four-band parametric EQ; LCRS, 5.1, 7.1 surround sound; onboard dynamics processing; touchscreens. Price: starts at \$145,000.  
**Contact:** DiGiCo at 44-13-7284-5600, [www.digiconsoles.com](http://www.digiconsoles.com).



## Studer Vista 7 Digital Mixing Console

**Features:** Modular design; 20 - 70 faders; 48 - 148 channels; 48 - 96 kHz; 24-bit I/O; upgradable processors; LCR, LCRS, 5.1, 6.1, 7.1 surround sound; Studer Virtual Surround Panning; Vistonic LCD screen control surfaces; motorized joysticks; rackmountable I/O. Price starts at \$250,000.  
**Contact:** Studer USA at 818-920-3212, [www.studer.ch](http://www.studer.ch).



## TL Audio M-3 Tubetracker

**Features:** Eight-channel; tube mic preamps; four-band EQ; 48V phantom power; 12AX7A/ECC83 tube signal paths; rackmountable; VU meters. Price starts at \$4,285.  
**Contact:** TL Audio/HHB Canada at 416-867-9000, [www.tludio.co.uk](http://www.tludio.co.uk).



## Fairlight DREAM Constellation

**Features:** Up to 144 channels; six-band EQ; Fairlight QDC processing engine; 7.1 surround sound; onboard dynamics; compatible with some DAW systems. Price: starts at \$110,000.  
**Contact:** Fairlight at 631-265-4499, [www.fairlightau.com](http://www.fairlightau.com).



## Solid State Logic C200 Digital Production Console

**Features:** Up to 128 channels; onboard modular DSP; HDTV-compatible; machine control functions; hot-swappable components; separate rackmounted processor; touchscreens. Price: starts at \$225,000.  
**Contact:** Solid State Logic at 212-315-1111, [www.solid-state-logic.com](http://www.solid-state-logic.com).





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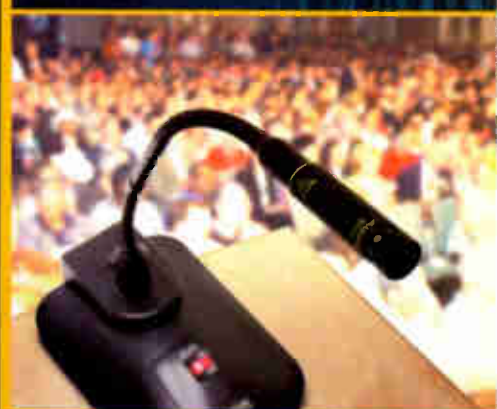
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World Radio History

# Wireless Systems

## Lectrosonics UCR411A

**Features:** UHF system; 256 frequencies; Digital Hybrid technology; SmartDiversity reception; SmartSquelch control; dual-band compander; digital pilot tone; portable machined aluminum case. Price: \$2,575.  
**Contact:** Lectrosonics at 800-821-1121, www.lectrosonics.com.



transmitters; choice of capsules for handhelds. Price: starts at \$3,119.  
**Contact:** Audio-Technica at 330-686-2600, www.audio-technica.com.

## Zaxcom Digital Stereo ENG Wireless Transmitter

**Features:** UHF system; 24-bit A/D-D/A; digital dropout compensation; encryption mode; compander; miniature bodypack transmitters; clothing noise reduction filter; battery operable. Price: \$3,595.  
**Contact:** Zaxcom at 201-652-7878, www.zaxcom.com.



## Azden 100LT

**Features:** UHF system; 63 frequencies; up to 16 channels; level control; squelch control; crystal phase lock loop; camera-mountable receiver; bodypack transmitter. Price: \$449.  
**Contact:** Azden at 516-328-7500, www.azdencorp.com.



## Audio-Technica Artist Elite 5000

**Features:** UHF system; up to 200 channels; True Diversity reception; dual compander; Tone Lock squelch; Intelliscan; handheld, bodypack transmitter packages; dynamic and condenser handheld



## Shure SLX Series

**Features:** UHF system; Audio Reference Companding technology; Auto Frequency Selection; Auto Transmitter Setup; 960 frequencies; up to 20 systems; choice of capsules — Beta 58A, Beta 87A, Beta 87C, SM58, SM86. Price: \$599.  
**Contact:** Shure Inc. at 847-866-2200, www.shure.com.



## Sabine SWM7000 Series 2.4 GHz Wireless Microphone System

**Features:** UHF system; True Diversity 2.4 GHz Smart Spectrum technology; FBX Feedback



Exterminator; compressor/limiter; de-esser; Mic SuperModeling; ships with Audix OM3 capsule; handheld or lavalier/headset bodypack transmitters. Price: starts at \$1,249.  
**Contact:** Sabine at 386-418-2000, www.sabine.com.

## CP Communications QR-2000 RX

**Features:** UHF system; 256 frequencies; QT-256 microminiature transmitter; DCS-QT companding; phase locked loop; memory. Prices: QR-2000 RX - \$2,695; QT-256 - \$1,950 (also available for rental).  
**Contact:** CP Communications at 800-762-4254, www.cpcomms.com.



## Mipro ACT-707

**Features:** UHF system; true diversity reception; up to 100 preset channels; phase locked loop;



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**Contact:** Mipro/Avlex at 877-447-9216, [www.avlex.com](http://www.avlex.com).

### Electro-Voice SCU UHF Wireless Microphone Receiver

**Features:** UHF system; compatible with EV N/DYM wireless systems; Secure-Phase diversity reception; ClearScan frequency agile; squelch control; battery operable; handheld (with capsule options), bodypack transmitter systems available

**Contact:** Electro-Voice at 800-667-3968, [www.electrovoice.com](http://www.electrovoice.com).



bodypack, plug-on and handheld transmitter packages available. Price: starts at \$767.

**Contact:** Sennheiser at 860-434-9190, [www.sennheiserusa.com](http://www.sennheiserusa.com).

### AKG WMS 4000 Wireless Microphone System

**Features:** UHF system; true diversity reception; up to 1,200 frequencies; handheld and bodypack transmitter packages; SR 4000 receiver; control software; battery recharging system. Price: starts at \$1,298.

**Contact:** AKG Acoustics at 615-620-3800, [www.akgusa.com](http://www.akgusa.com).



bodypack packages available. Price: \$799.

**Contact:** Peavey at 601-483-5365, [www.peavey.com](http://www.peavey.com).

### Nady Systems UHF-16 Wireless Microphone System

**Features:** UHF system; 16 channels; DigiTRU Diversity; twin antennae; choice of bodypack or handheld transmitters. Price: starts at \$449.

**Contact:** Nady Systems at 510-652-2411, [www.nady.com](http://www.nady.com).



### Sennheiser Evolution Wireless G2 Series

**Features:** UHF system; 1,440 frequencies; frequency scan;



### Peavey PCX U1002 Wireless Microphone System

**Features:** True diversity reception; 100 channels; Channel Control System; AutoScan; handheld and



### Sony UWPC1 Wireless Microphone Pack

**Features:** UHF system; Phase Lock Loop; space diversity reception; 188 frequencies; bodypack transmitter; lavalier mic; camera-mountable receiver.

**Contact:** Sony at 201-930-1000, [www.sony.com/proaudio](http://www.sony.com/proaudio).



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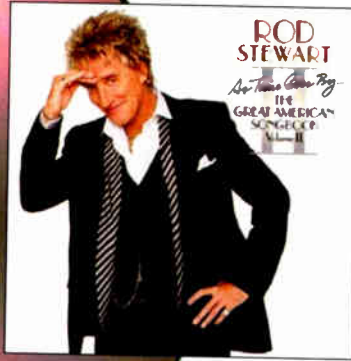
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BY CHUCK TAYLOR



**Rod Stewart with Cher**  
**"Bewitched, Bothered & Bewildered"**

**SINGLE:** "Bewitched Bothered & Bewildered," Rod Stewart with Cher

**ALBUM:** As Time Goes By... The Great American Songbook Vol. 2

**DATE RECORDED:** August 2003

**ENGINEER:** Carter William Humphrey with additional engineering by Bobby Ginsburg

**OTHER PROJECTS:** Rod Stewart: "It Had to be You: The Great American Songbook"

**SINGLE SONGWRITER:** R. Rodgers, L. Hart

**SINGLE PRODUCER:** Richard Perry

**RECORDING STUDIO:** tracked at Fox Force Five, Hollywood, mixed at Departure Entertainment, Hollywood

**MASTERING STUDIO:** The Mastering Lab, Hollywood

**MASTERING ENGINEER:** Doug Sax

**INSTRUMENTS:** drums, double bass, GTR, piano, 20 strings, harp, French horn, alto sax, two tenor saxes, two flutes

**CONSOLE:** mixed in Pro Tools, SSL 4000E for monitoring

**RECORDER:** Pro Tools|HD

**MONITORS:** Genelec 1031A, Yamaha NS-10

**MICROPHONES:** BLUE Bottle mic, Telefunken 251, Neumann M149, BLUE U47, Neumann UM57, Neumann KM 84, Shure SM57, Electro-Voice RE27,

**MICROPHONE PREAMPS:** Neve 1073, Langevin

**PROCESSORS:** UREI LA2A, TC Electronic Megaverb, Channel Strip

As Rod Stewart was completing tracks for his double-platinum *As Time Goes By - The Great American Songbook II*, associate producer Lauren Wilde decided that a cover of "Bewitched Bothered & Bewildered" would be a perfect fit for the concept album. So she and engineer Carter William Humphrey demoed a version on their own and played it for Stewart, producer Richard Perry and executive producer Clive Davis. The result: a thumbs up, with Davis' suggestion, "This needs to be a duet, and I think I can get Cher." Ultimately, the song, one of the last to make the project, became a formidable adult contemporary hit for the two chart veterans, though its creation was hardly the simplest of tasks.

Stewart was in France by the time the song was okayed, so he recorded his vocal there. Cher added her part in Los Angeles, but the two were so struck by the other's



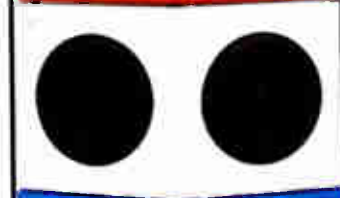
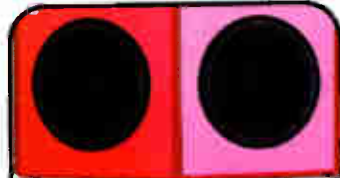
**Carter William Humphrey**

performance that they ended up rerecording their vocals twice over. "When each of them heard what the other was doing, they kept wanting to add to the song," says Humphrey. "They both have had these overtly sexual personas throughout their careers and it just kept growing more and more playful." Davis' signature for the album was that it have a robust "Fred and Ginger" sound, so in one session, live strings were added to seven of the songs in one day, including "Bewitched." Real horns were also incorporated into the original demo. "It has a broad, large ensemble sound, very big," Humphrey says, "and I was happy with the way it turned out. It's a really classic song and to have two icons like that sing it, I think we did pretty good homage to the tune. It's really one of the grandest on the album."

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



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