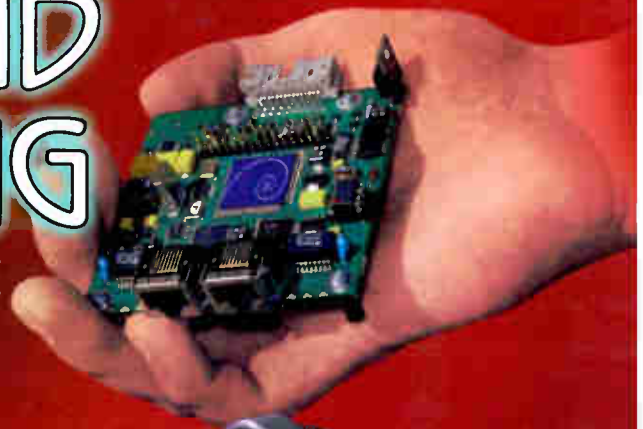
Single Slice: Dixie Chicks' Country Smash "Long Time Gone"

PRO AUDIO REVIEW

The Industry's Equipment Authority

September 2002

STORAGE AND NETWORKING ISSUE



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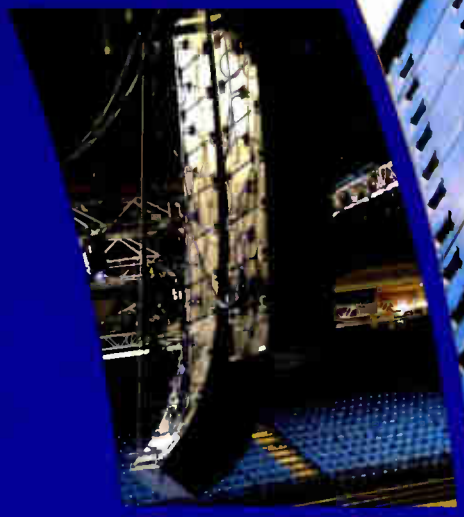

Rod Stewart Human Tour
4 EV X-Line arrays with 11 cabinets each
Up to 22 X-Line Xsub subwoofers
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MIDAS XL4 for FOH mix
2 MIDAS XL4 for monitor mix
Klark Teknik DN9848 loudspeaker management system

Creative Audio Current System
MIDAS Heritage 2000 for FOH mix
MIDAS Heritage 3000 for monitor mix
10 X-Line Xsub subwoofers
12 X-Line Xvls
8 X-Line Xvlt
XW12 X-Array monitors
Klark Teknik DN9848, DN360

Britannia Row Current System
28 X-Line Xvls cabinets
20 X-Line Xsub subwoofers
10 X-Line Xvlt cabinets
2 X-Line Xfil downfill cabinets
4 Xi-1152/64F cabinets

TSE AG Germany
32 X-Line Xvls cabinets
38 X-Line Xsub subwoofers
16 X-Line Xvlt cabinets
EV P3000 power amplifiers
Klark Teknik DN9848 loudspeaker management system

Sound Control Greece
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EV P3000 power amplifers
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The Industry's Equipment Authority

Vol. 8 Issue 9 • September 2002

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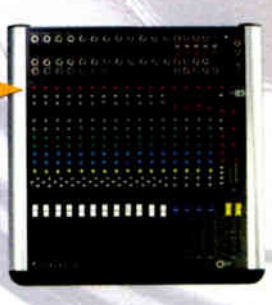

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World Radio History

PUBLISHER'S PAGE

BY JOHN GATSKI

Making the Old Sound New Again

I admit it. I am a glutton for reissues of old recordings. Whether it is reissued DSD recordings or CDs, I buy them — and often.

My two disc per week habit of recently remastered recordings is varied in genres: I have crammed into my already overstuffed rack such titles as Rod Stewart's *Every Picture Tells A Story*, Blood Sweat and Tears' first album, *Chicago Transit Authority*, Merle Haggard's early Capitol titles, and album re-releases from Van Morrison, James Taylor, Lynyrd Sknyrd, Miles Davis, Dave Brubeck, Kenny Burrell, Steely Dan and score of others.

Improved Reissues

A lot of the music was recorded in '50s, '60s and '70s for the LP or 78, but initial CD releases of numerous titles never sounded that good; some of them have been reissued more than once since the 1980s, but only the recent ones have done justice to the original recordings.

A lot of the early CD releases of these analog recordings (and even fresh digital recordings from the '80s to early 1990s) did not sound as good as LPs, with harsh playback quality, smeared instrument mixes, with little detail, and lack of bass.

Digital editing was in its infancy and the back forth conversion of A/D-D/A with the early converters did not sound so good. In many cases, the hard-core LP aficionados had reason to stick with the easier-to-listen vinyl.

Today, with advances in digital editing technology, nondestructive noise removal and high resolution digital conversion, the old analog stuff sounds pretty close to master tape caliber even on CD. Case in point, is an old 1978 Bob Dylan album, *Street Legal*, which even in the original LP and subsequent CD issue in the 1980s, was very compressed with little clarity and separation drum, horn and electric guitar tracks.

Hear the Difference

After listening to the new version, I could note believe how good it sounded. The bass drums had real low-end, the instruments emerged from the mix with a decent degree of separation and you could hear the ragged jangle of the Fender Stratocaster. What an incredible difference!

Other notable examples of fine remasters are Blood and Sweat and Tears first album, on DSD, and Rhino's reissue of the *Chicago Transit Authority* and the subsequent album *Chicago* with "25 or 6 to 4." All three of these recordings show how the subsequent generations of digital converters impart less and less harshness on complex, highly modulated sound such as trombone and trumpet.

Now, I don't know if I am ready to admit that original digital recordings sound the equal or better than the best analog in terms of realism (it is getting close). However, the transparent editing and transfer processes, as well as noise removal, have really improved analog playback to the point where we can look back and marvel out how good analog was in its heyday.

And of course, kudos, to those remastering engineers who really know how to use the latest high-resolution gear and software to get this great sound from the old recordings.

Special Section in PAR/AM

Speaking of high resolution, ***Pro Audio Review*** and our sister title ***Audio Media U.S.***, the high-end studio, broadcast and post magazine will publish a shared High Resolution Special editorial section in both magazines in our November issues. It will include feature articles on the latest high resolution technology and engineering techniques, interviews with the engineers and producers doing the best work. The section will also include reviews and product overviews of the "beyond 16-bit" world.

John Gatski is publisher and executive editor of ***Pro Audio Review*** *and proudly admits to owning the latest reissues from Barry Manilow and Neil Diamond.*

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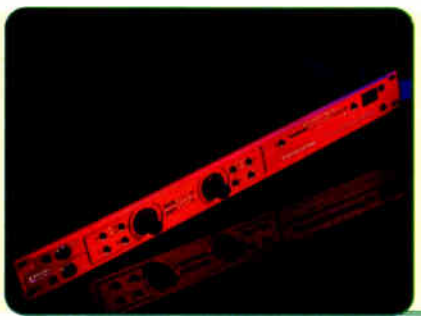
DPA 4015 Microphone

DPA's new 4015 is based on the venerable 4011 cardioid but offers a wide cardioid pattern. The 4015 maintains DPA's traditional slim body style while offering transformerless electronics and 48V phantom power needs. It specs to take up to 158 dB peak yet is aimed at studio use. Price: $1,850.

Contact: DPA at 800-565-5253, www.dpamicrophones.com.



True Systems P2 Analog Mic Preamp

The P2 Analog from True Systems is a multitalented two-channel mic preamplifier at home in the studio or on stage. Not only does it off traditional mic pre functions such as 48V phantom power but it adds twin DI inputs, a high-pass filter (40 Hz or 80 Hz), phase reverse, M/S decoding and a stereo phase correlation LED meter. The interior offers gold-plated contacts, mil-spec components and twin servos. Price: $1,750.

Contact: True Systems/Neumann at 860-434-5220, www.neumannusa.com.

Peavey RQ 2326 Mixer

Aimed at the project studio and live sound mixing markets, Peavey's RQ 2326 mixer features 24 channels, most with three-band, sweepable mid EQ. Other features include inserts, 60mm faders, 48V phantom power, two stereo effects returns along with pad and polarity controls. Price: $999.

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

Disc Makers ElitePro 1 CD/DVD Duplication System

The ElitePro 1 from Disc Makers is a full-featured turnkey CD/DVD duplication and printing system. The ElitePro 1 system consists of a computer with Padus DiscJuggler software for storing and editing disc images, robotic loader arm for automated operation, 1200 DPI inkjet disc printer, read drive and CD or DVD duplication drives. Holding capacity is 125 discs and job speed is 12 CD-Rs or 2 DVD-Rs per hour. Price with single duplication drive: CD - $4,790; DVD - $5,790.

Contact: Disc Makers at 856-663-9030, www.discmakers.com.

PMC DB1 Monitors

PMC proclaims the DB1 as "the world's smallest transmission line design" speaker and syas that five feet of line length are hidden inside the 11.5-inch x 9.25-inch x 6-inch cabinet (choice of cherry, oak, black ash and studio black finishes). The DB1 specs at a range of 50 Hz - 25 kHz, driven by a 5.5-inch woofer and aluminum alloy tweeter. A shielded version is available for work in broadcast or DAW suites. The DB1 is also designed to work with larger PMC speakers to create a configuration for monitoring surround sound mixes. Price: $745.

Contact: PMC at 800-849-2914, www.pmcloudspeakers.com.

continued on page 10 ➤

World Radio History

TASCAM DM-24:
The Affordable Luxury Console Is Here

Luxury usually comes with a hefty price tag. Not so with the new **TASCAM DM-24 32-Channel 8-Bus Digital Mixing Console.**

The DM-24's features are usually reserved for super high-end mixers. With 24-bit/up to 96kHz digital audio, the DM-24 blows away the standards in sonic quality for affordable consoles. With its internal automation, you'll get more power at your fingertips than you would from those huge consoles in commercial facilities. With some of the finest spatial and modeling processing from TC Works™ and Antares™, you can create fully polished productions without ever going to the rack. With incredibly flexible routing, fully parametric EQ, machine control capabilities, touch-sensitive motorized faders, and lots of audio interfaces, you can integrate the DM-24 into any studio environment.

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- Enhanced user interface
- "Keep" and "Touch" automation features now available

And there's more! Visit **www.tascam.com** to get all the info on **v1.6**, download the file and update the DM-24 via MIDI.

The DM-24's rear panel includes AES/EBU digital I/O, S/PDIF digital I/O, MIDI In, Out and Thru jacks, ADAT Optical input and output, external footswitch connector, time code input, GPI port, word sync in, out/thru, DTRS remote port, RS-422 9-pin control port, 24-channel TDIF I/O and more. Shown here with standard interfaces. Not luxurious enough? Customize your DM-24 with two expansion ports for extra analog, TDIF, ADAT or AES/EBU modules.

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➤ *Out of the Box from page 8*

Aphex Systems Model 212 A/D-D/A Converter

The Model 212 from Aphex Systems is an all-in-one A/D-D/A converter. To separate its converter from the crowd Aphex adds Drift Stabilized Analog to Digital Converter technology to prevent DC shift effects. The two-channel 212 offers the usual I/O suspects - notably AES/EBU, S/PDIF and optical on the digital side. Price: $995.

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

360 Systems DigiCart/E Recorder/Editor/Reproducer

The new DigiCart/E from 360 Systems is an Ethernet-enabled upgrade to the DigiCart family. The DigiCart/E is fully compatible with previous DigiCarts while offering upgrades such as 24-bit/96 kHz recording, more advanced editing features, higher sample rate conversion, a larger onboard drive and enlarged Zip drive. But more importantly it is the heart of 360 Systems' push into Ethernet audio networking. Added features include full Ethernet network functionality such as linking 24 DigiCarts together, remote control, server-based recording and playback and Windows/Mac software compatibility. Price: $3,995.

Contact: 360 Systems at 818-991-0360, **www.360systems.com.**

LETTERS **Feed back**

Pushing DSD

I've just been reading the editorial in this July's ***Pro Audio Review*** ('DSD Needs A Big Push') and I'd like to make a couple of comments.

It may seem that the lack of available pro audio equipment is hampering the promotion and development of SACD as a viable format but I can assure you that there is a great deal of effort going on behind the scenes. Sony to its credit is working with many manufacturers, including ourselves, and producing enabling technologies to allow us to develop products for the marketplace. Philips is similarly helpful.

It should be noted that the development of DSD processing engines and algorithms requires a totally different approach to traditional PCM design. Manufacturers can no longer bolt already working items together to create a new product. New designs have to be created from the ground up.

We at Genex are fully committed to DSD and realized the potential very early on. The GX8500 has been able to record and playback up to eight channels of DSD for two years now, and is used by Sony, Telarc and a great many others in the majority of their DSD recordings. We're shortly to release software which supports the DSD IFF file format (which is the AES31 of the DSD world), and last year we launched our GXA8 A/D converter and GXD8 D/A converter which are both capable of eight channels of 24-bit/192 kHz audio and eight channels of DSD conversion. At the LA AES in October we'll be introducing two completely new DSD capable products.

Kevin Brown
President
Genex Audio
Los Angeles, Cal.

Thanks, Nick

I enjoyed Nick Baily's article in ***PAR***, June 2002, on small room acoustics with John Storyk. I found the question and answer format very informative.

Melody Souza
Acoustic
Powder Springs, Ga.

I Miss My PAR

I do not know if you are the proper party to contact in regards to not receiving the July issue of ***Pro Audio Review*** but I love the publication. With all the magazines our I receive, if ***Pro Audio Review*** does not show, I get upset.

Edwin L. Zieminski
Crystal Sound Studios
Somers, Conn.

Care to opine?

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Or e-mail *par@imaspub.com*

CORRECTION

Our Table of Contents for the August 2002 issue incorrectly identified the author of the Crane Song Spider review. That reviewer was Dr. Fred Bashour.

World Radio History

A Killer Track Record.

The 7 Series. Professional cassette recorders from Denon.

Since 1953, when Denon first developed a professional-use tape recorder for broadcast, Denon has armed professionals with state-of-the-art cassette recorders. The 7 Series is no exception. With sound quality as our number one goal, we also work to develop user-friendly features. To manufacture rugged dependability. And to offer the kind of functional variety your industry demands. Since 1910, audio professionals have relied on Denon. The 7 Series is proof that you can, too.

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Grace Design 901
Headphone Amplifier

BY TOM JUNG

Grace Design has earned a reputation for quality products over the past few years with a line of high-end microphone preamplifiers. I reviewed the 801 eight-channel preamplifier in the March/April 1996 issue of *PAR* and have since used it on many projects.

Michael Grace has come up with a headphone amplifier employing the same passion for quality as he has for his microphone preamp designs.

FEATURES

The 901 has the same quality look and feel of the Grace mic preamps, complete with a precision gold contact 24-position level control switch. Most headphone amplifiers use dual gang potentiometers with tracking errors of several dB, especially at lower gain settings. Interchannel tracking error can be a real problem affecting both stereo image and internal balances with the potential of throwing off a mix. With the 901 precision attenuator, channel-to-channel accuracy is maintained within 1/20th of a dB at all gain settings! Try that with a pot.

The 901 has both balanced XLR and unbalanced RCA analog inputs as well as PCM digital inputs in both AES/EBU and S/PDIF formats, the latter available in RCA and TOSlink optical. A back panel miniature toggle switch selects between the pro and consumer formats.

The front panel has two centered 1/4-inch stereo headphone jacks wired in parallel and a large power switch to starboard, gain range control to the left. The digital/analog pushbuttons are sealed gold contact relays and are illuminated. Nice. A low distortion 24-bit DAC accepts sample rates up to 96 kHz with four LEDs indicating from 32

kHz to 96 kHz. The DAC also employs an automatic digital de-emphasis filter.

Like the Grace mic preamps, the level control is adjusted with a custom knob machined out of solid aluminum and is shaped so that from across the room you can tell by the angle of the knob where the gain is set. The 24-position gain control is just right, making it easy to get back precisely to your reference settings while providing just enough resolution. In addition, the taper layout is well thought out. Here is the breakdown of level control taper: fully counterclockwise is off, the next two steps go from –60 to –50, the next four steps are 4 dB each and the remaining to full up are in 2 dB steps. Perfect. The Gain Range switch provides an extra 10 dB of gain for monitoring –10 dBV or consumer level signals. This is also useful for low sensitivity headphones.

The 3 dB down points for frequency response are at 4 Hz and 600 kHz . Of course this is in the analog mode, which is where I generally listen to the 901. You can be sure DSD signals are not going to be compromised by this kind of bandwidth.

IN USE

The 901 uses a high-current output amplifier with an output impedance of 1 ohm and is capable of driving 8 ohm loads. Perhaps because of its low output impedance, the 901 has the best low-frequency control of any headphone amp I have heard. Most headphone amplifiers have output impedances of 100 ohms or more, making them potentially more bulletproof at the expense of low-frequency control.

The internal high-current linear power supply uses a high-current, low-noise, toroidal power transformer, giving the 901 just enough weight so that when you plug and unplug your headphones you do not have to hold on to the amplifier with your other hand.

The signal path is about as pure as you can get using high-grade instrumentation input amplifiers, high-quality metal film resistors and no electrolytic capacitors in the signal path.

I really liked the sound of the Grace 901. About five seconds after I plugged in my Grado HP-1 reference headphones (*PAR* 9/96) I knew this amp was going to take

continued on page 14 ➤

Fast Facts

Applications:
Studio

Key Features:
24-position gain control; onboard D/A converter; 96 kHz performance; XLR, RCA inputs; digital inputs; consumer and pro operation

Price:
$1,495

Contact:
Grace Design at 303-443-7454, *www.gracedesign.com.*

World Radio History

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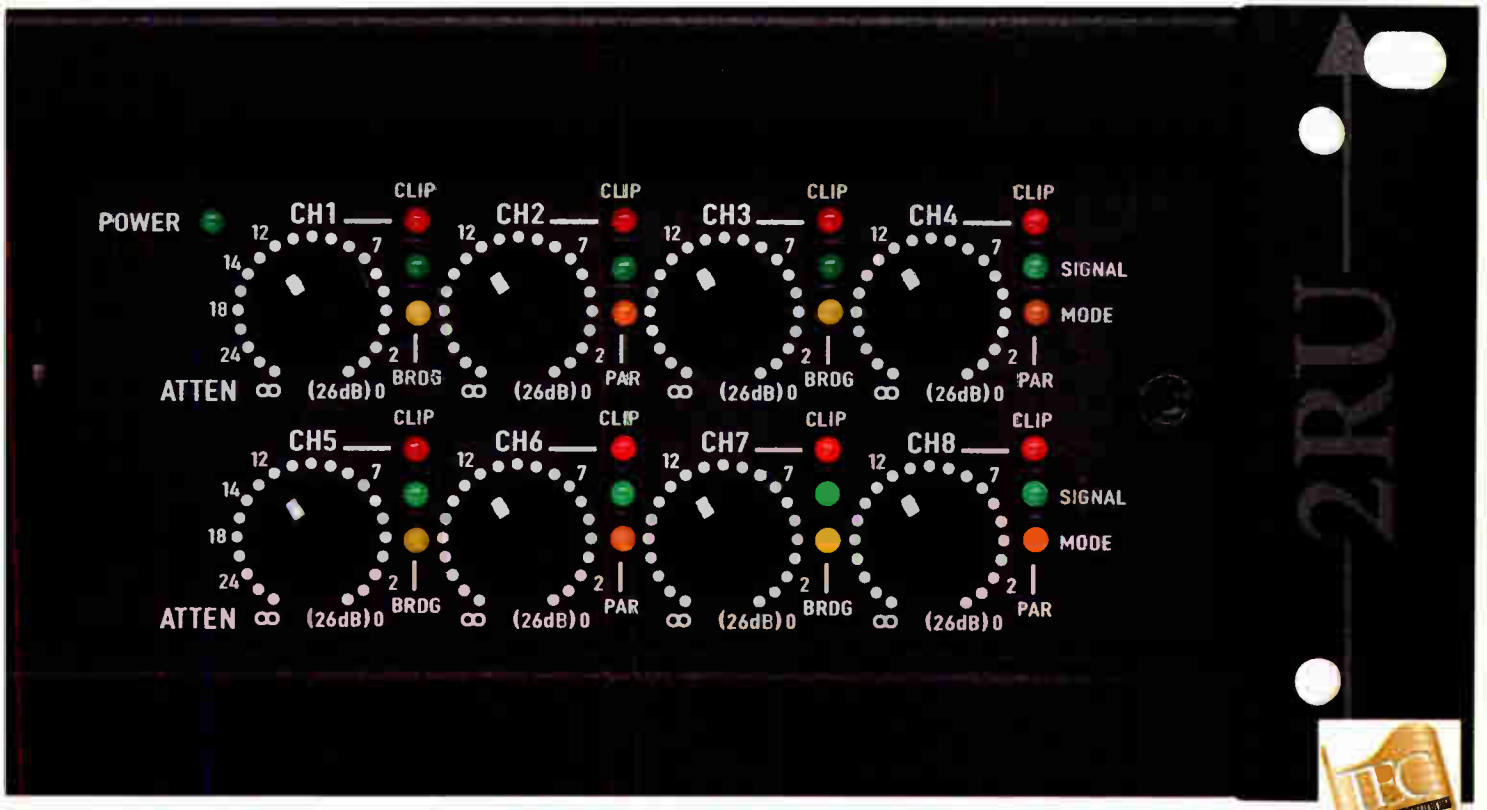

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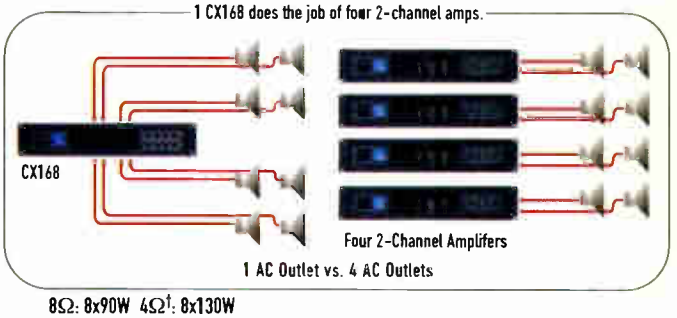

8Ω: 8x90W 4Ω†: 8x130W
20 Hz–20 kHz, .05% THD, All Ch. Driven †20 Hz–20 kHz, 0.1% THD, All Ch. Driven

Rear View of the CX168

QSC AUDIO

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World Radio History

➤ *Grace from page 12*

these phones to places they had never been before sonically. The first and most obvious area was the low end. Much of my work includes acoustic bass, which is traditionally difficult to reproduce accurately, especially with headphones. This is the one area where reference monitoring on headphones falls apart due to the fact that most amplifiers do not have good control of the headphone drivers, causing low-end boom. This boom creates a masking effect that clouds the entire bottom end, making it difficult to mix or make tonal adjustments in those low-frequency areas. The 901 has the best bottom-end control I have heard. It also seems like my Grado headphones have another octave of bass extension.

Good bass is not all; the top end has openness and extension as well with incredible harmonic detail and air. With a DSD signal connected to the analog inputs, the depth and width of the soundstage was about as good as I have heard on headphones. The PCM inputs are very good as well, with proper analog circuitry following the DAC chip. This makes the 901 an excellent D-to-A reference monitoring device. The Grado headphones are about 40 ohms and are fairly easy to drive, but the 901 has plenty of power and can drive much lower impedances and more difficult loads.

SUMMARY

I know of no other headphone amplifier that performs as well as the Grace 901. At $1,495 the 901 is not cheap, but this kind of excellence represents a good investment if you really care about audio quality.

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

REVIEW SETUP

Philips SACD-10 PE CD player; EMM Labs DAC8 D/A converter.

Product Points

GRACE DESIGN 901 HEADPHONE AMPLIFIER

Plus
- High-end performance
- Quality construction
- Useful I/O choices

Minus
- Price

The Score
I know of no other headphone amplifier that performs as well as the Grace 901.

EMTEC Preformatted DTRS Master Cassette

BY BRUCE BARTLETT

If you own a TASCAM or Sony Modular Digital Multitrack (MDM) recorder, you have to perform a tedious ritual: formatting the recording tapes before use. You fast forward the tape to the end, rewind it to the top, set the format sampling frequency and press Record. Then the machine is tied up for over an hour while the tape formats in real time.

Fortunately, EMTEC is providing preformatted recording tapes in the DTRS style. If you need a formatted tape in a hurry and do not have time to format one, the EMTEC tape will save the day. Plus, using preformatted tapes saves MDM head wear caused by the formatting process.

Currently, EMTEC offers 16-bit/44.1 kHz or 16-bit/48 kHz preformatting, both at 113-minute length. The bit depth and sampling rate are printed clearly on the tape box. When you insert an EMTEC preformatted tape into your recorder, it displays the counter time and sampling frequency just as it does from a tape that you formatted.

EMTEC DTRS tape is metal-powder coated with a super-smooth surface that is said to prolong head life and provide excellent high-frequency resolution. The cassette uses high-impact ABS plastic for best tape protection, and an antistatic lid keeps out error-producing dust and dirt. The labels offer a large writing area (APRS/SPARS labels are included).

I tried EMTEC tapes that were preformatted at 44.1 kHz and 48 kHz, and they both worked fine with no glitches. I recommend exercising the tape before use (fast forward and rewind) to loosen the tape pack and to align the tape with your machine's tape guides.

Although preformatted tapes cost a little more than nonformatted tapes, you can make up the cost difference in time saved and reduced head wear and tear.

*Bruce Bartlett, a regular **Pro Audio Review** contributor, is a technical writer, a recording engineer and an audio journalist.*

Fast Facts

Applications:
Studio

Key Features:
Preformatted, 16-bit, 44.1 kHz, 48 kHz sample rates, 113-minute length.

Price:
app. $15

Contact:
EMTEC Multimedia at 888-295-5551, 661-295-5551, *www.emtec-multimedia.com.*

World Radio History

Truth Audio TA-1P Studio Speakers

ON THE BENCH PAGE 16

BY JOHN GATSKI

In a crowded professional speaker market, the Truth Audio TA-1P is significant in that it is not another active monitor, but an old fashioned, passive speaker — e kind that you connect to speaker cables d an amplifier. As an avid passive speaker n, I find it admirable that companies, such Westlake, Truth Audio, Tannoy, Dynaudio coustics, Yamaha and others bring out new ssive models and not abandoning the pas- /e genre for powered.

EATURES

The TA-1P, priced at $599 each, is a com- ct closefield monitor that sports three driv- s and is designed for horizontal mounting a console. The 14.5-inch wide by 10-inch gh by 10-inch deep cabinet houses two /e-inch polycone woofers and a one-inch oth dome tweeter. Rated frequency sponse is claimed to be 51 Hz - 22 kHz, us or minus 2 dB. Nominal impedance is 4 ms; power handling is listed at 140 watts. sensitivity was listed. (See Carlos ltran's bench tests for actual test measure- nts.)

The rear-vented design has its woofers ounted below and to the left and right of the nter-mounted tweeter. The rear-mounted, e-way binding posts complete the Truth ysical package. Using 3/4-inch MDF edium density fiberboard), the speaker ighs in at a solid 24.5 pounds.

The horizontal placement is designed to mplement console placement, but Truth ys the speaker can be used vertically as long the tweeters are positioned to the outside.

N USE

I installed the Truth TA-1Ps in my home udio. I connected to my current rack amp, e Pass X-150 Class A FET amp, which es a good job driving low impedance eakers. Speaker cables were Alpha-Core oertz gauge solid copper. I ran a whole bunch of sources through the system including a Sony SACD-777-ES DSD/CD player, DAT, hard disk, etc., routed through a Mackie mixer and a Legacy high-current preamplifier. I installed the Truths on stands behind my console rack and sat in the sweet spot for an extended listen. The monitors were about five feet away from the listening position.

First, to get a sense of how well the Truths relayed the space of a stereo recording, I played a 24-bit, 88.1 kHz recording of my Martin D-35, miked with a pair of the Audix SCX-25s. On my high-end far-field monitoring, setup using Legacy Classics tower speakers, I know that the D-35 recordings have a pleasant presence boost with excellent detail and string harmonics.

Though not as detailed as the Legacys, the Truths delivered an impressive nearfield sound: a smooth, spacious rendering of the guitar recording with tight bass, and midrange clarity that showed the TA-1P's well braced cabinet.

On voice using a number of high resolution recordings of different mics I had on hand, the Truths were well balanced without excessive sibilance or boominess.

I then played a number of Tom Jung's DSD recordings, including a recent release by the Tom Mintzer Big Band. With fuller instrumentation recorded via high resolution DSD, the Truths maintained their clarity and the two 5-inch bass drivers handled the kick drum quite well for a small speaker. In fact, these speakers have impressive bass response — even in the middle of the room, which I placed them at one point during the listening.

Piano is always a good test for cabinet coloration, and I found the Truth to pass that exam easily — without the muddy quality of lesser speakers. On female voices and violin, I appreciated the cloth tweeter's lack of edge and sibilance. My notes said: "smooth" and "easy on the ears."

In fact, the easy-on-the-ears impression is a strong selling point of this speaker. Even cranking it up, the speaker does not sound harsh, and it should be a monitor that can be used for extended periods of time without premature ear fatigue.

One other point: I did try the speakers vertically, and they did okay. However, in my placement setup, I thought the stereo definition was better when mounted horizontally.

SUMMARY

It's refreshing to see a new, high quality passive speaker like the Truth TA-1P hit the market. If you use a good amp and properly place the speaker pair in a good-sounding room (which is more than half the battle for good speaker sound), it will play clean and accurate without ear fatigue. And it won't break the bank.

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

Contact: Truth Audio/Wave Distribution at 973- 728-2425, www. wavedistribution.com.

World Radio History

Truth Audio TA-1P Studio Monitor

The Truth TA-1P is a variation on the classic configuration of one tweeter on top of or below two side by side woofers. This configuration peaked in popularity in the early sixties with monitors from Altec Lansing and others dominating the scene. In those days, the tweeter was a large horn. Over the years, Westlake and others have kept up the tradition, but the dominance of the style is long gone. Unlike most of the "prior art" of this configuration, these speakers are not big or heavy. Inside, these monitors use high quality drivers and crossover components- a welcome sight given the reasonable price.

The on axis frequency response is the most critical measurement of a loudspeaker, and it is shown in Figure 1. Note that I have chosen a vertical scale that is 2-3 times more expanded that what you usually see in performance curves given by manufacturers. Note the overall smooth response from 55 Hz to 20 kHz (and beyond), the overall downward trend as we move to higher frequencies, the relative dip in the 2-6 kHz region, and a free field midband level of 89.5 dB. Note also that the bass rolloff is standard for an actual free field condition. In a typical room, we expect this speaker to have a typical boost in the bass of a few dB before roll-off. Figure 2 shows the impedance of the system. In today's world, it is VERY nice of these guys to be calling this a 4 ohm system, its impedance is in line with what everyone else calls an 8 ohm system these days. An impedance low of 3.5 ohms at 215 Hz will be no problem for your amp. Finally, Figure 3 shows the horizontal coverage of the loudspeaker. Note that the scales, the bass frequencies are not shown and there are many more dB shown vertically. The rolloff at the highest frequencies in similar to 90% of the speakers on the market. The magnitude and bandwidth of the hole centered around 1.8 kHz is bigger than usual for a two way speaker and is due to the large effective radiating area at these frequencies.

These speakers are not forward sounding. These speakers are not bright. These speakers are warm. You can listen all day long; they are not fatiguing. The TA-1Ps must be listened to on axis, the

sound changes rapidly as you move off center. If you need to have more than one person listening at a time, these speakers must be placed on their sides.

There are straightforward reasons for this. Remember what you did the first time you played with an octave, or even third octave EQ. It is okay, you can admit it now. Dropping the high midrange like there is no tomorrow was pretty cool wasn't it? As your ears are most sensitive to this region, a little less energy here is never perceived to be a problem. In fact, with a little less energy here, your ear-to-brain computer can now focus more on the rest of the audio spectrum. So you will be able to hear things you might not otherwise, and you will not be so easily fatigued.

When you listen to a loudspeaker in a room, the frequency distribution that you hear is composed of two parts, the first arrival (free field or Figure 1) response and the average power of the information that comes to your ears in the next several milliseconds (more or less an average of the curves in Figure 3). The first arrival information (Figure 1) is only slightly down in this region. The power response of the speaker (Figure 3) has a good size hole overlapping this same region.

Truth Audio has come up with a speaker that is certainly revealing and not fatiguing- but it is also not as neutral. For me, guitars were not as up front as they should have been, and vocals were a bit off. The narrow horizontal bandwidth, however, can really come in handy in tight spaces where strong early reflections from the walls would otherwise cause serious problems. Lastly, on the bass end of things, these speakers do quite well for their size, the slight peak in the low bass anticipated by the free field measurements was apparent and enjoyed. This bass was tight and strong with most music.

— Carlos Beltran

Bench Measurement

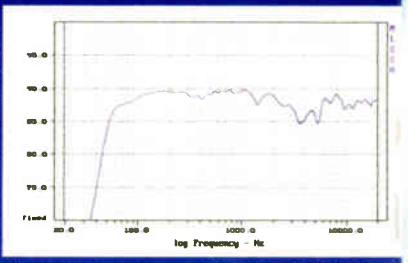

Figure 1: On axis sensitivity (2.83VRMS @ 1m)

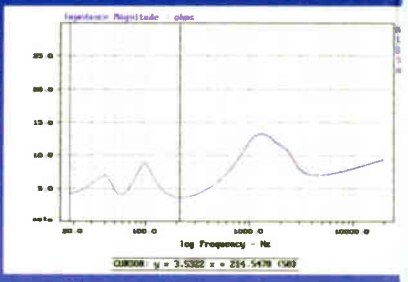

Figure 2: Impedance of system. Marked at lowest impedance.

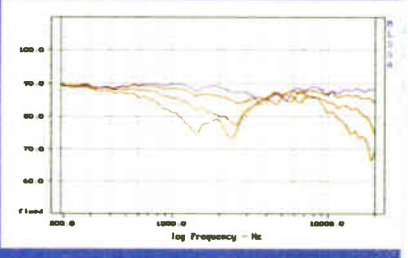

Figure 3: Response at 0, 15, 30, 45 degrees horizontal.

Carlos Beltran has been designi loudspeakers for more than 20 yea Carlos has written and presented pap and has been granted numerous pate in the areas of loudspeaker desig active noise control, and signal and warning.

BENCH TEST SETUP

B&K 4191 Special Order Lab Referen Microphone (+0.5 –0.0 dB, 5-20kHz), B& 2669 Microphone Pre-Amp; ACO Du Channel Mic Power Supply; MLSSA based test and measurement system (D Labs); Techron 5530 Laboratory Supp amplifier; Pioneer CD Player with prop etary modifications.

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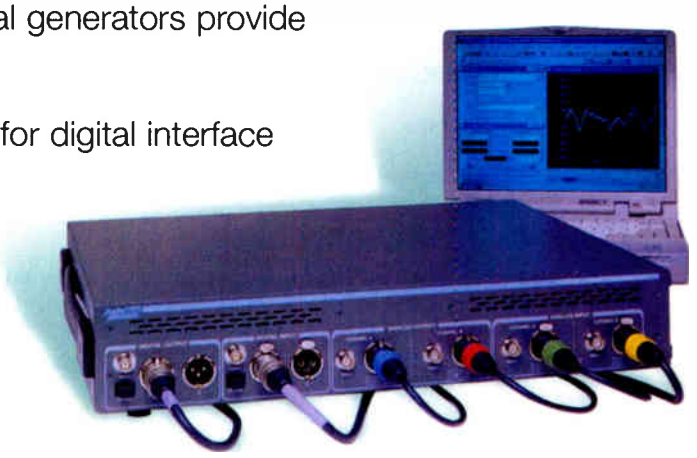

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World Radio History

Single Slice

BY CHUCK TAYLOR

Dixie Chicks' "Long Time Gone"

SINGLE: "Long Time Gone"

ALBUM: *Home* (Open Wide Records/Sony)

DATE RECORDED: February 2002

ENGINEER: Gary Paczosa

PREVIOUS PROJECTS: Alison Krauss, Dolly Parton, Nickel Creek

SINGLE SONGWRITER: D. Scott

SINGLE PRODUCER: Dixie Chicks, Lloyd Maines

MASTERING ENGINEER: Doug Sax

STUDIO: Cut at Cedar Creek Studios, Austin, Texas; mixed at Emerald Sound Studios, Nashville

INSTRUMENTS: Violins, mandolin, bass, guitars

CONSOLE: Euphonix System 5-M

RECORDER: Steinberg Nuendo, Euphonix R-1

MONITORS: Genelec 1031A

MICROPHONES: Neumann KM54, Neumann/Gefell M582, Sony C800G

MICROPHONE PREAMPS: Mastering Lab

PROCESSORS: GML EQ, GML compressors

Engineer's Diary

When the Dixie Chicks decided to until their bluegrass roots with "Long Time Gone," the first single from third album, *Home*, the trio of Natalie Maines, Emily Erwin, and Martie Seidel were quick to load up the track with enough sound to blow their new project wide open. It then became engineer Gary Paczosa's job to reign it all in so that the vocals did not get lost in the big sonic palette.

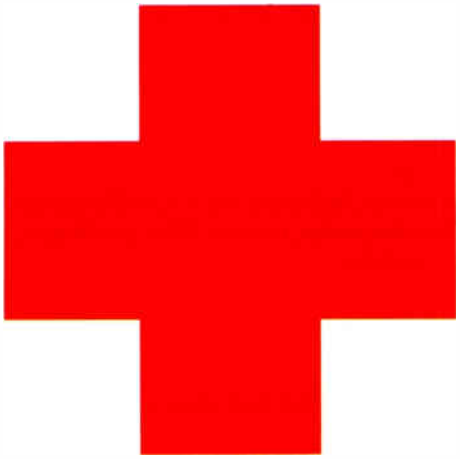
Gary Paczosa

"It was a very full track. There were a couple more instruments in there than I'm used to using," he says with a chuckle. "Squeezing all of that in against a pretty edgy vocal made it a really tough song to mix. There was so much going on at the midrange and top end, so getting the track to be punchy and grab you without taking your head off was pretty tough."

Paczosa thinned out the track as best he could, eliminating some of the sounds to make more room for the vocal. "Those girls are very deliberate and they really wanted things to sound a certain way, so it got mixed a couple completely different times." Part of his mission, with producer Lloyd Maines, was also to make sure that the cut was not tinkered with so much that it lost its soul. "We're basically dealing with the approval of five people: the three of them singing and then the two of them that are also playing," Paczosa says, noting that consensus was not a simple task. Now, as the song works its way to No. 1 on the ***Billboard*** Country Singles & Tracks chart, the engineer deadpans, "I'm still not convinced that it's really finished."

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

World Radio History



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-Pro Audio Review
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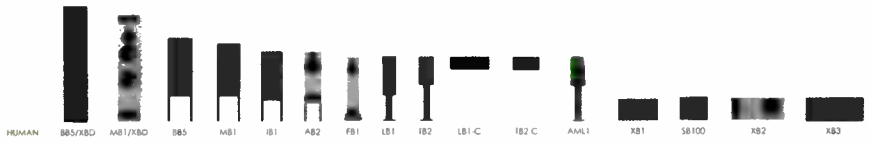

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World Radio History

Aphex 207 Tube Mic Preamp

BY RUSS LONG

When I reviewed the Aphex 1100 microphone preamplifier two years ago, I fell in love with its magnificent sound. I jumped at the opportunity to check out its baby brother, the Aphex Model 207 Two-Channel Tube Mic Preamplifier. This new box combines the main circuit of the Aphex 107, including the patented Reflected Plate Amplifier tube circuit with the patented Aphex MicLim circuit that is one of the highlights of the Aphex 1100.

Fast Facts

Applications:
Studio

Key Features:
MicLim limiter, Reflected Plate Amplifier circuitry, 48V phantom power, low-cut filter, 20 dB pad, polarity reverse

Price:
$649

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

FEATURES

The front end of the Aphex 207 ($649) is a discrete solid state transformerless amplifier crafted for particularly low noise and high common-mode rejection. Since it runs without feedback, it is an ideal input stage as it never reflects any feedback current back to the microphone. The output stage of the 207 incorporates Aphex's patented Reflected Plate Amplifier (RPA) circuit. While using a single 12AT7/ECC81 tube, the circuit provides a clear and detailed tube sound while avoiding the typical limitations of conventional tube circuitry like short life, noise, heat and low bandwidth.

Weighing 6 pounds, the Aphex 207 is a 1RU, 8.25-inch deep box. The pre has a dynamic range beyond 90 dB, -129 dBu EIN and 65 dB of gain. The attractive silver-gray front panel includes a power switch with a power LED that glows yellow during the standby start delay to allow for tube warm-up time, and then green when the unit is ready to operate.

Both channels have identical features. On the front panel, a 1/4-inch jack provides instrument input with an impedance of 1 megohm. This matches all coil type pickups and powered pickups. Fully passive piezo pickups work but they typically do not deliver a full range sound. When a plug is inserted, the mic input is inoperative.

Each channel has five front panel mounted switches that activate the various features of the Aphex 207. When a switch has been selected, it glows to show its status. The phantom power switch activates 48V phantom power. The pad switch inserts a 20 dB pad at the microphone and instrument inputs. The low-cut switch activates a 70 Hz low-cut filter. The MicLim switch activates the MicLim circuit. A limiting LED lights to show when limiting is taking place. The unique MicLim circuit follows the sound envelope like any limiter but actually works at the microphone level before any amplification takes place. A typical limiter cannot protect a mic preamp from clipping because it placed in the signal chain after the pre. The MicLim eliminates the possibility of preamp overload.

The gain knob adjusts the microphone preamplifier and instru-

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World Radio History

ment gain. The output trim pot (adjustable with a small flat-head screwdriver) works in conjunction with the 207's output level switch to precisely match any external equipment. Each channel's 10-segment meter indicates the available headroom in decibels below clipping.

The rear panel is equipped with a pair of Operating Level switches that selects the channel's operating level at either -10 dBV or +4 dBu. Each channel has a female XLR connector for microphone input, a 1/4-inch TRS jacks for insertion, and both male XLR and 1/4-inch TRS jacks for audio output. The output impedance of the XLR jack is low enough to drive loads of 600 ohms and higher. The insert point allows EQ, compression, etc., to be inserted into the signal path before the tube output stage. An IEC connector and line cord are provided for power.

In Use

I achieved excellent results using the 207 in a variety of studio applications. Before I started, I followed the advice of Aphex and ran a 1 kHz tone through the 207 and increased the gain control until the output headroom meter read zero. I ran the output of the 207 into the input of my iZ RADAR multitrack hard disk recorder and used a small screwdriver to set the output trim on the 207 to match the maximum input level on my RADAR. From that point on, I was able to record particularly hot signals into the RADAR without being concerned with nasty digital clipping. In normal use, the limiter is virtually inaudible so unless you are pushing the point of excessive limiting it will not color the sound. The MicLim feature can always be turned off as well. Though, in every instance, I preferred the end result with the limiter on.

I used the 207 on kick and snare (using an AKG D112 and a Shure SM57 microphone respectively) and the pre delivered a full, rich sound with plenty of attack. Using the 207 with a stereo Royer SF-12 for drum overheads yielded great results. I found that by pushing the gain into extreme limiting, I was able to make a drummer in a fairly small room swear that he was John Bonham reincarnated (I confess, I was convinced as well). The pre also performed flawlessly on a wide

continued on page 33 ➤

Review Setup

Apple 400MHz PowerMac G4; Digidesign Pro Tools v5.1 Mix+; RADAR 24 hard disk recorder with Nyquest 96 kHz card; MasterLink hard disk/CD recorder; Lucid Gen-X-96 Clock; Mogami cabling; Hafler amplification; Alesis PMC TB1, Yamaha NS-10M monitors; GML 8200 parametric EQ, Tube Tech CL-1B compressor, Empirical Labs Distressor compressor, Pendulum Audio 6386 Variable MU compressor/limiter; AKG C28B, AKG D112, Neumann KM 86i, Royer R-122, SF-1A, SF-12, Sennheiser 421, Shure SM57, Sony C-800G microphones.

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World Radio History

EV EVID 4.2 Speaker

BY ROGER WILLIAMS III

The Electro-Voice Company, a division of Telex communications, has always been a source of reliable products for the sound contractor. The first PA system for a football stadium, used by Knute Rockne to bark plays to the "Gipper" at Notre Dame, was designed by Electro-Voice. Every sound contractor that is over 40 years of age has probably run into the classic "Buchanan hammer" microphone at one time or another. EV Eliminator series enclosures were once a contractors' staple. In recent years EV has enjoyed success with the S-40 speaker for distributed systems and the larger format SX series, the latter of which are weather resistant and have enclosures fabricated from ABS plastic.

FEATURES

Enter the EVID series, which stands for EV Innovative Design. These enclosures are aimed for use in distributed sound systems, and are molded from the same ABS plastic as the SX series. They are a two-way design featuring dual weather-resistant treated woofers and a center-mounted tweeter with waveguide. The EVID series comes in three flavors: the 3.2 with 3.5-inch woofers, 4.2 with 4-inch woofers, and 6.2 with 6-inch woofers. All are available in black or white paintable finish with zinc-plated steel grille, video shielding and a multitap transformer option on the two larger models. Push terminal wire connectors are spaced to accept banana plugs.

A matching subwoofer, the 12.1, can be utilized with the units for extended bass response. And the EV-designed SAM (Strong Arm Mount) mounting system is found on all models, as well. The 8 ohm model that was reviewed was the 4.2, rated at 200W power handling with a claimed frequency response of 65 Hz to 20 kHz and sensitivity of 90 dB at 1W/1 M. Horizontal and vertical coverage is claimed at 120 and 80 degrees, respectively.

The first thing that strikes you when you see the EVID speaker is the physical shape. A radical departure from the typical box enclosure, the EVID is ellipsoidal, almost football-like. At first glance, from the face it reminds me of a pair of motocross goggles. EV's literature points out the organic unobtrusive shape, and I am inclined to agree. It is very easy to look at and it would seem to blend in with modern architecture better than a box. But there are more than aesthetic intentions with this design. The rotation and positional ranges afforded by this shape and mounting system give the installer greater flexibility to achieve desired coverage. The SAM mounting arm system allows a 45 degree rotation range at the cabinet pivot point, and 100 degree sweep range at the mounting plate. As opposed to a ball-and-socket-type mount, which can be tricky to adjust and tighten, the cast alloy SAM mounting arm has a positive feel and a hexnut tightening system that is easy to access.

Fast Facts

Applications: Distributed commercial or residential sound systems

Key Features: Unique ABS plastic enclosure, SAM mounting system, dual woofer design

Price: $340 per pair

Contact: Electro Voice at 877-863-4166, ww.electrovoice.com.

IN USE

I was able to substitute the EVIDs for a pair of JBL Control 1s that were placed above a soffit in a local establishment. The system consisted of a Rane CP64 mixer and Samson Servo 550 amplifier, with the source being a Marantz PMD370 player and Shure 450-II Mic. While listening to varied program material from the new Norah Jones CD to paging I liked the solid response of the EVID midrange, and the neutral sound of the highs, not sparkly like the Control 1s. While the bass response was not overwhelming, it was good considering the size of the enclosure.

The coverage by the EVIDs was wide and even, filling the space in this zone (20 feet wide x 25 feet long x 8 feet high) easily.

Later with a New Frontier DSP 2010 RTA and test microphone, I made some close-microphone basic measurements of the EVID in a "flat" room with out any gain from boundaries, such as a corner. The two small 4-inch drivers enabled bass response down to 100 Hz and likely would have reached the claimed 65 Hz with corner placement and room gain.

SUMMARY

While the sound quality of the EVID speaker is good, the most innovative aspect of these speakers beyond the unique look is the enclosure's ability to be positioned in many ways via the SAM mounting system to achieve optimum coverage. The speakers are lightweight (8.5 lb.), weather-resistant, durable and easy to install. Considering the economical price ($340/pair) the EVID should soon be a popular candidate for distributed systems.

Roger Williams III, a systems designer for MAS Audio and Syn-Aud-Con graduate, is a regular contributor to ***Pro Audio Review****.*

World Radio History

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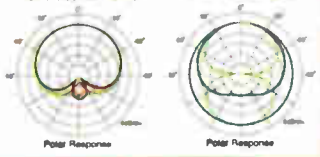

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AT4040 Large Diaphragm Condenser Microphone

BY ANDREW ROBERTS

You can find them getting blasted by a Marshall stack in front of 20,000 screaming fans. You may also see them picking up the nuance of a jazz drummer's cymbal work in a premier recording facility. And, they are frequently the only mic available in bedroom studios around the world. What are they? They are the venerable 40 Series mics from Audio-Technica. Starting with the classic 4033, this line has grown with the addition of the multipattern 4050, the FET style 4047 and the tube 4060. Together, they have redefined the concept of the value oriented, large diaphragm microphone - prompting a wave of imitators over the last few years. Now, A-T has introduced yet another member to the 40 Series club, the 4040.

FEATURES

The 4040 ($495) is a large-diaphragm, side-address, cardioid condenser. It is a true condenser in that it is externally polarized. This means that it requires phantom power to polarize the capsule, not just the electronics. The mic features an aged, vapor-deposited gold diaphragm that is two microns thick. The 4040 has a transformerless circuit design that is claimed to eliminate low-frequency distortion while providing improved high-speed transient response. The 4040 has a frequency response of 20 Hz - 20 kHz, a dynamic range of 133 dB (1kHz at max. SPL), a signal to noise ratio of 82 dB (1 kHz at 1 Pa), self-noise of 12 dB SPL, and a max input level of 145 dB SPL (1 kHz at 1% THD). On paper, the mic has a very flat response with significant bumps centered in the neighborhood of 7 kHz and 11 kHz. The 4040, which weighs 12.7 oz., has a switchable low-cut filter (80 Hz, 12 dB per octave) and a 10 dB pad. It also comes with A-T's standard 8449 suspension shock mount, a sturdy carrying case and a dust cover — all for $495.

IN USE

I was very curious to see what this new 40 Series mic sounds like — especially since I own several pairs of other 40 series transducers like the 4050, the 4047 and the 4051 pencil condenser. I should mention that I really enjoy all my 40 series mics and have learned, as you should with any mic, to appreciate the individual characteristics of each while recognizing what applications each one is best suited to.

Recently, A-T discontinued the original 40 Series mic, the 4033, after making a limited batch of Special Edition models to commemorate that mic's 10-year anniversary (4033SE). While I originally suspected that the 4040 was intended to replace the 4033 in the line, I have been told otherwise by several sources at Audio-Technica. They all reiterated that the 4040, with its true condenser design, improved dynamic range and signal to noise ratio, is a whole new model for the line and it bears little sonic resemblance to the 4033.

Upon opening the box, I was somewhat disappointed to find that the included 8449 shockmount is one of those rubber band mounts. While this shockmount works very well at isolating the mic, I have always struggled with getting the mics in and out of the tensioned rubber bands that support it. In fact, it was so frustrating that I trashed the original carry cases (which can only accommodate the mic without the suspension mount), went down to my local sporting goods store and purchased some universal handgun cases. Once modified, these cases can hold the mics while they are in the shockmounts. If you rarely travel with your mics, you may not need to do this but I use mine in remote settings regularly and I would suggest you follow suit if you periodically leave the confines of your studio or home. I was very pleased to see the addition of the handsome A-T dust cover. It will replace my plastic zip lock Baggies!

Fast Facts

Applications:
Studio, broadcast, live sound

Key Features:
Large diaphragm cardioid; true condenser design; 10 dB pad.

Price:
$495

Contact:
Audio Technica at 330-686-2600, *www.audio-technica.com.*

As for the mic itself, it is very impressive. I used it on acoustic guitar, electric guitar and voice with wonderful results in all applications. I used the 4040 to record some slide guitar work on a wonderful old 1960s era, all-mahogany, Harmony flat top. The guitar is a real midrange cannon with lots of mids and highs when used with a brass slide. The 4040 did a great job of capturing all the detail in the guitar's sound. Since the mic is a fixed cardioid, it is subject to proximity effect and there was some muddiness initially. Therefore, I opted to engage the low-frequency rolloff. This cleared up the mud but left me with a full, rich guitar tone that oozed with detail and texture.

The 4040 was just as capable on male vocals. It yielded a sound with full body and lots of high-end detail. With its high-end bump, I probably would not use this mic on a singer with sibilance issues. If that is not an

World Radio History

issue, this is a great mic with a very present sound and good peripheral rejection. It was particularly pleasing on spoken word material yielding a sound that was very clean and articulate. I did have some plosive problems so I would suggest using a pop screen and perhaps the low-cut filter too.

On electric guitar, the 4040 was very accomplished too. It delivered honest images of a Strat through a Fender tube amp. I found it very pleasing on clean tones. It captured all the low/mid punch and the sparkling high-end that is characteristic of this guitar/amp combination. On overdriven sounds I felt like there was a bit too much high-end, producing a harshness that was not as pleasing. Even at blaring volumes, the mic did not flinch. I wonder if you would ever have an occasion to use the 10 dB pad?

During this evaluation, I made sure to also use the 4047 and 4050 in each setting for comparison purposes. The 4040, like the 4047 is a very quiet mic with regards to self-noise and it seemed to have a bit more gain than both the 4050 and the 4047. Sonically, it is indeed unique when compared to the others. I think it falls somewhere in between the brilliance of the 4050 and the warmth of the FET style 4047.

SUMMARY

Things have come along way in the last ten years. It is stunning that a mic that sounds this good and produces so little noise is priced under $500 with a shockmount, case and a dust cover. Whether you are a big bucks engineer wanting to broaden your mic palette, a radio station tech, or a basement amateur in need of an all-in-one mic, the A-T 4040 is a wonderful mic and a fantastic value. It is a welcome addition to the 40 Series line.

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

REVIEW SETUP

DBX 376 preamp; MOTU 2408 interface; generic PC; Sonic Foundry Sound Forge 4.5; Spirit 328 console (monitor only); Mackie HR824 monitors.

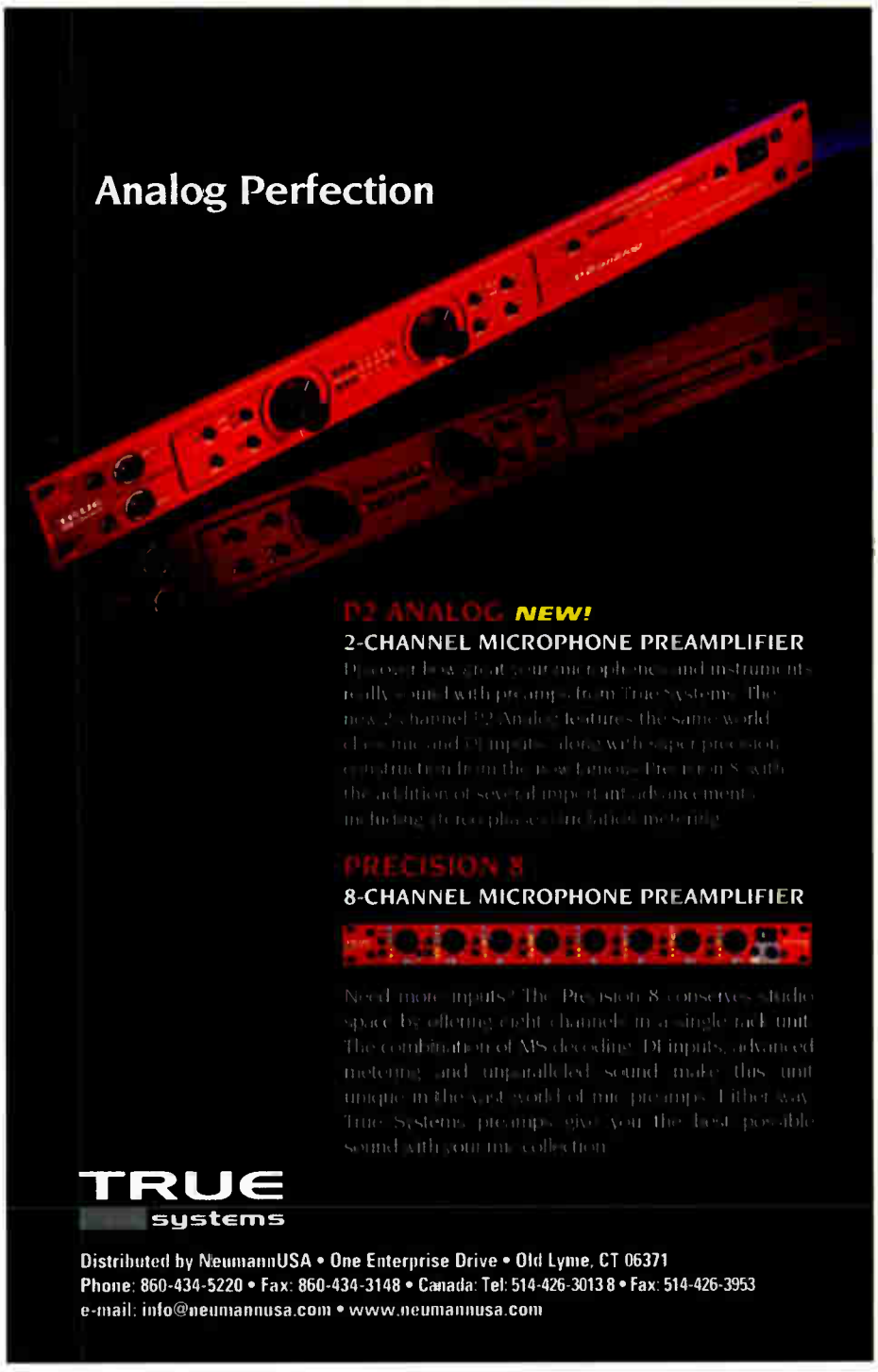
Product Points

AUDIO-TECHNICA AT4040 LARGE DIAPHRAGM CONDENSER MICROPHONE

Plus
- Great sounding
- Affordable
- Comes with dust cover, case and suspension mount

Minus
- Difficult to insert mic in suspension mount

The Score
A great-sounding mic at a remarkable price.



World Radio History

State of Address: Data Networking in Pro Audio

by Stephen Murphy

Data networking, a nearly three-decades old office-oriented technology, has officially arrived in the wide world of professional audio. The use of a variety of existing data-sharing and archival schemes in the audio industry has been building steadily over the last decade. This trend has been propelled in recent years by significant technological advances, manufacturer alliances, the adoption of standards and good old pioneering ingenuity.

Several new companies have risen to become near-ubiquitous in the audio networking industry; and many of the old favorites have added network compatibility to exiting product lines or have introduced entirely new divisions to take advantage of the new paradigm. While this is old news to some, many other audio systems designers, engineers and facility owners find themselves wondering what the fuss is all about. This article offers an overview into two of the biggest trends in networked audio: Ethernet-based systems and storage area networks (SAN).

Rewind

The most popular standard of networking in use today, Ethernet, is actually the oldest. Ethernet even predates personal computers, having been developed around 1973 by Xerox engineer Robert Metcalfe, who later founded 3Com.

QSC RAVE routing system

In an oft-repeated quote, Metcalfe exemplifies the era: "I came to work one day at MIT and the computer had been stolen, so I called DEC to break the news to them that this $30,000 computer that they'd lent me was gone. They thought this was the greatest thing that ever happened, because it turns out that I had in my possession the first computer small enough to be stolen!"

In keeping with the manifest-destiny atmosphere at the time, Metcalfe was asked to build the first data networking system to facilitate the inter-office use of Xerox's latest prototype: the laser printer. His challenge was to enable over 100 computers within one office to, in an orderly fashion, use the same device.

The key to his design was in assigning unique addresses (taking a nod from the recently developed Network Control Protocol, precursor to what became the Internet) to each "node" in the system, thereby allowing multiple disparate bursts of data packets to be routed in an orderly fashion. Metcalfe and his research team's Ethernet specification defined both the physical connections and media and the packets by which information is transmitted over a local area network (LAN).

This original Ethernet protocol, also known as 10BASE-T, transmits data between computers at a rate of 10 Mbps (10 megabits per second). Improvements in data transmission speed have spawned new Ethernet protocols including Fast Ethernet or 100BASE-T, supporting transfer rates of 100 Mbps, and Gigabit Ethernet or 1000BASE-T, supporting data transfer rates of 1,000 Mbps (1 gigabit).

Ethernet installations use inexpensive interconnecting cable similar to install-grade telephone cable called Category 5 (CAT-5). CAT-5 is an unshielded twisted pair (UTP) data grade cable which supports lengths up to approximately 100 meters before electromagnetic interference (EMI), signal radiation and attenuation problems threaten data integrity.

Ethernet is the most widely implemented networking standard in use today, connecting an estimated 50 million "nodes" in LANs worldwide. As can be expected with technology of this vintage and ubiquity, Ethernet components are generally inexpensive and readily available, making it attractive to developers for use in a number of alternate applications, including pro audio.

Crest Audio NextSys Ethernet-enabled amplifier

Ether Way

The adoption of Ethernet into the contracting, install and other segments of professional audio has been fast and furious — some say revolutionary. Protocols developed by Peak Audio (CobraNet) and Digigram (see Digigram EtherSound First Look, p. 36) are actively being licensed to many original equipment manufacturers (OEM) for incorporation of their technology in a surprisingly wide variety of pro

continued on page 28 ➤

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Been thinking about SAN?

"All I have to say is that the A/V SAN system has been bulletproof. Tracking...Editing...Mixing....our SCSI drives could not deliver what this system delivers. For every album. Every session. Every time. It's one less thing to worry about, and lets me concentrate on making great music"

~Bob Rock

"Installed in one day, recording in three rooms the next...it's been flawless. A/V SAN PRO finally let me get my assistant engineer back in the studio and out of hard drive hell."

~Pat McMakin/Sony-ATV"

"The SNS A/V SAN is a key part of my Pro Tools setup. It's fast, reliable and simple to use. I couldn't imagine life without it. The reliability factor was key in my decision and my SNS A/V SAN has not disappointed me one bit in its performance. Now, when I go home I can sleep instead of worrying about losing a client's project because of a crash from a slow hard drive."

~Jeff Balding

After investigating SAN technology for over a year, it was clear that SNS had the only system to meet our needs. Since installing the A/V SAN PRO, our Pro Tools systems have been rock solid, and we no longer have the headaches of SCSI drives."

~Kevin Dillon/Crescent Moon Studios

"The people at SNS care about their product, and they care about what we are doing with it. From sales to support, service is exceptional and the reliability of the system speaks for itself."

~Vidfilm/Technicolor

"After recording a live show that was over an hour long, straight into Pro Tools 48 tracks at 96k, the SNS system proved to be totally bulletproof."

~Steve Greco/Dreamhire

Users trusting A/V SAN instead of SCSI:

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blackbird studios
bob rock
chris fogel
crescent moon studios
dreamhire
fx rentals-london
improper channels inc.
jeff balding
metallica
music cafe
new line cinema
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➤ Networking from page 26

audio products. Other manufacturers making proprietary Ethernet-based systems include Yamaha (mLAN protocol), Peavey (MediaMatrix CobraNet-based system), Otari (ND-20/mLAN compatible) and Gibson Labs (MaGIC protocol/system). A sure sign Ethernet-based systems had arrived in pro audio was when Neutrik introduced its innovative EtherCon series of professional CAT-5 connectors. Upping the ante is 360 Systems delivering an Ethernet-enabled DigiCart recorder designed to be the main actor in facility-wide Ethernet production systems. Logitek's Remora is an Ethernet-based modular console mixing/routing system.

Use of a data network based on Ethernet offers several powerful advantages over traditional multi-zone analog wiring schemes. Ethernet's inherent data handling capabilities, vaguely like a bi-directional multilane highway where every car has somewhere to go and knows how to get there (unlike driving in DC), makes it a natural for carrying and routing signals in a complex multi-zone audio installation.

Symetrix SymNet

Traditional analog wiring of a facility requires a large amount of cable and conduit, and installation is often disruptive or destructive. Ethernet-based systems use inexpensive CAT-5 cable (or fiber optic cable for longer runs). Also on the favor of networked audio is the elimination of discrete wiring "home runs" to (and from for bidirectional communication) each zone to the source master. In typical Ethernet systems, there can be multiple master or source nodes contributing audio/control data to the rest of the network. Downtime, repair efforts and cost are also reduced commensurate to the reduction of cable and connections in use in networked audio as compared to analog systems.

CobraNet, introduced by Peak Audio (now a Cirrus Logic company) several years ago, is by far the most conspicuous use of Ethernet in pro audio to date. Peak has established CobraNet as a standard for the transport of multichannel audio and control data over a Fast Ethernet LAN. By aggressively licensing its technology, Peak Audio has created a audio and data communications protocol that allows the connection of products and systems from many different manufacturers which can operate together or independently on the same CobraNet LAN.

Peak Audio's website lists as development partners twenty-four audio manufacturers, all of whom are developing or have released products designed to operate on a CobraNet LAN. Companies producing CobraNet products include: QSC, Peavey, Crest Audio, Rane, Whirlwind, Crown, Shure, BSS, Yamaha, Digigram, Symetrix, Gentner, D&R, Golden Sound, Linker, Renkus-Heinz, Richmond Sound Design, LCS, Ivie Technologies, Clear-Com, Creative Audio, Bose, Bi-amp, EAW and Mackie.

Peak Audio's website (www.peakaudio.com) provides links to all of the above manufacturers for more information on their range of CobraNet products.

SAN Gets Everywhere

One of the other major movements towards networked data in pro audio is the proliferation in production studios of the storage area network or SAN. The rate of adoption among studios of bandwidth-intensive technologies — high resolution audio, multichannel surround sound, high-definition digital video and other "rich media" formats — is outpacing the ability for traditional storage solutions to keep up with the load. Enter the SAN.

Industry standard RAID tower, this one from Storage Tek.

A SAN distributes its resources over a scalable, redundant network of storage devices and servers, allowing many users to simultaneously access the same media without delay or reduction in quality of service (QoS). The SAN concept is based on a high speed interconnection technology called Fibre Channel, which allows transfer rates of up to one gigabit per second (far faster than the current SCSI maximum of 160 Mbps) and allows optical cable runs of up to 10 kilometers.

Studio Network Solutions A/V SAN

Several new start up and existing storage-oriented companies have focused their sights on the burgeoning market of rich media production, tailoring SCSI and Fibre Channel SAN systems specifically for the audio/visual markets. Companies

Rear panel of Yamaha's ACU16 Ethernet-based amplifier controller/router

World Radio History

such as Rorke Data, Storage Tek, PESA, Studio Network Solutions, Glyph Technologies and others offer a variety of scalable hardware systems and custom systems designs tailored to suit the facilities need.

Glyph Technologies X-Project FireWire-based storage

Some companies are producing self-contained SAN solutions that install in minutes and possess the familiar studio control room just-another-rackmounted-piece-of-gear look, removing much of the confusion and work involved in "going SAN." Glyph, for instance, popularly known for their long association with Digidesign Pro Tools audio and Avid video workstations, have added an array of self-contained SAN solutions and networked products including the Coba NetMedia Manager.

Perhaps Studio Network Solutions (SNS) has made the biggest splash in the pro audio market, going from a regional storage solutions provider to a full-scale Fibre Channel SAN hardware and systems design provider recognized throughout the industry in an incredibly short period of time. The company, founded in 1998, gathered a large amount of attention at the last several AES audio conventions with impressive demonstrations of their A/V SAN and A/V SAN PRO rack-mounted Fibre Channel products.

Otari ND-20

A/V SAN is a single rack unit/single user SAN that can be fitted with up to four drives and is designed to provide an easy-to-implement Fibre Channel storage solution at entry-oriented prices. A/V SAN's bigger brother, the three rack unit A/V SAN PRO is completely scalable in storage size (up to 15 drives/enclosure) and can accommodate to up to 20 simultaneous users.

Logging Off

The trend towards the use of networked technologies in pro audio is ever increasing, seemingly to the benefit of all working in the industry. Increased performance, better reliability, more user choices and easier installs are just a few of the gains to be realized by the proliferation of network-based audio systems.

Stephen Murphy is studio editor for Pro Audio Review.

World Radio History

Genex GXA8/GXD8 Converters

BY DR. FREDERICK J. BASHOUR

In my continuing quest for better sound, I habitually audition every new digital converter I can get my hands on. When I learned that the new pair of Genex converters featured every standard sample rate known to man, plus DSD conversion, I simply had to try them out.

FEATURES

The twin two-rack-space Genex units, the GXA8 (the A/D box) and the GXD8 (the D/A box) comprise a complete eight-channel conversion set, with eight balanced analog line inputs, eight balanced analog outputs, and eight channels of AES/EBU I/O as well. The closest comparison would be to the Apogee AD-8000, which performs both A/D and D/A functions within the same two-rack-space unit but which, unfortunately, does not convert above a 48 kHz sampling frequency.

Another similarity between the Apogee and Genex units is that both offer the possibility of I/O option card slots in the rear panel; Apogee has four, the Genex boxes have two each. Each of my review units was supplied with AES/EBU and DSD cards since, when operating at the highest sampling rates (176.4 kHz and 192 kHz PCM as well as DSD), the dual-wire protocol effectively halves the number of I/O channels. Thus, the standard built-in AES/EBU connectors support eight channels at sample rates from 44.1 to 96 kHz, but only four at the two highest rates; the extra AES/EBU card gives you the other four. Each of the DSD option cards contains eight BNC connectors, which mate easily (via a

continued on page 32 ➤

Fast Facts

Applications:
High end recording and editing.

Key Features:
Multiple PCM sample rates (from 44.1 kHz to 192 kHz) and DSD; numerous I/O options

Price:
$3,345 (GXA8), and $2,995 (GXD8). Expansion I/O cards are $395 to $595 each, with the exception of the DSD output card, which is $1,695 (and the converter must be made ready for it at the factory).

Contact:
Genex at 310-828-6667, *www.genexaudio.com.*

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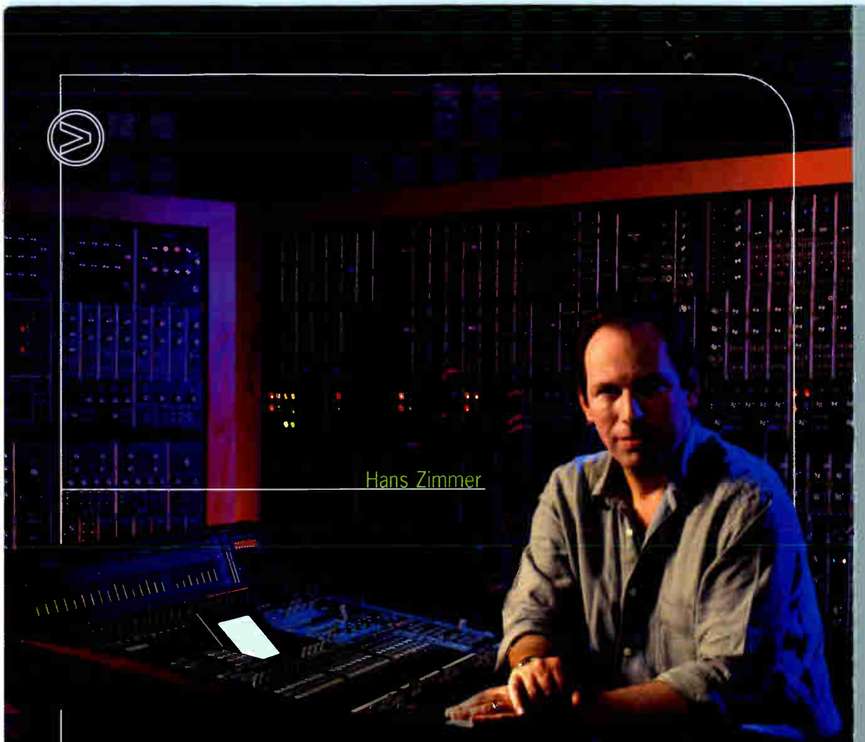
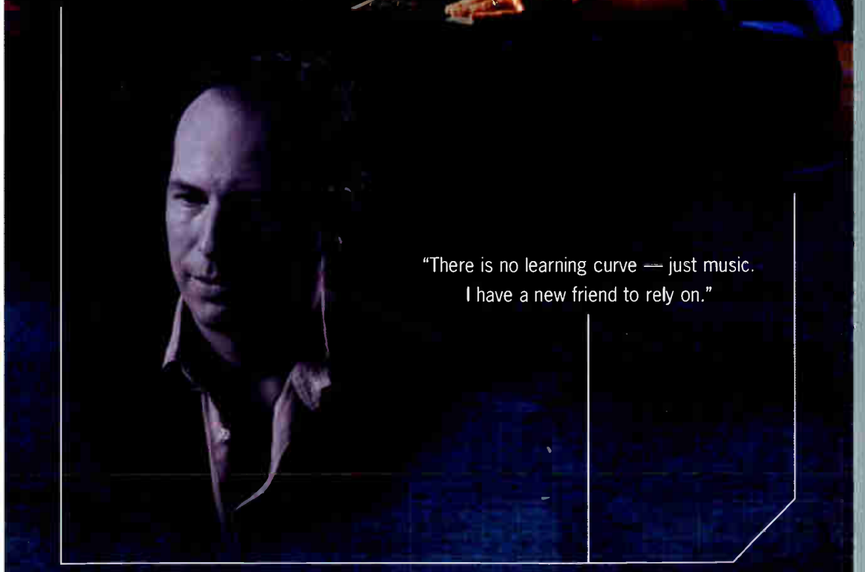


Hans Zimmer



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Broadcasters General Store, Inc.	2480 Se 52nd St.	Ocala	FL	34480-7500	352-622-77
Brook Mays Professional Recording Sales	8701 Carpenter Fwy. Suite 250	Dallas	TX	75247	888-286-05
Comprehensive Technical Group, Inc.	2195-G DeFoor Hills Road	Atlanta	GA	30318	404-352-30
Cutting Edge Audio Group	290 Division St., #103	San Francisco	CA	94103	415-487-23
Dale Electronics Corp	7 East 20th St.	New York	NY	10003	212-475-11
Engineering And Recording, Inc.	2641 E McDowell Rd.	Phoenix	AZ	85008-3641	602-267-0
Full Compass Systems, Ltd.	8001 Terrace Ave.	Middleton	WI	53562	608-831-7
Harris Audio Systems, Inc.	1962 N.E. 149th St.	Miami	FL	33181	305-944-34
Hollywood Sound Systems	1541 North Wilcox Ave.	Hollywood	CA	90028-7308	323-466-24
ICB Audio Company	1738 Tennessee Ave.	Cincinnati	OH	45229-1202	513-482-3
KLA Laboratories, Inc.	6800 Chase Road	Dearborn	MI	48126-1749	313-846-3
Leo's Professional	5447 Telegraph Ave.	Oakland	CA	94609-1921	510-652-15
Location Sound Corporation	10635 Riverside Dr.	North Hollywood	CA	91602-2341	818-980-98
Magic Audio, Inc.	3601 Vineland Rd. Suite 9	Orlando	FL	32811	407-649-6
Morgan Sound, Inc.	2004 196th St SW # 2	Lynnwood	WA	98036-7076	425-771-7
Ozark Pro Audio	Rt 1 Box 47A	Carrollton	MO	64633	660-542-08
Parsons Audio	192 Worcester St.	Wellesley Hills	MA	02481	781-431-8
Sam Ash Professional Audio Group	1600 Broadway 8th Flr.	New York	NY	10019-6832	212-586-1
Sound Productions, Inc.	10430 Shady Trail Suite 104	Dallas	TX	75220-2525	214-351-5
Washington Professional Systems, Inc.	11242 Grandview Ave.	Wheaton	MD	20902	301-946-3
Westlake Audio, Inc.	7265 Santa Monica Blvd.	Los Angeles	CA	90046-6717	323-851-9
Wind Over The Earth, Inc.	3063 Sterling Circle #4	Boulder	CO	80301	303-443-9

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For additional information, please call (714)522-9000 • www.yamaha.com/proaudio

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Elliott Scheiner's DM2000 Console was built and provided by Sound Construction & Supply, Inc. For a complete product listing go to www.soundconstruction.info

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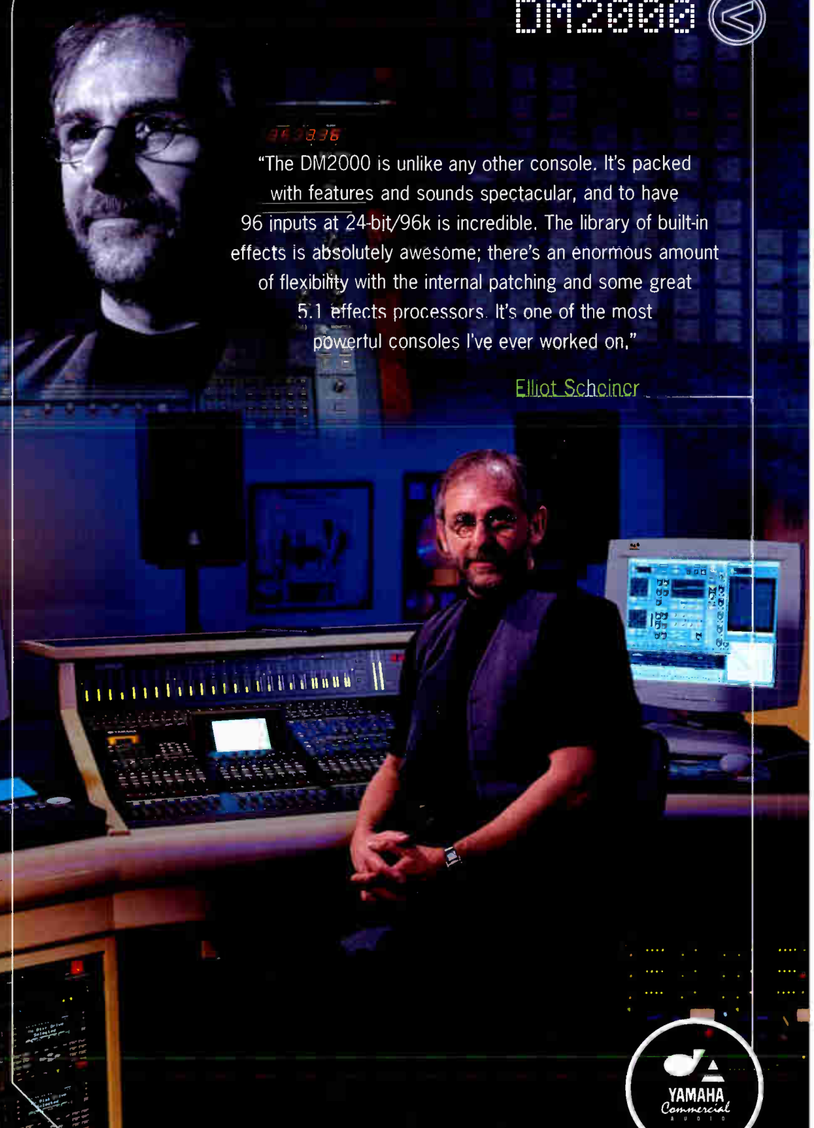
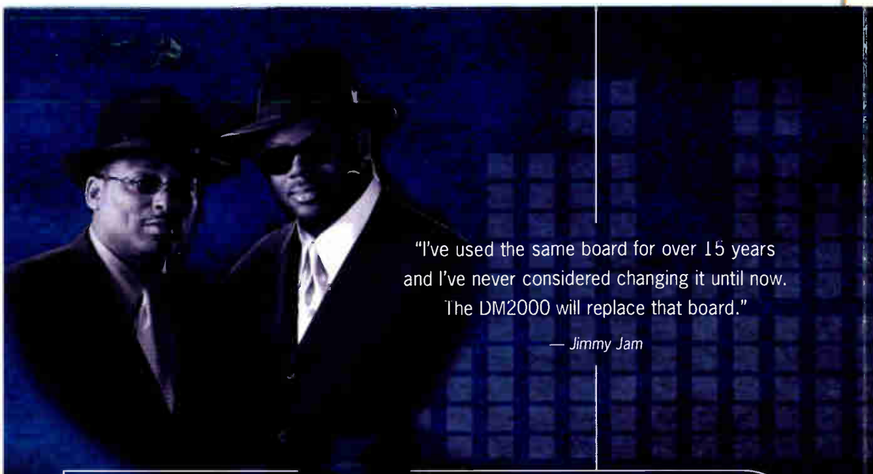
DM2000



"The DM2000 is unlike any other console. It's packed with features and sounds spectacular, and to have 96 inputs at 24-bit/96k is incredible. The library of built-in effects is absolutely awesome; there's an enormous amount of flexibility with the internal patching and some great 5.1 effects processors. It's one of the most powerful consoles I've ever worked on."

Elliot Scheiner



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— *Jimmy Jam*

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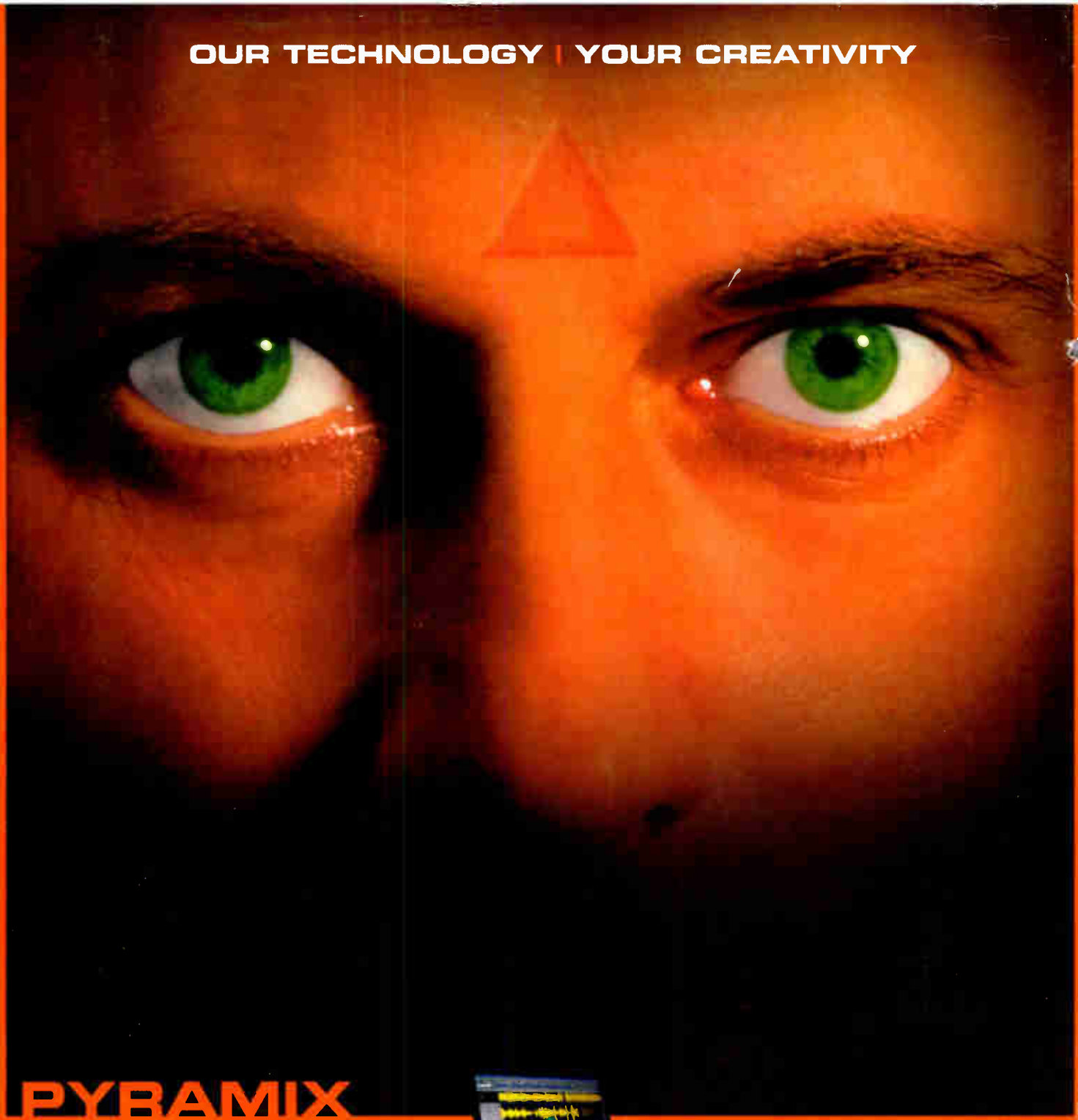

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Liberty Livewire Buys 104 Digi Systems

West LA Music (www.westla-music) sold 104 **Digidesign** (www.digidesign.com) Pro Tools MixPlus digital audio workstations to Liberty Livewire. Liberty's properties are better recognized as Todd-AO, Soundelux (the post house) and the operation formerly known as Glen Glenn Sound. Included in the package were also Digidesign I/O hardware and a software bundle that includes **Waves** TDM Gold Bundle (www.waves.com).

On another DAW front, **Steinberg**'s Nuendo (www.nuendo.com) platform was used by engineer Frank Filipetti for Korn's latest album. Filipetti also used **Euphonix** R-1 hard disk recorders on the album (www.euphonix.com). Chuck Ainlay used Nuendo for recent projects including Mark Knopfler, Robert Earl Keen and Nate Barrett.

Steinberg's Cubase platform was used by composer Paul Haslinger in film scores for *Crazy/Beautiful* and *Behind Enemy Lines*.

Berklee College of Music has added **Propellerheads**'s Reason music production software to its computer workstations (www.propellerheads.se, www.midiman.net)

VocALign, a synch software from **Synchro Arts** (www.synchroarts.com), has become a popular tool for Ronnie Kimball, post mixer for CBS's daytime soap, *The Young and the Restless*.

Fairlight (www.fairlightusa.com) must be providing Frequent Flyer Miles for Howard Schwartz Recording in New York City. The studio has purchased three DREAM Satellite digital audio workstations along with a MediaLink server and ServerSound library system. All that joins previously installed Fairlight MFX3plus workstations.

New Prodigy2 48-track DAW/mixers were purchased by Howling Trout studio in Manhattan and Audio Plus Video International in Northvale, New Jersey. Slightly to the south of the Big Apple and its environs, Sao Paulo, Brazil, to be exact, Mosh Studios took delivery on a 48-track Fairlight Merlin hard disk recorder.

A **Yamaha** AW4416 DAW was used on Boz Scaggs's most recent album, *Dig* (www.yamaha.com/proaudio).

Cube-Tec (www.cube-tec.com), a high-end DAW builder distributed in the US by Sascom (www.sascom.com), has announced several sales of its systems. Emil Berliner Studios in Berlin has agreed to purchase eight systems. Radio Swiss Romande purchased two Quadriga systems and Swiss Radio DRS ordered another. In the US the Smithsonian, Wolf Productions, Sterling Productions (all in the Washington DC area), Chace Productions, the Sounding Post (both in the LA area), New York's Absolute Audio, the Image Group, Vidipax and the Criterion Collection, Chicago's Castek Systems Solutions and Falcon Pictures Group and Master Mix Studios in Minneapolis have all purchased Cube-Tec systems. Bernie Grundman Mastering also upgraded its AudioCubes and bought another.

In other sales, National Public Radio (NPR) bought 25 **Neumann** U 87 Ai large diaphragm condenser mics for its new LA facility (www.neumannusa.com).

Vocalist Vonda Shepard is using Neumann's KMS 150 live sound mic for her live gigs. Jazz musician/singer Jon Regen is using Neumann KM 184s for his piano and a KMS 105 for his vocal mic. Classical guitarist brothers Assad, Sergio and Odair, accompanying violinist Nadja Salerno-Sonnenberg on tour are using KM 184s for the guitars.

Isaac Hayes with the Sennheiser/Neumann "Hybrid" mic at the Rock and Roll Hall of Fame.

KM 184s were also used in the score for *Lord of the Rings*. John Kurlander (also composer) used three Neumann M 150 mics as his main mics while the KM 184s were used for spot and support duty.

The **Sennheiser**/Neumann "Hybrid" mic (Neumann KMS 105 capsule on a Sennheiser 5000 wireless transmitter) was used at March's 2002 Rock and Roll Hall of Fame induction.

In other mic activity, Soundelux's U 99 was used on Alison Krause's latest CD, *New Favorite* (www.transaudiogroup.com).

Tower of Power's latest tour features **AKG** C 900 (vocals), D 440 (trumpets), D 550 (baritone sax and Hammond B3 organ), C 419 (tenor saxes) mics, WMS 81 wireless microphones (vocals) and IVM in-ear monitors (www.akgacoustics.com).

Paul McCartney's first tour in ten years features **Shure**'s UHF series wireless mics and a Beta 58A for vocals (www.shure.com).

And finally, Sennheiser is a sponsor of the **International Songwriting Competition.** Sennheiser is donating several Evolution mics as prizes. Struggling songwriters should visit www.songwritingcompetition.com for more info.

NEXT MONTH IN PAR

In the October 2002 issue, Pro Audio Review takes a look at digital audio workstations and previews the AES 2002 show. Also not to be missed is our Digital Audio Workstations Buyers Guide. As always, look for reviews of professional audio equipment for recording studios, project studios, contractors, live sound and post production.

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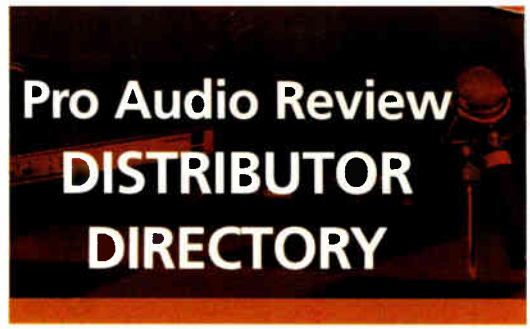

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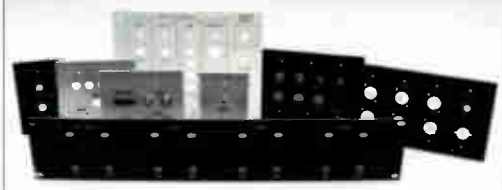

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➤ Soundcraft Spirit from page 49

preamps in this board are clean and quiet and the EQs (which I used conservatively) are very powerful. Using a pair of Audix SCX25s on the piano and an Audio-Technica 4051 in the room, I was able to get an image with which we were both very pleased. It was very detailed, capturing all the warmth of the Steinway, with just a hint of the room sound. For monitoring, I used the M12's P/B outs to a pair of powered monitors.

The M12 seems ideal for live sound work too. There are enough XLR inputs to mic a small band and with all those inserts, dynamics control is attainable. With four auxes there you can have a couple of stage monitor mixes and some effects sends too. There are plenty of inputs for effects returns and external devices such as CD, video audio and more. I also liked the fact that Spirit has used an internal power supply, unlike their FX series boards which use an in-line, external supply. My only beef with this board is that it does not have 16 mono channels (for use with two MDMs). However, given the space constraints, Soundcraft has done an excellent job at packing this little console full of useful features.

Fast Facts

Applications:
Studio, broadcast, post production, location recording, live sound, educational, multimedia

Key Features:
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Price:
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Contact:
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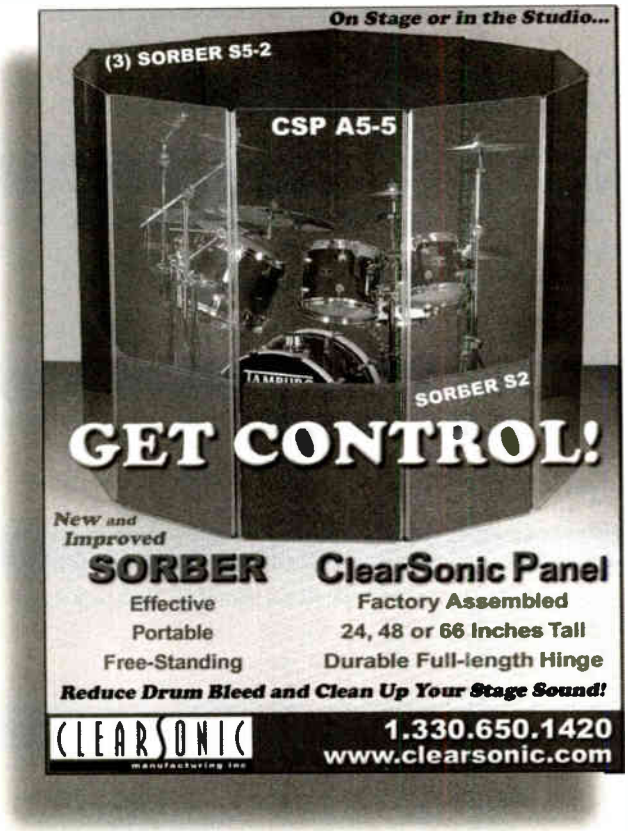
SUMMARY

I think the world really does need another compact mixer, especially if it is as competent and stylish as the Spirit M12. This little board packs many features and Soundcraft quality into an affordable little package. The M12 would be right at home just about anywhere - recording studios, nightclubs, schools, you name it.

REVIEW SETUP

Audix SCX25, Audio-Technica ATM4051 microphones; TASCAM DAP1 DAT recorder; Mackie HR824 powered monitors.



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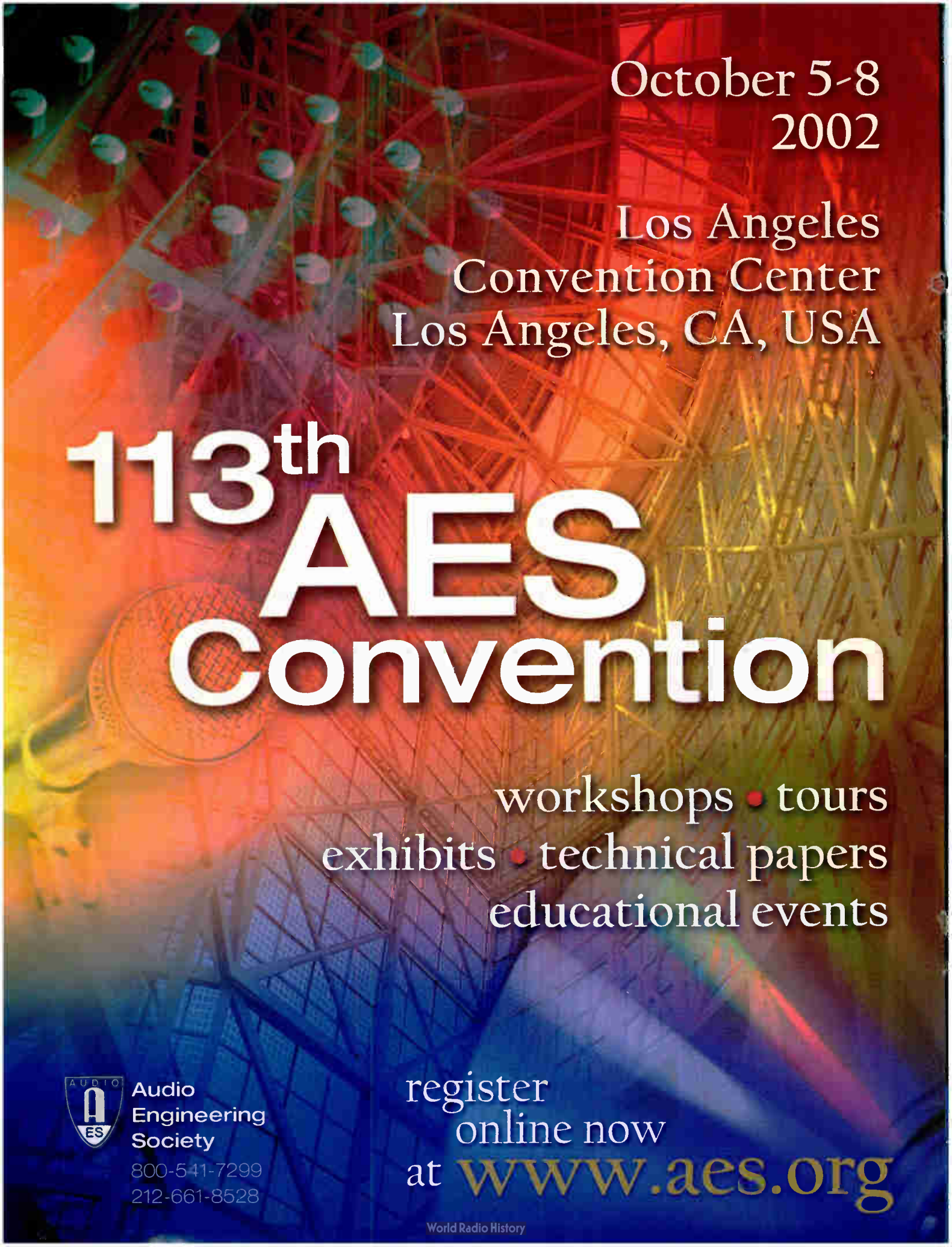

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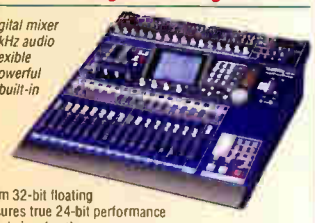
Available in 12 (CFX-12), 16 (CFX-16) and 20-channel (CFX-20) configurations, the CFX mixers incorporate digital effects and a 9-band graphic EQ to offer all-in-one compact mixing solutions. Based on developments made for the Mackie Digital 8-Bus Mixer the 32-bit EMAC (Extended Multiplication and Accumulation) effects processor found in the CFX Series sounds clean and realistic rivaling many outboard processors.

All Input Channels Feature: Pan, Mute, PFL solo, 2 Aux Sends with balanced 1/4" outs (switchable pre/post), external and internal EFX Send
Input Channels: Mic/Line inputs feature low-noise, high-headroom mic preamps, 3-band EQ with 100Hz 18 db/ octave low-cut filters • Stereo Line Inputs 4-band EQ on stereo line channels • Inserts
Subgroups: 4 Subgroup buses with 1/4" TRS outs and L/R assign
Effects: 32-bit Internal EMAC digital effects with 9 reverbs, 4 delays, phaser, chorus, flange; 2 parameter controls and an EFX wide spatial expander and bypass switch
Master Section: 9-band stereo low noise, low distortion, phase-coherent graphic EQ • Unbalanced RCA tape/CD I/D • Two stereo effects returns with balanced 1/4" inputs • 12-segment tri-colored LED meters
Outputs: Balanced XLR & 1/4" TRS main outs with inserts • Balanced XLR subwoofer output with built-in 18dB/oct. 75Hz crossover • Headphone out w/ level control • Extra 1/4" TRS stereo outputs with level control

TASCAM DM-24
Digital Mixing Console

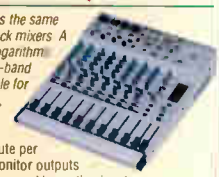
32-channel/8-bus digital mixer combines 24-bit, 96kHz audio quality with highly flexible routing, extremely powerful built-in automation, built-in professional-quality effects, dynamics processing and parametric EQ.



- Fully 24-bit, 96kHz compatible – Custom 32-bit floating point processor ensures true 24-bit performance throughout the digital signal path
- Flexible 32-channel/8-bus console with 6 aux sends
- High-quality, configurable Compressor and four band, parametric EQ on each channel – Channels 1-16 also feature a high quality Gate/Expander
- 16 mic pres, 16 balanced mic/line inputs on XLR & TRS jacks and 16 inserts • Digital I/O included as standard: 24 channels of TDIF, 8 channels of ADAT, (2) two channel AES/EBU and (2) two channel S/PDIF
- Two option slots are also provided for additional AES/EBU, TDIF, ADAT & Analog interface modules or a Cascade module for linking two DM-24s together • Powerful built-in automation (no computer required)
- (2) built-in, fully editable effects processors with reverb, spatial effects and mic/speaker modeling effects developed by TC Works, Antares and TASCAM
- Comprehensive user interface, featuring large LCD screen and LED ring encoder • (17) 100mm touch-sensitive moving faders
- Optional MU-24 meter bridge
- 4 assignable sends and returns also configurable as inserts for tape return path • Phantom power switchable in groups of four
- The perfect companion mixer for the MX-2424

BEHRINGER MX-1604A
12x2x2 Desktop Rack Mixer

Behringer's smallest mixer yet maintains the same high standards as the rest of the Eurorack mixers A total of 12 input channels with 60mm logarithm faders, even on the ALT 3-4 bus outs, 3-band EQ and balanced I/O throughout. Suitable for live sound, desktop music workstations, non-linear video, fixed installations.



- 12 inputs- 4 mic/line and 4 stereo
- 2 aux sends, 3-band EQ and Solo/mute per channel • 1/4" balanced Master & Monitor outputs
- 1/4" balanced Mute 3/4 Bus Outs (accessed by muting input channels) • Stereo RCA tape inputs & outputs
- 1/4" Headphone out with level control • 2x stereo aux returns

SHURE FP33
Portable 3-Channel Stereo Mixer

- Used the world over for remote audio recording, ENG/EFP applications and location film production • 3 XLR-balanced mic/line inputs with 48V/12V phantom and 12V T (A-B) power
- Light enough, small enough and rugged enough to take anywhere
- Two outputs • Center detented pan pots for each input channel
- Built-in oscillator • Two headphone jacks • Tape out jack, and a monitor input for the headphone circuit • Exceptionally low noise design and wide dynamic range — ideal for digital transmission links or digital video/audio media, including DAT and recordable CD.

MACKIE. FR Series
High Current Power Amplifiers

The FR Series Fast Recovery power amps from Mackie use traditional designs such as massive toroid transformers, huge storage capacitors, state-of-the-art output devices and cooling systems.

All FR Series Power Amps Feature–
- High continuous current output
- Fast Recovery design • Built-in variable low-cut filters
- Switchable limiters • XLR and TRS input with XLR signal pass-through
- 5-way binding posts and 1/4" or Speakon outputs • T-Design cooling with front inlet and side outlets • Detented gain controls • Selectable stereo, mono and bridged amp modes • Massive toroid transformers

QSC AUDIO RMX Series
Power Amplifiers

Model	Watts/Channel		
RMX	8Ω	4Ω	2Ω
850	200	300	430
1450	280	450	700
2450	500	750	1200

- Up to 2400 watts in 2 rack spaces
- 3-year warranty plus optional 3-year extended service contract
- High-current toroidal transformers • Independent user-defeatable clip limiters, DC and thermal overload protection on each channel
- Selectable low-frequency filters @ 30or 50 Hz • Balanced 1/4" XLR and barrier strip inputs • Binding post and Neutrik Speakon outputs
- Front mounted gain controls • Signal and Clip LED indicators

CROWN CE1000/2000
Power Amplifiers

CE 1000
Stereo 560W @ 2 ohms
450W @ 4 ohms
275W @ 8 ohms
Bridged 1100W @ 4 ohms
900W @ 8 ohms
CE 2000
Stereo 975W @ 2 ohms
660W @ 4 ohms
400W @ 8 ohms
Bridged 1950W @ 4 ohms
1320W @ 8 ohms

- 1/4" T.R.S, XLR and barrier strip inputs
- Neutrik Speakon output connectors
- Proportional fan-assisted cooling
- SST module allows customized features such as stereo crossover capabilities
- Short circuit protection
- 3- Year, No-Fault Warranty

MACKIE. SRM-450
Bi-Amplified Sound Reinforcment Monitor

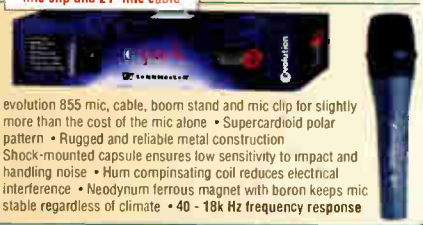
- FR-Series 300W low frequency and 150w high frequency amplifiers
- 24dB/Octave Linkwitz-Riley electronic crossover
- 45Hz to 20kHz frequency response
- 300mm long-throw low frequency transducer
- High-output precision titanium compression driver
- Studio-quality maximum dispersion horn
- XLR balanced mic/line input and thru
- Level control w/ signal present and peak LEDs
- 75Hz low cut and +3dB 100Hz and 12kHz contour switches • Electronic time correction, phase alignment and equalization • Timed power down • 51lbs.

audio-technica. U100 Series
UHF Wireless System

- 100 Phase Lock Looped channels in the 728.125 - 740.500 MHz UHF frequency band avoids interference from DTV frequency bands
- 300' operating range typical
- True Diversity operation • Balanced XLR output with level control • 5-7 hour life using a single 9 volt battery (7-9 hrs for transmitters)
- Headphone jack with volume control
- **ATW-T101 Body-pack Transmitter** - Available with AT831 cardioid or MT830 Omni-Directional Lav mics
- **ATW-T102 Plug-on Transmitter** - 3-pin XLR input for use with all dynamic and most self powered mics

SENNHEISER e Pack 855
evolution Mic kit

Includes the PM200 mic stand mic clip and 21' mic cable



- evolution 855 mic, cable, boom stand and mic clip for slightly more than the cost of the mic alone • Supercardioid polar pattern • Rugged and reliable metal construction
- Shock-mounted capsule ensures low sensitivity to impact and handling noise • Hum compinsating coil reduces electrical interference • Neodynum ferrous magnet with boron keeps mic stable regardless of climate • **40 - 18k Hz frequency response**

JBL EON Power 15 G2
15-Inch Full-Range Bi-Amplified Speaker

- 300 watt LF and 100 watt HF amplifiers
- 15" neodymium Differential Drive LF driver and a 1.75" ferro-fluid cooled compression driver with a titanium diaphragm
- The Loop/Mix output allows you to daisy-chain any number of EON speakers or send a mixed signal directly to a main PA.
- Two 1/4" line inputs with independent level control for keyboards, pre-amped guitars, basses, CD players or an input from a mixer.
- Hi and Low frequency EQ controls
- 42 Hz - 17 kHz frequency respons ±3 dB
- Accepts 110 - 230 VAC, 50 - 60 Hz

SENNHEISER evolution 100
UHF Wireless System

Includes Mountable UHF Receiver, Bodypack Transmitter with Lavalier Microphone & Plug-On Transmitter

- UHF wireless system operates in the 630-662 MHz frequency range • PLL Synthesized • HDX noise reduction • Total of 1280 available frequencies
- 60 - 18k Hz frequency response
- **EK100**- Camera mountable UHF receiver with 4- preset memory locations, Mute switch, 1/8" output
- **SK100**- Body pack transmitter available with an ME-2 omnidirectional electret lav mic, > 8hrs with alkaline 9V
- **SKP100**- Plug-on transmitter with XLR input for dynamic and self powered mics, > 8hrs with alkaline 9V

SHURE BETA 57A & 58A
Dynamic Mics

In the tradition of the SM57 and SM58, these two microphones are of the same basic shape, but feature a higher output, better gain-before-feedback and a wider frequency response. The Beta57A is tailored towards instrument applications while the Beta58A is best suited for live vocals.

They Both Feature-
- Supercardioid polar pattern
- High output neodymium element
- Pneumatic shock mount reduces handling noise
- Hardened steel mesh grille resists wear
- **50Hz to 16kHz frequency response**

BETA 57A BETA 58A

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LIVE / STAGE

Roland VS-2480
24-Track Digital Studio Workstation

24-track/24-bit digital recording hard disk tabletop recording workstation with user-selectable sampling rates up to 96kHz. Integrated 64-channel digital mixer with 17 motorized faders. Up to 8 onboard stereo effects processors. Features include Mouse, ASCII keyboard inputs (PS/2 mouse included) and an external VGA monitor output provide access to software-style editing and control.

- 24 bit digital recording with user-selectable sampling rates up to 96kHz and 56-bit processing
- 24 track playback (12 tracks @ 96kHz) and a total of 384 virtual tracks (16 per track)
- Up to 16 tracks can be recorded simultaneously
- 1000 markers, 100 locators and 999 levels of Undo
- 24-voice Sample Phrase Pads for triggering and arranging samples directly from disk
- Includes 30GB IDE internal hard drive • Audio CDs and data can be backed-up quickly and easily using the optional VS-CDRII CD Recording System
- 320 x 240 dot backlit LCD
- Mouse and ASCII Keyboard Inputs for software-style editing and control • VGA output connection
- ***64-ch, 34-bus Digital Mixer with 17 Motorized Faders*** to control inputs, tracks, auxes and effects returns as well as MIDI info.
- 16 rotary encoders • 100 mixer scenes • Onboard dynamics and 4-band EQ per channel
- ***Up to 8 Onboard Stereo Effects Processors***
- ***Total of 36 Inputs and 32 Outputs***
- Coaxial and optical digital I/O
- SCSI connection to the optional VS-CDRII or external hard drives
- MIDI In & Out/Thru

Also available **VS-2480CD** with Built-in CD burner

Antares AVP
Antares Vocal Producer

- Combines Auto-Tune Pitch Correction and Microphone Modeling Along With a Full Complement of Vocal Processing Functions • Analog Tube Modeling • Variable Knee Compressor • Downward Expander/Gate
- Variable Frequency De-Esser • Two band Parametric EQ
- Automatic Mono or Stereo Double Tracking • Fully Programmable
- Factory Presets for a Wide Variety of Vocal Styles • Full MIDI Automation
- Virtually every major function is only a button press away

t.c. electronic M-One XL
Dual Effects Processor

- 25 incredible TC effects: XL Reverbs, Chorus, Tremolo, Pitch, Delay, Dynamics and more • XLR connectors - Dual I/O
- Analog-style User Interface • Presets: 200 Factory/100 User
- Dual-Engine design • 24 bit A/D-D/A converters
- S/PDIF digital I/O, 44.1-48kHz • 24 bit internal processing
- Enhanced Early Reflections & Reverb Tails
- Improved Reverb Density
- Small Rooms - NEW!!!

Focusrite Platinum 5 Penta
Stereo Compressor and Class A Mic Pre

High Impedance Instrument Input • Works as a mono compressor when recording or as a stereo compressor, without the mic pre when recording or mixing • Image width enhancer • 16 preset compression settings that can be freely adjusted for individual needs • Side chain inserts for each channel • Balanced 1/4" ins and outs (accepts unbalanced connectors) • Front panel balanced XLR mic and high impedance 1/4" instrument inputs • Optional 44.1, 48, 88.2 or 96 kHz 24-bit S/PDIF digital output with BNC word clock input

PreSonus Digimax
8-Channel Mic Pre with Digital Outs

- 8 Dual Servo Mic Preamps with UltraWide dynamic range and very low noise operating levels • Dual Domain limiter on every channel
- EQ enhance, pad and phantom power on every channel
- 1/4" instrument inputs on channels 1 and 2
- Phase reverse on channels 1 and 2 • Eight 24 bit ADC converters
- 24-bit Light Pipe and S/PDIF digital outputs • AES/EBU digital outputs are available as an option • External clock sync input and Master clock output • 1/4" milled aluminum panel with blue anodized knobs

SHURE KSM-44SL
Multi-Pattern Condenser Microphone

Premium vocal microphone for studio recording

- Dual 1-inch, gold-layered, Mylar diaphragms
- Class A, discrete, transformerless preamplifier
- Cardioid, omni and bi-directional polar patterns
- Subsonic filter eliminates rumble below 17 Hz
- Integrated 3-stage pop grille and shock mount
- 15 dB pad and 3-position low-frequency filter
- Includes ShureLock elastic-suspension shock mount, swivel mount, protective pouch and locking aluminum carrying case
- **20 Hz - 20 kHz frequency response**

TLM-103
Cardioid Condenser Microphone

The TLM 103 utilizes the tried and true transformerless circuit found in numerous Neumann microphones along with a large cardioid diaphragm capsule to provide an acoustically well-balanced mic with low self-noise and high sound pressure level transmission.

- Large cardioid capsule derived from the U 87
- Pressure gradient transducer
- Available in satin nickel and matte black
- Includes an SG 103 swivel mount and a wooden jeweler's box • Optional EA-1 suspension mount
- **Frequency range 20 Hz–20 kHz**

AKG 414 TL II
Vitnage TL

Free AKG K240M Headphones w/purchase!

Combines the best of old and new: legendary C12 acoustics and the latest generation of C414 transformerless FET electronics. Although similar in design and shape to the C414BULS, the TLII features a capsule that is a faithful sonic recreation of the one used in the classic C12 tube mic combined with computer-aided manufacturing techniques that assure greater uniformity in response from mic to mic.

- Cardioid, hypercardioid, omnidirectional and figure 8 polar patterns • Warm, smooth microphone that is suitable for high-quality digital recording. • **INCLUDES SHOCKMOUNT**
- **Frequency response 10Hz to 20kHz**

TASCAM CC-222 NEW
Combination Cassette & CD Recorder

- CD Recorder and Cassette Deck in 3-U rack mount • RIAA phono input for direct connection of turntable • Independent RCA analog inputs and outputs for CD recorder and cassette deck
- Deck can be used independently • Headphone output w/ level control • Sync one touch CD record button • Auto ID sensitivity level • Incl. RC-222 remote

CD Recorder / Player Features– • Compatible with standard & consumer (audio only) CD-R and CD-RW discs • S/PDIF Coax and Optical Digital I/O • TEAC computer CD-RW drive mechanism • Timer play • Shuffle & program modes

Cassette Features– • Bi-Directional cassette mechanism • Record mute function • Dolby B Noise Reduction • ±12% Pitch Control on Cassette Deck • RTZ (Return To Zero)

HHB CDR-830/CDR-830 Plus
CD-RW CD Recorders

- Unbalanced RCA analog as well as coaxial & optical S/PDIF digital I/O
- 1 track, all tracks, and all tracks with finalize synchro recording • 24-bit
- Standard & audio only CD-R/W compatible • SCMS-free digital input • Digital input gain & balance controls • CD Text • 2x CD finalize • Infra-red remote

CDR-830 Plus Adds– • Balanced XLR analog I/O & AES/EBU (XLR) digital input

- SCMS management— create discs that cannot be copied, copied once or not copy protected • 8-pin parallel control interface • All functions on front panel
- 32 to 48 kHz sample rate converter • Word clock on BNC Connector

KRK V Series
Bi-Amplified Reference Monitors

These bi-amplified near field reference monitors are able to satisfy the most critical listening requirements. The separate built-in power amplifiers for each woofer and tweeter and true electronic crossover that tailors the power and frequency response specifically for each transducer combine to deliver the dynamic range and performance required for everything from digital production to 5.1 surround sound.

V-Series Feature-
- Magnetically shielded • Variable Gain +6dB to -30dB
- XLR - 1/4" TRS Combo plug inputs accommodate balanced and unbalanced line level signals

V4 Features-
- 1" Fabric Dome tweeter, 4" Woven Kevlar woofer
- 15 Watt HF & 30 Watts LF amplification
- 65Hz - 20kHz frequency response ±2dB
- Maximum SPL @ 1m: 101dB Music 104dB Peak

V6 Features-
- 1" Silk Dome tweeter and 6-inch Polyvinyl woofer
- Max SPL at 1m rated at 102dB Music, 105dB Peak
- 30 Watt HF and 60 Watt LF amplification
- 58Hz - 22kHz frequency response ±2dB

V8 Features-
- 1-inch Silk Dome tweeter & 8-inch Woven Kevlar woofer • 60 Watt HF and 120 Watt LF amplification • HF adjust (+1dB, Flat, -1dB) LF adjust -3dB @ 45, 50 & 65 Hz
- 47Hz - 23kHz frequency response: ±2dB
- Max SPL at 1m is rated at 110dB Music, 116dB Peak

marantz PMD 680/690
Compact Flash Recorders

- The PMD680 (monaural) and PMD690 (stereo) audio recorders capture high-quality digital audio files directly to PC Cards, Compact Flash or to an IBM Microdrive
- Audio data can be transferred to a computer for editing, or uploading to the Internet. • File formats include compressed MP2 and uncompressed .wav file. • Mark tracks recording for easy search during playback. • 2-Second Pre-Record Buffer • RCA Analog In/Out • Coaxial Digital Output • Built-In Microphone, Speaker and headphone output
- Includes an XLR and 1/4" Mic Input with -15/-30 dB attenuator. **PMD680** has a telephone jack and the **PMD690** a +48V phantom power for condenser mics

HHB MDP-500 PortaDisc
Professional Portable MiniDisc Recorder

- Balanced XLR mic / line inputs
- Switchable phantom power and limiting
- 6-second pre-record memory buffer
- **USB interface** allows real-time transfer of files to computer editing systems
- Coaxial and optical SPDIF digital I/O
- Built-in monitor speaker and back-up microphone
- Includes 8 x AA NiMH batteries, AC Adapter/ 100V-240V charger, soft case, carrying strap, and HHB MD80 MiniDisc

ALL ITEMS ARE COMPLETE WITH ALL ACCESSORIES AS SUPPLIED BY MANUFACTURER

World Radio History

Soundcraft Spirit M12 Multipurpose Console

BY ANDREW ROBERTS

Does the world really need another multi-purpose, compact mixer? I guess how you answer that question depends on how satisfied you are with the current crop of boards. There certainly are many choices out there. Now, Soundcraft has decided to stir things up with its line of Spirit M Series mixers. I received the M12 ($849), the largest in the group, for evaluation.

FEATURES

I hate to start a review by talking about cosmetics but this board mandates that I do. The M12 is the sportiest looking board I have ever seen. Its aerodynamic edges and brushed aluminum side extrusions make it look like one of those GT cars whipping around the track at the 24 hours of LeMans. You could raise your studio rate just by having it on the coffee table in the lobby. If you want to hit the road, just take off the extrusions and the M12 can be rackmounted. Enough talk about show, how about the go factor?

The M12 is 19.04 inches tall (11 rack spaces), 4.65 inches deep, 19 inches wide (19.93 inches in tabletop mode) and it weighs 19.7 pounds. It is a 16x2 board that packs 12 mono channels, four stereo channels and four stereo returns. The mono channels feature XLR mic inputs, 1/4-inch line inputs (TRS), 1/4-inch direct outputs (TRS) and 1/4-inch insert jacks. Additionally, each mono channel strip has controls for input gain, high-pass filter (switchable at 100 Hz), highs (12 kHz), mids (sweepable from 240 Hz to 6 kHz), lows (60 Hz), two prefade aux sends, two post-fade aux sends and panning. These mono channels also have pushbutton controls for mute, PFL and Direct Pre (to send a prefade signal out of the channel's direct output). Below the pushbuttons are LEDs for signal present (green), peak (red) and a long-throw, 100mm fader.

The stereo channels have dual 1/4-inch (TRS) input jacks, high EQ (12 kHz), low EQ (60 Hz), two pre and two post-fade aux sends, pan, mute, PFL and the same LEDs and 100mm fader as the mono channels. The stereo returns have dual RCA female inputs, gain controls and a peak LED.

The Master section of the M12 has attenuators for returns master, playback level, mono sum output, monitor, headphones and the four aux returns. Also, there are pushbutton controls for returns mute, P/B PFL, P/B replace Mix and AFL for the four auxes. This section is also home to a 12-step stereo LED ladder, L/R main faders (100mm) and a headphone jack.

Considering its compact size, the M12 has an impressive array of outputs. There are two balanced XLR main outs, a 1/4-inch mono sum out, a stereo pair of 1/4-inch outs for monitoring (a.k.a. control room), a pair of main mix inserts (1/4-inch unbalanced), 1/4-inch outs for the four auxes and a S/PDIF output (44.1 kHz) that carries the main mix. Also residing in the output section are playback returns (RCA), the four stereo returns (RCA) and a switch for global phantom power.

IN USE

With regard to function, the M12 works almost as well as it looks. It is very sensibly laid out, no manual really required. It has a remarkable feature list for a console of this size and price. Surprisingly, all 12 mono channels have inserts and direct outs, making it a snap to do sound reinforcement and multitrack recording at the same time. The inclusion of a S/PDIF output is a big plus too.

I used the M12 on a remote recording session where I was working on a project with pianist/composer Tony Bernardi. Tony does improvisational classical music in a 20th century vein. His piano is a Steinway Grand that has a dark, warm sound and it sits in an all-wood room that is very reflective. I used the M12 to facilitate a direct-to-digital two-track recording and it worked superbly. The mic

Continued on page 54 ➤

➤ *From the Road from page 48*

100 valve compressors. 350 channels of BSS MK II active splits were used to route the audio between front of house, monitors and the remote trucks.

MIC TALK

Microphones used for strings were Schoeps CMC5 and B & K for close miking. Shure handheld UHF wireless were used for the vocalists with a Sennheiser SKM 500 wireless and the new KK105 Neumann capsule.

Needless to say, this was one of the most comprehensive lists of equipment I have ever seen assembled in one location, and The Party at the Palace was one of the largest productions I have ever witnessed.

Britannia Row's equipment worked flawlessly and was a real testament to how a first class company prepares its gear for a large-scale world-class entertainment event. This was the first time an event like this has ever happened within the Palace walls. We can only hope it will not be another fifty years until the next one.

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

World Radio History

FROM THE ROAD

BY TOM YOUNG

Queen's Jubilee Party at the Palace

To celebrate Queen Elizabeth II's Golden Jubilee, 12,500 members of the public were invited by Her Majesty and other members of the royal family for a special concert on the lawn of Buckingham Palace. The concert was a contemporary reflection of the popular music of the Queen's half century reign. Produced by the BBC, Phil Ramone and Sir George Martin, an estimated one million people poured into central London to view and hear such stars as Paul McCartney, Eric Clapton, Ricky Martin, Annie Lennox, Phil Collins, Tom Jones, The Corrs, Shirley Bassey, Bryan Adams, Tony Bennett, Ozzy Osbourne, Brian Wilson, Steve Winwood, Joe Cocker, Rod Stewart, Brian May and Roger Taylor of Queen. Remote video screens and sound systems were setup throughout London's park areas to broadcast the event. A television audience of 200 million worldwide viewed the 3 hour, 20 minute concert.

A Huge Crew

Britannia Row was selected as the sound company for the Palace Grounds with support from Wigwam for two stages in front of the palace and the Royal Parks. Britannia Row had a 15-person crew working on the event for the main stage, three satellite stages, and two rooms within the palace. Additionally, crew was assigned to the palace roof where the concert opened with Brian May playing "God Save the Queen. The 80-foot wide stage featured the 50-piece Royal Academy of Music Symphony Orchestra with an all-star house band consisting of Phil Collins (drums), Phil Palmer (guitar), Wix Wickens (keyboards), Pino Palladino (bass), Ray Cooper (percussion), and Eric Robison (sax).

The entire event was managed by Derek Zieba, Live Event Sound Supervisor for the BBC. Dave Bracey was front of house engineer for the all-star band and guest vocalists, with the orchestra mix duties handled by Richard Sharrat. Monitor engineers were Simon Hardiman and Chris Peters. Guest engineers on site included Paul "Pab" Boothroyd for Paul McCartney, Rich Davis with Brian Wilson and myself for Tony Bennett. The audio crew was very professional and accommodating and considering the lineup and limited rehearsal schedule, handled the duties admirably. With the producers using a house band with accompanying orchestra, very few acts required any type of changeover, making the show run seamless from start to finish.

Equipment Lineup

Two Yamaha PM1D consoles were chosen for front of house to handle the 300-plus inputs used during the show, with a Midas XL-4 used for Brian Wilson. The PM1D's were a perfect choice for this type of show, and it was great to see a digital console work so well in this multi-artist entertainment environment. The monitor consoles were four Midas H3000's with two Midas XL-4's exhibiting quite a difference in real estate as compared to front of house.

EV X-Line array cabinets were used as the main speaker system in a left/right cluster configuration with 10 speakers on the inside with 9 subs flown on the outside. Two delay towers each with 6 EV line array speakers were positioned about 200 feet from the stage. Chameleon 3700 power amplifiers were used for the line array system. Eight EV 115 speakers were used as infill speakers with Turbosound SPQ 440's and SPQ425 to fill outside areas not covered by the line array.

The EV line arrays were definitely 'in your face' when listening to the show. The system was very comprehensive and well designed to cover the audience attending the concert. However, the front of house scaffold tower was so close to the delay towers that it was hard to hear the main PA when mixing at a distance high up from the audience listening area.

EV Line Arrays

Two EV Line Array cabinets were flown for sidefills with an assortment of Turbosound wedges used for the band and performers. Thirty-two channels of BSS FCS960 graphic equalizers were also used for the monitor system. Drawmer and Behringer noise gates were also used with BSS and DBX compressors. Effects for monitors were Yamaha SPX 900/990/1000 reverbs with Roland 3000 delays.

The front of house drive rack contained four KT 9488 management systems and a laptop with SIA Smaart Live. Four units of BSS Soundweb were used for routing of sound to locations off the main concert area, which included speaker systems, by L'Acoustics and d & b. Effects for front of house included a TC Electronics 6000, Eventide H3000SE, Lexicon PCM 70/80 and Yamaha reverbs. Inserts available were Summit DCL200 and TLA

continued on page 49 ➤

World Radio History

see if another key would yield a better vocal performance? Just change the playback pitch, turn up the monitor speaker and have the vocalist sing along.

I do a lot of work recording speeches for transcription. The PSD300 eliminates just about everything on my equipment list except a microphone. With onboard mic preamps, you do not need a mixer and with a monitor speaker and you do not need headphones.

I made a number of CD copies using the PSD300 and all the copies (Orange Book spec) played on all four of my CD players. I did get a tad antsy while waiting for the discs to burn at the now antiquated rate of 2X. I was impressed by how many different record modes the PSD300 has in addition to the 2X mode. If you want to monitor the CD dubbing process, you can choose Copy + Listen, which plays/records at real time while broadcasting the dubbing over the monitor speaker. In Halfspeed mode you can create a copy that is half speed and one octave lower than the original. This mode could be very useful for transcribers or musicians trying to learn high-velocity passages. Like most professional recorders, the PSD300 has a Sync mode that commences recording when source material is detected.

The PSD300 can be a lot of fun too. The voice reduction works well by reducing things in the center image. Unfortunately that often includes significant amounts of the bass, snare and kick drum. I consider this feature something of a gimmick but I suppose it could have practical applications for trying to see if a vocalist is ready to perform a hastily rehearsed cover song. The pitch and tempo adjustments were fun too. I could not resist the urge to call a friend and leave a warped version of a song we know and love on his voicemail. While there are significant reductions in sonic quality, being able to hear a well-known CD at a much lower pitch (while remaining at the same tempo) is just plain wacky. Another feature of the PSD300 that should prove useful to musicians is the loop function. It is very easy to create a loop that will repeat indefinitely — very handy for learning a piece by ear.

SUMMARY

For professional engineers, the Superscope PSD300 is a great idea that falls a bit short of its potential. If it had DC power capability, it could probably do well in an ENG environment. If it had balanced analog outputs and digital (AES/EBU) I/O, phantom power and better converters, it would be more appropriate for pro audio use. Nevertheless, it has a lot of features that make it a convenient and easy way to make remote recordings and CD dupes. For musicians, the PSD300 is a true blessing. It is a valuable tool for learning, transcribing and rehearsing songs. At $1,099, it is a good value — especially for those in need of a machine like this.

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

REVIEW SETUP

Audio-Technica ATM61HE dynamic mic; Audio-Technica M40 headphones; Taiyo-Yuden gold 74minute CD-Rs.

Hear What The Hype Is All About

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

I have a microphone "wish list". You have allowed me to check off both the U87 with the C1 and the C12 with the T3.
Ted Perlman - Producer/Arranger/Composer
Bob Dylan, Chicago, Kaci, 2gether, Young MC

One of the best vocal mics in the world is the $300 Studio Projects C1. You can spend way more for "one of those" mics from Germany if your ego demands it, but the C1 is certainly the sonic equivalent.
Pete Leoni -Producer Engineer, Tech writer and reviewer

C1 Single-pattern Cardiod List $299
C3 Multi-pattern Cardiod, Pad, Filter List $599
T3 Variable-pattern Tube List $1099

VT-1
Tube Mic Pre, Discreet Class A/B switching with variable Tube Drive. List $299

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World Radio History

Superscope PSD300
CD Recording System

BY ANDREW ROBERTS

In this world of miniscule digital cameras, palm pilots, pint-sized mobile phones and other compact tools of technology, it makes sense that a small, portable CD Recorder would appear in the marketplace. While hard disk recording devices, with their obvious storage and multitrack advantages, seem to be the trend of choice for intensive, portable recording, there are certainly times when we may need to make stereo recordings and create or duplicate CDs outside the confines of a traditional studio. Of course, anything using the compact disc medium can only be so small. Nevertheless, the promise of burning or copying CDs in a remote setting is enticing.

Enter the Superscope PSD300 ($1,099), a compact, dual-drive, CD recorder/duplicator that is small enough to throw in a travel bag, and can function as a high-quality two-track recorder, CD duplicator or personal recording device with a host of nifty features.

FEATURES

Considering its lengthy feature list, the PSD300 is remarkably compact. It is 11 inches wide, 9 inches deep, 4 inches high and it weighs about seven pounds. This unit has been outfitted with a wide range of controls, interfaces, displays and two drives, yet it is only a tad bigger than most field cassette recorders. The top of the PSD300 is home to the playback CD drive, a monitor speaker, monitor EQs (bass, middle, treble), two sets of transport controls (one for each of the two drives), a built-in microphone, a jog wheel control, a sizable display and a number of control buttons. These control buttons cover a broad range of functions like tempo (+50/-33 per cent), pitch (± one octave), single-track play, record mode (CD copy, 2X, half speed, etc.), text, voice reduction (karaoke-style center image reduction), display function, menu/store, repeat and cancel/delete.

The front of the PSD300 is home to the CD-R/CD-RW drive, a volume control (monitor speaker and headphones), a 1/4-inch stereo headphone jack, a phones/monitor source selector switch (CD, line out, mic/line, aux), a line out level control, two XLR mic preamps with additional 1/4-inch line inputs, input trim controls and source selectors (external mic, line, internal mic). There are also switches for analog/digital source, automatic level control (limiting), speaker on/off, and recording source routing. Routing options include sending both channels of the playback CD to the left channel of the CD-R and both sides of the mic/line inputs to the right side of the CD-R (split mode); sending L/R of the CD and mic/line to L/R of the CD-R (stereo mode) or sending L/R of the CD, aux input and mic/line to the CD-R (mix mode).

The rear of the PSD300 is adorned with mix out jacks (RCA), line out jacks (RCA), aux input jacks (RCA), digital in and out jacks (coaxial RCA), a foot pedal jack (for play/pause control) and a power switch. The PSD300 also comes with an infrared remote control that can execute most functions that the machine performs.

Fast Facts

Applications:
Live sound, music rehearsal, broadcast, preproduction

Key Features:
CD-R and CD drives; built-in mic preamps; monitor speaker; tempo, pitch controls

Price:
$1,099

Contact:
Superscope Technologies at 630-820-4800, *www.marantzpro.com.*

IN USE

Initially, the PSD300's lack of professional standard I/O, modest converter specs and eclectic features made me question whether this it should be reviewed in a pro audio magazine. Now, after several weeks of use, I must say that it not only deserves a review, but this unit is valuable and it is downright fun to use.

While I would not use the PSD300 for critical mixing or mastering, it does have some practical applications. It could be very handy for preproduction work. With its built-in mic preamps, the PSD needs only a pair of dynamic mics or line connections to record a rehearsal. Need to make a copy for the band? Just pop a blank in the CD-R bay and make a copy. Need to

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sometimes locating the perfect point in an audio file is sometimes more easily done by ear than by sight and Samplitude has an excellent jog/shuttle/scrub function to accomplish this. The resulting audio is clean and glitch-free at a wide range of speeds, and the responsiveness of the control is spot-on. The mouse's scrub mode is equally well implemented.

Samplitude's 5.1 surround support is very good, offering easy routing, panning and automating of multichannel projects. I really appreciate the small location display that shows channel surround position right on the main mixer surface. Samplitude supports four-point impulse response models for creating ultra-realistic surround ambiences.

Are there shortcomings worth complaining about with Samplitude Producer 6.0? Not many. The software does not allow direct automation of effects sends, but you can accomplish the same thing with a somewhat inconvenient routing of effects sends through mixer busses.

Samplitude crashed hard for me a few times (on both Windows ME and 2000), and locked up once or twice while placing and removing plug-ins. The software's "Crash Guard" handled the majority of the crashes gracefully, allowing me to save files and projects before the software exited.

It is no fault of the software that it can lure a person into applying more effects than are prudent. With so many places to stack up effects, you have to be extra careful to not drive your CPU to its silicon knees. That said, Samplitude's supplied effects sound excellent almost without exception and are quite conservative on CPU usage to boot (even the four-band compressor).

Where Samplitude continually amazes me is in the number of options it gives you at virtually every point in the audio production process. You do not get just stereo or mono pan, you get multiple types of each. You are not limited to simply inserting a DirectX effect, you get to decide whether it is pre or post-fader, where it sits in relation to other DirectX effects, and whether it is before or after Samplitude's own effects algorithms. Samplitude does not give you just one compressor to choose from, it gives you a stack of 'em. And, oh — would you like a peak limiter with that? The options just keep coming.

SUMMARY

I cannot think of another software package that tops Samplitude for a wide variety of audio editing, mixing, mastering and audio-for-video chores. This is a mature, polished piece of software that just oozes thoughtful design. Perhaps one of Samplitude's greatest strengths is the way in which it can be reconfigured, with presets at almost every level, to become the perfect audio editing environment for most every user.

It is a very rare product that boasts almost limitless power tucked behind a well-conceived user interface.

Loren Alldrin is a frequent contributor to ***Pro Audio Review****. His book, "The Home Studio Guide to Microphones," is available from ArtistPro.com.*

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rithm are always available; to these you can add up to three of Samplitude's stock effects, plus as many DirectX/VST effects as you would like, per object.

Objects can also be stretched in time or pitch-shifted, looped and automatically crossfaded. Beat sensing allows cleaner tempo and pitch changes of highly percussive audio objects (such as drum loops). With version 6.0's new object-oriented pitch shift and time stretching, object manipulation becomes nearly limitless on the Samplitude "Virtual Project" timeline.

All of this object-specific processing is real-time and nondestructive, and it is only the tip of the iceberg. Audio objects sit on tracks, which have their own volume and pan automation. These mixer tracks also offer individual delay or reverb effects, traditional aux sends, dynamics, four-band fully parametric EQ, distortion and any number of DirectX or VST effects.

Finally, all mixer tracks funnel into the main stereo output (or 5.1 surround output). Mixer outputs offer the now familiar four-band EQ, FFT filter, single-band dynamics and any number of third-party plug-ins. Plus, you can add in the smart de-hisser, multiband stereo enhancer and multiband dynamics processor.

Catching the trend here? Samplitude Producer lets you add effects almost at will, giving you three different opportunities to process any chunk of audio data (object, track and master output). It is conceivable that one audio object could pass through dozens of real-time effects by the time it leaves Samplitude. Try *that* with a rack of outboard gear.

In addition to serious multitrack mixing power, Samplitude Producer offers powerful nondestructive wave editing features; fast-and-easy CD burning right from the timeline; tight integration with Magix VideoDeluxe video editing package; the ability to directly open, edit and output to such formats as MP3, RealAudio, Windows Media and MPEG; and more.

Other enhancements since version 5.5 include a transparent linked file system that allows recording of audio files much larger than 2 GB, project folders that contain all relevant data for a given project and CD-R backup of the latter that can span multiple discs. A nifty FTP (file transfer protocol) download utility allows you to pull audio files off the Internet or another file server. Magix will even host and stream your finished masterpiece from its web site.

In the native effects department, Version 6.0 boasts new "advanced dynamics" algorithms that offer smooth analog-style compression as well as mastering-type limiting and maximizing functions. Metering on these effects is great, actually plotting audio amplitude on the "gain line" in real time. As with the multi-band dynamics, FFT filter and de-hisser effects, advanced dynamics offers look-ahead processing.

New "visualizations" give you several ways to look at your audio, including a spectrum analyzer, spectrogram, oscilloscope, phase correlation meter and traditional bar-style level meters. The latter offer lots of options for scale and speed, as well as peak hold, numerical indicator, RMS indicator and more.

In Use

It makes me happy when designers put as much effort towards refining and streamlining the user interface as they do towards adding new features and goodies. Samplitude Producer 6.0 boasts a significantly enhanced interface, with the main improvements being in the project window and digital mixer.

Control layouts are more intuitive, mouse modes are more powerful and flexible, and "tool tip" help — seen when the mouse hovers over a button or control — is improved. You can now reconfigure the whole Samplitude screen and save it as a work surface preset for instant recall. Likewise, you can save presets that instantly reconfigure the whole mixer.

In addition to these high-level presets, Samplitude lets you configure things at a lower level as well. You can store individual screen sets, zoom levels, track selection and more. You can save mixer snapshots for instant recall, as well as mark specific views of the mixer for recall. You can customize your toolbars, track display, snap and grid modes, fonts, time markers, keyboard shortcuts and more. In a word, you can make Samplitude fit the way *you* like to work.

Samplitude offers a useful color-coding tool called Comparisonics which separates signals in the waveform by frequency. But

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Magix Samplitude Producer 2496 Version 6.0

BY LOREN ALLDRIN

I had the privilege to review SEK'D Samplitude 5.5 back in 2000, and I was impressed with the power and flexibility of this German-made audio editing package. With the introduction of version 6.0 ($674), Magix (previously SEK'D) has made Samplitude an even stronger package.

Because the product is so vast in its feature set, this review will survey the basics of Samplitude, look at some of Samplitude's strengths and highlight significant new features introduced since version 5.5. (*PAR* 9/00)

FEATURES

Samplitude is a multitrack audio editing package for PC computers running Windows 95, 98, ME, 2000 or NT (Magix says Samplitude 6 should function also in Windows XP - Ed.) It will work with virtually any audio hardware, relying only on the CPU for its extensive audio processing. Several of Samplitude's more-demanding effects algorithms have been optimized for Pentium III and IV processors for optimum performance.

One of the main characteristics that distinguish Samplitude from other packages is its object-oriented approach to digital audio. Individual audio objects (segments of audio data) have volume, fade and pan controls. You can apply real-time effects to objects, drawing from Samplitude's own excellent algorithms as well as DirectX or VST effects.

Standard effects include fully parametric four-band EQ, de-hisser, FFT filter, stereo enhancer and various dynamics algorithms (four-band compressor, expander, single-band compressors, maximizers, limiters and more). Equalization and one single-band dynamics algo-

continued on page 44 ➤

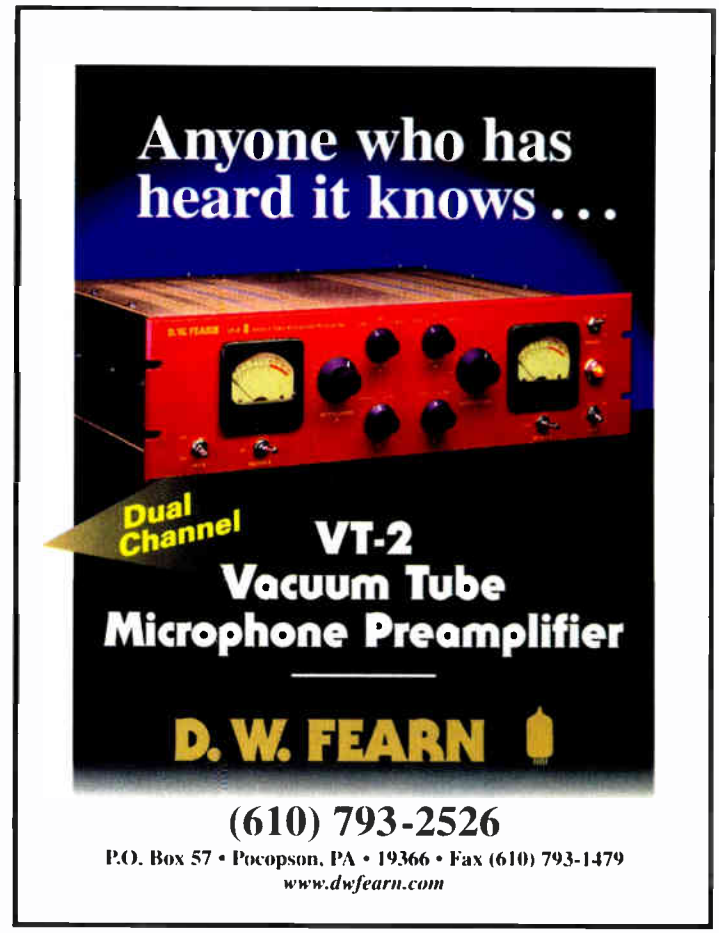
Fast Facts

Applications:
Audio editing, mastering and recording; 5.1 surround processing; audio for video; Internet audio encoding

Key Features:
Nondestructive/object-oriented editing mode, 32-bit internal processing, 192 kHz sample rate support, uses DirectX and VST plug-ins, 5.1 surround support, Red Book CD burning.

Price:
$674

Contact:
Magix at 310-477-0241, *www.magix.com, www.samplitude.com.*



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Shure Headset and Mixer, Behringer Mixer

As the need for professional quality voice recording expands to the office and home, a new generation of low-cost gear makes it easy to set-up and operate a first-rate compact personal recording system. With the products described here, just add a recording device.

Shure WH30XLR Headset Microphone ($278): For personal voice recording, it's hard to beat a headworn microphone for convenience, portability, and consistency of sound quality. When working alone, your voice can easily go "off mic" with a simple turn of the head. Headworn microphones follow head movement, insuring a consistent distance of the microphone from the mouth.

Shure's new WH30XLR, designed primarily for music vocalists who also play instruments, features an electret condenser cartridge that delivers excellent voice quality for just about any application. Because of its cardioid pickup pattern, it also provides isolation from extraneous sound sources (nice for nonstudio environments) and high gain-before-feedback in situations where the audio is amplified.

In addition to superb sound with freedom of movement, I found the WH30XLR comfortable to wear. The wireframe — designed to adjust to any head size and shape — succeeds by resting almost weightlessly atop the earlobes. An integrated elastic Croakies headband pads and secures the headset. An isolation shock-mount reduces vibration noise. The microphone, on an adjustable gooseneck, is supplied with two snap-on windscreens (reduces "p" pops), clothing clip, storage bag and cable management device. The WH30XLR, with preamp integrated into the XLR connector, requires a phantom power source of between 11 and 52 volts. Other versions are available for wireless transmitters.

Behringer MXB1002 Mixer

Behringer Eurorack MXB1002 Stereo Mixer ($229): Another essential part of a good personal recording system is the mixing device. These days, the market is flooded with small, compact personal audio mixers at low prices. I looked at Behringer's 6.6-pound, 10-channel MXB1002 because it has a rare feature — the ability to operate on internal batteries.

The option of running a small audio mixer on either AC or battery power allows extraordinary flexibility and extra protection against the hum, noise and RF interference that often comes with plugging into AC outlets on location. Two standard alkaline 9V batteries will power the mixer for a claimed four hours, and a third will provide +18 volts of phantom power to condenser microphones.

The MXB1002 offers an excellent feature set for its diminutive desktop size (less than a foot wide and nine inches from top to bottom). It has two mono, three stereo channels and a separate stereo tape return. All stereo channels have separate gain controls for mic and line inputs, allowing both inputs to be active. Each channel offers a three-band EQ plus two aux sends; inserts are provided on the mono channels.

Inputs and outputs are balanced. Low-noise, discrete preamps are on all microphone inputs. Clip LEDs are on all input channels. There's a stereo output for recording. The headphone output has a dedicated volume control. Even a 19-inch rack mount kit included.

The MXB1002 offers clean sound, intuitive controls, and unusual flexibility in a small desktop package. The sealed faders and potentiometers (by ALPS) are silky smooth, and the extremely rugged construction makes this mixer feel like it's here to stay. An excellent low-cost choice for a stereo-capable personal recording system.

Shure SCM268 Mono Microphone Mixer ($350): A mono alternative to the Behringer MXB1002 is Shure's four-channel SCM268 mixer. You'd never guess, but this ultra compact, half-rack mixer contains six transformers inside: four transformer-balanced XLR mic level inputs, one transformer-balanced XLR mic/line output, and one internal power transformer.

Shure says this bank of transformers provides superior protection from RF interference, prevents ground loops, and makes the SCM268 exceptionally quiet. The internal power transformer also means no annoying wallwart.

The SCM268 is as simple to operate as a professional audio mixer gets. There are five unbalanced aux (-10 dB line level) inputs and one unbalanced aux level out (all phono connectors); built-in low-cut filters on the mic inputs (80 Hz); 12V phantom power for condenser mics, and a six-segment LED peak output meter.

In addition to its excellent sound quality and low cost, this basic Shure mixer works with a wide variety of consumer devices, including audio cassette decks, VCRs and portable recorders. Coupled with a good quality microphone, the SCM268 is a no compromise "workhorse" mixer that fits perfectly in a basic home or office recording setup.

For more information contact: Shure at 847-866-2200, www.shure.com and Behringer at 425-672-0816, www.behringer.com.

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The C 451B is full-featured, with 10 dB and 20 dB pads as well as 75 Hz and 150 Hz 12/dB/octave rolloffs.

ly considered bright, the 451B sound extremely bright through these preamps. With the Aphex 1100, the sound was still bright but to a lesser degree. The +5 dB shelf shown on the AKG- supplied individual EQ plots, starting at about 3 kHz, seemed slightly conservative — based on what I heard through the aforementioned preamps.

It was interesting to note that as bright as the two 451B mics sounded during some of our tests, they did not sound overly bright at John Grant's studio using a Mackie mixer's preamps.

As a final test, I plugged one of the mics into my own Mackie 1604 VLZ/XDR. I recorded my Martin again through the Mackie and found that, while it sounded brighter than "natural," the result was nowhere near as bright as it had been with the GML and Millennia Media STT-1 preamps.

SUMMARY

Although AKG said it engineered the C 451B to mirror the sound of the older models, the newer 451s were significantly brighter sounding than the older ones we used for comparison.

Got dark sources that you want to shine some light on? Want to capture the essence of the cymbals in a drum kit? Try the C 451B. I would not, however, recommend the mic for use on sibilant sources, such as banjo, sax or tambourine unless you find the right mic/preamp combination to reduce the top end. In my case, the Mackie 1604 was such a preamp.

Ty Ford is a regular contributor to ***Pro Audio Review****. His web site is http://www.jagunet.com/~tford.. Check it out for voiceover samples and audio equipment reviews.*

Product Points

PRODUCT NAME

Plus
- Affordable
- 10, 20 dB pads
- Low-frequency roll off
- Quieter and more headroom than the old design

Minus
- Very bright with some preamps

The Score
A good mic for brightening up dulled sources such as cymbals.

➤ *TASCAM from page 39*

of increasingly complex digital setups — it is an odd omission. Otherwise, the CD-RW402 met or exceeded all my CD-recorder demands, and its useful editing capabilities were a pleasant surprise.

SUMMARY

TASCAM's CD-RW402 is a powerful, yet easy-to-use player/recorder/duplicator that can easily do the work of several other CD devices found in the typical pro or project studio. With each of its drives providing about as much professional functionality as one can possibly imagine, and at a street price under $1,000, the CD-RW402 is a strong value.

Stephen Murphy, contributing studio editor for **PAR***, has recorded hundreds of vinyl and CD releases, including a Grammy Award-winning and a Platinum-selling album. Steve can be reached at editor@smurphco.com.*

World Radio History

AKG C 451B

Small Diaphragm Condenser Microphone

BY TY FORD

In late 2001, AKG introduced its new version of the C 451B cardioid, small diaphragm, condenser microphone ($549). Said to be an update on an old classic, the new mic combines attributes from the old mic with modern manufacturing processes.

FEATURES

According to AKG, in its quest to create a new C 451B, its engineers measured the performance and listened to recordings made from a dozen older 451s. From what they heard, they developed the sound of the new C 451B and added some new features.

The microphone is full-featured, with 10 dB and 20 dB pads as well as 75 Hz and 150 Hz 12 dB/octave rolloffs. Switching through the pad settings, I noticed that each mic's self-noise, while always lower than the older models I compared them to, changed in an unusual way. The self-noise was similar in level at the unpadded and -20 dB settings, but decreased slightly at the -10 dB setting.

According to AKG designer Norbert Sobol, the unusual self-noise observation at -10 dB is easily explained. "The -20 dB position is a combination of the -10 dB circuit and another pad circuit after the first impedance converter stage," Sobol said. "The -10 dB position is a lower noise figure than unpadded, as the noise of the first stage is dependent on the capacitive impedance at its input, which is rather low with a small diaphragm condenser transducer alone but increases with the capacitive voltage divider of the pad circuitry. And a small increase in noise in the -20 dB position due to the way this -20 dB padding is achieved. By the way, the noise figure in this position does not reach the figure in the 0 dB (unpadded) position, but is somehow in between the figures of 0 dB and -10 dB."

Unlike previous 451 models, the capsule is not designed to be unscrewed and swapped. However, I did take a careful look inside (parts can fall out) to see how the capsule is put together. One caveat, disassembly voids the warranty.

Four very small screws hold the capsule housing in place. Once the housing is carefully removed, the capsule pulls out of the head-grille. To my surprise, what I first thought was a fine gold mesh pop filter fitted into a thin metal ring atop the capsule turned out to be not mesh at all, but the diaphragm itself. The gold-sputtered diaphragm is a completely free-standing element that is held in place by the pressure of the spring.

IN USE

I first compared the sound of a new C 451B pair to a pair of older AKG 451Es, with no rolloff and no EQ at John Grant's Secret Sound near Baltimore. We put both sets of 451s up as drum overheads, using Mackie VLZ/Pro preamps.

Switching back and forth between the new and old pairs was very revealing. The new C 451Bs were more sensitive than the older 451Es. The dreaded key jangle test also showed that the new mics had more headroom than the older mics.

Fast Facts

Applications:
Studio, instrument miking

Key Features:
Cardioid pattern, 10, 20 dB pads, low-frequency roll off

Price:
$549

Contact:
AKG at 615-620-3800, *www.akgusa.com.*

However, in our subjective judgment, we found the 451Es mics to sound more neutral. Based on what he was hearing, Grant said the newer 451Bs were more sensitive in the 6 kHz+ range and had slightly less bass than his 451E.

At Flite Three, with Louis Mills and Mark Patey, we compared the new 451B to a vintage 451EB through API mic preamps. Again, the older 451EB sounded more natural. The newer C 451B sounded very bright; noticeably more so than the older AKG and a Neumann KM 84 we were using for comparison.

At Kraig Greff's Tonal Vision studio, we miked his Steinway Model D nine-foot concert grand piano with one 451B, recording to a Fostex PD4 DAT machine. After listening to the recording, Kraig said the 451B might be useful for rock or country sessions with busy arrangements where the piano needed some help cutting through the mix. However, Kraig commented that the microphone would be too bright for his sparser jazz arrangements.

Back at my studio I tried the 451B on acoustic guitar and voice through GML, Millennia Media STT-1 and Aphex 1100 preamps. Although neither the GML nor Millennia Media STT-1 preamps are normal-

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all the features so check out the website."

IN USE

One of the obvious uses of the CD-RW402 is as a 1:1 duplicator. The deck is capable of duplicating both audio and most data CD formats at speeds of 1x to 4x. In a testament to the CD-RW402's ease of use, literally within one minute of unpacking the unit from the shipping box, I was already burning a 1:1 CD copy at 4x speed.

During the review period, I continued to make many 1:1, 1:1 plus extra cuts, and "selected cuts" compilation discs without incident, coasters or the manual.

With help from the manual, I also explored the unit's advanced editing capabilities. I found it was an easy and intuitive process to create a shorter edit of a song by marking A-B points and specifying to exclude that section when copying the track. It was equally simple to remove a drummer's stick clicks at the intro of a song and his unwanted ba-da-dump at the end of a song by using the similar A-B inclusive edit mode.

REVIEW SETUP

Westlake 8.1 and Mackie HR824 studio monitors; Hafler H3000 power amplifiers; Digidesign Pro Tools workstation; Verbatim CD-R media; Zaolla Silverline analog and digital cables.

To try out the unit's sample rate and 24-bit A/D-D/A converters, I recorded a number of mixes from a Pro Tools system directly to the CD-RW402's recorder drive using every combination of input format and sample rate I could come up with. In all cases, the deck functioned as expected, and sounded very good, even when resampling the incoming signal. Note: the unit's internal sample conversion automatically turns on when an incoming digital signal's sample rate deviates from 44.1 kHz by .02% or greater.

The only complaint I have about this unit, which otherwise batted 1000, is its lack of external clock I/O. For a machine of this caliber and versatility — and in a world

continued on page 41 ➤

Product Points

TASCAM CD-RW402 CD RECORDER/DUPLICATOR

Plus

- Advanced editing functions
- Ease of use
- Many play/record options and features

Minus

- No word clock I/O

The Score

The TASCAM CD-RW402 CD player, recorder and duplicator is a feature-rich yet easy to use studio essential.

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TASCAM

CD-RW402 CD Recorder/Duplicator

BY STEPHEN MURPHY

Audio products are often exclusively "easy to use" or "loaded with features." TASCAM's new CD-RW402 dual-well CD recorder and duplicator successfully combines ease of operation with enough professional features and uses that, at a list price of $1,249, it becomes easy to justify having this versatile deck in your studio.

FEATURES

The three rack-space CD-RW402 is designed provide facilities with the functionality of two independent professional-quality CD players, a real-time CD recorder and a CD-to-CD duplicator in one package.

On this type of unit, the most important details for professional use are often what inputs and outputs are provided, so we'll start with the back panel. For Drive 1 (the playback deck), the CD-RW402 provides SPDIF outputs on coaxial (RCA) and optical (TOSLink) connectors, as well as balanced (XLR) and unbalanced (RCA) analog outputs.

For Drive 2 (record/playback deck), the unit provides SPDIF inputs and outputs on coaxial (RCA) and optical (TOSLink) connectors, as well as balanced (XLR) and unbalanced (RCA) analog inputs/outputs. An additional set of unbalanced (RCA) "common" outputs are provided for A/B (or Drive 1/Drive 2) piggyback/sequential playback.

In addition to a standard IEC A/C jack, the back panel also features a stereo 1/8-inch jack for the provided remote control, and a 25-pin D-sub female connector for external control. Most important deck functions are available via the D-sub control I/O, including dual-deck transport operation and tally information. Control pin-out specs and voltages are provided for use with suitably-equipped equipment, or for wiring by suitably-qualified do-it-yourselfers.

On the front panel is a 1/4-inch TRS jack and level knob for headphones; a three-position switch allows the user to monitor Drive 1, Common, or Drive 2 outputs. A PS/2 keyboard input is also found on the front panel for CD text and titling purposes. The keyboard can also be used to emulate most of the functions of the remote control, including transport and menu selection operations.

The CD-RW402 features dual displays — one for each drive — for level metering, track indication and menu operations. Each display can also show artist info, disc and track titles or other user data up to 12 characters in length, with scrolling for longer text.

Both drives on the CD-RW402 allow a wide range of advanced transport functions including "stutter" scrub, auto cue, auto ready, and call. Quick track selection is accomplished by turning either drive's "Multi Dial" control.

Recording drive settings include digital gain adjustment, digital fade in/out, digital direct mode, record mute and several auto ID options. The player drive features a +/-9.9% pitch control, and any desired pitch adjustments can be recorded to a destination CD-R/CD-RW.

A variety of advanced deck-to-deck copy and editing functions are also possible with the CD-RW402, including integrity verification and defeatable SCMS copy protection. Frame-accurate edit points can be located using the scrub function and marked using A-B locate points. Intra-song inclusive and exclusive edits can then be assembled onto a destination disc.

The CD-RW402 boasts so many other features that it has the distinction of being the first CD recorder I've reviewed that I needed to say, "I don't have room to print

Fast Facts

Applications:
Studio, post production, multimedia, broadcast.

Key Features:
Independent professional-quality CD player/recorder/duplicator. SPDIF (RCA) and optical (TOSLINK) digital I/O. Balanced (XLR) and unbalanced (RCA) analog I/O. Hardwired remote control, plus control via standard PS/2 keyboard and 25-pin D-sub.

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World Radio History

Digigram
EtherSound Audio Networking System

BY STEPHEN MURPHY

Digigram's patent-pending EtherSound system is poised to make its entry into the highly competitive arena of installed audio networking systems. While other seemingly similar Ethernet-based audio products and protocols exist, or are in various stages of development, Digigram intends to stand apart by virtue of EtherSound's prevailing design philosophy: simplicity.

Information in this "First Look" is derived from company documentation, discussions with EtherSound's developers and my own research. A full, hands-on review of EtherSound is planned for an upcoming issue of *PAR*.

FEATURES

An audio network using Digigram's EtherSound technology supports up to 64 channels of 24-bit audio at 44.1 or 48 kHz sampling rates. The system has a unidirectional audio signal flow, bi-directional control and status data capabilities, and is based around a familiar master/slave design.

The designated "Primary Master" interface functions as the clock source for all other connected devices and can also contribute source data to the stream. Each other device on the network is designated as a "Master" (contributing source), "Slave" (signal destination and throughput only) or a "Master/Slave" (signal destination, throughput and contributing source). Only devices located "downstream" from a contributing source may playback audio from that source.

EtherSound is structured around a standard Ethernet frame, allowing the system to use off-the-shelf Ethernet hardware, such as switches and routers, to extend system capabilities. EtherSound networks can be configured in a daisy chain, star, or combined topology.

In general, most Ethernet-based audio systems offer several inherent advantages over traditional multi-destination wiring schemes: inexpensive and readily available cable (CAT-5), the elimination of discrete wiring runs to and from each destination and, most notably, the powerful routing capabilities of data networks.

These advantages exist in all of the available and soon-to-be-available networked audio systems, including Digigram's EtherSound. Principal disadvantages of most networked audio systems usually involve general system latency and asynchronous data delivery to the various destinations.

For some installation applications — a typical multizone club or restaurant for instance — latency and synchronous audio delivery are not necessarily problems. Latency becomes an acceptable trade off in exchange for additional digital signal processing, bidirectional signal transmission and other features appropriate for these applications. But for critical professional audio applications — live sound, broadcasting, and studio — those tradeoffs are fatal to a system's viability.

According to Digigram's Neil Glassman, president of the French company's U.S. office, the EtherSound system offers a unique approach that addresses the stringent needs of professional audio installations.

"For live sound, the processing time for conversion to and from the EtherSound protocol, as well as performing network management functions, must remain short enough to permit real-time monitoring."

Not coincidentally, EtherSound's design team solved the latency issue by adopting a tightly focused goal for the system that targeted the most important priority of a professional audio network: synchronization.

"By focusing on synchronized signal transmission and control — and avoiding features superfluous to pro audio applications such as DSP and specific control protocols — EtherSound's hardware design is extremely simple and processing is extremely fast," says Glassman.

Digigram further reduced system latency by opting to use the low-level Ethernet frame structure rather than using the standard Internet Protocol (IP). As a result, each device in the EtherSound chain contributes only 1.22µS of latency and the overall end-to-end delay of a typical daisy-chained system is less than six samples — well within the acceptable range for real time monitoring.

SUMMARY

In designing EtherSound to be a streamlined audio delivery network focused on low latency and sample-accurate synchronization, Digigram has addressed the demanding requirements of professional audio applications. The company continues to expand EtherSound's potential through its progressive licensing programs and OEM partnerships.

Through these combined efforts, Digigram might well be on its way to achieving its ultimate goal for EtherSound: ubiquity.

Contact: Digigram at 703-875-9100, www.digigram.com.

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Professional

PARfiles

BY STEPHEN MURPHY

The Who 2002 North American Tour

Photo by Stephen Murphy

ENGINEERS: Bob Pridden (Audio Production, Monitors), Robert Collins (FOH)
FRONT-OF-HOUSE CONSOLE: Midas XL4
MONITOR CONSOLE: Midas Heritage 3000
DYNAMICS PROCESSING: Summit TLA-100A, dbx 160 compressors
EFFECTS PROCESSING: Lexicon PCM-60, Yamaha Rev-5 and Rev-7
SPEAKERS: Clair Brothers Audio mains and subwoofer cabinets loaded with JBL drivers (as are Townshend's Fender amps)
STAGE MONITORS: Clair Brothers Audio floor wedges, Shure PSM 700 in-ear monitor system
MICROPHONES: Shure SM58 (all vocals), SM57 (all guitar amps, snare drum), Beta 52 (kick drum, bass amp), Beta 98 (toms); AKG 414 (drum overheads); Neumann U 87 (stereo drum pair — for recording only)
MICROPHONE PREAMPS: Midas (XL4 in-console)
DIRECT INPUTS: Countryman Type 85 (keyboards, acoustic guitar, bass guitar), Demeter VTDB-2B (Townshend's Fender Strat "acoustic" pickup output)

Bob Pridden has literally been at nearly every show The Who have played. That fact does not make him an overly obsessive fan — it makes him one of the most respected, envied (and occasionally pitied) audio engineers in the business. Pridden started as road manager for the band in the early '60s and gradually began mixing live shows and helping Pete Townshend with his demo recordings. His first label credit was in 1972 as mixer and producer of his friend Eric Clapton's Rainbow Concert *LP (the re-released* Rainbow *was remixed and remastered by another longtime Who associate, producer Jon Astley). Pridden is currently on the road with The Who's JBL-sponsored North American tour.*

Historically, you have worn many different engineering "hats" — FOH, monitors, studio engineer/producer, road manager — describe your various roles on this tour.

In addition to supervising overall audio production, I am also mixing the monitors for the band. And from the monitor position, I control a lot of the live audio effects — guitar and vocal echoes and the like — which are then sent up to the front-of-house mixer and into the house. In addition, I cue and start the keyboard sequences for the songs that use them — songs like "Baba O'Riley" and "Who Are You." I am also recording and archiving all the shows on dual Otari RADAR IIs. Apart from the physical location, a lot of the lines between monitor and front-of-house mixing are blurred. I do a lot from the stage that is used directly in the house mix and vice versa.

One of your earliest studio roles with The Who was as a dedicated headphone mixer during studio tracking.

That's right. They used to have all kinds of trouble getting the live performance energy while recording in the studio, so I would come in with a board and help them get the live feeling they wanted, leaving them free to perform their best.

Which brings you back, full circle: mixing the in-ear monitors for the band.

Almost exactly. Though, on this tour, only Roger (Daltrey) and Zac (Starkey, son of Beatle Ringo Starr) are using in-ears. In fact, Roger uses a hybrid monitoring system: one in-ear monitor supplemented by floor wedges. Zac uses a full in-ear set. For songs with the sequenced keys, he wants the click on one side and most everything else panned to the other.

In Memoriam: John Alec Entwistle, 57, legendary bassist and founding member of The Who, died of a heart attack on June 27, 2002 on the eve the tour. Entwistle's innovative sound and unique playing style influenced generations of musicians throughout his four-decade career. Often referred to as "The Quiet One" — originating from his reserved stage presence and seemingly effortless playing — belied the fact that Entwistle was every bit a co-conspirator in the sonically pyrotechnic war that was The Who. Steve Luongo, Entwistle's studio partner (and drummer in the John Entwistle Band) appropriately summarizes: "Every time it thunders, I will think of John Entwistle."

For more information on The Who tour visit www.petetownshend.com and www.jblpro.com.

World Radio History

will, I feel, be used alternatively in the future. The Genex GXA8 and GXD8 converters are presently unique in the marketplace since they permit one to enjoy the best characteristics of two of these three universes. Buy these converters, and then add a high-end Studer or Ampex analog tape recorder to your studio, and you will have all three. I should know; that is what I am going to do!

Dr. Fred Bashour is a jazz pianist, church organist, classical music producer/engineer, intermittent college professor, consultant to university music libraries on the digital storage of course listening materials and a contributor to **Pro Audio Review**.

REVIEW SETUP

Crane Song Spider mixer; D.W. Fearn VT-2, Manley Mic/EQ-500, Millennia Media M-2B vacuum tube mic preamps; Neumann M 50, SM 69, U 47, M 249, AKG C 24, Royer SF 12A microphones, Merging Technologies Pyramix DAW; Weiss DAC1 digital audio converter; Éclair Engineering custom vacuum tube monitoring console; IMF Electronics SACM transmission line monitors driven by McIntosh MI-200 vacuum tube amplifiers, Manley Tannoy loudspeakers driven by VTL MB-300 vacuum tube amplifiers, Dynaudio BM6A active loudspeakers.

Product Points

GENEX GXA8 AND GXD8 CONVERTERS

Plus
- **Versatile**
- **Expandable**

Minus
- **Can't think of any! Well, okay, so they get hot, especially the GXA8.**

The Score
These two units receive Dr. Fred's current "Converter du jour" award. A better sounding and more versatile set of converters would be pretty difficult to find.

➤ *Aphex from page 21*

variety of percussion instruments from hand drums to tambourines and shakers.

On electric guitars I tried the 207 with the new Royer R-122 (my current desert island microphone), a Sennheiser 421 and a Shure SM57 and in every instance it worked like a charm. The pre also did a fine job coupled with a Neumann KM 86i and a Royer SF-1A to capture an acoustic guitar performance. I recorded bass and keyboards through the instrument input and had good results in both instances. Pushing the bass to the point of excessive limiting worked well in a couple of situations.

Perhaps the strongest point of the 207 is in recording vocals. I had killer results recording both male and female vocals (with a wide variety of microphones). I found the low-cut filter to be very musical (translate: usable). When activated it takes away the rumble without thinning out the vocal.

Through the use of the MicLim feature, the 207 is able to controllably capture overly dynamic performances without squashing out the passion of a fantastic performance. Then the RPA tube stage adds subtle yet musical tube warmth to the final signal. I am constantly amazed at how appealing the sound of 2nd order harmonics is to the human ear.

SUMMARY

I have yet to hear anything in the price range of the Aphex 207 (nor do I expect to) that offers the high-quality sound of the 207 coupled with its long list of features. The only real downside that I encountered was the instrument input's lack of compatibility with unpowered piezo pickups. Adding a direct box in the chain and going through the mic input instead of the instrument input solves this problem without a hitch.

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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➤ Genex from page 30

breakout cable) with Pyramix's own DVD breakout.

Genex can also supply eight-channel ADAT, TDIF, SDIF2, and Pro Tools I/O cards. The units also feature two bit-splitting modes: Paqrat (same as Apogee's ABS) for PCM, and stereo DSD. Each mode enables one to record on legacy 16-bit MDMs — the former can transmit and receive four channels of 24-bit 44.1 kHz digital audio to and from ADATs and DTRS machines, while the DSD mode splits the stereo DSD signal across all eight MDM tracks.

The front panel controls are both numerous and quite intuitive to use. Unlike the case with some other converters, I never once had to crack the manual to figure something out. There are pushbuttons which toggle the eight vertical LED meters between different peak delay settings, between fine and normal PPM scale, regulate the number of "overs" which will illuminate the over LED, and mute the digital audio. Beneath each meter is a trimpot for adjusting input sensitivity.

One can select different configuration modes for the converters (analog, I/O option slot 1, slot 2, and DSD), and adjust the clock's sensitivity in "lock mode" between wide and precision. The AES/EBU outputs can toggle between single, dual, or quad-wire, the clock source can alternate between internal crystal, external word clock, or the audio from either of the option cards. The sample rate and bit depth can also be adjusted via front panel pushbuttons.

The analog I/O has a very strong preference for balanced signals. In fact, the review sample was practically unusable with the direct outs from my Crane Song Spider mixer, as that unit produced a bit of DC offset which interacted with the DSD input amplifier (PCM was okay). Hastily-wired little adapter plugs with internal 70-ohm resistors reduced the offset. Since the review unit was from an early build, Genex informed me that later units' DSD inputs will not be nearly as "fussy." The balanced ouputs can be unbalanced by simply leaving one leg unconnected; shorting the unused pin to ground is not recommended.

In Use

Over a period of several months, I have used these converters at all three sample rate levels — standard, double, and quadruple frequency and, of course, in DSD mode as well. I have used them on every recording I have made during the first half of 2002, and even built my new Pyramix DAW around them. Thus, I feel confident in being able to describe their sound — or, should I say, sounds.

Used as PCM converters, they sounded just as I would expect from units at this price level; clear, sharply chiseled and better and airier as the sampling frequency ascended. They also had a particularly "big" sound that is hard to describe. One might call it "ballsy," or almost larger than life. They flattered just about all sound sources I fed them; they were the strongest-sounding 44.1 kHz converters I have ever used (as opposed to warm, or mellow — like Apogee's), but their personality was always pleasing to my ears. I would rate them right up at the top of the heap.

At a big bucks brass band recording session I did for Dorian in early June, their sound at 176.4 kHz was clearly the best I had ever captured of that group. Unfortunately, in DSD mode, I had trouble getting all my six mic channels reliably into my brand new Merging Pyramix DAW (which was the session recorder) due to clocking issues between the Genex and Merging hardware, but that really did not matter because I preferred the Genex's 176.4 kHz PCM sound to DSD for those particular brass instruments anyway.

So what exactly did Genex's DSD conversion sound like? Well, think analog. Think mellow, laid-back, relaxed, and a tidge heavy. It is easy to connect Genex's GXA8 and GXD8 converters back to back, and switch between 176.4 kHz and DSD while listening to a analog source, so I did many A-B tests this way. Whereas Genex's high resolution PCM conversion sounded etched, sharp, detailed, big, and ballsy, its DSD process sounded, well, a little heavier and duller; almost as if the spectral energy had been moved down half an octave (or a little like the "tilt" equalization control on some vintage British electronics.)

On some sources, this DSD "effect" was flattering and, in fact, was preferable to the lighter detailed and etched treatment imparted by Genex's PCM conversion. But on some of the other sources I tested during the review period, it made a female vocalist sound a little too "chesty," and some of the ultimate air was lost on, say, brushes and cymbals, or even harpsichord.

Please bear in mind that, in actuality, these differences were very slight; I have just worked very hard to come up with appropriate language to describe them. I also found it fascinating that, for this — my second audition of DSD conversion (the first was dCS 904 and 954 converters I reviewed in *PAR* 12/00), my subjective evaluations of DSD were similar in each case.

One should also remember that some of us have been recording via PCM since the early 80s, and have evolved ancillary equipment and techniques to make the most of the PCM "sound." I feel I could easily learn to do the same thing if I were "forced" to use only DSD conversion. DSD's "relaxed" and mellow (as opposed to the typical "aggressive" and "chiseled" PCM) characteristics are, arguably, an easier sound to work with than PCM.

I can certainly understand why certain audiophile engineers seem to prefer DSD these days. But just as I had to change many of my recording techniques and front-end equipment back in the eighties in order to make my PCM recordings sound "more like the source," I would definitely have to perform an analogous process were I to make the switch to DSD. The two conversion techniques definitely have different sounds (as also does analog recording on magnetic tape); not one of the three is the proverbial "straight wire with delay."

Summary

The audition period for these two superior pieces of Genex gear was definitely an educational opportunity for me. I have concluded that the world of professional audio recording now has three different — and equally valid — sound storage universes: analog, PCM, and DSD. Each has its own strengths and weaknesses and all

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