

PRO AUDIO REVIEW



Kelly Clarkson
Page 66

Gear & Software Reviews For The End-User

March 2006

State-of-the-Art Digital!

Aurora and TASCAM HD-P2

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PROFESSIONAL PRODUCTS



Flashy Digital Delights

BY JOHN GATSKI

Two of my favorite toys these days are the *Pro Audio Review* digital edition and the latest generation of digital Flash recorders.

First of all, I am quite pleased with the industry reception to our digital edition of *PAR* that began "e-mailing" out last August. The email-delivered, Flash-operated, digital edition of the print magazine (complete with turning pages) is the *complete magazine* with editorial ads and active links. Rich Media features are on the horizon as well. Total digital edition page views, through the Feb. issue, total nearly 3.1 million. The Feb. New Gear Guide issue garnered 500,000 page views in its first four days.

The people who view the digital edition say they like it because because it works well as an Internet-navigated version of the print magazine, and it is immediately accessible via a computer from anywhere.

Because of the digital edition, *PAR* is no longer just a U.S. magazine; we now have digital subscribers from across the world — Europe, the U.K., Middle East, Australia, China, Japan and South America. With the digital edition, they don't have to wait three months to read it. When combined with our web site visitorship, about 70,000 per month, and our 28,000 print run, *PAR* is being distributed to about 150,000 in total every month!

No matter what the access point is, however, this popularity, I believe, is rooted in just one fact; our reviews. Our real-world, end user written reviews has made *PAR* a resource the pro community trusts. For over 10 years, if the professional audio engineer wanted to know about products, they looked in *PAR*. The digital delivery mechanisms just makes it easier to access.

NOT A FLASH IN THE PAN

Now back to those digital Flash card recorders. Two of them are reviewed in this issue, the full-featured, TASCAM HD-P2 and the iPod-sized M-Audio MicroTrack. And so is the very nice Sony MZ-M100 MiniDisc recorder, which records using either the space-sav-

ing ATRAC data-reduction scheme or linear 44.1 kHz.

I am so impressed with this generation of recorders — with their ability to record high resolution at such low cost. The portable DAT recorders of the 1990s worked pretty well and sounded good, but their media fragility and the limit of 48 kHz sampling always left you with the impression that location recording could be done better. The \$400 street priced M-Audio MicroTrack sounds better than any DAT portable I have ever owned, which has been plenty.

We plan to review more of these recorders, including the Fostex, Edirol and Marantz version over the next few months, along with some expert bench tests to see how they measure up as well.

SO LONG, OLD FRIEND

I want to wish a fond farewell to my longtime friend (best man at my wedding) and coworker Alan Carter. Alan, who served as our national sales manager for the last four years and numerous other positions at IMAS Publishing, is leaving after 18 years to take some time off and travel the world. I wish him well, and I am sure I will see him frequently for our Greek pizza lunches.

John Gatski is publisher/executive editor at Pro Audio Review magazine. He has officially entered the pre-middle age demographic with his purchase of a V8 muscle car. Vrrroom-Vrrroom.

USER INPUT

PAR is looking for reader/owner comments on the following gear: BIAS Peak XT, JBL LSR 4300 monitors, Digidesign Venue console and dbx DriveRack 4800 processor.

WE WANT YOUR FEEDBACK

We want to hear from you. Send your comments to jgatski@aol.com. Please include name, city, state and job title and firm in the email. For product submissions, contact Brett Moss at bmos@imaspub.com.

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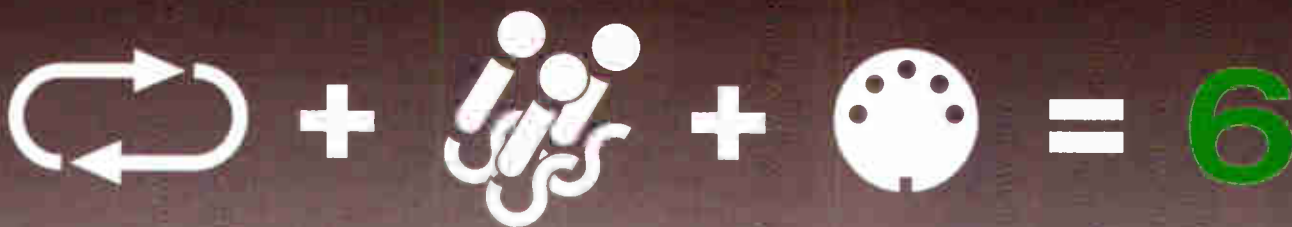
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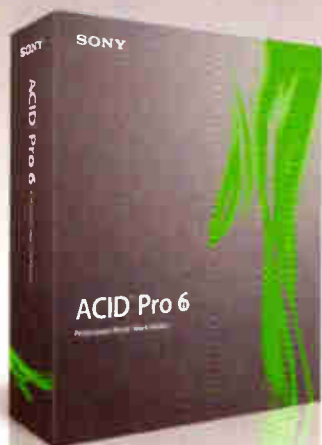
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World Radio History

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NEW PRODUCTS

Proving once again that big studios aren't dead, **Fairlight** placed four DREAM Constellation XT consoles into Manhattan's Penny Lane Studios. Fairlight also found a buyer for the first DREAM Anthem digital console in the form of Sound Studio N in Cologne, Germany.

Rupert Neve is busy these days. His **Rupert Neve Designs** sold eight Portico 5042 tape emulation processors to Infitum Productions in Chestnut Ridge, New York. He also placed 16 Portico 5032 mic preamps into the Blue Rock Studios in Texas. See picture of Rupert and Billy Crockett, owner of Blue Rock Studios.



Also of Rupert Neve and Texas, Rhapsody Street Studios, in San Antonio, bought one of the Rupert Neve-designed Masterpiece mastering processor suites. The Masterpiece is built and sold by **Legendary Audio**.

Still in Texas, Southern Methodist University in Dallas (Go, Ponies!) added a **Yamaha** Motif ES6 to its keyboard collection for its Electronic Music Program.

Engineer Michael Wagener used **Royer Labs** R-121, R-122 and SF-12 ribbon mics for the latest from Kings X, Ogre Tones. Also used were a **Euphonix** R-1 recorder, **Steinberg** Nuendo and **Randall** MTS guitar amps.

Avalon Recording in Harrisburg, Pa. is now an owner of an Audient ACS8024 console. Audient is distributed in the US by Audio Exchange International (AXI). AXI also sent a Sumo summing mixer to Tarquin Studios in Bridgeport, Ct.

SM Pro Audio PR8E Preamp

If you are in need of a multichannel preamp but just lost the home studio preamp/DAW front end money playing craps with a bandmate you might want to take a look at the very affordable SM Pro Audio PR8E. An eight-channel preamp with the usual features – 48V phantom power, 20 dB pad, phase reverse and combo jacks. Price: \$199.



Contact: SM Pro Audio/Kaysound at 514-633-8877, www.kaysound.com.

Lauten Audio Horizon Microphone



A new name to consider – Lauten Audio – and a new product – the Horizon tube microphone. Basics include a cardioid pattern, internal shockmounting for the capsule and 10 dB/20 dB pad. The tube is military grade NOS stock. The Horizon will ship with a 20-foot Gotham Audio mic cable, mount, power supply and case. Price: \$549.

Contact: Lauten Audio at 877-721-7018, www.lautenaudio.com.

Lucid GENx192 Ultra Low Jitter Master Clock

The name pretty much says it all. The Lucid GENx192 Ultra Low Jitter Master Clock is a 192 kHz-capable master studio clock. It has 14 outputs and some sync repair capabilities. Price: \$879.



Contact: Lucid Audio at 425-778-7728, www.lucidaudio.com.

Disc Makers Pico

CD and DVD duplication just gets easier and cheaper. Disc Makers Pico is an automated CD/DVD duplicator aimed at the small run do-it-yourselfer. It will output six DVDs or 12 CDs per hour. The hopper will hold 25 discs. The Pico uses a USB port to connect with a host computer for operation. Automation includes a relay mode for handling multiple jobs. Price: \$699.

Contact: Disc Makers at 866-707-0012, www.discmakers.com.



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BY JOHN GATSKI

Remote recordists have never had such high-quality, portable recording device choices for so little money. Case in point, is the new 24-bit/192 kHz sampling TASCAM HD-P2 stereo recorder, which won the PAR Excellence Award at the New York AES last October.

Following in the pedigree of the TASCAM DAP-1 portable DAT from the mid 1990s, this shockingly low-priced \$1,299 recorder offers a bevy of features that would of cost twice as much, or more five, years ago. And as our bench test measurements reveal, audio quality is pretty impressive as well.

FEATURES

Unlike the complex moving-part mechanism of DATs and CD-Rs, the HD-P2 and similar products from several companies, utilize Compact Flash memory cards as the storage devices. These recorders are, in essence, small computers dedicated to recording.

The made-in-China HD-P2, codeveloped by Frontier Designs, is compact-sized (about 9 inches wide x 7 inches deep and 2 inches tall), and only weighs 2.5 pounds without batteries and about 4 pounds with batteries.

Features are numerous including timecode chase, use of AA batteries or AC, balanced line or mic preamp input (including phantom power), 20 dB pad, low-cut filter, switchable analog limiter, FireWire port for downloading to computer and supplying enough juice to run the machine (minus phantom power), word clock sync, digital S/PDIF I/O, a very good headphone preamp, RCA in/out line jacks, a built-in mono speaker, a built-in mono micro-

Fast Facts

Applications:

Studio, location, broadcast, live sound

Key Features:

Two-track; 24-bit; 192 kHz; Compact Flash media; internal balanced mic preamp; timecode; word clock; AC/DC power

Price:

\$1,249

Contact:

TASCAM at 323-726-0303,
www.tascam.com.

TASCAM HD-P2 Digital Compact Flash Recorder



phone, and an angled, backlit view screen.

External power-wise, the HD-P2 operates on eight AA batteries — disposable or rechargeable. The AC adaptor is a transformer that is fed by an AC cord on one end and a DC cord on the other that attaches to the recorder. The HD-P2 also will run on FireWire bus power.

The black, hard-plastic square chassis design is laid out logically with most of the buttons mounted on the right side of the top. They include: the menu shuttle/data wheel, left/right channel line/mic selector switches, left and right microphone pad switches, limiter switch, phantom power switch, low-cut switch, stereo link switch for united or separate channel gain controls.

The Select switch engages the various menu functions, while the Cancel button gets you out of the current menu. The Menu button enables numerous options for set up of the recorder. The Project and Display button round out the cadre of small buttons.

The front right panel buttons include rewind, fast forward, stop and play. On the front panel next to the display are the record, pause, Retake, Timecode enable, Hold, Locate forward and back buttons, as well as the concentric Gain controls. The headphone/speaker volume control are located on the left front near the power switch.

The side panels are home to the various connectors. The HD-P2's left side houses the keyboard, FireWire port, Timecode, word clock, digital S/PDIF I/O and headphone jacks. The right side includes the balanced XLRs for mic/line input, RCA line ins/outs, and the slot for the Compact Flash card.

A sliding door on the bottom opens to the battery compartment. The unit comes with a carrying strap, AC adapter, and FireWire cable; TASCAM offers an optional leather carrying case.

The unit comes without the ultra-important Compact Flash card. I think companies ought to throw in a 1 GB card as standard get-started media, but that is just my opinion. (M-Audio supplies a — ha-ha! — 64 MB card with its 24 bit-96 kHz capable MicroTrak, but that is another story).

The Compact Flash card as audio storage is relatively new thing. They are not cheap considering the amount of space you get. A standard retail price for a 1 GB card is about a hundred bucks (about \$80 on the street). And 1 GB only gets you 14 minutes of 192 kHz sampling stereo, 28 minutes of 96 kHz and about an hour at 44.1 kHz. A 2 GB drive gets you more time, but is nearly \$200 at retail about \$150 on the street. There are 4 GB and soon-to-be available 8 GB cards, but they are pricey at this point. I say the 2 GB cards are probably the right cost/time balance.

In the HD-P2 the audio files are written as Broadcast Wave files and can be spotted to timecode in most computer workstations. You can also edit the file on the computer and drag the audio back to the card and HD-P2 for playback.

IN USE

The HD-P2 is ruggedly built, but its hard plastic construction and buttons are not quite as pro-feeling as the classic 1990s DAP-1 DAT machine — with its soft buttons and soft outer skin. Also, I noticed that the buttons on the HD-P2 rattle a bit if you shake the unit. But you can't have everything for \$1,200. Anyway, I'm nitpicking.

I delved into the unit by trying to see if I could use it without the manual. Computer-style recorders are usually more complex than a standard tape machine but I found

that once I learned that the sample rate had to be set through the project menu and not the system menu, the HD-P2 was easy to record and playback.

Here is a trip through the menu items:

The main Menu items include Project Menu, Change/New Project, System Menu, Display Menu, Media Unmount and FireWire Dock.

- Project Menu — includes Settings, Files, Markers, Trash Manager, and Save-As Project. The Settings subsection contains: Sample Rate (44.1 kHz, 48 kHz, 88.2 kHz, 96 kHz and 176.4 kHz or 192 kHz); Channels (stereo, mono left or right, mono summed), Word Length (16-bit or 24-bit); Input Source, Clock Source, Timecode Enable or Disable, Timecode Settings, Headset Monitoring, Auto Markers, Auto Append, Pre-Record, Locator Types, Meter Settings, Base Names for audio files and Markers.

The Project Menu's "Files" subsection shows the list of all active files in each project. The files are the audio tracks. The Default lists the files as "Takes." The files can be renamed via the Shuttle Wheel control and Menu option or via an optional key-

board. The Change/New File subsection allows loading of Existing Projects, Selecting the current project and Changing the Project Template Default.

- System Menu — includes setting the Real-Time Clock, Audible Alerts, Power Management, Audio Clock information, Media Management (which includes Formatting and Erasing), and Software Update.

- Timecode Settings Menu — enables use of the HD-P2 with external timecode generating equipment. The settings include Clock Source, Frame Rate, Rate Pull-Up/Down, Freewheel, Trigger Mode, Trigger On, Frame Enable, Trigger Frame, Origin, and Timecode Offset.

Besides the use of menus to complete the various functions, some functions can be done more easily via button shortcuts, which are identified in the manual.

- FireWire Dock Menu — function enables the HD-P2 to download the Project files from the Flash card drive to a computer for subsequent editing. Unfortunately, the FireWire connection does not allow the HD-P2 to record via the FireWire to an external drive. In some situations, the use of an external

drive would be quite convenient to get longer recording time without swapping cards — especially at the more space consuming, high-bit rates of 176 kHz and 192 kHz.

With all its flexibility, I found the TASCAM HD-P2 rather easy to use and I seldom had to consult the manual. Though it has numerous setting and menus, they are *continued on page 12* ▶

Product Points

Plus:

- +Compact Flash technology
- +Quality 192 kHz converters
- +Timecode capable
- +Compact
- +Full featured
- +Value

Minus:

- +No recording to external drive
- +Buttons and battery door rattle excessively

Score:

This less than a grand Flash card high-res recording marvel may be the one to get.

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► *TASCAM from page 11*
easy to navigate.

Once I set the word length and sample rate, away I went. You can record in short order, I should point out that the individual files are limited to 2 GB even if you use a bigger card. Also, you should make sure your Compact Flash cards are compatible with the unit. TASCAM has a list of compatible card on its web site. TASCAM says the Type 1 cards are the most stable. I used a San Disk 1 GB card, purchased at Best Buy.

To test the accuracy of the converters, I performed a number of recording and playback scenarios. I first copied prerecorded DVD-As SACDs via the analog balanced jacks. The source was my Esoteric DV-50 discrete SACD/192 kHz sampling PCM player. I also made my own guitar recordings with two Audix SCX-25s mics through the HD-P2's mic preamps.

I also recorded with the TASCAM using other gear including the Trident S-20 stereo preamp and a stereo Benchmark ADC-1

A/D converter.

In setup, cabling was done via Mogami or Alpha Core balanced cables and Kimber unbalanced cables. All HD-P2 A/D recordings were played through my best monitor system including Coda preamp, Bryston and Pass amps, and Legacy Focus 20/20 reference speakers.

I first listened to the recorded audio through the HD-P2's DAC. I also downloaded that recorded audio to the Mac G5 workstation via the FireWire Dock and burned new 24-bit DVD-As in DiscWelder Bronze for playback in the Esoteric. Using the Esoteric allowed me to hear how the TASCAM's A/D captured the original recording vs. the Benchmark.

In listening to my own guitar recordings audio via the TASCAM's A/D-D/A at either 24-bit/96 kHz or 192 kHz sampling, the sound was very good. In essence, room reverb nuance

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1000W/HF 500W; CONNECTIVITY: BALANCED INPUT WITH ADJUSTABLE SENSITIVITY



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Dealer Check TASCAM HD-P2

The following is a sample of dealers and pricing obtained from the Internet at the time the review was written. B-H Photo Video (www.bhphotovideo.com), \$999.99 plus free ground shipping, \$1,299 with 6 GB card; Sweetwater, \$999.97 plus free ground shipping; ZZounds, \$999.95 plus free shipping, \$6.95 for two day shipping, Guitar Center, \$999.99; Location Sound (www.locationsound.com), \$949.

and pick attack of my guitar recordings was intact, and the TASCAM DAC was smooth without PCM filter harshness.

In evaluating the A/D only, playing back via my Benchmark DAC-1 at 96 kHz and the Esoteric's high-end converter, I, again, concluded the converter has amazing performance in this \$1,000, all-in-one recorder/player.

Compared to the Benchmark ADC-1, the HD-P2 A/D was close in its reproduction of the pick attack of my Martin D18V. As you might expect from a standalone converter that sells for about \$700 more bucks than the all-in-one TASCAM, there was a difference in the tightness of the bass and the Benchmark, not unexpectedly revealed a bit more of my Audix SCX-25's presence rise than the HD-
continued on page 16 ►

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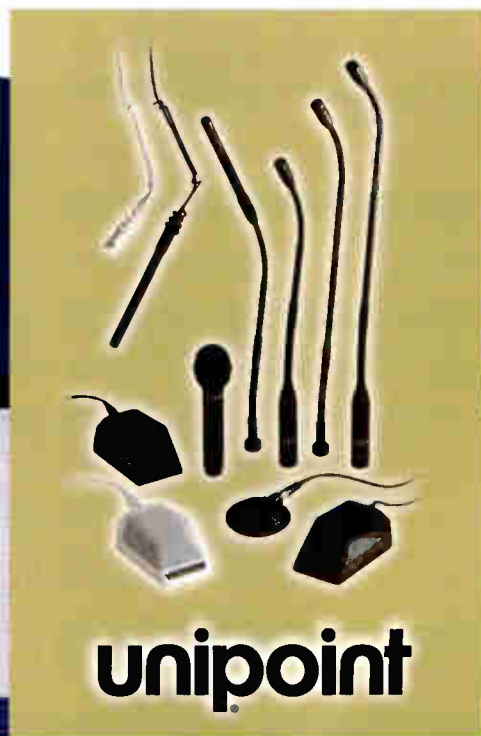
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World Radio History

TASCAM HD-P2 Linear PCM Recorder

ANALOG/ANALOG I/O

HEADPHONE OUTPUT LEVEL

At -0.1 dBFS digital level, just shy of onset of digital clipping, headphone output
 High impedance loading 2.98V, 11.7 dBu
 Both channels loaded with 50 ohm @ 1% THD+N 63.0 mW, 1.77V, 7.2 dBu

INPUT SENSITIVITY

Line level input, for digital out 0 dB FS,
 Line input volume full up,
 44.1 kHz - 192 kHz Fs 27.4 mV, -29.0 dBu
 Mic input for digital Out 0 dB FS,
 mic pad at 0 dB 4.4 mV, -44.9 dBu

INPUT IMPEDANCE

Line inputs 7.5 kilohm
 Mic inputs 1.17 kilohm

OUTPUT IMPEDANCE

Line Outputs 105 ohm

FREQUENCY RESPONSE

44.1 kHz Fs +0.0, -0.1 dB 20 Hz - 15.8 kHz
 -3.0 dB @ < 10 Hz, 22 kHz
 96 kHz Fs +0.0, -0.1 dB 20 Hz - 14.1 kHz
 -3.0 dB @ < 10 Hz, 40.9 kHz
 192 kHz Fs +0.0, -0.1 dB 20 Hz - 14.4 kHz
 -3.0 dB @ < 10 Hz, 40 kHz

TOTAL HARMONIC DISTORTION

22 kHz measurement filter
 44.1 kHz - 192kHz Fs < 0.1%, 20 Hz - 20 kHz

LINEARITY ERROR

44.1, 96 kHz Fs +/- 1 dB 0 to -95 dBFS
 < +10 dB @ -120 dBFS

SIGNAL TO NOISE RATIO

44.1 kHz Fs
 Wideband 49.2 dB
 A-weighted 84.7 dB
 22 kHz BW 96 dB

96 kHz, 192 kHz Fs

Wideband 50.6 dB
 A-weighted 88.5 dB
 22 kHz BW 96.8 dB

DYNAMIC RANGE

44.1 kHz - 192 kHz 99.6 dB

QUANTIZATION NOISE

44.1 kHz - 192 kHz Fs -94 dB FS

CHANNEL SEPARATION

44.1 kHz - 192 kHz Fs
 Ch1 > Ch2, Ch2 > Ch1 75 dB 20 Hz - 4.0 kHz
 > 65 dB @ 20.0 kHz



ANALOG/DIGITAL I/O

FREQUENCY RESPONSE

44.1 kHz Fs +0.0, -0.05 dB 20 Hz - 19.7 kHz
 -3.0 dB @ < 10 Hz, 22.1 kHz
 96 kHz Fs +0.0, -0.05 dB 20 Hz - 17.3 kHz
 -3.0 dB @ < 10 Hz, 47.6 kHz
 192 kHz Fs +0.0, -0.05 dB 20 Hz - 17 kHz
 -3.0 dB @ < 10 Hz, 71 kHz

TOTAL HARMONIC DISTORTION + NOISE

44.1 kHz Fs < 0.009% 20 Hz - 20 kHz
 96 kHz Fs < 0.011% 20 Hz - 20 kHz
 192 kHz Fs < 0.016% 20 Hz - 20 kHz

LINEARITY ERROR

44.1 kHz, 96 kHz Fs +/- 1.0 dB 0 to -105 dBFS
 < +5 dB @ -120 dBFS

SIGNAL TO NOISE RATIO

44.1 kHz Fs, Lch/Rch
 Fs/2 95.1/93.3 dB
 A-weighted 97.3/96.2 dB
 96 kHz Fs, Lch/Rch
 Fs/2 92.5/90.2 dB
 A weighted 97.4/96.9 dB
 192 kHz Fs, Lch/Rch
 Fs/2 80/78 dB
 A-weighted 97/95.4 dB

DYNAMIC RANGE

44.1 kHz - 192 kHz 97.5 dB

QUANTIZATION NOISE

44.1 kHz - 192 kHz Fs -96 dB FS

CHANNEL SEPARATION

44.1 kHz - 192 kHz Fs
 Ch1 > 2, Ch2 > 1 > 75 dB 20 Hz - 4.0 kHz
 > 65 dB @ 20 kHz

Note: Most measurements were made at 44.1 kHz, 96 kHz, and 192 kHz and with bit depth of 24 bits unless otherwise noted. The input volume controls were set for the onset of clipping for both channels for a 1V input.

TASCAM HD-P2 High Definition Audio Master Recorder

The TASCAM HD-P2 is another fascinating two-channel solid state memory recorder of the new generation of machines utilizing solid state memory for storage instead of a HDD, tape, or optical disc. This unit came with a 1 GB card installed which provides about 14.5 minutes of recording at the highest sample rate of 192 kHz and 94 minutes at 44.1 kHz.

Since the unit has analog and digital I/O, it would be possible to measure the unit in all four of the I/O modes. However, since the majority of use for the machine is likely to be analog I/O and analog in to digital out, these are the two modes that measurements were made in. To further simplify and reduce what would be an unwieldy amount of data, sample rates of 44.1 kHz, 96 kHz and 192 kHz were used along with a constant 24 bit word length. The input level control was set for an output condition just shy of visual clipping for a 1V input level. This corresponded closely to 0 dB FS at the digital output.

Frequency response for the sampling frequencies of 44.1 kHz, 96 kHz and 192 kHz are shown plotted in figure 1 for the analog I/O using the line in/out RCA jacks. As can be seen, there is a severe rolloff at the two higher sampling frequencies with the 192 kHz sample rate response being down a bit more than 20 dB at the usual band limit point of some 96 kHz for that sample rate. Most of this is in the D/A converter as the response for the digital output for the same analog input as shown in figure 2 holds up quite well at the 96 kHz Fs but still smoothly rolls off above 50 kHz at the 102 kHz Fs. One nice consequence of the nature of the HF rolloff at the 192 kHz sample rate is the great reproduction of a 10

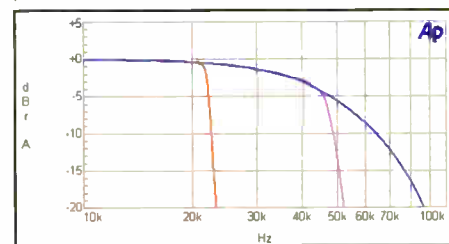


Fig. 1 Frequency response at 44.1, 96, & 192 kHz Fs. Red = 44.1 kHz, Magenta = 96 kHz, and Blue = 192 kHz. Analog output.

continued on page 16 ►

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- Universal internal power supply
- Extensive multi-mode metering
- Real knobs!

quad gate



NEW!

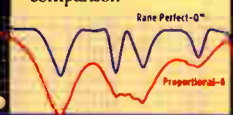
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- Separate High- and Low-Cut filters
- Stereo linking
- A/B curve comparison

Perfect-Q™ graphic



DEQ 60



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- Universal internal power supply
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Bench Test

► TASCAM from page 14

kHz square wave. It is almost ring and overshoot free as opposed to the symmetrical ringing that occurs with the usual FIR low pass response. The digital output has just a little symmetrical overshoot. Including frequencies down to 10 Hz shows a small rolloff of 0.25 dB. With a 600 ohm load, 10 Hz was down about 3.7 dB.

Total harmonic distortion plus noise in a 22 kHz measuring bandwidth as a function of signal frequency and sampling frequency was virtually identical for all sampling frequencies. A typical result is shown in **figure 3** for the analog output. Sampling frequency for the figure is 44.1 kHz. With the measurement bandwidth opened up to 80 kHz, The distortion from 20 Hz to 20 kHz was dominated by noise and measured about 0.15% for 44.1 kHz and about 0.2% for 192 kHz. Distortion vs. frequency and sampling frequency was somewhat better in the A/D mode and is shown in **figure 4** for all three sample frequencies and for the left channel.

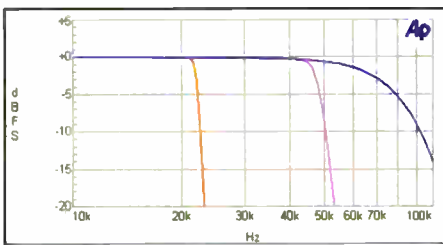


Fig. 2 Frequency response at 44.1, 48, & 96 kHz Fs. Red = 44.1 kHz, Magenta = 96 kHz, and Blue = 192 kHz. Digital output.

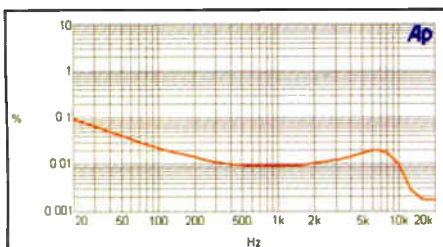


Fig. 3 Typical Total harmonic distortion plus noise as a function of signal level at 44.1 kHz Fs. Analog output.

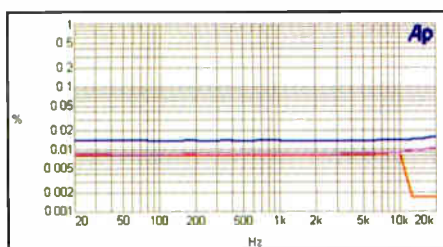


Fig. 4 Total harmonic distortion plus noise as a function of signal level at 44.1, 96, & 192 kHz Fs. Digital output. Red = 44.1, Magenta = 96, & Blue = 192 kHz Fs.

Here, the distortion at the highest sample rate is quite a bit better than in the A/A mode.

THD+N of a 1 kHz test signal as a function of level down from a few tenths of a dB below full scale is shown plotted in **figure 5** for the analog output. Results are essentially the same for all three sampling frequencies. The results for the A/D mode were virtually the same.

Deviation from linearity was essentially the same for all sampling frequencies and is shown in **figure 6** for the analog output and a sampling frequency of 44.1 kHz. For the A/D mode, the deviation from linearity was somewhat better holding down to zero to about -115 dBFS and being up about 5 dB at -120 dB Fs.

Channel separation was essentially independent of sampling frequency and direction. A plot of separation for the analog output is graphed in **figure 7**. The channel separation in the A/D mode is essentially the same.

— Bascom H. King

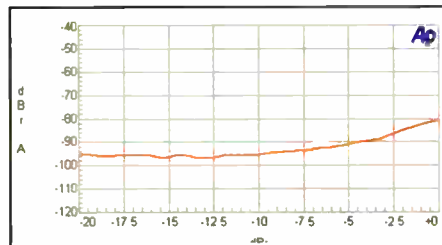


Fig. 5 Typical Total harmonic distortion plus noise vs. input level for a 1 kHz tone at 44.1 kHz Fs. Analog output.

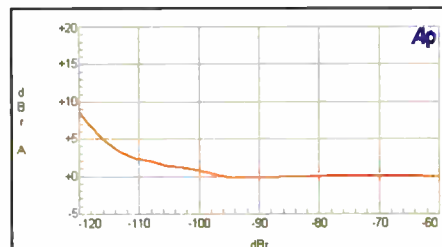


Fig. 6 Typical deviation from linearity of a 1 kHz test signal. Sampling frequency of 44.1 kHz. Analog output.

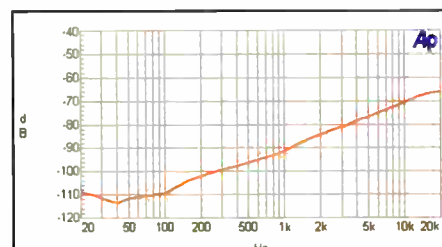


Fig. 7 Typical channel separation vs. frequency at analog output. Sampling frequency 44.1 kHz. Analog output.

► TASCAM from page 12

P2. But the TASCAM was not that far off.

All in all, though, I was very pleased with the A/D audio quality that ultimately gets downloaded to the computer. The DAC is quite good, but few folks are going to use the machine as their ultimate playback medium. The A/D is what counts here.

How are the preamps versus my separates? They sounded open and revealing with the Audix mics, but there was more image depth from the standalones, as you would expect. My audio tests also revealed that the HD-P2's has a quality sounding headphone amp that could drive most any headphone I had on hand: the new Grado SR-325s, AKG K271s, or Ultrasonics HFI-2000.

From a feature function perspective, the TASCAM HD-P2 is simply amazing. The Flash card technology enables quick, noiseless recording on seemingly reliable media. I had not one glitch in hours of recording on the same Flash card. For those location sound engineers that have timecode generating equipment, the unit is downright miraculous in its utility, considering it can be purchased for under a \$1,000.

The HD-P2 has easy-to-use Marker and Locate functions and several recording niceties such as append and prerecord that add to its versatility. The little ergonomic extras — such as the built-in microphone for quick general purpose recording to the built-in mono speaker for general monitoring and audio recording confirmation — this machine is just about complete.

As previously mentioned, my only complaint is the lack of FireWire port recording to an external drive. Hopefully, in a future model, TASCAM could offer enhanced external drive capability.

SUMMARY

Of all the Compact Flash card recorders on the market, the TASCAM HD-P2 is the most featured-filled professional unit, that can record 24-bit/192 kHz audio, available under a \$1,000. With timecode sync capability, built-in balanced mic preamplifier/line in, digital I/O, good converters, numerous record and playback functions, it is ideal for numerous uses. If it had the ability to record to an external FireWire drive, it would be perfect.

John Gatski is publisher of *Pro Audio Review*.

BY RUSS LONG

Lynx Aurora Converter

Lynx Studio Technology designs and builds professional audio products for recording studios, project studios, post production studios, home studios, and live concert settings. The Lynx Aurora provides exceptional A/D and D/A conversion, flexible routing capabilities, I/O expansion options, remote control functionality, and maximum channel capacity within a small, single rack-space chassis. There are two versions of the Aurora available, the eight-channel Aurora 8 (\$2,195) and the 16-channel Aurora 16 (\$3,295).

FEATURES

The Aurora supports 44.1 kHz, 48 kHz, 88.2 kHz, 96 kHz, 176.4 kHz and 192 kHz sample rates and it can sync to external AES/EBU signals, word clock, or expansion devices. It supports both single-wire and dual-wire AES operation (most devices support only one). The unit allows the control of parameters, clock settings, mixing/routing, and mixer scenes via remote control which is possible with a Lynx AES16, MIDI-equipped Mac or PC, or via infrared. Windows CE software allows control of Aurora via an IrDA equipped Pocket PC.

The Aurora's analog I/O can be used with balanced or unbalanced line level devices operating at a nominal trim level of +4dBu or -10dBV (switchable in banks of four channels). The analog outputs are capable of delivering +20 dBu signal levels in the +4dBu trim setting.

The Aurora incorporates Lynx's

SynchroLock technology, which provides unmatched tolerance to jitter when synchronizing to external clocks. This makes it an ideal solution for situations where noise sources are abundant, or where long cable runs are required. The SynchroLock output can also provide a clean and accurate clock for other connected audio devices.

The Aurora's front panel controls provide access to the most frequently required parameters and allows for effective, independent operation. The Sample Rate button selects sample rate when the Aurora is set to Internal for Sync Source. When the Aurora is slaving to an external clock source, the LED for the measured sample rate illuminates.

The Sync Source button selects the clock source that drives the Aurora sample clock generator. The options are Int Clock (derived from the onboard crystal oscillator), Ext Clock (applies the signal from the word clock input), Ext/2 Clock (applies the signal from the word clock input running at half the desired sample rate), AES A and AES B Clock (uses the signal from the AES I/O Port A or Port B Digital Input) or LSLot Clock signal (from an LSlot/LStream card installed into the LSLot expansion port).

The SynchroLock LED shows the status of the SynchroLock clocking system. A flashing LED indicates that the incoming clock signal is being analyzed. It typically takes one to two minutes to achieve final lock. The Aurora can be used prior to a locked state, but the jitter reduction is significantly enhanced when lock is achieved. A solid LED indicates that the clock is locked and the Aurora is ready to use. No LED signifies that SynchroLock is disabled by remote control or the source is outside of SynchroLock range and the Aurora has reverted back to the wide-range analog PLL. By coupling statistical analysis with low-noise clock generation techniques, SynchroLock is capable of attenuating jitter



on incoming AES/EBU signals by a factor of 3000:1 (compared to typical attenuations of 100:1 or less for most professional analog phase-lock loops).

The To Analog Out button selects the signal source that will be routed to the analog outputs (either Analog In, AES In, or LSLot In) and the To Digital Out button selects the signal source that will be routed to the digital outputs (again either Analog In, AES In, or LSLot In). The IR/MIDI LED illuminates to indicate activity from the MIDI input or IR transceiver.

Each channel has a peak meter that displays the instantaneous peak level of audio being sent to the Aurora analog or digital inputs. The intensity of the lower row of orange LEDs indicates signal strength. The upper row of red LEDs indicate signal level above -1 dB FS. The Meter button determines whether the peak meters display input activity for the digital or analog inputs and it also determines the behavior of the Trim/AES Mode controls. When the meter select switch is set to analog, the Trim/AES Mode button allows the nominal trim level to be set for the analog inputs and outputs to either +4dBu or -10dBV. When controlling the unit from the front panel, this setting impacts all channels of input and output together, but when controlling the unit remotely, the analog inputs and outputs can be altered in banks of four channels.

The Power button controls the standby state of the Aurora. When the front panel

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Fast Facts

Applications:

Studio, broadcast, post production, sound reinforcement

Key Features:

Eight-channel, 16-channel; 24-bit; 44.1 kHz, 48 kHz, 88.2 kHz, 96 kHz, 176.4, 192 kHz sample rates; SynchroLock technology

Price:

Aurora 8 - \$2,195, Aurora 16 - \$3,295

Contact:

Lynx Studio Technology at 949-515-8265, www.lynxstudio.com.

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► Lynx from page 18

LEDs are not lit, the Aurora is in standby mode. In this state the Aurora is not functional and is using a minimal amount of power. When the power button is pressed, front panel LEDs will illuminate indicating that the Aurora is now ready for use. To completely power down the Aurora, it must be unplugged from the AC power source.

The rear panel of the Aurora has MIDI IN and MIDI OUT connectors to provide connectivity to external equipment via

standard 5-pin din MIDI cables. When connected to a computer with an installed MIDI Interface, the Aurora firmware can be updated remotely, or the MIDI version of the remote control software can be used.

Analog input and output and AES/EBU digital I/O are provided via 25-pin D-sub connectors. The LSlot Expansion Port allows for the installation of the LSlot or LStream expansion card, used for expanding Aurora's interface options. Currently, the LT-ADAT expansion card is available to

provide ADAT lightpipe I/O. Other formats will be released in the future. Word Clock In and Out are provided via BNC connectors.

The Aurora's remote control software allows users to access operational parameters, view real-time level meters for all inputs and outputs, save scenes, and route any input to any output from a convenient, easy to use interface. To use the software, the computer must either be equipped with the Lynx AES16, a functional MIDI interface, or IrDA port. For live or remote recording situations, Lynx has developed a unique software interface allowing complete parameter control via infrared from a standard Pocket PC.

IN USE

Lynx sent me an AES16 card to interface the Aurora 8 with my DAW. It installed so easily that I actually spent more time removing my dual 2GHz Mac G5 from its shock-mount rack than I did installing the card and its drivers. The card ships from the factory with Windows firmware installed so the firmware has to be updated before it can be used on a Mac but this is a simple process that is explained very clearly in the card's documentation. The entire process took about 20 minutes and then I was ready to rock.

I spent substantial time listening to and comparing several prerecorded pieces of audio of varying sample rates, some individual tracks and some complete mixes, through the converters of the Lynx Aurora, the iZ RADAR and the Digidesign 96 I/O. I was very impressed with the sound of the Aurora. I preferred the sound of the iZ RADAR at 44.1 kHz and 48 kHz but the Aurora was the winner at every other sample rate (and that says a lot because I love the RADAR!). The Aurora has amazing high and low frequency definition and a notable sonic depth.

I put the box to work recording a high-resolution (24-bit, 192 kHz) Nuendo tracking session and it performed flawlessly. At this resolution I couldn't believe the quality of the sound reproduction. Every nuance of the recording was clear as day.

I only have a few complaints with the Aurora. The metering with the external control software is excellent but the metering on the Aurora's front panel leaves a lot to be desired. For those using the Aurora as a standalone converter more accurate metering would come in handy. I was also disappointed with the

continued on page 23 ►



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World Radio History

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BY RUSS LONG

ADAM P33A Powered Monitor

ADAM studio monitors are designed to be a no-compromise speaker intended for engineers and producers interested in the truest possible reproduction of their recordings. The first time I heard ADAM speakers was at an AES show several years ago. The thing that impressed me the most about the demonstration was that it included both good and bad sounding recording with the purpose of showing the accuracy of ADAM monitors. Unfortunately, there are several popular monitors out there that make pretty much everything sound good; perhaps a good thing for a music enthusiast but not a good thing for a producer or engineer. The ADAM monitors reveal the true sound of a recording; good recordings sound good and bad sounding recordings sound bad. This is exactly what you need when mixing an album.

FEATURES

The \$3,200/pair P33A is a three-way active bass reflex speaker and is an excellent choice for engineers and producers who want the advantages of ADAM's unique mirrored S3A design at a lower price point. Like the S3A, one woofer acts as a full-range driver while the second woofer reproduces only the frequencies below 150 Hz. This unique approach essentially doubles the area and power of the woofer when responding to lower frequencies, resulting in exceptional low-end reproduction without compromising the midrange performance.

The P33A is a shielded, triamped (with three 100W amplifiers) box that delivers exceptional dynamic performance. The P33As are designed to work either horizontal-



ly or vertically. For proper performance, the full-range woofers should be mirror images of each other. I used the speakers in several different control rooms and in most cases preferred the horizontal placement although there were a couple of scenarios where vertical placement provided better monitoring. The speaker, which has a frequency response of 34 Hz – 35 kHz, has a 7-inch (182 mm) Nomex cone woofer and an A.R.T. (Accelerated Ribbon Technology) tweeter.

The unique A.R.T. tweeter design is based on the original works of Dr. Oskar Heil, who invented the "Air Motion Transformer" in 1972. Typically, loudspeaker drive units, whether they are voice coil-driven, electrostatics, piezos or magnetostatics, act like a piston, moving air in a 1:1 ratio. The A.R.T. design incorporates a membrane consisting of a lamella-like folded diaphragm whose single folds move according to the alternate current, thus squeezing air in and out. This design achieves a 4:1 velocity transformation between the driving diaphragm and the driven air. This means the air moves in and out four times faster than the folds are moving. The A.R.T. tweeters have an above average efficiency of ~93 dB/W/m, a perfectly linear impedance of 3.2 ± 0.05 ohms, and an equally perfect phase response of ± 1 degree within the

used bandwidth.

The P33A weighs 34 pounds and is 20 inches (500mm) wide x 9 inches (230mm) high x 11 inches (280mm) deep. A green LED, mounted in the ribbon tweeter baffle, illuminates to verify that the power is on and the speakers are active. Located on the rear panel of the speaker is a power switch, a balanced female XLR input and four recessed continuous trim pots for input gain, high and low room EQ,

and an additional high-gain control. The input trim pot offers ±10 dB of boost or cut, useful for matching amp outputs and L/R alignment. The high-gain trim pot controls the overall tweeter level providing ±4 dB of gain change. Two shelving EQ controls provide ±3 dB gain change for shelving points starting at 150 Hz (low) and 6 kHz (high).

IN USE

I've been a fan of ADAM monitors since mixing a concert DVD for the band Mercy Me on a set of S3As nearly two years ago so I couldn't wait to give the P33s a listen. I set the P33As up and found them to sound great with all of the controls set to flat. I used the monitors nonstop for two weeks while tracking, overdubbing and mixing an EP for Washington D.C.-based Hotspur and I found

**The P33As provide a
noticeably wider and
deeper sweet spot than
most monitors...**

Fast Facts

- **Applications:**
Studio, project studio, broadcast, post production
- **Key Features:**
Three-way; twin 7-inch Nomex cone woofers; Accelerated Ribbon Technology tweeter; three 100W onboard amplifiers
- **Price:**
\$3,200 per pair
- **Contact:**
ADAM Audio USA at 805-413-1133, www.adam-audio.com.

them to have fabulous imaging and definition and to be some of the least fatiguing speakers that I have encountered. The sound of the tweeter is unlike any other monitors that I've heard (except for other ADAM monitors) and to some this might be described as an acquired taste.

The monitors are plenty loud for rock star playback levels when the band comes into the control room to listen down to their take and I found that there was plenty of low-end punch and oomph without the use of a sub in most control rooms.

The P33As provide a noticeably wider and deeper sweet spot than most monitors making the typically cramped sweet spot a bit more comfortable. Although the sweet spot was wider when using the monitors in the horizontal position than in the vertical position, the vertically placed monitors still had far better imaging than most studio monitors.

While the low frequency clarity of the P33As is good, it is somewhat lacking in comparison to the S3As. I hate to compare the two because the S3A is substantially more money (\$5,350 per pair) so it should sound better but that was the one thing that I missed in working with the P33As in comparison to the S3As.

SUMMARY

Anyone looking for an exceptional sounding, robust, powered closefield monitor should give the P33As an audition.

Russ Long, a Nashville-based producer/engineer, owns The Carport recording studio. He is a regular contributor to **Pro Audio Review**.

► *Lynx from page 20*
 inability to easily interface the Aurora with Pro Tools or with a laptop computer. Currently the only way the Aurora can be used with Pro Tools is via lightpipe or AES/EBU. I would like to see Lynx release a Pro Tools HD LSlot card that allows Pro Tools to view the Aurora like another 192 or 96 I/O. I would also like to see either a PCM/CIA LSlot card that allows the box to interface with a laptop via the PCM/CIA slot. [Lynx says: Lynx is currently developing several LSlot interfaces for Aurora, which will allow Aurora to be used in many popular formats. Firewire has already been announced with a 3rd quarter of 2006 introduction- Ed.].

SUMMARY

After using the Lynx Aurora for several weeks, I have no doubt that it is one of the finest sounding A/D and D/A boxes in existence today and its price tag is literally a fraction of many of its competitors. Lynx has combined rigorous component selection, custom firmware programming, and input from a seasoned engineering team to achieve a product with an amazing sound quality. The unit is the perfect solution for stereo or multichannel music production or mastering or simply as the front end for digital audio workstations, digital mixers, or modular recording devices and its price points and feature set make it a great option for anyone in need of pristine A/D and D/A conversion.

Russ Long, a Nashville-based producer/engineer, owns The Carport recording studio. He is a regular contributor to **Pro Audio Review**.

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BY TOM JUNG

Over the past few years powered speakers have made huge inroads into pro audio and one thing that is fairly common among them is the mediocre to down-right awful amplifiers they use. With today's chips, a cheap amplifier can be built with a lower cost than what it takes to build a decent passive crossover.

Active speakers can have significant advantages over their passive cousins but way too often the bean counters have the final say on design approach and dictate the use of inexpensive parts that are ultimately used in production. Because of this phenomenon higher quality monitoring usually consists of a really good passive speaker and a great standalone power amplifier that compliments the speaker it is driving.

No sooner did I find what I consider to be the "perfect power amplifier" for the standard passive SLS S8R ribbon monitor and the engineers at SLS come up with a powered version shooting my theory all-to-hell. Called the PS8R (P for powered) this new monitor has in my opinion the highest quality onboard power amplifier that I have ever heard.

THE CHAMP AMP

The Evenstar Sigma Delta amplifier design is from the ground up using a dedicated 1-bit modulator feeding a switch mode MOSFET output stage. The front end of this amplifier is very similar to a Direct Stream Digital A/D converter with its 1-bit modulator at the heart of the design.

The PS8R amplifier can deliver 270 watts RMS all day long to the woofer and 50 watts all day RMS to the ribbon with musical peaks that can more than double these numbers. I should mention that the SLS five-inch ribbon is so efficient and easy to drive that 50 watts is more than enough to part your hair.

A toroid based linear power supply provides separate filter banks and regulation for the woofer and tweeter amplifiers optimizing rail voltages for each with woofer amp rails approaching 160 volts! A well-designed power supply is where so many self-powered speakers fall way short resulting in compromised overall system performance.

The PS8R differs from the passive S8R in that it has a front port and is about an inch and a half deeper to accommodate the onboard power amplifier. A brushed aluminum front chassis houses the eight-inch woofer and five-inch ribbon tweeter along

Active or Passive SLS Ribbon Monitors: A Matter of Taste

with a set of four LEDs. The blue LED indicates power status, wherein a bright blue indicates the speaker is fully active and a dim blue indicates a standby state. The yellow LED indicates the amplifier is 3 dB below clipping while the orange LED indicates the low frequency limiter is active and the red LED indicates the protection circuit is active.

The back panel is straight ahead with a single XLR balanced input connector, unbalanced can be had by shorting pin 3 to ground. A detented level control can handle inputs ranging from -10 and up. The PS8R is equipped with a push button activated 80 Hz second order high-pass filter for use with a subwoofer. This filter integrates about as well as I have heard with the SLS PSS12 subwoofer that has a variable low-pass filter that is adjustable from 50 Hz to 100Hz. A low frequency limiter, also push button activated is designed to protect the woofer from over excursion. This is nice in a recording set up when that big door closes sending out a very low frequency wavefront heard by countless open microphones while monitoring at high levels. This limiter helps keep the woofer in the enclosure and does not seem to get in the way of the music. Nice touch.

AC power is supplied through a standard IEC connector while a rocker switch controls power on/off. The back panel runs just slightly warm drawing only 20 watts at idle while this amp design is about 90 percent efficient.

LISTENING IN

My listening set up consists of a Meitner Modified Philips SACD 1000 transport optically connected to an EMM Labs DAC8 Mk IV converter feeding an EMM Labs Switchman driving three PS8Rs (LCR). For sometime now my music reference is a jazz trio 6.0 (sixth channel is center surround) SACD by Warren Bernhard, Peter Erskine and Jay Anderson entitled *Amelia's Song*. This recording was made using only one microphone for each of the six channels, mic preamps direct to an EMM Labs A/D converter - no console, no EQ or processing. In my 40+ years of making records this is as close as I have come to capturing a live performance but it can only be realized with a hi-



resolution playback system and this set up is such a system.

Jay Anderson's acoustic bass sounds as if he was right in front of you coming out of the center speaker with incredible low-end control and bass extension without any additional boominess whatsoever. You hear detail such as the skin on Jay's finger as it leaves the string to let the note resonate. Peter Erskine's cymbals are simply the best I have ever heard live and what comes out of the left speaker is as close to live as I have ever heard. Warren Bernhard's piano, a great nine-foot Steinway, coming out of the right speaker sounds just like it does when you stand in front of it in the studio, full, rich and that unmistakable Steinway harmonic character.

By now you should be able to realize that I am totally impressed with the SLS PS8Rs and feel comfortable saying they are the finest powered monitors I have heard to date. When compared to the S8R passive monitors driven by the new Bel Canto e.One Series amplifiers (to be reviewed in a future *PAR*) I can only say that you couldn't go wrong with either, it's a matter of taste

The PS8R has a MSRP of \$1,570 each, which is a real bargain for this kind of performance.

Tom Jung is *Pro Audio Review's* Technical Consultant.

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World Radio History

BY STEPHEN MURPHY

New Zealand's Buzz Audio released its first commercial pro audio product in 1993. Owner/designer Tim Farrant's unique Class A preamp was originally inspired by an ultra low-noise moving coil pickup circuit Farrant had developed during his broadcast engineering years.

Lynn Fuston of 3D Audio was one of the first stateside engineers to extol the virtues of the hard-to-find Buzz MA preamp, which was later featured on his 3D Pre CD. Buzz Audio's handcrafted products are no longer hard to find, thanks to their well-established high-end reputation and worldwide distribution.

Last year, Buzz introduced its ARC 1.1 analog recording channel (\$3,500) featuring a discrete mic preamp similar to that found in the MA series, a top-notch parametric equalizer, an optical compressor section drafted from Buzz' popular SOC 1.1 stereo optical compressor and a FET peak limiter. Outfitted with an immense array of controls and routing options, the ARC 1.1 is truly one of the most comprehensive and flexible recording channels available.

FEATURES

The Buzz Audio ARC 1.1 is essentially comprised of four separate sections: a microphone preamp, an instrument/line-level preamp, parametric EQ, and compressor/limiter. With the wealth of I/O connec-

Buzz Audio ARC 1.1 Analog Recording Channel



tions provided, the ARC 1.1 can in fact be simultaneously used as four separate analog audio amplifiers/processors.

On the rear panel are Mic Pre In and Mic Pre Direct Out jacks (XLR), Line In and Line Loop Out jacks (XLR), and a line-level Main Out jack (XLR). A front-panel high-impedance instrument jack (TS 1/4-inch) is also provided. The Line Loop connection provides a hard-wired copy of the signal at the Line In jack for daisy chain/parallel-path purposes.

Also on the rear panel are EQ In and EQ Out jacks (XLR), and Comp In and Comp Out jacks (XLR), as well as a Sidechain Insert jack (TRS 1/4-inch) and a Compressor Link jack (TS 1/4-inch) for stereo operation of two ARC 1.1 units.

The front panel of the ARC 1.1 is logically divided into three main sections: input/output amplification, parametric equalizer, and optical compressor/FET limiter.

The mic preamp section features a Mic Gain knob (+9 to +50 dB of gain), a +15 dB gain switch, a 48V phantom power switch (with soft-start circuit) and a continuously variable 220 ohm to 5.5 k-ohm Mic Load control. The line amp input section features a Line Gain knob (0 to +40 dB of gain), -10 dB line gain switch, and a Balanced/Unbalanced toggle switch that selects between the rear panel XLR line input and the front panel 1/4-inch instrument input.

The last part of the front-panel I/O amplifier section provides the controls that pertain to the signal sent to the rear-panel Main Out XLR jack. These controls are comprised of a Mic/Line selector switch, Output Attenuation/Gain knob (providing an additional 10 dB of gain if desired), a combo normal phase/mute/reverse phase switch, and a main path/side chain path monitor switch. Also included in this sec-

tion is a Clean/Tranny switch for switching in a custom-made audio transformer into the main path for added harmonic distortion and color.

The EQ section consists of a sweepable high-pass filter, semi fixed-frequency high and low shelving filters, and two bands of fully parametric equalization. Each of the five bands features a three-position In (main path)/Ext (external rear connection)/SC (side chain path) routing toggle switch – see *In Use* for more on the ARC 1.1 routing options.

The high-pass filter attenuates at 12 dB/octave, and features a variable cut-off frequency range (3 dB down) of 25 to 450 Hz. The high shelf provides up to 17 dB of boost or cut in two modes: Broad or Tight. As its name implies, the Broad setting is a wide, gradual curve that starts at around 1 kHz and flattens out around 20 kHz. The Tight setting is a much steeper shelf that rises significantly starting around 4 kHz and flattens out around 20 kHz. The real inductor-based low shelf provides up to 17 dB of boost or cut in a fairly gentle curve at a 60 or 120 Hz turnover frequency.

The two fully parametric bands provide for up to 16 dB of boost or cut at continuously variable center frequencies of 30 Hz to 7 kHz (Band 1) and 160 Hz to 34 kHz (Band 2) at bandwidths ranging from .25 to 1.7 octaves.

The final section on the front panel includes the ARC's compressor and limiter. The optical compressor features a Drive control (AKA threshold), a four-position ratio control (2:1, 5:1, 10:1, 20:1), a three-position attack switch (slow, fast, auto), a six-position release control (1, 2, 4, 8 and 16 x 100mS, auto) and a Comp Makeup gain control (0 to +15 dB). The compressor also features a

Fast Facts

Applications:
Studio

Key Features:
Single-channel analog recording strip; Class A mic preamp with variable input impedance; parametric EQ section with high-pass filter, high and low shelves and two mid bands; optical compressor; FET peak limiter; gain reduction and output metering; transformer/transformerless output circuit.

Price:
\$3,500

Contact:
Buzz Audio at www.atlasproaudio.com (US distributor).

dedicated 12-step LED gain-reduction meter, a Pre-EQ/Post-EQ/EXT path selector switch and a Mono/Stereo link switch. The peak limiter includes a 0 to +20 dB threshold knob, a three-position release switch (Fast - 100mS, Medium - 750mS, Slow - 2000mS), a three-position routing switch (In, Out, Ext) and a Limit operational LED.

Rounding out the front-panel controls are a 12-step LED level meter plus Over LED, and a mains power switch with LED. The level meter can be switched to monitor mic or line input level in the main path (as determined by the master mic/line selector switch), the main path output level, or switched off.

IN USE

From both a design and use standpoint, this is an *engineer's* recording channel: it is designed by someone with an obvious passion for audio circuitry and all the possible options afforded at each stage in the audio path, and it is best employed by recording engineers who appreciate being trusted with such a full range of control. Despite its 18 knobs, 24 toggle switches and 12 I/O jacks, I can picture Buzz's Tim Farrant sweating over which features he would have to cut out to fit the single-channel ARC 1.1 into its 2-rack space chassis.

The first thing I did when I received the ARC 1.1 for review was to wire all its rear-panel jacks to my patch bay to maximize its routing potential. But before I get into the ARC's routing flexibility, I want to talk about how it sounds. In a word, fantastic. The preamp is extremely quiet and pure, and its 15 dB gain switch (plus additional 10 dB available at the output stage) provides plenty of gain for even the quietest sources. The continuously variable mic impedance knob always enabled an excellent match with my favorite ribbon, condenser and tube mics (as well as an odd-ball assortment of dynamics). The not-so-subtle "Tranny" transformer switch added yet another colorful dimension to the palette, and its placement before the output gain stage allowed me to drive the transformer with the input stage to varying degrees while compensating for level at the output.

The EQ and compressor sections are as thoughtful and musical as the preamp section. The EQ section's two parametric

mid bands can craft subtle or surgical changes across the entire audio spectrum, and the more limited control of the shelving and high-pass filters proved to be the perfect tools to effect quick, overall changes. The optical compressor section also yielded excellent results, most notably in its ability to intuitively track bass and vocal performances with nary a hint of pumping.

In one of the most brilliant strokes of

**The optical compressor
section also yielded
excellent results... with
nary a hint of pumping.**

circuit-design creativity, the ARC 1.1 essentially features three discreet audio paths to which individual sections (and individual EQ bands) can be routed: main, external and side chain. It is by virtue of this flexible scheme and the inclusion of dedicated I/O per section that this single unit can be used to independently amplify and process up to four separate sources. In the short space I have left, I will attempt a reasonable explanation here, but I highly recommend checking out the well-written manual found on the Buzz website (www.buzzaudio.com) for in-depth info.

The main path is for the most "normal" use of the ARC 1.1 – i.e. as an all-in-one recording strip. This path routes the mic or line source into the EQ then compressor (or compressor then EQ) sections and out through the output gain stage and meter to the main output jack. Choosing the external path sends the compressor and/or limiter output signal to the rear-panel compressor output jack, and likewise, the selected EQ bands to the rear-panel EQ output jack. Setting any or all of the EQ bands to SC puts that signal into the compressor side chain circuit, allowing frequency-dependent operation of the compressor.

In an extreme example of the ARC's flexibility, one could separately use the Buzz

mic preamp via its direct I/O, the line or instrument input (with, say, the "Tranny" option, the high-pass filter and a band of EQ plus the peak limiter) through the main path, patch another source in and out of (any or all of) the remaining bands of the EQ section, and a fourth source in and out of the optical compressor. If you really want to get crazy, you can also send one of the bands of EQ to the compressor side chain to have one instrument affecting the compression characteristic of the other! Of course you could also do that without sacrificing an EQ band by making use of the external compressor side chain insert jack.

For me, a more common simultaneous scenario was to use the mic preamp patched into the EQ input (with the HPF set to Ext.) then back out into the compressor input and out to tape, alongside a DI on the line input routed through via the main path into the EQ and peak limiter and through the main out (with 'Tranny'!) to tape.

The one omission on the ARC 1.1 – believe it or not – is its lack of individual EQ band on/off switches. In most cases, this is not a problem since bands can be taken out of circuit by simply setting them to S/C or Ext (assuming you are not using the EQ I/O). The only possible time this would be a problem would be if you have an EQ setting you want to turn on and off for A/B purposes and both the side chain and the external EQ I/O are in use.

SUMMARY

The Buzz Audio ARC 1.1 is by no means designed for dumbed-down, streamlined set-and-leave use, but neither is it unintuitive or difficult to operate.

At its most basic operational level, the user will be rewarded with an excellent-sounding preamp, musically intuitive EQ and a smooth optical compressor section – everything one could want in a top-notch recording channel. For those with a more in-depth engineering sense (or those wanting to learn), the ARC 1.1 has the uncanny ability to instill in the user some of the same passion for audio creativity that so obviously went into its design.

PAR Studio Editor Stephen Murphy has over 20 years production and engineering experience, including Grammy-winning and Gold/Platinum credits. His website is www.smurphco.com.

NEW PRODUCTS

Live at the zoo! The tour guides at the Brookfield Zoo in Chicago are using **Mipro**



MA-705PA portable wireless PA systems. See picture of Ranger Dave and his snake.

And speaking of wild animals... or rather large tenors – Luciano Pavarotti's "Farewell Tour" used **Meyer Sound** MILO, M1D speaker arrays, UPA-1P speakers, 700-HP and M3D-Sub subwoofers on the Australia and New Zealand legs. Also used were **Schoeps** mics, a **Yamaha** PM5D console, **Sennheiser** G2 in-ear monitors, **TC Electronic** System 6000 and **Lexicon** 480L processors. Sound down under was provided by Oceania Audio. Blondie's recent European tour used Meyer Sound MILO array, UPA-1P speakers and 700-HP subs.

And speaking of oldies, the Everly Brothers **XTA** DP428 digital processors on their recent Eurotour.

Shure UHF-R wireless mic systems have been seen on the recent tours of LeeAnn Rimes and the Black Eyed Peas.

Helping out Natalie Imbruglia's "Counting Down the Days" (too what?) tour are **Neumann** KK104 capsules on **Sennheiser** SKM 5000-N wireless mic transmitters. See pic of Natalie counting... er... singing.



Also with **Neumann** equipment on the road are Nickel Creek (KMS105 mics and **Sennheiser** ez 300 G2 in ear monitors) and the Los Angeles Guitar Quartet. The classical acoustic LAGQ are using KM 184 mics.

Crest Audio HP-W Console

While so many areas of audio go digital, Crest Audio continues to hold the line in the live sound analog area. The latest is the HP-W analog console. Available in 28, 36 or 44-input frames the HP-W builds on Crest's HP-Eight platform. Features include

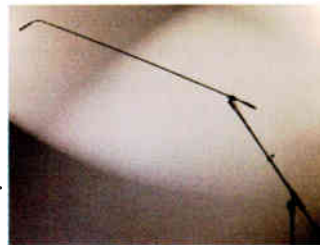


four-band semiparametric channel EQ, 48V phantom power, an 11 x 2 matrix, 100mm and 60mm faders, eight mute scenes, a talkback section and eight subgroups. Another feature is Automix, an automated priority control designed to keep off-mic and off-channel noise to a minimum.

Contact: Crest Audio at 866-812-7378, www.crestaudio.com.

Audix MicroBoom

The MicroBoom from Audix is really anything but micro. It's a 50-inch carbon fiber boom arm. Being made of carbon fiber makes the arm unusually light for its size. The MicroBoom is designed for use with Audix's Micro series mics. To wit it has a mini-XLR connector at the business end and Mogami cabling through the length, terminating in an XLR connector. Price: starts at \$549.



Contact: Audix at 800-966-8261, www.audixusa.com.

Gemini Sound GPA Series Amplifiers



Gemini Sound has a new line of amps out – the GPA series. These mid-priced amps offer power from 70W per channel @ 8 ohms from the runt of the litter (GPA-1000) to 200W per channel @ 8 ohms from the largest (GPA-4000). All units are bridgeable and will work at 4 ohms. Other features include standard protection circuitry, removable rack ears, LED meters, level controls, Speakon outputs, twin aluminum heat sinks and a front-to-rear airway for the cooling fan. All units are 2RU high and built with a steel chassis. Prices: \$259 - \$449. Contact: Gemini Sound at 732-738-9003, www.gemindj.com.

Nady U-33B Wireless Bass Guitar System

Nady's U-33B wireless system is a belt-pack transmitter UHF wireless system tuned towards use with bass guitars. The U-33B uses Enhanced Headroom technology for overall clarity and Bass Boost to add some oomph to the lower end. The system also features DigiTRU Diversity reception, compander, squelch control and a half-rack unit receiver with dual antennae. Price: \$219.



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Hear the Power of Technology

BY WILL JAMES

Not too long ago, I enjoyed telling you about a revolutionary new line array speaker system, the A-Line Acoustics AL10 system.

Absolutely knocked out by their sound quality and ease of rigging, I personally purchased sixteen of these little gems for my own sound company, and have relished every moment with them. Shortly after, I began to lament about the need for power amp racks, for all speakers in general, and began to wish for powered speakers. A-Line Acoustics has answered the call for powered speakers with their new product, the AL10A.

First, a quick overview of line array. As originally conceived, line array was (arguably) created to solve the sight line issue associated with conventional/trapezoidal speaker boxes. It was discovered by lining up like components in a straight downward line, that they would couple, and truly provide a volume and dispersion that is more than the sum of the parts, as well as fly well above the sight lines of the audience.

In conventional speakers, it is argued, that placing many cabinets next to each other, actually adds up to be less than the sum of the total, due to horn and speaker apertures creating disturbances that actually cancel out segments of the waveform. Furthermore, conventional cabinets don't necessarily align on a similar plane and center, thus creating a frequency "hole" because of the lack of frequencies being generated at the same time in to a given space. Time differential translates direct-

A-Line Acoustics AL10A Powered Line Array Speakers

ly into phase differential, or phase misalignment.

By lining up similar components (woofers, drivers) on to one plane, a "line" is created. Depending on the size of the woofers and horns/lenses and the way they see each other in the "line," depends on how much actual pattern control can be generated out of a given length "line." Also, smaller components allow for more even and gradual bends in the line. The shorter the line, the less tolerant the line is of curvature, and the longer the line the more tolerant the line is to slight bends. The bends are needed to facilitate the focus process of a line array, but when focusing a line, it is very important to keep the line as straight as possible, even in a long throw application, as the more you bend the line, the more you begin to uncouple the components and create misalignment of the components. Some of the line array purists (myself included) believe that a total bend of more than four or five degrees to a 12-foot array, will begin to unravel the alignment process, and have an adverse effect on the overall line. There are many theories about this process, but the more you experiment with line array and the more you indulge in critical listening, the more experience you will develop with these products.

FEATURES

The A-Line Acoustics AL10A (the last 'A' for active or powered) contains two 10-inch neodymium woofers and one 1.4-inch exit compression driver, all B & C. The first 10-inch woofer functions in a frequency range of 90 Hz - 500 Hz, the second woofer operating from 90 Hz - 800 Hz. The woofers are passively separated by an internal crossover which uses no solder to impede any of the signal distribution process. The transformer balanced XLR input and output allow for parallel connection of multiple AL10As or powered subs. XLR is the input connection of choice by all ICE modules in the A-Line Acoustics stable.

The actual separation of frequency bands from lows/mids to highs is achieved through



the use of the power amp module, in which the digital signal processor (DSP) is contained. The DSP sees a composite signal of full bandwidth. It then separates the frequencies above 800 Hz, and routes them to the 1.4-inch compression driver, at a slope of 24 dB per octave on the high pass side and separates the frequencies below 800 Hz to the two woofers via the internal passive crossover, at a slope of 24 dB on the low-pass side. Additionally, the DSP allows for a virtually unlimited amount of EQ presets, precision delay for driver alignment and limiting from the factory. (ICE amplifier module comes with two customizable DSP settings to tailor the enclosure for a particular setup.)

The power amplifiers are two-channel ICE modules, which deliver amazing amounts of ultraclean audio power in a relatively small package. A-Line presets all of the DSP settings prior to leaving the factory. The ICE module amp in the AL10A delivers 1,000 watts RMS to a 4 ohm load for the lows and 250 watts RMS to an 8 ohm load for the highs, both amp

continued on page 32 ➤

Fast Facts

Applications:

Live sound, sound reinforcement, installation

Key Features:

Three-way; 10-inch woofer LF driver; 10-inch woofer mid range driver; 1.4-inch exit compression HF driver; onboard amps; internal DSP; line array configuration

Price:

\$5,899

Contact:

A-Line Acoustics at 814-663-0600, www.a-lineacoustics.com.

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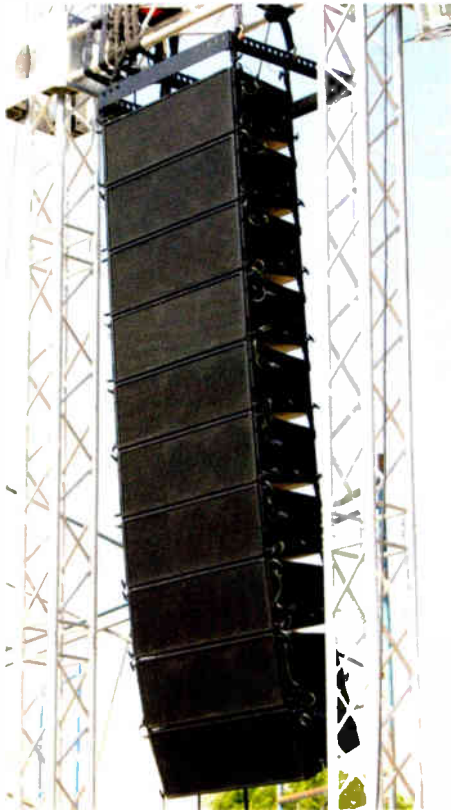
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► A-Line from page 30

channels deriving their power source from a single switching power supply. A-Line Acoustics recommends using the AL10 speaker cabinets in powered pairs, where the first cabinet houses the power amp and the second cabinet is unpowered, but slaved to the amp in the first cabinet. The result is the ideal load situation for the ICE amp, since all of the speaker devices are 16 ohms, creating a 4 ohm network in the lows and an 8 ohm network in the highs, when a second unpowered cabinet is slaved to the first.



The ICE module adds only 8 pounds to an 82-pound speaker cabinet, so the resulting weight of the AL10A is around 90 pounds, making these speakers very Genie Tower friendly when flying situations are called for, but no support structure is available. The AL10A is 36 inches wide, about a foot tall and 16 inches deep.

The accompanying steel hardware for flying and angle adjustment (EZAL™) has taken a quantum leap from an already incredible rigging system. The new cabinets now have quarter degree incremental adjustments as well as all new silk-screened angle markings. The angle adjustment hardware is an ingenious arrangement of plunger pins coupled to a fulcrum operated pitch control handle,

allowing for focus of the entire speaker line while still in the air.

IN USE

My first meeting of the A-Line Acoustics powered line array speaker was at the Country Thunder music festival in Twin Lakes, Wisc. My company contracted three stages of sound and lighting production, and we employed the A-Lines on two of those stages. The stage that I personally mixed, had six per side, or three powered pairs per side, and four A-Line powered LS218 powered subs per side. We flew the line array speakers from two Genie ST24 towers, via the smaller fly frame, which comfortably holds up to eight per side. Installation on the Genie Towers was incredibly fast and painless. We tilted the array back on two wheels of the accompanying wheel board, took the forks up about 2 feet, enough to clear the Genie outriggers, and tilted the whole line in to place with the fly frame firmly resting on the Genie forks. Final anchoring of the line was done by choking spansets around the fly frame and forks and tightening with shackles. I have suggested a possible attachment to A-Line, and they have agreed that a hitch pin slot on the fly frame will be a welcomed lockdown attachment, eliminating the need for spansets.

Angle adjustment of the AL10A system was achieved by having an assistant adjust the pin-based levers on the appropriate cabinets while I called the pitch to him by radio. The perfect focus was achieved in about three minutes total for both sides. The line is transported in four speaker increments, on A-Line's proprietary wheel board, and the time it took to move the AL10As from the truck, until they were focused, on the Genies, was about 10 minutes total. You can transport these speakers six units tall, but I recommend some good shock absorber material between the stacks to impede possible trucking damage. A-Line recommends four units to a wheel board, but when truck space is essential, they ship quite nicely in stacks of six, and are not terribly top heavy for two people to handle.

I found the sound quality of the AL10A powered speakers to be superb. The representation of the audible frequency range was clear and full. The B & C components were arranged perfectly within the cabinet, such that time alignment was perfect and I detected no audible phase/time issues. I used an analyzer several times on the system when

set up for ball park-type shows and was able to walk the entire coverage area. What I found was an extremely even coverage of frequency, with no hot spots and no dip zones. The frequency coverage was unbelievably smooth while moving parallel to the speakers at a distance of 200 feet and the mids and highs were very clear and succinct throughout the throw zone of the system. I was most impressed with the attack capability of the A-Line speakers on transient sounds like drums/percussion. The vocal presence was unmatched, as were guitars, keys and strings.

At each day of use with the powered system, we received numerous positive comments, comparing the A-Lines to many of the very well known high-end line speaker systems. Rightfully so, as the EQ required to make these speakers sound like studio speakers, was minimal. There were six to eight points on the third octave EQs, with no more than 5 dB of cut at any one frequency.

SUMMARY

As I indicated with the original A-Line system that I reviewed, I was absolutely knocked out with the sound quality of these speakers. The addition of internal ICE module power amps added no noticeable weight, but added a nice dimension of sound quality to an already incredible sounding speaker system.

A-Line Acoustics has definitely done their homework with this product, and I am told that there are several more powered products on the way... more on that in another review. The sound quality of this system, coupled with the ease of rigging and system focus, makes this the finest line array system I have ever used. If you are in the market for a line array system that is modestly priced and has these kind of characteristics, I give my highest recommendation for the A-Line Acoustics AL10A powered line array.

Will James, owner and chief engineer of Atlantis Audio and Lighting, is a contributor to Pro Audio Review.

Review Setup

Soundcraft Series Five 48-channel FOH console; Klark-Teknik DN360, dbx 2231 EQs; BSS MiniDrive speaker processor ; A-Line Acoustics LS18 powered subwoofers.

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– **David Schwartz, Essential Communications**
Sound designer for Equinox Fitness Clubs, New York

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NEW PRODUCTS

Not to be confused with the ship of a similar name but London's QEII Conference Centre has purchased six **Allen & Heath** mixers – two large GL series consoles (GL3800 and GL2400) and four smaller powered PA12-CP mixers.

See picture. Unit Sound of The Netherlands has added some GLs of their own (GL2800 and GL2400).



In Portage, Indiana Allen & Heath have installed a 48-channel ML5000 console at the Real Life Community Church. Work was done by Amtech Pro Audio. And back in London Sotheby's Institute of Art is using a GR2 zone mixer in a newly acquired building.

While we're saluting pseudo-royalty – the Maxwell C. King Center for the Performing Arts in Melbourne, Florida has added four **Lake** Contour digital speaker processors and two Lake Mesa Quad EQs.

The oldest Catholic church in North Carolina, St. Paul's in New Bern and St. Martha's Catholic Parish in Murietta, Cal. recently installed **SLS** ribbon speakers.

Stampede Park, home of the Calgary Stampede, saw a recent speaker addition – **Community** M4, R2 speakers and an R6 Basshorn subwoofer. Crown CTS amps drive the system – under the control of a Biamp Audia digital processor. At Greenbrier State Park in western Maryland 20 Community RMG200AT horn loudspeakers were installed for public areas. The system is a Rane system powered by Crown CK1600 amps. Lastly, Community recently outfitted the School of Rock in Philadelphia with iBox series speakers for live performances.

Henry Engineering Digital DA 2x8

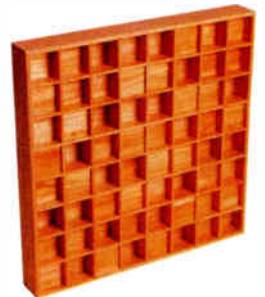
The Digital DA 2x8 from Henry Engineering is just what it advertises – a two-input/eight-output AES/EBU digital distribution amplifier. It can operate as a 1 x 8 or dual 1 x 4s. Inputs and outputs are transformer-balanced Phoenix/Euroblock connectors. The one third-rack units are rackmountable with a rack shelf adapter or wall-mountable Price: \$395.



Contact: Henry Engineering at 626-355-3656, www.henryengineering.com.

Auralex SpaceArray

It might look like a holder for nick-nacks (and could be used for that) but the SpaceArray from Auralex has a bit more ambition. Properly used it is an acoustical diffuser. Designed by Russ Berger as part of Auralex's Berger-designed pArtScience line of more affordable, yet high-end performing, acoustical treatment products, the SpaceArray is measures 24 inches by 24 inches and is made of wood. The little squares are actually random in their depth. Price: \$399.



Contact: Auralex at 317-842-2600, www.auralex.com.

Furman Sound Power Factor Pro R



Aimed at the audio industry, Furman Sound's Power Factor Pro R is a full-featured power conditioner for rectifying power inconsistencies, eliminating supply problems and smoothing power output. Rackmountable the Power Factor Pro R includes Furman's Power Factor Correction, Series Multi-Stage Protection Plus, Linear Filtering and Extreme Voltage Shutdown technologies. As a bonus it has a BNC connector designed for a gooseneck rack light. Price: \$368.

Contact: Furman Sound at 707-763-1010, www.furmansound.com.

Danley Sound Labs DTS-20 Subwoofer

In the arms race to see who can create the lowest subwoofer (at reasonable specs), newcomer Danley Sound Labs has thrown the gauntlet down with the DTS-20 subwoofer. Danley Sound Labs might be a new name but chief muckety-muck Tom Danley is familiar to many through his ground-rumbling work with Servo-Drive and SPL (Sound Performance Labs). Also called the Tower of Power, the DTS-20 claims usable performance of 18 Hz – 150 Hz. All courtesy of a 12-inch woofer (unaided by any mechanical devices). Maybe it's magic. Price: \$2,998.

Contact: Danley Sound Labs at 770-534-7620, www.danleysoundlabs.com.



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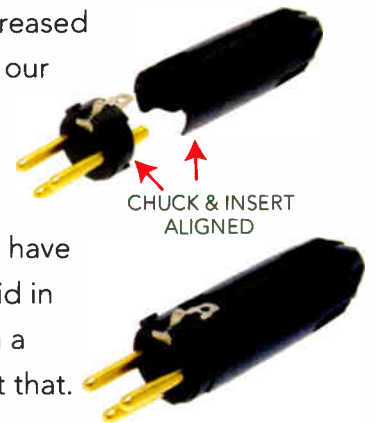
points that boost conductivity and reduce stress on the male pin. Now check out the aptly named "solder cup." It keeps the solder away from the contact, for faster, easier assembly. You can feel yourself relaxing. Your shower drain seems less clogged.

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The moral of this story? If you want a new head of hair you need a new connector. The XX series from Neutrik.



www.neutrikusa.com

BY ANDREW ROBERT

If you have been involved in sound reinforcement during the last few years, you have likely experienced the effects of radio frequency interference (RFI) from BlackBerrys or cell phones. Recently, "Nextel Noise" has even reached the upper echelons of our government. In his last term, President Bush had a speech interrupted by an abrupt noise that startled attendees, Secret Service agents and even the President himself. The culprit was purportedly a Nextel phone. While that is an extreme example, I have experienced countless episodes of noise generated by executives or musicians leaving their phones next to a mic, cable or amplifier.

Audio-Technica has recently revamped their popular UniPoint contracting mics in response to user requests for greater RFI rejection, improved sonics and placement possibilities. In my opinion, it is the mark of a great manufacturer when a company responds quickly to the needs of users. Having installed hundreds of A-T mics in schools and worship houses, I was most curious to see what improvements have come to the UniPoint line.

FEATURES

For those unfamiliar with the UniPoint line, it features an array of boundary mics, gooseneck style podium (or conference table) mics, hanging mics (for theatrical or choir applications) and a lone handheld. Within each class are a variety of choices for features like pattern, mounting style, length (goosenecks), battery or phantom power operation, and finish. Since most of these mics have been around for a while, I'll be looking principally at the improvements that have surfaced with this most recent revision.

The folks at A-T have made some significant changes to the series with more than thirty new models. Some of the improve-

Audio-Technica UniPoint Series Microphones

ments are labeled with a "Uni" preface. First is the incorporation of UniGuard—a proprietary shielding system targeted at traditionally susceptible locations in the signal chain.

Another "Unimprovement" is the incorporation of UniSteep, an 80Hz low-cut filter to reduce plosives and rumble (like when someone drops a 6-inch stack of papers on the conference table, slams the podium with a fist, or inserts a gooseneck mic into their mouth). At 18dB per octave, the filter lives up to its "steep" moniker.

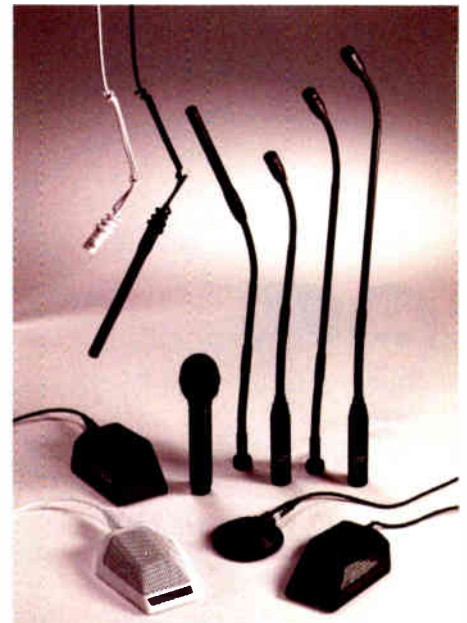
Another enhancement to the line is the addition of interchangeable elements for the gooseneck and hanging mics. Cardioid, hypercardioid and omni are now available in just seconds when a pattern issue arises. As an added feature, these elements are backwards compatible with previous generations of UniPoint mics. Speaking of goosenecks and hanging mics, A-T now has a line-cardioid model (called UniLine of course) that features a tight 90-degree pattern.

The UniPoint boundary mics now feature PivotPoint connectors. This is a rotating output connector that allows the cable to come out the back or the bottom of the mic—a sure hit for contractors who install in fancy boardrooms with pricey conference tables.

IN USE

I was delivered a sampler of the new UniPoint mics that featured something from each category in the line. There were several gooseneck mics (U857QL, U859QL and the U857AU with an adapter mount), some boundary mics (U841A omni, U851RW, and the U891RC with local or remote switching), a hanging mic (U853A), the handheld (U873R) and some accessories. I really liked the AT8662 table-mount shock absorber for the XLR goosenecks.

My first use of the UniPoint mics was during a committee meeting at the National Institutes of Health. If I've learned one thing in this line of work, it's that scientists love to set their personal communication devices right next to the microphone on the table. I used the cardioid boundary mics (U851 and U891) on the facilitators and placed the omni (U841) at a table with some guests who would be answering a few questions. One of the cool things about the 891 is that it can be wired for switch-



ing (touch on/off, momentary on, momentary off) both locally or remotely. While this meeting didn't call for it, this would be a wonderful feature for meeting participants to have a brief "off the record" conversation. It's always important to find out what's being served in the Senate cafeteria during the Armed Services Committee meetings—you just don't want the inquiry to end up on C-SPAN.

Getting back to the scientists, this day, there was no Nextel Noise to be heard. In fact, after the meeting, I took out my pesky Cingular GSM phone and laid it right on top of the 891 and there was no noise in the system. Then, in a fit of empirical science, I wired up an old, trusty Shure boundary mic and even one of my old A-T boundary models. They both picked up the GSM noise loud and clear. No control group or placebo needed here—the new UniPoint mics totally squelched cell phone noise. Also, the new high-pass filters did a fine job of reducing table thumps and I found the boundary models—especially the cardioids—to have a nice natural sonic character.

A few weeks later, I used the U857QL for a speech by Senator John Kerry. Kerry is a tall fellow but some of the others using the podium were very short. The gooseneck on the 857 was wonderful—it has great memory and it can be moved with nary a creak. With the cardioid capsule installed, the mic

continued on page 38 ►

Fast Facts

- **Applications:**
Installation
- **Key Features:**
RFI rejection; silent goosenecks; improved sonics; rotating cable exits
- **Price:**
\$195 - \$355
- **Contact:**
Audio-Technica US at 330-686-2600,
www.audio-technica.com.

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A-Line's exclusive patent-pending **EZAL™** (Easy Alignment) system saves time and risk of injury by allowing one person to position any cabinet from 0-5° while coupled and under load. It consists of integrated side-mounted high strength steel brackets with lever adjustment, four pushpins and top-mounted swivel tabs with holes for connecting cabinets. Sixteen enclosures may be attached and flown. Set on a fulcrum, the desired angle is secured by pulling out and reinserting pins on each side and positioning the metal bar over holes spaced in 1/4° increments for the first 2° and 1/2° increments from 3 - 5°. Further adjustment to 19° is possible by selecting alternate attachment holes.

Review comments

"Incredible sound via premium components...I was amazed at the clarity of sound and evenness of frequency dispersal."

"We attacked the EZAL angle adjustments, and actually focused the array-to-room in a span of only eight minutes."

"...I could not believe how much labor time we were saving..."

"The ease of transport, two stacks of five taking up less room in the truck than one level of four conventional speakers, was amazing." — Will James, Pro Audio Review, April/05

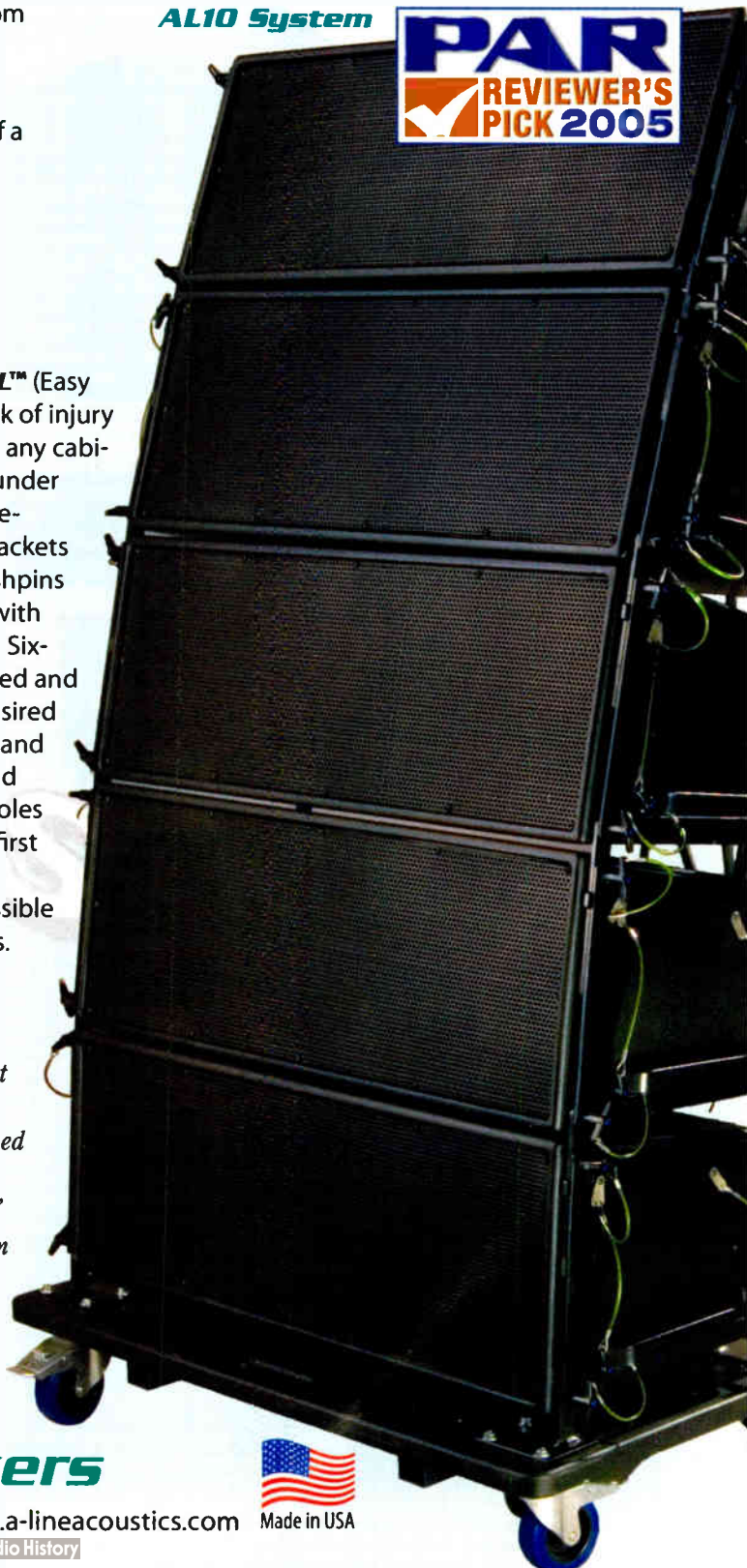
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► *Audio-Technica* from page 36 had a very nice sonic character (not as bright as some A-T podium mics I've used in the past) and it did a good job of catching off axis speech without too much room ambience.

I have used previous versions of the AT853 hanging mic for choral and theatrical applications for years. With the addition of RFI rejection,



Photo by Stuart Levy

Senator John Kerry and an Audio-Technica UniPoint microphone

tion, replaceable elements and a line-cardioid model for spot applications, these mics should continue to be industry standards.

I tried the handheld U837R and found it to have a pleasing sound with lots of detail. This mic would be a good complement to the other mics as it has a similar sound but can handle the rigors of loud singing. It would be well suited to soloists or praise singers where the choir and pastors were using UniPoint hanging and podium mics.

SUMMARY

The new Audio-Technica UniPoint mics have a leg up when it comes to reducing unwanted noise from cell phones and BlackBerrys. The shielding of these mics is very impressive. Add to that, sonic improvements and configurable cable exits and you have a great product line that should please contractors everywhere.

Andrew Roberts, a regular contributor to Pro Audio Review, is a sound reinforcement and recording engineer.

Review Setup

Spirit FX16, Midas Venice 320 consoles; JBL SRX, Turbosound TXD speakers; Rane, TC Electronic, BSS, Community processing.

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BY ANDREW ROBERTS

Rane MA4 Multichannel Amplifier



Those of you who have been reading my reviews over the years probably know that I am a Rane fan. They have quietly and consistently produced high-quality products for the pro audio market. While they have a reputation for install equipment, I have a number of their products in my live sound arsenal that I rely on steadily. At the same time, Rane has proven to be a valuable resource to our industry, providing a broad range of useful technical data in manuals and on their website. In fact, the manual for the MA4 comes with lengthy treatises on constant-voltage audio distribution systems and sound system interconnection.

Single space, multichannel amplifiers are still something of an oddity in our industry but I would suspect that Rane is one of a few companies with the capability to make this format a staple. Thus, my curiosity was piqued to examine the new MA4 (\$1,399) from our friends in Mukilteo, Washington.

FEATURES

As mentioned, the MA4 is a single rack space, four-channel amp that utilizes a switch mode power supply to provide 100 watts per channel (4 ohms or 8 ohms) output. The whole unit weighs in at eight pounds and it measures 9.25 inches deep. As is characteristic of Class D amps, the MA4 is purportedly very efficient. The universal voltage supply (85 – 260 VAC, 50 Hz or 60 Hz) is power factor corrected and has a claimed low inrush current. The MA4 has a host of valuable features like remote turn-on, load sensing, remote fault reporting and redundancy switching (where an alternative primary amp channel or secondary amplifier can be employed to automatically engage

when a fault is detected in the primary amp channel). Additional features include remote DC level control (when partnered with Rane's VR2 remote), a load dependent limiter, a soft-knee compressor, a downward expander, and a high-pass filter (20 Hz, 40 Hz, 60 Hz or 80 Hz).

The front panel of the MA4 has a four-segment headroom meter, a limit indicator, a compressor indicator, an expander indicator and indicators for ready, load and fault for each channel. While these indicators may seem rudimentary on the surface, they are actually fairly in-depth. For instance, the load indicator is off when the amp encounters loads of greater than 16 ohms, it turns on when the load is between 2 ohms and 16 ohms and it flashes when the load is below 2 ohms. The MA4's rear panel has inputs (each with a sensitivity attenuator), outputs, remote DC level ports, and external amplifier inputs (for use with internal automatic redundancy) on Euroblock connectors. There is also a bank of DIP switches to control parameters of the compressor, the expander, the high-pass filter and Master/Slave status. If all this isn't enough, consider the fact that the MA4, when used in tandem with Rane's MT4 multichannel transformer, can drive 70V or 100V distribution systems.

IN USE

As with previous Rane products I've encountered, the MA4 has a marvelous fit and finish. The chassis seems rugged and the look is very professional. At first, I tinkered with the amp in my studio and then I temporarily installed it in an exercise studio with two independent zones (each with two 8 ohm speakers). In my studio, the amp sounded clean and responded well to a variety of program material. The MA4 negotiated transients and bass-heavy content in a way that was impressive for an amp of this size. Engaging the HPF at 60 Hz or 80 Hz cleaned up some mud from a headset mic with a cardioid element but I would probably leave it set to 20 Hz or 40 Hz if the amp was being

used for playback music without subs.

In the exercise studio, the MA4 was used for CD/MP3 playback with two pairs of full-range cabinets, each pair located in a different room. Admittedly, the MA4 was not presented with any stressful program material in this simple application, so there should be no surprise that it excelled in what it was asked to do — provide four channels of good sounding audio. It was comforting to know that the internal load-dependent limiter was at the ready. At the same time, I was able to utilize some of the onboard features like the previously mentioned high-pass filter, the internal compressor (threshold is set at 10 dB below the limiter threshold and ratio and attack are fixed at 3:1 and 1.5seconds) and the expander (-70 dB FS threshold). While the MA4 tackled this application with no problems, more complex scenarios are where I think it would truly shine. This unit cries out for assignment to critical paging, home theater and multizone speech or music applications. Were I to have installed the MA4 in a critical permanent setting, I would have been very confident that, with its internal protections and internal/external automatic redundancy, it would offer many years of un-interrupted service.

SUMMARY

With an ample power-to-size ratio, distribution capability, efficient operation, internal protections, a variety of smart features and external controls, the MA4 is ripe for use in schools, restaurants, corporate offices, worship houses and even high-end residential applications. If it is anything like other Rane products I've used in the past, it should prove competent and durable. With a list price of \$1,399, it isn't a "budget" piece and it should be applied accordingly. At the same time, it would cost much more (in money and space) to equip a client with all the tools to do what the MA4 does.

Andrew Roberts, a regular contributor to *Pro Audio Review*, is a sound reinforcement and recording engineer

Fast Facts

- **Applications:**
Installation
- **Key Features:**
Four-channel; Class D; soft knee compressor; limiter; high-pass filter
- **Price:**
\$1,399
- **Contact:**
Rane at 425-355-6000,
www.rane.com.



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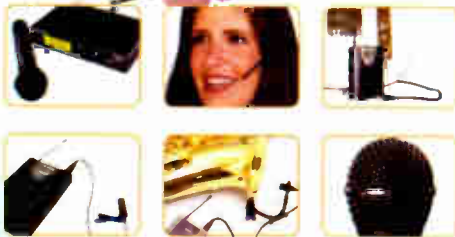
When you first use the RAD-360 UHF Wireless, you'll be tempted to see how far you can go before it actually drops out. Go ahead. Get it out of your system. It will most likely be somewhere between 500 and 1000 feet, depending on your location and line of sight.

The RAD360 is a complete solution for all of your wireless needs, whether it be Live Music, Fixed Installations, Presentations, or Houses of Worship. Handheld systems feature the OM series dynamic mics, critically acclaimed for their clarity, off-axis rejection, and ability to achieve high levels of gain before feedback without distortion. Bodypack systems feature a variety of lavalier and headset microphones, as well as instrument systems for guitar, flute, harmonica, and brass.

You can be sure of drop-out free performance whatever the venue. And best of all, the RAD-360 is simple to set up and use. You'll be up and running in minutes!

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World Radio History

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World Cafe Live, Philadelphia —

a unique multiroom club atmosphere that relies on Audix microphones

BY MEL LAMBERT

Microphones designed for live performance need to offer a combination of sonic fidelity with robustness. Unlike the controlled environment of a recording studio or post facility, these essential transducers suffer a hard life in clubs and live venues; with continuous rigging and re-rigging, knocks and scrapes, a typical microphone need to takes it all and keep on working. At World Cafe Live, one of Philadelphia's most successful venues — and which hosts of series of regular music broadcasts for WXPB-FM, an NPR affiliate based at the nearby University of Philadelphia campus — the engineering crew place great faith in a robust and reliable series of dynamic microphones and accessories bearing the Audix logo.

FIRST OPENING

First opened in 2004, World Cafe Live — an elegant multilevel supper club housed in a former factory building — showcases a spectrum of live contemporary music, serving up an eclectic blend of blues, rock, folk and alternative country. Its story starts with a coincidence. As a dedicated concertgoer, Hal Real had become increasingly disenchanted over the years with the smoky rooms, poor sight lines, inadequate acoustics and lackluster seating that have become the standard live-music experience. Meanwhile, David Dye was hosting a contemporary music program, “World Cafe,” on WXPB-FM; Dye was playing music that Real considered to be “missing in the clubs - talented artists in a nurturing environment, making music for an appreciative audience.” But, having outgrown its studios, “World Cafe” was looking for a new home. The two operations decided to join forces to form World Cafe Live, with WXPB broadcasting from the same venue that is used the remainder of the week for live shows in a sophisticated, smoke-free atmos-

phere that focuses on ambience and food almost as much as music.

The \$16 million, 44,000-square-foot facility, includes two performance areas. Downstairs Live features a three-tiered music hall with capacity for seating 300 patrons in its normal bistro configuration, 400 with auditorium-style seating and 650 for standing-room only. The stage area measures 16 by 38 feet, and has played host to such acts as former Velvet Underground member John Cale, plus Buddy Miller Phillips and Robyn Hitchcock, along with singer-songwriters Jill Sobule and Cheryl Wheeler, and newcomers Ray LaMontagne and pianist Jamie Collum. The 100-seat Upstairs Live is a showcase for local acts, most of which are presented with no cover charge; it features live radio broadcasts and performance seven days a week.



Heading up the venue's engineering department is Don “Turk” Shell, who has a wide range of experience with live sound, dating from front-of-house mixing duties with Taj Mahal and Busted Root, Ryan Adams, and culminating in a decade as head of audio for Lucinda Williams. “The ‘World Cafe’ show for WXPB-FM records some 80 percent of its shows in the station's studios [located on the

ground floor of the same building that houses World Cafe Live's performance spaces], and the remaining 20% here at our major live venue,” Turk says. “We have a 40 + 4-input Midas Legend 3000 console for front-of-house mixing, plus a CAT214 digitally controlled curved line array PA with QSC power amplification and a Lake Contour DSP processor.” A Clair Brothers 12AM stage monitor system also is available. Recent concerts include Hall & Oates, Buddy Guy, Rosanne Cash and Hanson. “It's a wide cross section of local and national acts,” the engineer says. For the majority of concerts, separate mixes for the on-stage monitors are prepared at the FOH console. “The Midas/Clair system is a wonderful combination,” Turk concedes. “It's the best sounding room in Philadelphia!”

World Cafe Live's microphone closet is a showcase for Audix models. “I've been a huge fan of their mics for seven to eight years,” Turk stresses. “My choice is always Audix if I have them available. We have OM5s, OM6s, OM7s and OM3s to cover vocals, D3s and D4s, and an i-5 — it's a killer for snare — plus a D6 on the kick drum. The D6 is the best sounding mic for kick - it makes even a mediocre drum sound good!”

BRINGING IN MICS

First produced in 1995, the Audix OM5
continued on page 44 ►

Feast your ears.



The 550b, 550A and 560 equalizers from api

www.apiaudio.com



► World Cafe Live from page 42

dynamic vocal microphone has become highly regarded by artists and engineers for its ability to produce quality sound at high SPLs without distortion or feedback. The OM5 is naturally attenuated at 120 Hz to reduce boominess and handling noise, while the mike's mid-range response has been tailored for clarity and "presence." "That mid-range boost means vocals can be heard both in the main line arrays and the stage monitors," the engineer explains. Audix VLM (Very Low Mass) capsule technology used in the OM5 results in exceptional transient response. "It's extremely tight and uniformly controlled hypercardioid pattern helps isolate vocals from other on-stage instruments," Turk offers.



The Audix OM6 is described as offering rich, full bodied vocal sound, with unmatched clarity and detail, an extended low-end response, and can handle high SPLs without distortion. The mike is known for its low handling noise, superior off-axis rejection and high durability. An extended frequency response between 2 kHz and 10 kHz allows the mike to compete with the sound of condenser models. The OM3, first introduced in 1989, is the original VLM Technology high-output vocal microphone, characterized by a hypercardioid pickup pattern and a claimed uniform frequency response from 50 Hz to 18 kHz. "It's an excellent choice for any size of stage," Turk considers. The OM3 provides a claimed off-axis feedback rejection in excess of 25 dB, and is capable of handling high levels of gain with-

out distortion. Other standout features include a dent-resistant, spring-steel grill and SPL handling in excess of 144 dBA.

The Audix i-5 features a cardioid pick-up pattern plus a quoted frequency response of 50 Hz to 15 kHz, and is a natural choice for snare, toms, percussion, guitar backline cabinets, brass and acoustic instruments. "It can handle SPLs in excess of 140 dB," Turk considers. A transformerless design, low impedance and balanced output ensure interference-free performance, even with long cable runs.

The large-element D6 is a firm favorite for kick drum, bass cabinets and other instruments requiring low-frequency coverage. The D6's frequency response has been tailored for optimum use on kick drum; the unit is highly sensitive between 80 Hz and 120 Hz, with a low-end extension well below 40 Hz, a slope in the midrange and a boost in the high frequencies. "The D6 provides plenty of bass boom while still maintaining sonic clarity and 'attack'," the engineer reflects. "Excellent results can be achieved on any size of sound system without having to reach for EQ or pad down the console sensitivity." The microphone features a one-piece body machined from a solid block of aluminum, protected after manufacture with a durable, hard-coat anodized finish.

Characterized by a hypercardioid pickup and a 40 Hz to 18 kHz frequency response, the D4 has also been designed for instruments requiring precise low-frequency reproduction. Such features as a transformer-less design, low output impedance and balanced output ensure interference-free performance with long cable runs. A dent-resistant grill and SPL capabilities in excess of 140 dBA add to the D4's robustness, along with an ability to work close to a sound source without overloading.

UTILITY USE

"The D3 and D4 are great 'utility' mikes for a wide range of instruments," Turk offers. "We use them on guitar backline, floor toms, percussion, sax and brass; they offer a full-bodied 'warmth' and an extended low end that accurately reproduces the instrument's sound." Hypercardioid patterns make the models less susceptible to feedback than comparably priced cardioid designs, while their

tight pickup pattern and high off-axis rejection ensure high gain before feedback, enabling multiple miking in tight quarters with little bleed through or feedback.

For rack and floor toms, in particular, the D3's and D4's extended LF response to 40 Hz – most comparable mikes reproduce mid-bass from 80 Hz to 120 Hz – offers "a more accurate picture of the drum, combining lower bass elements with fast attack and punch," Turk concedes. "Both mikes sound full and clear on our Clair system, without having to add EQ."

"Currently, we don't have any Audix condenser mikes here at World Cafe Live," Turk confesses, "but we are considering the VX10 model, which we know is a brilliant vocal mike. We are also looking at the Audix SCX1, which would be great to cover hi-hat, or as drum overheads." Also under consideration is an Audix RAD-360 hand-

held wireless mike and receiver. "We have used the RAD-360 a couple of times during recent concerts," the engineers recalls, "and it sounded really, really nice, with no drop-outs, and offers a very long battery life."

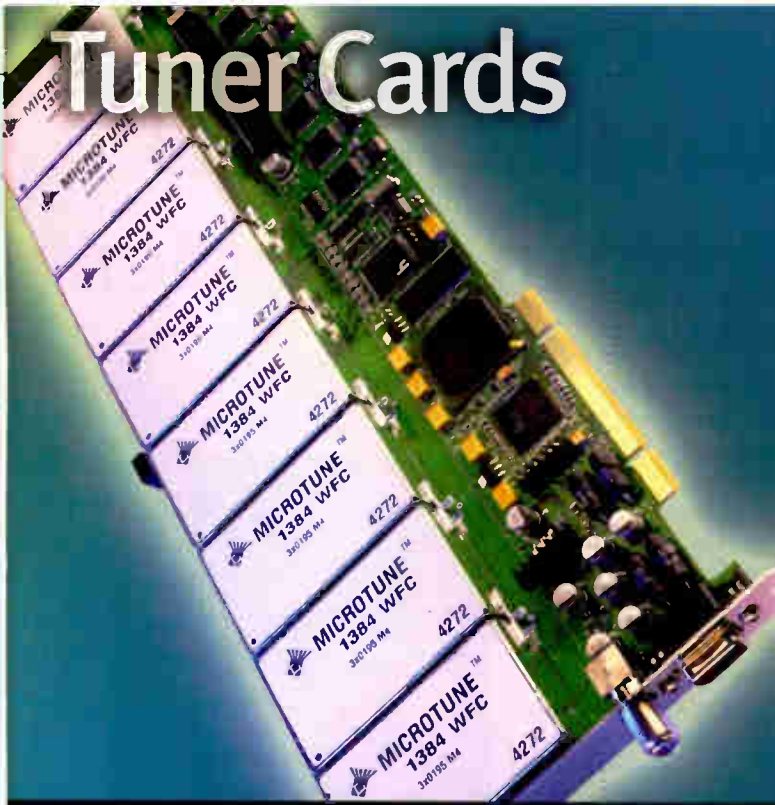
The venue also stages a series of MusicLab concerts during which leading artists present a master class in front of an audience that is videotaped for distribution to educators and schools. A recent event spotlighted Charlie Watts from The Rolling Stones; other concerts have showcased the talents of Joe Sample, Ian Anderson from Jethro Tull and ex-Doobie Brother Michael McDonald. "The MusicLab program has recently been adapted as a TV series," Turk continues, "for broadcast on HDTV."

"World Live Cafe is a wonderful sounding room – concerts in here sound fantastic, assisted in no small measure by the Audix mic collection, and the Midas-driven Clair PA system," the engineer concludes. "I wouldn't have come off the road after 20 years for just any gig. This is a first-class venue with cutting-edge technology that gets the job done night after night."

Mel Lambert has been intimately involved with production and broadcast industries on both sides of the Atlantic for more years than he cares to remember. Now principal of Media&Marketing, a Los Angeles-based consulting service for the professional audio industry, he can be reached at mel.lambert@MEDIAandMARKETING.com; 818-753-9510.



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BY DR. FREDERICK J. BASHOUR

As profiled in *Pro Audio Review's* December 2005 issue, portable digital recorders using Flash memory storage exemplify one of the hottest-growing trends in pro-audio today. Sooner or later, every engineer will choose one (or more) of them; after seeing the selection available at the AES convention last fall, I chose M-Audio's MicroTrack 24/96, and have been using it almost daily ever since. To paraphrase the disco song, it's not perfect, but it's perfect for me.

FEATURES

In a nutshell, the M-Audio MicroTrack 24/96 (\$499) is a very lightweight two-channel Compact Flash recorder about the size of a pack of cigarettes, with built-in phantom powered mic preamps, high sample rate recording via analog or digital inputs (as well as all the usual MP3 flavors), and it even comes with a decent sounding tiny T-shaped stereo mic which plugs into its 1/8-inch jack. One can also access the internal mic preamps via a pair of TRS jacks (XLRs just wouldn't fit into something this small, so you'll need to connect adapter cables — like the pair I made up — to your standard mic cables.). You can also feed the MT (as I'll refer to it from now on) directly from the S/PDIF output of your fancy, upscale analog to digital converter. Output is via analog (RCA jacks), headphones, or USB 2.0 directly to computer.

IN USE

Using this recorder is simplicity itself. After charging the internal battery (overnight is good for the first time), one just inserts a

Fast Facts

- **Applications:**
Studio, live, broadcast.
- **Key Features:**
Compact Flash format; 24-bit/96 kHz sample rate; tiny size; phantom power; includes stereo microphone configuration; USB port; battery operable
- **Price:**
\$499
- **Contact:**
M-Audio at 626-633-9050, www.m-audio.com.

M-Audio MicroTrack 24/96 Flash Recorder

CF card, turns the unit on, and presses the red record button. Well, maybe not that easy — setting a few preferences first would be a good idea, since the unit can record 16-bit or 24-bit WAV files at 44.1 kHz, 48 kHz, 88.2 kHz and 96 kHz, or MP3s at various rates between 96 kbps and 320 kbps. You also have to tell it where to get its input from — line, mic-1/8-inch, or mic via TRS connectors. And it's also a good idea to go first to the M-Audio website and download and install the latest driver. I started out at 1.02, and am now up to 1.23. If your computer doesn't take CF cards directly, you can just connect the MT itself via USB, and its memory card will show up as an external drive.

The four main menus—files, record settings, back light timing, and system, are accessed by a pushbutton on the top left side, and the submenus and their various options are dealt with by an interesting up/in/down pushbutton on the top right side. Once you get the hang of its “ballistics,” navigation becomes pretty simple and unproblematic. The Files menu allows you to see the titles of files it's recorded ('file0019.wav' for example), and play/pause/stop or delete them. This mode also lights up a nice LCD display of battery status, current file title, transport function, and the stereo level meter.

The Record Settings menu allows you to set the input source, toggle input monitor on/off, engage a 27dB digital boost on the TRS input, select file type/sample rate/bit depth choices, stereo or mono operation, and view the invaluable record time available status. While recording, the LCD display also counts down the time remaining.

The blue backlight can be set for always off, always on, or to turn off after 5 seconds, 15 seconds or 30 seconds. The System menu allows housekeeping choices such as “connect to PC,” format media, link L&R, playback EQ (a few typical choices such as one gets in applications like iTunes), toggle the verify delete warning, scrub audio, toggle auto off mode, language (English or Spanish), restore factory defaults, update the firmware (drag the files to the CF card after downloading, and push the MT navigation button a couple of times), verify firmware



version, adjust LCD contrast, set date and time stamp, etc. — the MT designers have obviously built-in just about every setup adjustment one can imagine!

For the past three months, I've made more recordings with this little gizmo than I've done with all my other stereo recorders combined over the past year. The MT is so easy to use, and sounds so good, that you just want to make recordings with it! I've done professional stereo recording sessions using vintage tube mics feeding DW Fearn and Manley tube mic preamps, those feeding Genex and Apogee converters — whose output went right into the MT's little S/PDIF RCA jack. In these situations, I used the MT “plugged in” so I didn't have to worry about battery life. It served basically as a substitute for the stereo high-sample rate DTRS tape recorder setup I've been using for many years (Sony PCM800, Spectral Translator Plus, Apogee PSX100 in ABS 2496 bit-splitting mode) which weighs about forty pounds! It sounded just as good and its recordings were way easier to transfer to my DAW.

And then, on the other hand, I've done stealth acoustic recordings of classical ensembles (University of Massachusetts Chamber Orchestra), traditional Celtic bands

(Zoe Darrow and the Fiddleheads), as well as board of directors meetings, sermons at church, my girls' music lessons, etc. — all using the little T-mic supplied with my MT — with no external anything — and they all sounded really nice. The string ensemble performance, in particular, recorded from the back row of Bezanson Recital Hall, sounds good enough to go on the radio, so I'm really impressed with this little mic, and the MT's built-in mic preamps. The mic isn't a directional stereo design; it's kind of like two little mono electret mics with capsules at 180 degrees — about 1.25 inches apart, but it definitely sounds stereo.

I've also used a hybrid of these two types of recordings — fancy external mics and mic preamps/mixer, but going directly into the TRS line inputs of the MT, and the sound was really good; the internal electronics, both digital and analog, is of high quality. The only problem was that I had to pad down the input by about 15 dB, since there was too much gain, even with the line input turned all the way down. M-Audio is aware of this problem, and will soon be shipping a set of optional inline pads for engineers who find the gain too high.

So what else's not to like? Well, the "factory replaceable" battery scares me. I don't like the idea of being without my MicroTrack for, what, a week or so? And what about engineers who need to record longer than the internal battery lasts? Mine has gone for the entire length of a 2GB CF card at 44.1 kHz/24 bits (a little over two hours) with no problem, and I've never

recorded a classical concert lasting longer than two hours in over 35 years of recording. But on the other hand, I'd have to wait a few more hours to recharge it, if I had to do another one the same day.

I have also heard that, on some occasions, trying to record on the MT while its battery is low (by simply "plugging it in") produces occasional glitches in the audio, so it appears that it's recording via the battery all the time, even when it's plugged in (via USB); the MT seems to be charging the battery at the same time it's being depleted, that's all. But for my typical uses the battery life has been adequate, and I have yet to need to have it replaced at the factory.

Otherwise, let's see. One of my Western Massachusetts engineering colleagues has trouble with a particular brand of TRS plug interfacing with the left channel TRS jack on both our MTs, but my Neutrik plugs mate reliably. Also, please be aware that the phantom power is not a full 48 volts (more like around 30 VDC), so it might not power all condenser mics fully, but I've not found any problem with the mics I've used with it. And not all Compact Flash cards (and "old fashioned" MicroDrives) work with it; be sure to check M-Audio's list of approved media before you pick up a couple of 2GB CF cards on sale at your local camera shop.

What else? Well, I wouldn't drop it if I were you. And, carrying it around in your pants pocket with the T mic plugged in all the time might put too much torque on the MT's little 1/8-inch stereo connector, so I keep trying not to do that! The other day I

shoved it in my coat pocket that way, but removed it as soon as I got into the car.

SUMMARY

Maybe I should just go out and buy a second one! I really like this recorder; I don't remember the last time I've gotten an audio gizmo I've enjoyed using this much. Highly recommended, big time!

Dr. Fred Bashour holds a Yale Ph.D. in Music Theory, and currently performs as a jazz pianist and church organist. During the past 25 years, he has received credits on hundreds of recordings released on over a dozen labels. He has also been a regular contributor to Pro Audio Review since its second issue.

Product Points

Plus:

- + Great sound
- + Records to Compact Flash cards
- + S/PDIF digital input
- + Battery power
- + Drag-and-drop file transfer

Minus:

- Internal battery is factory-replaceable only
- Input gain too high for unity-gain recording on line input.

The Score:

For the budget minded, the MicroTrack 24/96 should become the ubiquitous location recorder of choice. Bye-bye, portable DAT!

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BY TY FORD

Sony MZ-M100 MiniDisc Recorder

Just when you thought the MiniDisc was headed off into the sunset, Sony reinvents the genre with Hi-MD; most significantly, a format capable of recording 16-bit, 44.1 kHz stereo files to standard or new 1 GB MiniDiscs. Supported recording formats include Linear PCM (16-bit/44.1 kHz) and ATRACC3plus. Playback formats include Linear PCM, ATRAC3plus, ATRAC3, ATRAC and MP3 from 32 kbps to 320 kbps.

The Sony MZ-M100 (\$399) is cleverly designed as a three quarters inch thick, two inch square with minimal markings that slips into almost any pocket. Like the Sony TCD-D8 DAT machines, the M100 has a somewhat delicate feel.

FEATURES

Supplied accessories include: an AC wallwart power adapter; hard-wired remote control with group, play/pause, stop, AMS FF, FR controls and mini headphone jack; ear buds; clip-on stereo mic; USB cable; nickel metal hydride (NiMH) rechargeable battery and LR6 screw-on, external, single AA battery case. Adding the LR6 external battery lengthens record and playback times by 2 - 4 hours, depending on which mode is used.

The M100 supports recording of PCM, Hi-SP or Hi-LP. For linear PCM WAV files. That works out to be about twenty-eight minutes on a standard MiniDisc or an hour and a half on the 1 GB. Hi-SP mode gets you two hours and twenty minutes on a standard 80-minute disc and almost eight hours on a 1 GB disc. Hi-LP mode gives you about ten hours on a

standard 80-minute disc and a whopping thirty-four hours on the 1 GB Hi-MD disc. Even though the M100 won't record in MD, with a PC computer (98/Me/XP), you can record and transfer MD files to the M100.

You can also transfer non-audio data to the inserted discs as you would any hard drive. The non-audio menu directory system of the M100 can be quite complex. Up to 16 levels of directories, up to 512 files or folders can be viewed in a root directory and up to 1,024 file or folders can be viewed in each subdirectory.

Inputs and outputs are mounted along one edge; mini TRS headphone, powered mic (.13 mV minimum) and optical/analog line in (49 mV minimum) jacks and a HOLD switch. The AC adapter, USB and LR6 external battery compartment attach on another edge. Switches for opening the drive slot and battery door occupy the other two edges.

The face of the M100 is sparse with six buttons, some more multifunctional than others. The legends are written in very small type and the reflective surface of the M100 makes them difficult to read. After a while, you learn what the buttons do and don't have to squint at the labels.

IN USE

There's also a CD with applications that allow Windows and, to a lesser degree, Mac users, to transfer files to and from computers. With Windows, you can use SonicStage or MD Simple Burner software. SonicStage allows audio file transfers. Simple Burner lets you put a CD in a computer drive and "burn" it to the disc in the M100. You can also play files on the M100 across the USB connection so that the audio is heard from your PC. Finally, the USB connection will also partially charge the rechargeable battery in the M100.

Getting WAV files off the M100 and onto a Mac requires the installation of Hi-MD Wave Importer and Hi-MD Monitor software. WAV Importer for Mac works only with linear PCM files.



Plugging the M100 via USB to my Mac G5 keyboard resulted in a low power warning on the Mac. The M100 doesn't like USB hubs. It needs to be connected somewhere higher on the food chain. Plugging into the tower worked and showed up as a 12 Mbps connection. After starting up the WAV Importer application, I dragged files from its window to a folder on my desktop at a rate of about 1 MB/sec. Clicking directly on the Sony drive on my desktop showed me files, but not in a format the Mac could use. You should name file in the WAV Importer window because file numbering gets out of sync when transferring from the M100 to a Mac if default numbers aren't changed. You can name files on

Fast Facts

Applications:

Studio, broadcast, location

Key Features:

Two-track; 16-bit, 44.1 kHz; WAV files and Hi-MD formats; USB port; stores other data files

Price:

\$399

Contact:

Sony at 800-472-7669,
www.sony.com/professional.

Product Points

Plus:

- + Records stereo, 16-bit, WAV files
- + Includes mic preamp
- + Plays back MD and Hi-MD
- + Stores other data
- + Supports USB transfer

Minus:

- Small enough to lose.
- Somewhat delicate
- Navigation requires some learning

The Score:

How about 16-bit, 44.1 kHz, stereo WAV files on a MiniDisc recorder smaller than a hockey puck? Cool!

the M100, but it's not much fun.

The manual (118 pages!) is actually one of the most complete and well-written manuals I've seen. It isn't perfect. For example, the Record section doesn't tell you that you have to hold the Menu button down for about three seconds to get into the other settings. After doing so, you can scroll down and select manual record rather than AGC Record. If you stop recording and fall back to Record Ready, you'll stay in manual record. If you stop completely, you'll end up in AGC Record and have to reactivate manual mode. The AGC Record isn't the worst I've heard, but even with two mic sensitivities from which to choose you can hear the AGC.

I don't like the Sony stereo clip-on mic that comes with the M100. It was thin and noisy. What surprised me was the Rode Video Mic. It sounded quite nice. I also recorded with my Schoeps CMC 641 through a Sound Devices 442 mixer to the mini TRS input jack on the M100. No problem. (Clips are in the Articles Archive on my site www.tyford.com).

**If compression doesn't bother you,
having 34 hours of playback on
each 1GB disc is iPodly impressive.**

With a quality mic or mic/mixer, the M100 is a very useful tool for recording or playing back uncompressed, good quality speech or music. It may be the perfect thing for that art installation, business presentation, singer/songwriter moment of inspiration, nuptial ceremony, theatre cue playback or sleep program. We're talking real WAV tracks that you can combine later with studio tracks. If compression doesn't bother you, having 34 hours of playback on each 1 GB disc is iPodly impressive.

The built-in EQ for playback may be helpful when patching into some systems and there are programmable playback options too numerous to mention. Navigating the playback controls to know what cut you're actually playing tested my patience. I'm pretty sure that was mostly due to my learning curve on the buttons. The best price I saw for 1 GB Hi-MD discs was 10 for \$67 and five for \$33, plus shipping.

SUMMARY

So, now, instead of lugging a DAT machine, dedicated CD recorder or laptop to a gig, one can simply slip a recorder smaller than a can of sardines into one's pocket and go for it. Later, you can drag and drop files to your desktop and do with them what you will. True, the connections aren't balanced and you have to remember not to put the M100 in a back pocket because sitting on it would probably be destructive. Otherwise, life is good.

Ty Ford has been writing for PAR since the first issue. He can be reached at www.tyford.com.



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An advertisement for the D.W. Fearn VT-7 Vacuum Tube Compression Amplifier. The top part features a black background with the text "Anyone who has heard it knows..." in white. A yellow triangle with the word "NEW" is on the left. Below this is a photograph of the red amplifier unit, which has two analog meters and several knobs. The text "VT-7 Vacuum Tube Compression Amplifier" is written in large yellow letters. At the bottom, the D.W. Fearn logo is shown, along with the website "www.dwfearn.com", the phone number "610-793-2526", and the address "P.O. Box 57 • Pocopson, PA • 19366 • U.S.A.".

On Location



BY DAVIS WHITE

Last December's *Pro Audio Review* contained a comprehensive round-up of many new high-resolution portable recorders. Sadly, none of these ended up in my Christmas stocking. I was once again disappointed to find no hint of an affordable DSD recorder on the horizon either.

That said, do I really want a DSD recording of my latest band practice? Can I live without a 96 kHz AIFF of my scratchy quarter century old *Sandinista!* three record set? Not all music is destined/worthy to be captured in high resolution. Until recently, I was recording all of my non-crutial audio to a stand alone CD-R recorder (which only records onto increasingly impossible to find 72 minute blank "music" CD-Rs.) Then I would rip this to iTunes (although some versions had trouble with the copy code protection introduced by the recorder.) Eventually, I would have an economically-sized MP3 to keep forever. Needless to say, a lot of music was not worth all this hassle.

CUT OUT THE MIDDLE MAN

In December the Gemini iKey portable recorder was also introduced. This little white plastic box was seemingly designed to contain the minimum number of internal components to convert audio straight to MP3. There are absolutely no extras. It does not even playback or monitor. The iKey has no internal data storage — instead there is a USB connection for hooking up your own "plug & play" key-chain memory, hard drive or even an Apple iPod. Two out of three USB devices I tested mounted fine. A 4GB "hockey puck" Flash drive was the only one incompatible.

RCA jacks provide the -10 dB line level input with a small rotary trim control to fine tune the level. There is no microphone input on this version of the iKey. No frills also means no pesky copy code protection. You get to own your own music finally.

Operating the iKey is simple once you master the row of seven blinking lights. These lights are NOT an LED signal level meter (more on that later) instead they indicate the recording

format, amount of space available, overload, recording in progress, disc mounting, etc. The SEL button lets you select between three kinds of MP3s or uncompressed 16-bit, 44.1 kHz CD quality WAV. The REC button starts and stops your recording. Four AA batteries can run the unit for up to five hours. Don't worry, the sound quality comes close to consumer DAT machines and mid-priced USB converters. I copied some commercial CDs and listening tests showed little quality difference.

Probably the best iKey application is as a dedicated recorder for stereo systems. My ten-year plan to digitize my old vinyl is finally underway. Interesting late-night TV live



Gemini iKey

music performances and even *American Idol* favorites (Paris Bennett and Taylor Hicks) are just a touch away. Nothing to set-up, iKey is always there waiting. It does affect TV antenna reception a bit. Cable should be OK.

ON LOCATION: BYO USB DRIVE

In a band? All of this makes the iKey a natural to record "from the board" mixes at your live shows. Live sound guys might want to pick one up to offer this service to bands, for a hopefully "very modest" fee. Karaoke DJs could do the same, although history shows that few karaoke recordings ever get played twice.

The unit's size is a bit larger than an iPod — it will fit in your gig bag easier than lugging around a laptop for recording. The iKey feels somewhat fragile, despite few moving parts. Use it on location with care.

As much as I admire the device, simple improvements quickly come to mind. Gemini has anticipated most of my wish list with its new iKey PLUS introduced at January's NAMM show. This second generation iKey features a plug-in powered mic input, internal switchable phono preamp, and the row of blinking lights now more logically double as an LED meter. You can also monitor the input. We think and they listen — that's progress.

Another remote recording device I probably bought too soon is the Sony Hi-MD

Walkman MZ-RH910. Good word of mouth, implementing 16-bit, 44.1 kHz uncompressed WAV recording and the larger capacity 1GB blank MD is what sold me — in addition to it's very small size. I figured what more could be done with the MiniDisc format, right?

Within weeks Sony announced a much improved model, the MZ-M100 with limited Mac support for recordings in the WAV format only. Ty Ford has a full review starting back on page 48 in this issue. A few of my other gripes are still unfixed, disabling the auto record level still requires too many menus and can not be made as the default. The annoying copy protection is there too.

Still, the sound quality of these modern MDs is outstanding, even in compressed formats. I have some symphony recordings which are almost as pleasant to listen to as commercial CDs of the same piece. The sensitivity setting has allowed me to capture everything from string quartets to big arena rock concerts. Excessive room noise is usually the only flaw. For the most part, the underground music scene I frequent tolerates audience taping. I'm often asked to send grateful performers an MP3s of their set.

NOT-SO-SECRET WEAPON

Concert Tape-Heads are familiar with the amazing Core Sound "stealthy" Binaural Microphones. Getting them has really improved my location recordings. I prefer to separate the capsules in a 24-inch spaced array. I have a neat folding tripod specially made for



Core Sound Binaural Microphones (Actual Size)

this. With so much music listening done with headphones/earbuds nowadays, you might prefer the realistic binaural configuration, with the small mics alligator clipped to your glasses.

A long-lasting 9V battery box powers the condensers rather than the recorder's plug-in power. This extra connection is worth the bother as the resulting quality of the Core Sound mics with Sony MiniDisc is often thrilling.

Until an iPod comes out which also records high quality audio, my iKey and MiniDisc will get a lot of use.

Davis White has recorded albums for the *Shute, Slumberland and Dischord* labels.

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World Radio History

BY JERRY MCPHERSON

Taylor T5 Thinline Koa Custom

Taylor Guitars has been building and acoustic guitars for the last 30 years. In all that time there has not been a single electric guitar offering from Bob Taylor and company - until the T5 Thinline Five-way was introduced in 2005

The T5 started out as a just an experiment - taking a prototype bass body, adding the Expression acoustic pickup system, as well as a couple of humbucker pickups. Mr. Taylor was fired up enough to go ahead and develop a full-fledged electric guitar.

FEATURES

Available in a variety of woods and finishes, I reviewed the T5 Custom with a Koa wood top, priced at \$3,718. The electronics include an acoustic body sensor, a hidden neck humbucker, and a neck humbucker pickup.

The back and sides are made from Sapele, also known as African mahogany, and the neck is Tropical American mahogany. It sports a 21-fret, ebony fingerboard with the Taylor "Artist" inlay. The acoustic bridge contains a bone saddle. For me, this puts it in the acoustic/electric category, instead of it being a true electric guitar of the traditional mold.

The T5 is a short-scaled instrument (24 7/8-inch) that allows for easy bending on the .011 thru .049 Electric Elixir strings that it ships with. The unwound G string might be foreign feeling to players that mainly play acoustic. Taylor

does offer an optional saddle that can allow the user to string up a heavier set of acoustic strings with a wound G.

Neck width at the neck is 1 11/16 inches, which is the most common nut width for electrics. The neck joint is interesting. The T-lock Neck System is comprised of a single bolt that holds the neck and body together, instead of a traditional electric four-bolt neck system.

The body measures 16-inches wide, 20-inches long and has an overall length of 40.75-inches. The Thinline designation is the result of the 2.35-inch thickness of the body. This thin body, along with a comfort-

able neck shape, makes for an easy and inspiring playing experience.

The volume, bass and treble knobs are mounted on the top of the guitar along with a visible electric pickup near the bridge. There is a five-way switch located on the upper shoulder that lets you choose between various combinations of the body sensor and two humbucker pickups. Some of the pickup combinations are best suited for plugging into a guitar rig or amplifier, while other positions are optimized for going directly into a console or PA system.

IN USE

I tried out the T5 using a '94 Matchless DC-30. Position 1 is a blend of the neck humbucker and the body sensor. Position 2 gives you the neck humbucker pickup only with a warm, but detailed jazz tone. Position 3 is the bridge pickup only, and Position 4 is the neck and bridge pickups in parallel wiring. Position 5 is the neck and bridge pickups in series wiring.

In Position 1, you get a nice, natural acoustic sound that does not suffer from the typical piezo harshness when taken direct. Works great for finger picking or full out strumming. This is due to the blending of the humbucker pickup.

Unplugged, even with the thin profile, the premium-Koa topped T5 projects a surprising amount of volume and tone. Good for singer-songwriters who may want a nice mid, present-treble sound strumming along or fingerpicking while song-writing. It is not loud enough to gig solo, but it does project enough to mic up in the studio to blend in with the pickup system.

While none of the T5's sounds came across as a surprise (it mostly sounds like an acoustic with electric pickups), I realized that even though I own 40 or so guitars, no one guitar has all these tones. This is versa-



**This is a versatile guitar,
especially for giggers
who need a palette of
different sounds...**

tile guitar, especially for giggers who need a palette of different analog (no digital here) sounds from one guitar

CONCLUSION

If you are looking for a guitar for your professional gigs or sessions that includes a really good acoustic DI sound and a wide palette of electric tones, the T5 is definitely recommended. It probably will not replace your favorite electric, but it could very well replace your favorite live/direct acoustic - especially for stage work.

For more information, go to www.taylor-guitars.com

Jerry McPherson is a professional studio guitarist in Nashville, where he has worked with artists including The Neville Brothers, Toby Keith, Jewel, Faith Hill, Martina McBride, Johnny Van Zandt, Donna Summers, Brian McKnight, BeBe & CeCe Winans, and Reba McEntire.

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Audio Processors

Digital Domain Model DD-2 K-Stereo Processor



Features: 24-bit; 96 kHz; K-Stereo process; two shelf filters; POW-r dither; high-pass filter; low-pass filter; presets; bypass. Price: \$3,500. Contact: Digital Domain at 407-831-0233, www.digido.com.

Peavey VSX 26 Loudspeaker Processor



Features: Three inputs/six outputs; 48V phantom power; 27-band parabolic EQ; five-band parametric EQ; compressor/limiter; delay; crossover controls; onboard signal generator; USB port. Price: \$559. Contact: Peavey at 601-483-5365, www.peavey.com.

Joemeek oneQ Master Channel



Features: Single-channel preamp/EQ/opto-compressor; threshold, ratio, attack, release controls for compressor; four-band EQ; "Iron" switch; high-pass filter; S/PDIF digital output. Price: \$799. Contact: Joemeek/PMI Audio at 877-563-6335, www.joemeek.com.

Alesis MidiVerb 4



Features: 24-bit internal processing; 256 presets; 128 user preset slots; 32 algorithms; reverb, pitch, delay, flange, chorus effects. Price: \$299. Contact: Alesis at 401-658-5760, www.alesis.com.

Rane CP 64 Commercial Processor



Features: Two-zone; two gated paging inputs; four program inputs; four priority levels; mic/line pad, gain trim, threshold, zone assign, zone level controls; phantom power; level, ducking controls, limiter, seven-band EQ per zone. Price: \$849. Contact: Rane at 425-355-6000, www.rane.com.

Wheatstone Vorsis AP3 Digital Signal Processor



Features: De-esser; compressor; parametric EQ; M/S; high, low-pass filters; AGC; PC software; Ethernet; LED meters. Price: \$3,199. Contact: Wheatstone at 252-638-7000, www.wheatstone.com.

Toft Audio Designs AFC-2



Features: Two-channel preamp/EQ; four-band EQ; 48V phantom power; phase reverse; low-pass filter; 1/4-inch front panel instrument input; bypasses; VU meter. Price: \$1,299. Contact: Toft Audio Designs/PMI Audio at 877-563-6335, www.toftaudio.com.

Crest Audio IPro Two



Features: Two-channel; gain, pan controls; 48V phantom power; phase reverse; 20 dB pad; low-cut filter; two-band parametric EQ; Smartube tube emulation; compressor/expander; limiter; LED meters. Price: \$679. Contact: Crest Audio at 866-812-7378, www.crestaudio.com.

Dynacord DSP 244 Sound System Processor



Features: Crossover system processor; two inputs/four outputs; 24-bit; delay; crossover controls; compressor/limiter; 50 factory presets; 30 user preset slots; Butterworth, Linkwitz-Riley, Bessel filters. Price: \$1,599. Contact: Dynacord at 800-392-3497, www.dynacord.com.

Inter-M GEQ-2231 Digital Graphic Equalizer



Features: Two-channel; 31-band graphic EQ; high-cut, low-cut filters; peak limiter; 24-bit A/D-D/A; 64 kHz sample rate; bypass. Price: \$3,458. Contact: Inter-M Americas at 610-874-8870, www.inter-m.net.

Yamaha SPX2000 Multi-Effects Processor



Features: Two-channel; 24-bit; 96 kHz sample rate; REV-X reverb algorithm; 25 "classic" presets; 99 user presets; reverb, pitch, flange, tremolo, decay, compressor, expander, pan, exciter. Price: \$1,249. Contact: Yamaha at 714-522-9011, www.yamaha.com/proaudio.

Smart Research C2 Stereo Compressor



Features: Two-channel; threshold, ratio, attack, release, makeup controls per channel; crush frequency enhancement mode; link; side chain. Price: \$2,995. Contact: Smart Research/Sunset Sound at 323-469-1186, www.smartresearch.co.uk.

D.W. Fearn VT-7 Compression Amplifier



Features: Two-channel; threshold, attack, release, gain, curve controls; Class A; stereo link; VU meters. Price: \$4,400. Contact: D.W. Fearn at 610-793-2526, www.dwfearn.com.

Shure DFR22 Audio Processor



Features: Two-channel; 24-bit; 48 kHz sample rate; gate, expander, compressor, limiter, 10-band parametric EQ, 30-band graphic EQ; delay; high, low-pass filters; lockout function; Windows software. Price: \$999. Contact: Shure at 847-600-2000, www.shure.com.

Pendulum Audio Quartet II Mercenary Edition



Features: Single-channel; preamp/EQ/Delta-mu compressor/limiter/FET peak limiter; 48V phantom power; 20 dB pad; three-band passive inductor EQ; JFET/MOSFET modes for limiter; linkable sections; VU meter. Price: \$5,000. Contact: Pendulum Audio at 908-665-9333, www.pendulumaudio.com.

Millennia Media NSEQ-2



Features: Two-channel parametric EQ; Twin Topology tube/solid state circuitry; four-band; bypasses; Q adjustment; Class A. Price: \$3,500. Contact: Millennia Media at 530-647-0750, www.mil-media.com.

Electro-Voice Dx38 Digital Sound System Processor



Features: Two inputs, four outputs; 24-bit A/D-D/A; parametric EQ; shelving, pass filters; delay; compressor, limiter per output channel; onboard presets for EV X-Array and other speakers; RS232 port; LED meters. Price: \$1,590. Contact: Electro-Voice at 800-392-3497, www.electrovoice.com.

AMS Neve 8051 5.1 Analogue Compressor



Features: Six-channel; 5.1 surround sound; two side chains; threshold, ratio, attack, makeup gain, recovery controls; VU meters. Price: \$9,000. Contact: AMS Neve/Vintage King at 248-591-9276, www.ams-neve.com.

TL Audio Ivory 2 Series 5052



Features: Two-channel; tube preamplifier, compressor/limiter, four-band tube EQ with sweepable mids; 30 dB pad; high-pass filter; phase reverse; stereo link; bypass; VU meter; optional digital output card. Price: \$2,200. Contact: TL Audio/Independent Audio at 207-773-2424, www.independentaudio.com.

TC Electronic Reverb 4000



Features: Two-channel; 44.1 kHz – 96 kHz sample rates; 24-bit; onboard reverb parameter DSP; MIDI I/O; PCMCIA slot; USB port. Price: \$2,995. Contact: TC Electronic at 818-665-4900, www.tcelectronic.com.

Chandler Limited TG Channel MKII



Features: Single-channel; Chandler TG2 preamp/EQ; high, low EQ boost controls; mid cut controls; low-cut filter; bypass; 48V phantom power; phase reverse. Price: \$2,115. Contact: Chandler Limited at 319-885-4200, www.chandlerlimited.com.

Manley Laboratories SLAM!



Features: Two-channel; input, optical limiter; FET limiter, release, output controls; onboard mic preamps with 48V and phase reverse; linkable; VU meters; optional digital interface (\$2,500). Price: \$6,600. Contact: Manley Laboratories at 909-627-4256, www.manleylabs.com.

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GT PROFILE

Michael Wagener goes for the Glory!

WHAT HE'S DONE: Produced, recorded and mixed some of the biggest names in rock and pop, including Mötley Crüe, Dokken, Metallica, Janet Jackson, Ozzy, King's X and many more. Over 50,000,000 (!) copies of his work have been sold worldwide.

WHAT HE'S DOING: Developing and producing new bands like *Hydrogyn* and *Goldylocks*.

WHAT HE USES: Groove Tubes' ViPRE™ tube mic preamp, *Glory Comp*™ tube compressor, and all of GT's studio condenser mics.

WHAT HE SAYS: "I've been using GT gear for many years. The reason is simple: every piece from Groove Tubes offers the great sound I'm looking for. The *Glory Comp*, ViPRE and GT mics have become an essential part of my setup, on everything from guitar to bass to vocals."

Michael

More info on Michael Wagener and GT's other Friends & Relations at www.groovetubes.com

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Bombshell
The new album by Hydrogyn
now available on DARErecords.
www.hydrogyn.com



Buyer's Guide

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Electro-Harmonix NY-2A Compressor

Features: Two-channel; pre-gain, compress, post gain controls; light source switch; squash, attack switches; tubes; bypass; switchable VU meters. Price: \$3,295. Contact: Electro-Harmonix at 718-937-8300, www.ehx.com.



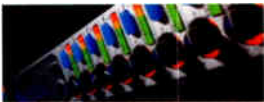
Rupert Neve Designs Portico 5042 Tape Emulator

Features: Two-channel; tape emulation circuit; saturation controls; 7.5, 15 ips modes; stereo link; LED meters. Price: \$1,795. Contact: Rupert Neve Designs at 512-847-3013, www.rupertneve.com.



Klark Teknik DN9848E Loudspeaker Multiprocessor

Features: Crossover/system processor; four inputs, eight outputs; parametric EQ; delay; compressor; limiter; Butterworth, Linkwitz-Riley, Bessel filters; memory; factory presets; security lockout. Price: \$5,250. Contact: Klark Teknik at 800-392-3497, www.klarkteknik.com.



CEDAR DNS1000 Dynamic Noise Suppressor

Features: 24-bit A/D-D/A; 40-bit internal processing; onboard DSP; 32 kHz, 44.1 kHz, 48 kHz sample rates; faders. Price: \$7,025. Contact: CEDAR Audio USA/Independent Audio at 207-773-2424, www.independentaudio.com.



Architectural Acoustics Prolinx



Features: System processor; 12 inputs/12 outputs; 96 kHz sample rate; Feedback Ferret; Kosmos processing; 48V phantom power; 96 x 36 matrix; Ethernet; USB, Memory Stick ports. Contact: Architectural Acoustics/Peavey at 601-483-5376, aa.peavey.com.

Solid State Logic XLogic X-Rack

Features: Module dock for XLogic X-Rack modules; SuperAnalogue preamp module; four-band parametric EQ with sweepable mids module; XL9000 K Series compressor/limiter/gate module. Price: starts at \$2,425. Contact: Solid State Logic at 212-315-1111, www.solid-state-logic.com.



Mercury Recording Equipment EQP1

Features: Single-channel; two-band; Pultec-style; frequency, boost, attenuate controls; transformer bypass; EQ bypass. Price: \$2,400. Contact: Mercury Recording Equipment at 510-581-3817, www.mercury-rec.com.



TC-Helicon Voice Doubler

Features: Up to four overdubs; 50 factory presets; 99 user preset slots; VoicePro technology. Price: \$1,245. Contact: TC Helicon at 818-665-4900, www.tc-helicon.com.



Eventide H7600 Ultra-Harmonizer

Features: 1,000 presets; onboard 174-second sampler; 230 stereo effects modules; editable presets; PC/Mac software; keypad; PCMCIA slot. Price: \$4,495. Contact: Eventide at 201-641-1200, www.eventide.com.



Summit Audio FeQ-50 Parametric EQ

Features: Single-channel; four-band; six frequencies per band; peak/shelf, wide/narrow switches; high-pass filter (80 Hz); tube and solid state signal paths; iron-based circuitry; bypass. Price: \$995. Contact: Summit Audio at 775-782-8838, www.summitaudio.com.



Phonic i7700 Digital EQ

Features: Two-channel; 30-band graphic EQ; 13-band parametric EQ; 24-bit A/D-D/A; 32-bit processing; onboard RTA, compressor, limiter, gate; delay; feedback suppressor; USB port. Price: \$675. Contact: Phonic America at 813-890-8872, www.phonic.com.



Omnia CD

Features: Six-band limiter; five AGC bands; 24-bit; 96 kHz sample rate; stereo effects; Ethernet; Dorrough meters; PCMCIA slots. Price: \$12,980. Contact: Omnia/Telos at 216-241-7225, www.omniaaudio.com.



M-Audio TAMPA

Features: Preamp/compressor/converter; single-channel; threshold, attack, ratio, release controls for compressor; 24-bit; up to 96 kHz sample rate; 20 dB pad; low-cut filter; VU meters. Price: \$799. Contact: M-Audio at 626-633-9050, www.m-audio.com.



Crate Audio CPL2

Features: Multiprocessor; two-channel; compressor; limiter; expander/gate; threshold, attack, ratio, release, output controls; "breath" controls. Contact: Crate Audio at 800-727-4512, www.crateaudio.com.



Groove Tubes Glory Comp

Features: Single-channel; attack, release, threshold controls; logarithmic, linear release; side chain; two 6550 tubes; switchable VU meter. Price: \$3,499. Contact: Groove Tubes at 818-361-4500, www.groovetubes.com.



Crane Song HEDD 192

Features: Two-channel; 24-bit A/D-D/A; 44.1, 48, 8.2, 96, 176.4, 192 kHz sample rates; triode, pentode, tape emulation controls; word clock; bypass; LED meter. Price: \$3,495. Contact: Crane Song at 715-398-3627, www.cranesong.com.



API 2500 Stereo Bus Compressor



Features: Threshold, attack, release, ratio controls; soft, medium, hard knee compression; compression knee type switch; makeup gain, output controls; link; VU meter. Price: \$2,650. Contact: API/ATI Group at 301-776-7879, www.apiaudio.com.

Korg TP-2

Features: Processor/preamp; two-channel; two 12AX7 tubes; optical compressor; 24-bit; up to 96 kHz sample rate; phantom power; 26 dB pad; VU meters. Price: \$699.



Contact: Korg at 516-333-9100, www.korg.com.

Drawmer 1968 Mercenary Edition



Features: Two-channel compressor; threshold, attack, release, gain controls per channel; "big" processor switch; stereo link; bypass; switchable VU meters. Price: \$2,150.

Contact: Drawmer/TransAudio Group at 702-365-5155, www.transaudiogroup.com.

Vox Valvetronix ToneLab Amp and Effect Modeler

Features: Valvetronix amp modeling; Valve reactor circuit; 16 amp models; 10 cabinet models; 22 digital effects; 48 presets; 48 user presets; three-band EQ; presence control; 12AX7 tube. Price: \$600.



Contact: Vox Amplification at 516-333-9100, www.voxamps.co.uk.

XTA SIDD



Features: Two-input, four-output; 24-bit A/D; EQ, delay, compressor, gate, limiter, expander; AudioCore software; high, low-pass filters; PCMCIA card slot; LED meters; optional transformer balanced inputs, outputs; optional AES/EBU I/O. Price: \$2,795.

Contact: XTA/Group One at 516-249-1399, www.xta.co.uk.

Lexicon MX200 Dual Reverb Effects Processor



Features: Two-channel; 24-bit; 44.1 kHz/48 kHz sample rates; Lexicon reverb, dbx dynamics, delay, effects; VST plug-in mode; USB port; 99 factory presets; 99 user memories. Price: \$249. Contact: Lexicon at 801-568-7567, www.lexiconpro.com.

dbx 4800 Drive Rack Loudspeaker Management System



Features: Four input channels; eight output channels; 48 kHz, 96 kHz sample rates; crossover controls; 31-band graphic EQ; six-band parametric EQ; notch filters; cluster/driver alignment; delay; real time analyzer; limiter; Ethernet; LCD screen; LED meters; Windows remote software. Price: \$3,995.

Contact: dbx at 801-568-7660, www.dbxpro.com.

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innerTUBE Audio Dual Atomic Squeeze Box

Features: Two-channel compressor; input, squeeze, attack, release, slope, gain controls per channel; four 12 SL7 tubes, four 12SN7 tubes; switchable VU meter. Price: \$6,750.

Contact: innerTUBE Audio at 805-688-8286, www.innertubeaudio.com.

Daking FET Compressor II

Features: Single-channel; threshold, attack, release, makeup gain controls; vintage compressor settings; Class A; bypass; switchable VU meter. Price: \$1,995.

Contact: Daking/TransAudio Group at 702-365-5155, www.transaudiogroup.com.

Z-Systems Z-Qualizer

Features: Two-channel; six-band parametric EQ; 24-bit; up to 192 kHz sample rate; POW-r word length reduction; M/S. Price: \$1,380.

Contact: Z-Systems/TransAudio Group at 702-365-5155, www.transaudiogroup.com.

TOA Electronics DP-0206 Digital Signal Processor

Features: Two inputs, six outputs; 24-bit A/D; shelving, pass filters; notch filters; delay; crossover control; noise gate; comp/lim; memory settings; controllable via DACsys II PC software. Price: \$3,294.

Contact: TOA Electronics at 800-733-7088, www.toaelectronics.com.

George Massenburg Labs Model 2032

Features: Single-channel; preamp, four-band parametric EQ, 48V phantom power; high-pass filter; gain, trim controls; phase reverse; bypass. Price: \$3,000.

Contact: GML/TransAudio Group at 702-365-5155, www.transaudiogroup.com.

Tube-Tech MMC 1A Multiband Compressor/Preamplifier

Features: Single-channel; three-band opto compressor; gain, threshold, frequency, attack and release controls per band; band crossover controls; 48V phantom power; phase reverse; 20 dB pad. Price: \$3,995.

Contact: Tube-Tech/AXI at 718-982-2600, www.proaudiodesign.com.

Demeter Amplification Realverb

Features: Two-channel; spring reverb; input, output, mix level controls per channel; high-pass filters; phase; delay; stereo link. Price: \$699.

Contact: Demeter Amplification at 818-994-7658, www.demeteramps.com.

Focusrite The Liquid Channel

Features: Features: Preamp/compressor/EQ; single-channel; 48V phantom power; phase reverse; high-pass filter; threshold, ratio, attack, release, makeup gain controls; three-band EQ; factory presets; Dynamic Convolution emulation technology; LED meters. Price: \$3,495.

Contact: Focusrite/American Sound and Music at 866-474-7711, www.focusrite.com.

BSS Audio FDS-336T Speaker Control System

Features: Two inputs, six outputs; three-way; crossover; 60 parametric filters; delay; limiter; trim controls; WHISEworks-NTM filters; 60 user programs; output matrix; security lockout. Price: \$1,500.

Contact: BSS Audio at 615-360-0451; www.bss.co.uk.

Esoteric Sound Surface Noise Reducer

Features: Distortion limiting, quieting controls; bypass. Price: \$425.

Contact: Esoteric Sound at 630-960-9137, www.esotericsound.com.

DACS FREQue II Dual Ring Modulator

Features: Twin ring modulators; weight, edge spectral controls; fine, tune, range controls; onboard twin oscillators; frequency shifting; cascable effects routing; bypass. Price: \$1,625.

Contact: DACS/Independent Audio at 207-773-2424, www.independentaudio.com.

Aphex Systems Model 320D Compellor

Features: Two-channel; compressor/limiter; 24-bit A/D-D/A; 32, 44.1, 48, 96 kHz sample rates; drive, process, output, threshold controls; link; bypass; LED meter. Price: \$1,495.

Contact: Aphex Systems at 818-767-2929, www.aphex.com.

Muse Research Receptor Plug-in Player

Features: VST, VSTi plug-in formats; 24-bit, 96 kHz sample rate; 40 GB onboard hard drive; 256 MB RAM; Ethernet; USB 2.0; Linux OS; ships 100+ plug-ins. Price: \$1,599.

Contact: Muse Research at 650-326-5400, www.museresearch.com.

Avalon Design VT-747SP

Features: Single-channel; optical compressor; six-

band EQ; twin tube/solid state signal path; input, threshold, attack, release, compression, makeup gain controls; Class A; side chain controls; VU meter. Price: \$2,495.

Contact: Avalon Design at 949-492-2000, www.avalondesign.com.

Lake Technology Contour Pro26D Speaker Processor

Features: 24-bit, 96 kHz; crossover controls; graphic EQ; parametric EQ; "Mesa" filter; RMS limiter; "Soft Clamp" limiter; Ethernet; Windows software; wireless touchscreen remote control. Price: \$4,995.

Contact: Lake Technology at 415-861-1147, www.lake.com.

Great River Electronics EQ-2NV

Features: Two-channel; four-band; frequency, bandwidth, cut/boost controls; high-pass filter; bypass; Class A. Price: \$3,495.

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

Line 6 PODxt Pro

Features: 32 amp models; 22 cabinet models; four mic models; 49 stomp box effects; A.I.R. emulation; three-band EQ; presence control; compressor; 24-bit A/D-D/A; 96 kHz sample rate; tuner. Price: \$979.

Contact: Line 6 at 818-575-3600, www.line6.com.

Manifold Labs Plugzilla Plug-in Player

Features: Two-channel; VST format; onboard hard drive; Ethernet; USB 2.0. Price: \$3,495.

Contact: Manifold Labs at 201-641-7716, www.manifoldlabs.com.

Symetrix 565E Dual Compressor/Limiter/Expander

Features: Two-channel; threshold, release expander controls; threshold, release, ratio compressor controls; threshold limiter control; output gain controls; stereo link; bypass; side chain. Price: \$399.

Contact: Symetrix at 425-787-3222, www.symetrixaudio.com.

Prism Media MLA-2 Stereo Precision Compressor

Features: Two-channel; input gain, output gain, ratio, attack, release controls per channel; dynamic auto-adjustment; 96 kHz compatible; ImageLink stereo link; bypass; switchable VU meters. Price: \$3,170.

Contact: Prism Media at 973-983-9577, www.prismsound.com.

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Buyer's Guide

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BBE Sound 862 Sonic Maximizer

Features: Two-channel; contour, process controls; bypass. Price: \$599.

Contact: BBE Sound at 714-897-6766, www.bbесound.com.

Lectrosonics DSP 4/4 Digital Signal Processor

Features: Four inputs, four outputs; 24-bit A/D-D/A; Automatic Digital Feedback Eliminator; 12 filters per channel; parametric EQ; compressor; limiter; delay; PC software control; AMX, Crestron-compatible. Price: \$1,650.

Contact: Lectrosonics at 800-821-1121, www.lectrosonics.com.

SPL Transient Designer 4 Model 9842

Features: Four-channel; dynamics shaper; Differential Envelope Technology; attack, sustain controls; bypass. Price: \$1,199.

Contact: SPL USA at 805-241-5140, www.spl-usa.com.

Nady Systems SDP-20 Digital Sound Processor

Features: Two-channel; 44.1 kHz sampling rate; 20-bit A/D-D/A; reverb, chorus, flange, Leslie, pitch shift, distortion; 256 presets; cascade mode. Price: \$175.

Contact: Nady Systems at 510-652-2411, www.nady.com.

PreSonus EQ3B Parametric Equalizer

Features: Single-channel; three-band parametric EQ; high-pass filter; bypass. Price: \$129.

Contact: PreSonus at 225-216-7887, www.presonus.com.

Universal Audio 6176

Features: Single-channel; UA 2-160 mic preamp; UA 1176 limiter; input, output controls; attack, release controls; 15 dB pad; switchable VU meter. Price: \$2,495.

Contact: Universal Audio at 831-466-3737, www.uaudio.com.

Miles Technology M86 Multisonic Imager

Features: Level, image balance, surround, 5.1 input level, output levels controls; filter switches. Price: \$899.

Contact: Miles Technology at 616-683-4400, www.milestech.com.

Speck Electronics ASC Equalizer

Features: Single-channel; four-band; gain control; parametric mids; frequency, parameter, Q, controls; bypass. Price: \$645.

Contact: Speck Electronics at 760-723-4281, www.speck.com.

Waves L2 UltraMaximizer

Features: Two-channel; 16, 24-bit A/D-D/A; 44.1, 48, 88.2, 96 kHz; digital look-ahead peak limiter; redither; noise shaping; Automatic Release Control; word clock; LED meters. Price: \$2,395.

Contact: Waves at 865-546-6155, www.waves.com.

Ashly Audio Protea System II 4.24G Multiprocessor

Features: Four-channel; compressor/limiter/EQ; 24-bit A/D-D/A; 24-bit processing; 28-band; delay/time alignment function; high, low-pass filter; 128 presets; RS232 port. Price: \$2,599.

Contact: Ashly Audio at 716-872-0010, www.ashly.com.

Antares Audio Technologies AVP Multiprocessor

Features: Auto-Tune pitch corrector; Antares Microphone Modeling; Antares Tube Modeling; compressor; parametric EQ; downward expanding gate; de-esser; factory presets; programmable. Price: \$599.

Contact: Antares Audio Technologies at 888-332-2636, www.antarestech.com.

ART DI/O Preamp System

Features: Two-channel; Variable Valve Voicing; 12AX7A tube; gain, output controls; Output Protection Limiter; up to 96 kHz A/D; analog meters. Price: \$399.

Contact: Applied Research and Technology at 716-436-2720, www.artoch.com.

Behringer Ultra-Dyne Pro DSP9024

Features: Dual processing engines; six-band compressor; limiter; de-esser; exciter; noise gate; delay; tube emulator; 24-bit A/D-D/A; Virtuoso mastering process; LCD screen; PC-based remote control software. Price: \$599.

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

Sabine Adaptive Audio GRQ3102 Graphi-Q Processor

Features: 31-band graphic EQ/feedback controller/compressor/limiter/delay; two-channel; 24-bit A/D-D/A; 12 feedback notch filters; ratio, threshold, gain controls on

compressor/limiter; high, low-cut filters; bypass; ClipGuard; slave version available. Price: \$1,299. Contact: Sabine Adaptive Audio 904-418-2000, www.sabine.com.

Rolls CL151 GLC Compressor Limiter Gate

Features: Single-channel; input, gate threshold, gate release, compressor ratio, compressor threshold, output controls; LED meter. Price: \$120.

Contact: Rolls at 801-263-9053, www.rolls.com.

Goldline/TEF EQ2 Digital Parametric Equalizer

Features: Two-channel; 10-band per channel; high, low-pass shelving filters; notch filters; onboard delay; level controls; linkable; RS232 port; Windows software control; memory; presets. Price: \$1,250.

Contact: Goldline/TEF at 203-836-2588, www.gold-line.com.

Bellari LA 120 Compressor/Limiter

Features: Single-channel; tube-based; level, threshold controls; comp/lim switch; bypass; VU meter. Price: \$160.

Contact: Bellari/Rolls at 801-263-9053, www.rolls.com.

Requisite Audio Engineering PAL Preamp/Limiter

Features: Single-channel; 48V phantom power; 20 dB pad; optical limiter; gain, peak reduction, output level controls; 1/4" input; stereo link; switchable VU meter. Price: \$2,300.

Contact: Requisite Audio Engineering at 818-247-2047, www.requisiteaudio.com.

Empirical Labs Model EL8 Distressor Compressor

Features: Two-channel; input, output, attack, release controls; switchable compressor ratio; distortion switches; side chain; bypass. Price: \$2,799.

Contact: Empirical Labs/Wave Distribution at 973-728-2425, www.wavedistribution.com.

Purple Audio MC76 Limiting Amplifier

Features: Single-channel; Class A; attack, release, input, output controls; selectable 4:1, 8:1, 12:1, 20:1 compression ratios; switchable VU meter. Price: \$1,995.

Contact: Purple Audio at 718-482-8494, www.purpleaudio.com.



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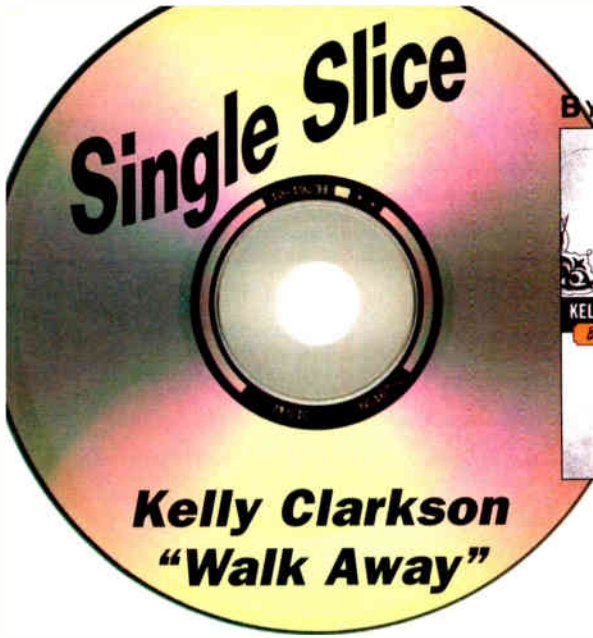
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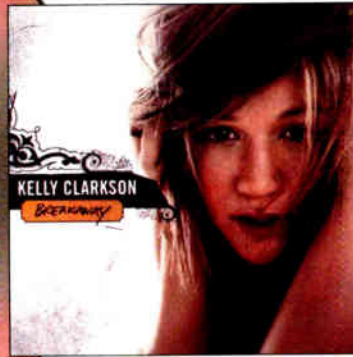
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BY STROTHER BULLINS



"Walk Away" - the fifth single from superstar vocalist Kelly Clarkson's Grammy-gleaning album *Breakaway* - began not as a tight pop nugget but a big-roomed, rafter-rocking barnburner. A respected recording artist himself, co-producer, co-writer, and co-engineer Raine Maida originally recorded "Walk Away" with slightly more aggressive instrumentation, most notably in the sound of the drum tracks.

"My background is rock," clarifies Maida. "My band Our Lady Peace's last two records were done with Bob Rock, you know? So the drums that I did originally were a little more rock. There was already programming, but with the drums I really went for it. It was much more Bonham-style in a very big room. But Stephen Ferrera - an amazing A&R guy who I love - felt that it was just a bit too bombastic for the song, and he was looking at the album as a whole, saying, 'We don't have anything else this slamming.' So I went back in to redo drums with Cameron (Webb, engineer). Brian (Garcia, engineer) did the first session. I engineered everything else on the record, so that was cool."



Raine Maida

The majority of the work was done at Maida's private Malibu recording facility called King Noise, which is also where Clarkson's deftly performed vocal tracks were captured through a simple vocal chain. "It was a Pultec, an LA-2A, and a 1081," Maida offers. "I just used a little bit of compression on the LA-2A. With most singers you have to use more, but Kelly compresses herself. She's phenomenal. This is a slamming song vocally, and I usually would use an 1176 just to catch things quicker, but the LA-2A was fine and warmed things up a bit, too."

According to Maida, the secret weapon of the vocal session was his favorite transducer of the moment, "The Convertible" microphone system by Korby Audio Technologies, featuring four hot-swappable classically "cloned" capsules. "It comes with copies of a 251, a U47, a C12, and U67," he explains enthusiastically. "The 251 clone is really amazing, and it sounded great on Kelly. She has a throaty, soulful voice and the top end of the Korby's 251 is nice, smooth, and silky. It made the vocal stand out."

Single: "Walk Away"

Album: *Breakaway* (RCA)

Dates Recorded: Recorded in Fall 2004 at King Noise, Malibu CA, NRG Recording, North Hollywood CA, and Henson Recording, Hollywood CA

Single Producers: Raine Maida, Chantal Kreviazuk, and Kara Dioguardi

Single Engineers: Brian Garcia, Cameron Webb, and Raine Maida

Assistant Engineers: Mark Kiczula (NRG) and Jon Berkowitz (Henson)

Single Mixer: Serban Ghenea

Mastering: Joe Yannece at the Hit Factory Mastering Studios NYC

Other Projects: Raine Maida is the vocalist and founding member of multiplatinum rock act Our Lady Peace. He has worked written, produced, and engineered projects with a variety of other artists including Avril Lavigne, The Veronicas, and vocalist/spouse/production partner Chantal Kreviazuk.

Single Songwriters: Chantal Kreviazuk, Raine Maida, Kara Dioguardi, and Kelly Clarkson

Console: API 16 X 4 analog console

Recorder: Pro Tools|HD

Monitors: Dynaudio Acoustics BM6

Vocal Microphone: Korby Audio Technologies "The Convertible" microphone system

Vocal Preamp: Neve 1081

Vocal Processing Chain: Pultec EQP-1 equalizer, Teletronix LA-2A leveling amplifier

Strother Bullins is a North Carolina-based freelance writer specializing in the professional audio, music and entertainment industries.

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