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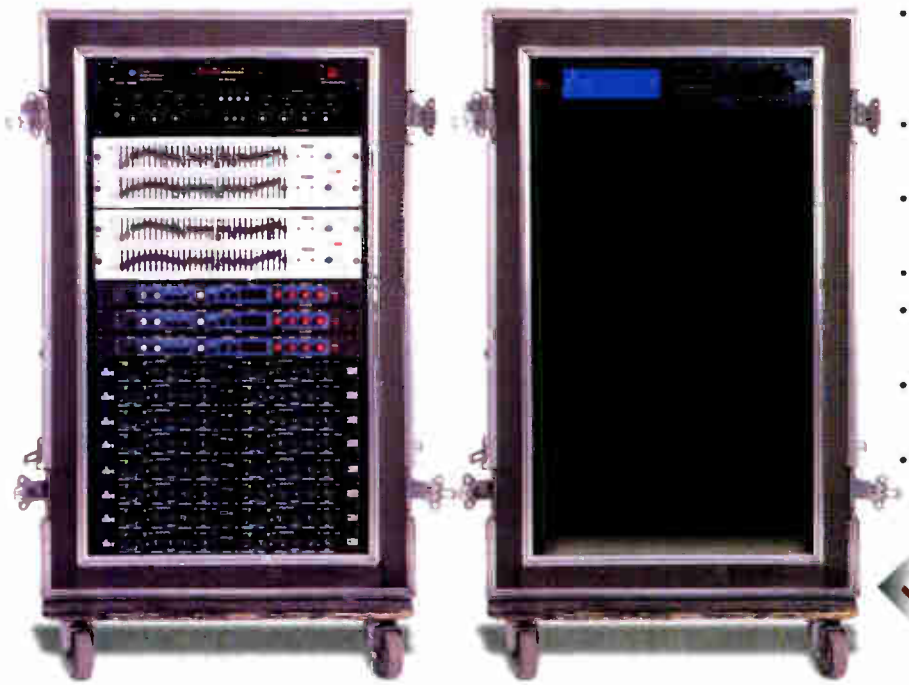

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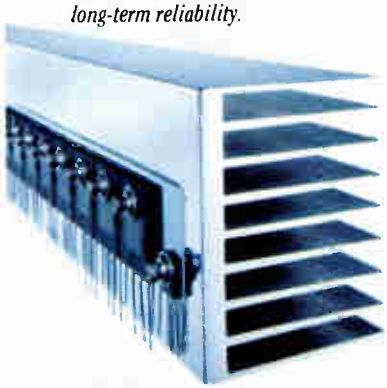

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Vol. 7 Issue 01 • January 2001
Evaluating audio products for professionals in commercial recording, broadcast production, audio for video/film, project studios, live sound, contracting and multimedia.

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Note to Self...

by Stephen Murphy

When you have engineered several thousand recording sessions — a couple of sessions a day for more than 10 years — you start to notice some things. If you don't, you are most likely dead — probably a good time to get out of the business.

Take note

After engineering many sessions, the technical side of recording fades into the background and becomes second nature — like riding a bicycle or shifting a manual-transmission car (assuming you don't usually drive an automatic). You become free to concentrate on another part of engineering — encouraging good performances.

One way to do this is to use past recording experiences to improve the present. For instance, take note of different performer's working styles. Despite the sheer number and diversity of the performers an engineer works with, general similarities will emerge — what one might call performance profiles.

After a while, you can identify several general performance profiles (e.g. singers who are consistently sharp, people who like lots of verbal feedback, players who always push the beat when overdubbing, whatever).

Next, you start to develop tools or tricks that work with different performance profiles. Some of the tools are simple, while others require a high degree of creativity and finesse.

Learn to recognize when a certain technique that helped one performer get a good take will also work with another one. It is a subtle yet effective way to be better at your job — clients notice this and you become more valuable to them.

In an upcoming column, I'll share some performance profiles — and corresponding tools — that I have noted.

On a related note ...

A motivational speaker was in the studio recording a book-on-tape for a major publishing house. The target audience was professional salespeople, and the title was something like *Close More Sales Through Dynamic Interpersonal Adjustment*.

The script covered the usual tips like, "Notice the pictures on your prospective client's desk. Enthusiastically express interest in the same subject."

The next section recommended mimicking the prospective client's actions, like crossing your legs shortly after he crosses his.

Another tip says to formulate your follow-up question while the other person is answering your first one. If this requires not listening to the entire first answer, fine. Rapid-fire questions make you appear self-assured and in command.

You become free to concentrate on another part of engineering — encouraging good performances.

To me, someone practicing the above recommendations would seem, at best, insincere and aloof. At worst, they would be down right annoying.

The motivational speaker did, however, mention one thing that piqued my curiosity. He said each person has a prevailing sense (as in the five senses: see, hear, smell, touch, taste). He strongly encouraged identifying the prospective client's prevailing sense as early as possible. Then adopt the same sense for the duration of the sales pitch.

To do this, listen for telltale buzzwords in the conversation. For example, a "touch" person will use phrases like "How does this *grab* you?" or "I *feel* that ...." A "see" person will say, "How does this *look* to you?" or "*Picture* this ..."

I must admit this fascinated me. The rest of the tape's suggestions were questionable, but this one seemed to have some merit.

I immediately recognized one of my recording clients as a "hear" person. Every time he called on the phone, his first words to me were "Steve, listen ..." Sometimes he would throw me a curve ball and say, "Listen, Steve ...," but he never failed to open with some combination of "Steve" and "listen."

It used to bother me that he would say "listen" all the time, as if he had to remind me to do so. But thanks to the motivational speaker, I had a newfound understanding of where my client was coming from. What a breakthrough!

I could not wait until my client called again so I could put into practice what I had just learned. I prepared phrases like "*Sounds* good to me," "*Hear* me out" and "That has a nice *ring* to it."

The next time he called, the people in the studio were stunned as I dropped the phone and fell out of my chair, laughing so hard that tears came to my eyes. The client, for the first time ever, had started the call by saying, "Steve, *look* ...."

So much for *Dynamic Interpersonal Adjustments*. The moral: don't believe everything you record.

So when you get a salesperson in your office who a) enthusiastically expresses interest in your spouse, b) mirrors your actions like a kindergartner, c) asks you questions but doesn't listen to your answer, d) and asks, "How does this deal *smell* to you?" don't blame me, I just recorded the thing.

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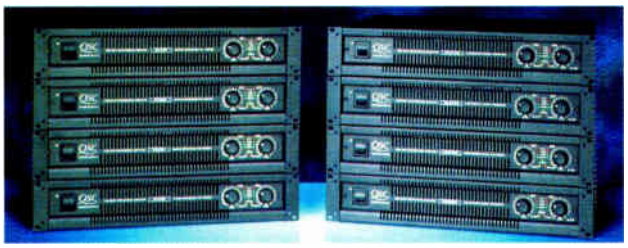

The "A" versions of QSC's PowerLight 2 series amps include onboard analog signal processing capability, switchable gain sensitivities and adjustable output power limiters. Power ranges from 900 W to 1,850 W per channel (2 ohms) in a 21 lb., 2 RU chassis. The power amps incorporate the same proprietary PowerWave switching technology as found in the original PowerLight series. The amps have several features designed for live sound pros: built-in, defeatable input clip limiters and selectable low-frequency rolloff filters. Custom security covers conceal front-panel gain controls and prevent tampering. Price: $1,687 to $2,478.
Contact: QSC Audio at 714-754-6175; *www.qscaudio.com*; or circle **Reader Service 113**.

Alesis Monitor One Mk2 Closefield Monitor

The Alesis Monitor One Mk2 passive closefield studio reference monitor has redesigned transducer drivers and cabinets. Other improvements extend dynamic range and increase efficiency. The Monitor One Mk2's crossover point is 2 kHz, providing truer, flatter frequency response than that of the original Monitor One was capable of. A 6.5-inch low-frequency driver provides a more detailed and controlled low end. The industrial cabinet design offers longer and more rigid porting tubes for a punchier sound; radiused corners reduce edge diffraction and improve sonic quality. The Mk2 also has a 1-inch silk dome ferrofluid-cooled, high-frequency driver for a natural response and no ear fatigue during long mixing sessions. Price: $299 pair.

Contact: Alesis at 310-255-3401; or circle **Reader Service 115.**

New Frontier SurgeX SX2120-SEQ Surge Suppressor

New Frontier's SurgeX SX2120-SEQ sequential surge protector power conditioner provides surge protection and power conditioning for up to 14 pieces of audio, video, broadcast and computer equipment. The SX2120-SEQ can sequentially power up/down electronic devices in separate groups. Housed in a rugged two RU metal chassis, the unit's rear panel features 14 standard grounded AC receptacles divided into three individual banks of four 120 V outlets, plus two always-on receptacles. The front panel contains a back-lit, three-line LCD that indicates operating status and AC line voltage. Functions and time delays are programmable through interactive menus shown on the LCD with all setup adjustments stored in non-volatile memory. The surge suppressor is rated for 20-amp use. An infinite number of SX2120-SEQ units can be cascaded to operate simultaneously or in sequence. Price: $799.

Contact: New Frontier at 888-735-2692; *www.frontierelec.com*; or circle **Reader Service 122**.

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Taking over the PARIS DAW line from Ensoniq, E-Mu is wheeling out the latest version, PARIS Pro. Paris Pro begins with a 16-fader control surface with dedicated function buttons and a jog/shuttle wheel. The guts of the system is a rack-mountable modular expansion chassis for I/O and processor card modules.

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Contact E-Mu at 831-438-1921; or circle **Reader Service 117.**

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Contact: Avalon Design at 949-492-2000; *www.avalondesign.com*; or circle **Reader Service 114**.

continued on page 12

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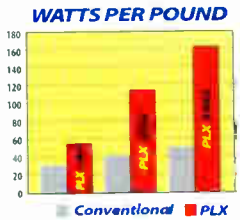

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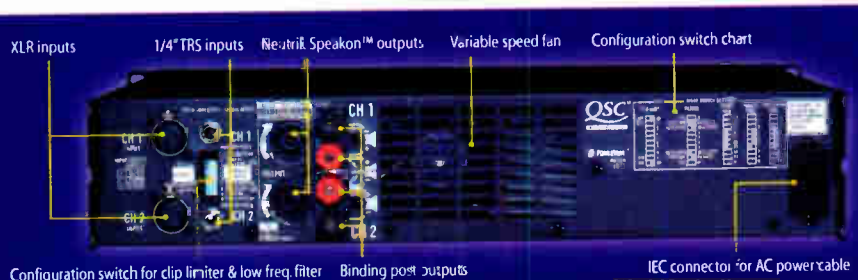

Rear view of the PLX 3402

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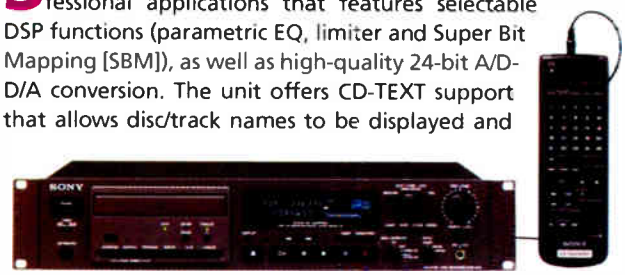
Contact: Electro-Voice at 800-392-3497; *www.electrovoice.com*; or circle **Reader Service 118.**

Sony CDR-W33 Professional CD Recorder



Sony Electronics CDR-W33 is a CD recorder for professional applications that features selectable DSP functions (parametric EQ, limiter and Super Bit Mapping [SBM]), as well as high-quality 24-bit A/D-D/A conversion. The unit offers CD-TEXT support that allows disc/track names to be displayed and entered from the front panel AMS controller, supplied remote control or (optional) PC keyboard. Remote transport control can be accessed via Control-S or PC-compatible keyboard. The unit has a 32 kHz to 48 kHz built-in sampling rate converter; CD-R-DA, CD-RW-DA recording media support; fluorescent display; I/Os equipped with coaxial digital and optical digital; and analog unbalanced phone jack. Price: $799

Contact: Sony Electronics at 800-686-SONY; or circle **Reader Service 116.**

Audio Tech 101

Thanks for "Audio Tech 101: the Elusive Ubiquitous Decibel" (***PAR***, 12/00, p. 38). I enjoyed it very much, it is precisely the type of information that I need.

I would like to know more about this subject, as well as more about impedance. I'm having difficulty understanding these two topics — could Ed Foster recommend some materials that would help me? I enjoyed how the article cited examples, which I find helpful. Formulas and equations are fine, but they don't offer the same impact as examples. I appreciate any information that you could provide.

Chris Owens
via e-mail

Edward Foster, technical editor, responds:

I'm glad you found the article about the decibel useful. In the future, I hope to tackle impedance — another potentially confusing subject. Believe me, I understand your dilemma! When I searched my admittedly not exhaustive — but extensive — technical library to find a book or two for you, I came up with nothing very useful!

Sure, I could find definitions in some books like "Impedance (Z): Total opposition offered to the flow of an alternating or pulsating current measured in ohms" with a further explanation that "Impedance is the vector sum of the resistance and the capacitive and inductive reactance, i.e., the ratio of voltage to current" but anyone who understands a definition like that doesn't need it!

Impedance is one of those basic concepts (like the decibel!) that are taken for granted. It is assumed that everyone understands them (so there is no further need to elucidate). That is simply not the case in the real world. Hang in there — Audio Tech 101 will try to address the basics.

Idea for PAR

I have been a long-time subscriber to ***PAR***. I imagine you get a lot of requests for different equipment reviews, but I have a special request.

The equipment in which I have invested demands protection on the road and at home. How about a few articles on cases? Flight cases on the road and at home; studio furniture; on-the-go, around-town types of cases; (SKB, soft cases etc.).

Thanks you for your consideration in this matter, and keep up the good work. I love your magazine!

Bernie Dake
Washington, DC

Steve Murphy, editor, responds:

Thanks for the suggestion. A roundup of flight cases is a very good idea.

*We do plan on doing more accessories/essentials reviews in the upcoming year. FYI, I reviewed some Quik-Lok studio racks and speaker stands last month (**PAR**, 12/00, p. 36), and I am in the process of checking out some studio workstation desks.*

Care to opine?

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READER SERVICE NUMBER 97

Shure KSM44 Condenser Microphone

by Tom Jung

Over the past few years, there has been a substantial increase in new microphones aimed at the home/project studio market. Compared with the professional studio market of a few decades ago, this market is huge, and building microphones for it has become attractive to numerous companies. Many of these mics are designed and built to a low price point, using inexpensive Chinese capsules and parts. Some of them do, however, provide respectable value — especially when you consider how much a good condenser microphone cost 10 to 20 years ago.

Just two years ago, Shure introduced the KSM32 studio condenser microphone (*PAR*, 1/99, p. 16). Known best for its rugged live performance microphones, the company entered the high-end microphone market with its KSM designs. The KSM32 is a side-address, single-diaphragm, cardioid-only microphone with what I would call a medium-sized 3/4-inch capsule.

I have used the KSM32 on every one of my recording sessions since I heard the first prototype. In fact, I own 12 of them — many of my projects have been recorded with just KSM32s.

Features

The latest in the KSM series is the KSM44, which is also side-address, but with a large capsule, dual-diaphragms and multiple patterns (cardioid, omnidirectional, bidirectional). Whereas the 32 is self-polarized or permanently biased, the 44 is externally polarized, which some people like to think makes a true condenser.

With the exception of the pattern switch on the front of the microphone, the KSM32 and 44 look almost identical. The 44 — like the 32 — has both a two-position, low-frequency rolloff switch and a 15 dB pad, each located on the back of the mic. These lever switches are recessed and, while not easily moved by mistake, can be switched with a fingernail.

The KSM44 is the quietest microphone I have ever used; Shure specs the self-noise at 7 dB in the cardioid position with slightly higher figures in the omni or bidirectional pattern settings. The output level is a fairly hot –31 dBV/Pa.

At a Glance

Applications:
Studio; broadcast

Key Features:
Dial-diaphragm condenser mic; cardioid, bidirectional and omnidirectional patterns; two-position rolloff and 15 dB pad; carrying case and shockmount

Price:
$1,340

Contact:
Shure at 847-866-2200; *www.shure.com*; or circle Reader Service 175.

One of the design goals of the KSM44 was to build a great vocal microphone while simultaneously making it versatile enough for use with many different kinds of instruments. I can only report on the instrument side of the KSM44 since vocals are not something I record with any regularity these days. (See sidebar on Stephen Murphy's vocal sessions.)

The 44 has a slight rise in response around 6 kHz, giving it just a bit of that sought-after coloration engineers and producers have loved about the old Neumann U47. Another thing that makes the KSM44 so attractive for vocals is the way proximity enters into the equation.

All cardioid microphones are subject to a proximity effect, which is the build-up of low frequencies as the microphone gets closer to the source. Single-diaphragm capsules have more proximity effect than dual diaphragm capsules, which, in some cases, may prove to add too much low frequency emphasis when working up close. The amount of low-frequency boost with a dual-diaphragm just happens to work out great with vocals. Another advantage to using a dual-diaphragm design on vocals is that popping is a smaller problem because of less low frequency build up.

Shure engineers Guy Torio and Jeff Segota presented an interesting AES paper last fall on the subject of proximity and polar response with respect to distance.

continued on page 16

On Vocals: the KSM44

by Stephen Murphy

With a gradual high-frequency rise between 4 kHz and 7 kHz, the KSM44 is a natural for a variety of vocal uses. Primarily, I used the microphone for close cardioid purposes, but in a few instances, I put its multiple patterns to the test.

The first vocal sessions consisted of a lead male voice, a female ad-lib, and stacked male and female backing vocals.

The lead vocal part was widely dynamic, consisting of breathy "up-close and personal" passages and a "power it home" out-chorus. Self-mic control was key to getting a good signal and appropriate tonal quality to tape, and the KSM44 helped out nicely.

continued on page 16

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World Radio History

Shure continued from page 14

comparing single- and dual-diaphragm designs. One of their conclusions was that dual diaphragm designs were better suited for nearfield applications, whereas single-diaphragm microphones had superior polar and on-axis response characteristics better suited for far-field work.

In use

On a recent Bob Mintzer Big Band session I used a pair of KSM44s on four trombones. I set the pattern switch to bidirectional with one player on each side of each microphone. Of course you have to start with great players, which we did, and the results were the best I've heard trombones sound in the studio.

The microphones were approximately three feet from each trombone, so the balance was just right for ensemble playing while there was still enough presence for soloing. At that distance a slight, low-frequency lift due to proximity gave the horns just a bit of warmth while the 6 kHz rise in response resulted in a nice sheen without getting edgy.

I recently recorded a guitar trio using KSM44s on both acoustic bass and electric guitar. One KSM44 was set up about two feet in front of, and about a foot up from, the bridge of the bass. Because both the guitar and the drums were set up in the main room with the bass, I used a cardioid pattern and the results were wonderful. The bass was full and fat without boom; the definition of the fingers pulling the strings made it sound like the bass was in the room with you. I also used the cardioid pattern on the guitar and can only say the KSM44 made the guitar sound just like it did in the room.

Product Points

Shure KSM44

Plus
- Excellent sound quality
- Quiet
- Multipattern versatility

Minus
- None

The Score
An extremely quiet multipattern condenser vocal microphone that sounds equally good on musical instruments.

Summary

While the KSM44 and the KSM32 are two mics that look alike and are definitely related, they are different enough that you need both in your microphone collection. The KSM44 comes with both a Shure Lock swivel mount, a matching elastic shockmount, a velveteen pouch and an aluminum carrying case. It carries a retail price of $1,340 (street price should be well below $1,000, which is great value).

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

On Vocals continued from page 14

For the up-close sections, the singer moved right up to the pop filter, placed about two inches from the mic. This yielded an intimate feel, and the microphone's proximity effect added desirable low end to the thinner breathy vocal. On the louder passages, the singer hit an on-axis mark about seven inches from the pop filter. The mic had no trouble handling the higher SPL sections.

Since the high- and low-level vocal sections were so clearly delineated in the song, it was easy to ride the preamp gain to established marks, eliminating the need for compression on the way to tape. Several complete takes were laid to tape and comp'ed together afterward. The resulting composite vocal performance had a live and natural feel.

The layered backing vocals were cut using a male and female vocalist, both singing into an omni-configured KSM44 from a distance of two feet. The two singers sang in unison, and each part was recorded twice. When the six tracks were panned across the stereo field, the product was a wide and lush three-part harmony.

The use of the omni position added a nice overall ambience to the backing vocals that sets them apart from the lead vocal. A solo female response-type ad-lib was added during the out-vamp, completing the vocals for this song. Again, I used the KSM in cardioid mode, and the singer was about seven inches from the pop screen.

I later tried the KSM44 for a type of recording in which I knew the microphone would excel: voiceovers. The voice talent was seated at a table with the 44 placed a few inches below his chin, angled up toward his mouth. No pop filter was used. The cardioid pattern rejected most of the reflections coming from the table; a thick absorptive pad on the table took care of the rest. I employed the KSM's steep 80 Hz cutoff to take care of any unexpected rumble. The predictable result was a clean, full-bodied read with excellent clarity and intelligibility.

For vocals over music — especially male vocals — the KSM44's built-in high-frequency boost added the desired clarity and top needed to cut through a mix. No extra EQ was necessary.

In a quick comparison, I found I could mimic the KSM44's sound with a Neumann U87 by adding a wide-Q 4 dB boost centered around 5 kHz; the sort of EQ I would add to a vocal track cut with the U87, in other words.

In the case of this particular solo female ad-lib, the high-end boost turned out to be a bit much, especially in high SPL passages. A mid-Q dip in the same frequency range was needed to reduce the slight smear and essing on certain phrases.

The KSM44 is a natural for a variety of vocal uses.

The layered background vocals went down like a charm; smooth and warm with no annoying microphone or room signature buildup. The distance from the KSM44 and the use of the omni position resulted in a sound I will definitely employ again.

For voice-over and, presumably, broadcast applications, the KSM44 should be a hit. Its clean top end, internal subharmonic filter and low-noise/high-output specs make this mic a natural for commercial recording and broadcast applications.

I consider the KSM44 an excellent "open-palette" mic — the sort that presents the engineer with a full-range, clean signal that can be easily enhanced or altered through user placement, patterns and settings. In other words, it provides the basis for a good recording.

*Stephen Murphy is the editor of **Pro Audio Review**. As a recording engineer/producer, he has worked on many successful audio and video productions, including Platinum and Grammy-award winning recordings.*

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READER SERVICE NUMBER 95

Yamaha AW4416 Integrated Recorder/Mixer

by Loren Alldrin

On The Bench, Page 20

Yamaha has been at the forefront of digital mixing and recording for more than a decade with its ProMix 01, 02R, 03D and 01V digital mixers. Now the company aims at the project studio/home recording market with the release of the AW4416 all-in-one digital recorder/mixer. The workstation bundles up all of Yamaha's digital recording savvy into one potent little package.

Features

At its heart, the AW4416 is a 44-channel digital mixer mated to a 16-channel hard-disk recorder. Sixteen mixer channels are devoted to playback from the hard drive, and an additional 24 channels are ready for live inputs; the last four show up as two stereo effects returns.

The AW4416 offers four-band, 56-bit EQ on all 44 inputs. Yamaha also provides a full dynamics processor (compressor, compander, noise gate, expander or ducker — all with flexible keying) on all channels but the two stereo effects returns. The stereo bus has full EQ and dynamics.

The AW4416 has two internal effects processors with a full complement of ambiance, delay, pitch and other special effects (amp simulators, rotary speaker effects, etc.). You can take these effects off the auxiliary send bus and dedicate them to individual channel inserts.

For outboard effects, the AW4416 offers six additional aux sends that can be tapped either pre- or post-fader (or EQ). Add in the Yamaha's eight main busses, stereo bus and cue bus, and there are 20 busses to keep signals headed in the right directions.

You can directly tap any channel signal and send it virtually anywhere in the recorder, or route any of 50 different signals to the mixer's four analog outputs. The Yamaha has a full-blown digital patchbay under the hood — a good thing, considering how many channels of digital audio are flowing through the AW4416 at any given moment.

The unit's routing capabilities become extra important when you add digital or analog I/O cards into the AW4416's two expansion slots. Available cards include ADAT lightpipe (eight channels of input and output), TASCAM TDIF digital (eight I/Os), AES/EBU digital (eight I/Os), XLR analog (four in or four out) and TRS analog (eight in).

You could add one card for ADAT lightpipe digital I/O, for example, and pick up an additional eight TRS analog inputs from a second card in the other slot.

Even without expansion cards, the AW4416 is pretty well equipped to interface with the outside world. Analog inputs include combo XLR/TRS on Channels 1 and 2, TRS analog inputs on Channels 3 through 8 and an additional high-impedance input on Channel 8 (for electric guitar or bass). Channels 1 and 2 offer phantom power as well as an analog insert point.

Other jacks include headphone and monitor outputs (both with level controls), RCA stereo output, S/PDIF digital I/O, four unbalanced outs and a footswitch jack. MIDI in/out/thru jacks are joined by a dedicated MTC output jack and BNC-style word clock I/O jacks. A To Host jack allows direct connection to a computer for MIDI control or AW4416 software updates. Finally, the Yamaha offers a 9-pin jack for attaching a PC-compatible mouse.

All this mixing, processing and routing power is incorporated with a 16-channel HD recorder that records 16- or 24-bit uncompressed audio at 44.1 or 48 kHz sampling rates. There's one additional stereo track per song, which you can use to record your final mix. With the AW4416's mastering mode, it is a simple matter to burn stereo mixes (44.1 kHz only) to CD.

Each of the 16 audio tracks in a song points to one of eight virtual tracks. As with other virtual track schemes, the theory here is that you'll do multiple (or alternate) takes of a given part and choose the best one for playback. With some effort, you can comp together sections of different virtual tracks into one "keeper" track.

At a Glance

Applications:
Home and project studio recording; live recording

Key Features:
44-input digital mixer; four-band EQ and dynamics; 16-track 24-bit HD recorder; built-in automation engine; motorized faders; built-in effects, I/O expansion slots, sampler; optional CD-RW drive, external SCSI interface

Price:
AW4416 HD: $3,599; AW4416 CDHD: $3,799 (includes CD-RW drive and Sonic Foundry ACID, Sound Forge and Siren software)

Contact:
Yamaha at 714-522-9011; www.yamaha.com/proaudio; or **circle Reader Service 176.**

The main audio drive is an internal 2.5-inch IDE unit, up to 64 GB in size. The drive mounts on a removable card — you can purchase and swap out multiple drives (the unit I tested had a single 12 GB drive). An external SCSI jack on the back of the recorder shows promise, but can be used only for backing up and restoring song data. Out front, the AW4416 hosts a CD-RW drive for mastering audio CDs, backing up/restoring songs or importing CD tracks and WAV files.

continued on page 20

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World Radio History

Yamaha continued from page 18

On the software side, the AW4416 offers an impressive list of capabilities. Most notable is the system's automation recorder — a direct descendant of the software found in the 02R mixer. It allows easy automation and editing of fader positions, pan, EQ and aux send settings. It also recalls any of the AW4416's 96 scene memories (per song), as well as effects, dynamics and other setting libraries. Automation data is saved with each song, there's virtually no chance of maxing out the AW4416's automation memory.

The AW4416 has 16 sample pad buttons that can be assigned digital audio clips (up to 90 seconds total). A simple sequencer keeps track of when pads are pressed down and released. Pad outputs show up at the AW4416's digital patchbay, and can be routed to any mixer or recorder channel.

Other features of the AW4416 include tempo and meter maps, a fully routable metronome, 99 markers per song, good locate functions, auto-punch, multilevel undo, fader and mute groups, automatic crossfade between regions, and user-controlled dither/bit-depth settings.

In use

The engineers at Yamaha have obviously done a lot of thinking about the user interface of the AW4416. The unit's control surface is logically laid out, with many features and buttons coming directly from the 01V, 03D and 02R. Folks familiar with any of these Yamaha digital mixers will have a significant head start in learning the AW4416.

Two displays — one fluorescent and one LCD — keep the user well informed as to the status of the AW4416. The smaller fluorescent display holds the main HD meters and counter, while the large LCD handles most of the user interface. Various buttons on the AW4416 switch it into different operational modes, while function buttons beneath the LCD allow you to step through sub-pages for each mode. When switching between modes (track edit and song setup, for example), the AW4416 sometimes takes several seconds to reconfigure.

The AW4416's bank of motorized faders do triple-duty, controlling either the first 16 mixer inputs, inputs 17 through 24, or the outputs of the HD recorder. Faders are smooth and quiet, apparently having been improved over those on the 01V. Overall, the AW4416's faders, buttons and controls have a high-quality feel to them.

When using the AW4416, much time is spent with your hand wrapped around the Yamaha's data/jog/shuttle wheel, as it is the main point of contact for changing parameter values or moving quickly around a song. The outer shuttle ring offers several high-speed transport modes and 1/2X and 1/4X playback speed.

At speeds faster than 1X forward (and all speeds in reverse), the Yamaha plays brief blips of audio to help you get your bearings. When going forward, the 1/2X and 1/4X speeds play back continuously but with transposed pitch. A nudge mode repeatedly plays a short clip of audio either before or after the current point, allowing you to fine-tune playback position with the inner jog wheel.

The Yamaha offers a good complement of editing tools at the track, region and part levels. It is relatively easy to move whole tracks (and corresponding virtual tracks) around, nudge parts a few milliseconds in one direction or another, or repeat a snippet of audio down the timeline.

I ran into a major roadblock when trying to edit a track I had recorded. For whatever reason, the AW4416 splits the track-editing mode from the track playback mode — the mode in which you hear audio playback is not the one used to make edits to your tracks. The edit track view doesn't show track contents or even region borders. You see nothing but a solid black line showing the presence of audio data. Since the audio waveform view is only available from playback mode, you're flying blind (and deaf) once you get into edit mode.

Dropping precisely placed markers is the key to accurate editing with the AW4416.

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On The Bench

Yamaha AW4416 Integrated Recorder/Mixer Bench Measurements

Yamaha's AW4416 is an attractive all-in-one, 44-channel mixer, hard disk recorder and CD burner. Of all the devices I have measured, this one takes the cake for having the most complicated operation to figure out.

When I first started to measure it, I couldn't get any signal from the monitor outputs. Aside from this, the unit functioned okay. Yamaha's technical support indicated that I had to recall the initial first scene setup. When I did that, I then got signal from the monitor outputs.

Since the AW4416 has digital I/O, one could measure things in all four possible I/O modes. Since most usage would likely be in the analog-in/analog-out mode, however, I concentrated on this mode of operation.

The high-frequency rolloff characteristic for 44.1 and 48.0 kHz sampling frequencies is plotted in **Figure 1** (please see p. 110 for all graphs). The low-frequency response was a function of the channel gain setting being down 0.5 dB at 20 Hz at maximum gain and 0.1 dB down at minimum gain.

Distortion vs. frequency at 0.3 dB below full scale with 44.1 kHz sampling frequency is shown in **Figure 2**. The results for 48.0 kHz are virtually the same. Input linearity was quite good for the AW4416, as can be seen in **Figure 3**. In the plot, results are shown for Channels 1 and 2.

Equalization capability of the AW4416 is quite extensive as it has four bands of parametric type control. **Figure 4** shows the effect of the Q control with the low filter set for 10 dB of boost at 125 Hz. As can be seen, the curves vary from shelf to varying Q to a high-pass filter over the range of the control.

A similar effect for the high-frequency end of the spectrum is illustrated in **Figure 5** for the high filter and a 10 kHz frequency and again, 10 dB of boost. In the case of the high filter, the final setting is a low pass filter at the selected frequency. The low-mid and high-mid filters are both bell-shaped boost-cut curves with variable Q, center frequency and boost or cut.

The dynamics feature of the AW4416 permits flexible compression and limiting on various input channels and outputs. I set up a compression arrangement for a threshold of -15 dBu and various ratios. The results are shown in **Figure 6** for ratios ranging from 10:1 to 1:1.

After working with the AW4416 during its bench testing, I am most impressed with its useful and extensive capability.

—Bascom H. King

see table and graphs starting on page 108

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Yamaha continued from page 20

You have to find the points you want to make cuts or edits in playback mode, drop markers at those points, switch to track-edit mode, locate the markers and perform the edits.

This multistep process is counterintuitive and inefficient. I hope it is replaced by something better in the next software update.

Another impediment to productivity is the speed at which the AW4416 shuttles some types of data to and from the internal CD-RW drive. The AW4416 took 14 minutes to import one four-minute mono WAV file from CD-RW, and almost as long to write a finished mix back to disc.

Backing up one song (280 MB) to CD-RW took nearly 20 minutes. It is also worth noting that the AW4416 will import — but not export — WAV files. This is a serious problem for many types of production, especially when collaboration is a factor. (*Yamaha says software Version 1.1, available for download from its Web site, improves the performance of CD operations—Ed.*)

In the sonics department, the AW4416 does not disappoint. The mixer section's preamps are the same as those found on the Yamaha 01V, which puts them in the "very respectable" category for a product in this price range.

The AW4416's 24-bit converters sound great — and remember, one can easily spend more on a single mic preamp or A/D converter than on this whole recording studio in a box.

The unit's EQ uses the same excellent algorithms as are found in the 02R and 01V mixers, which sound marvelous. I especially appreciate the EQ's true high- and low-pass filtering. The Yamaha's two built-in effects units are top-notch, and offer a good variety of effects.

The dynamics processors do a nice job of controlling levels and noise without coloring the sound.

Summary

The Yamaha AW4416 is capable of doing more than just competing in the high-end one-box-studio market — it has the potential to totally dominate it. But before Yamaha can rule the roost, there is some homework to do.

The unit's software is several paces behind its phenomenal hardware — especially in the area of track editing. This is a crucial issue, because audio editing is at the heart of the production process. So much time is spent jumping back and forth between the AW4416's two modes, that what should be a simple task becomes a potential exercise in frustration. Most aspects of the AW4416's software fare better, but there are several areas that need attention.

Any product with this much depth and power usually has to wait for its software to catch up. Yamaha says it is hard at work improving the AW4416 software as we speak. Most importantly, they have an incredible hardware platform to build on.

Is the AW4416 the ultimate solution for every backroom recordist? Probably not. With its price tag and sophistication, it will scare off many users. Folks without a decent grasp on signal routing and bussing might get lost for a long time inside the Yamaha. Those that understand the power that is there, however, will be rewarded with a recorder that imposes virtually no limits on their creativity.

If I haven't made it abundantly clear that the AW4416 is a serious power tool for professional-quality recording, consider this: Sheer track count aside, virtually every Grammy Award-winning album recorded and mixed on a Yamaha 02R console in past five years could have been made with similar results on the AW4416 — for about $3,000.

Bottom line: the AW4416 is not a toy — it is a beast!

Loren Alldrin is ***Pro Audio Review's*** *project studio editor and author of* The Home Studio Guide to Microphones.

Product Points

Yamaha AW4416

Plus

- Incredible recording power and flexibility
- Top-quality sonics
- Expandable

Minus

- Clumsy track-editing interface
- Slow CD-RW read and write
- No WAV file export (to be addressed in an upcoming software release)

The Score

If its software catches up, Yamaha's power-packed AW4416 is poised to take over the one-box studio market.

World Radio History

Audio-Technica AT835ST
Stereo Shotgun Microphone

by Mark Ulano

My need for a dedicated stereo microphone has been intermittent but steadily increasing. My main uses had been for stereo effects and occasional music recording. I would set up a pair of Schoeps — M/S, XY, etc. — for the specific application. I still do this for critical uses, but now I need something less involved — something I can quickly grab that is rugged, lightweight and flexible.

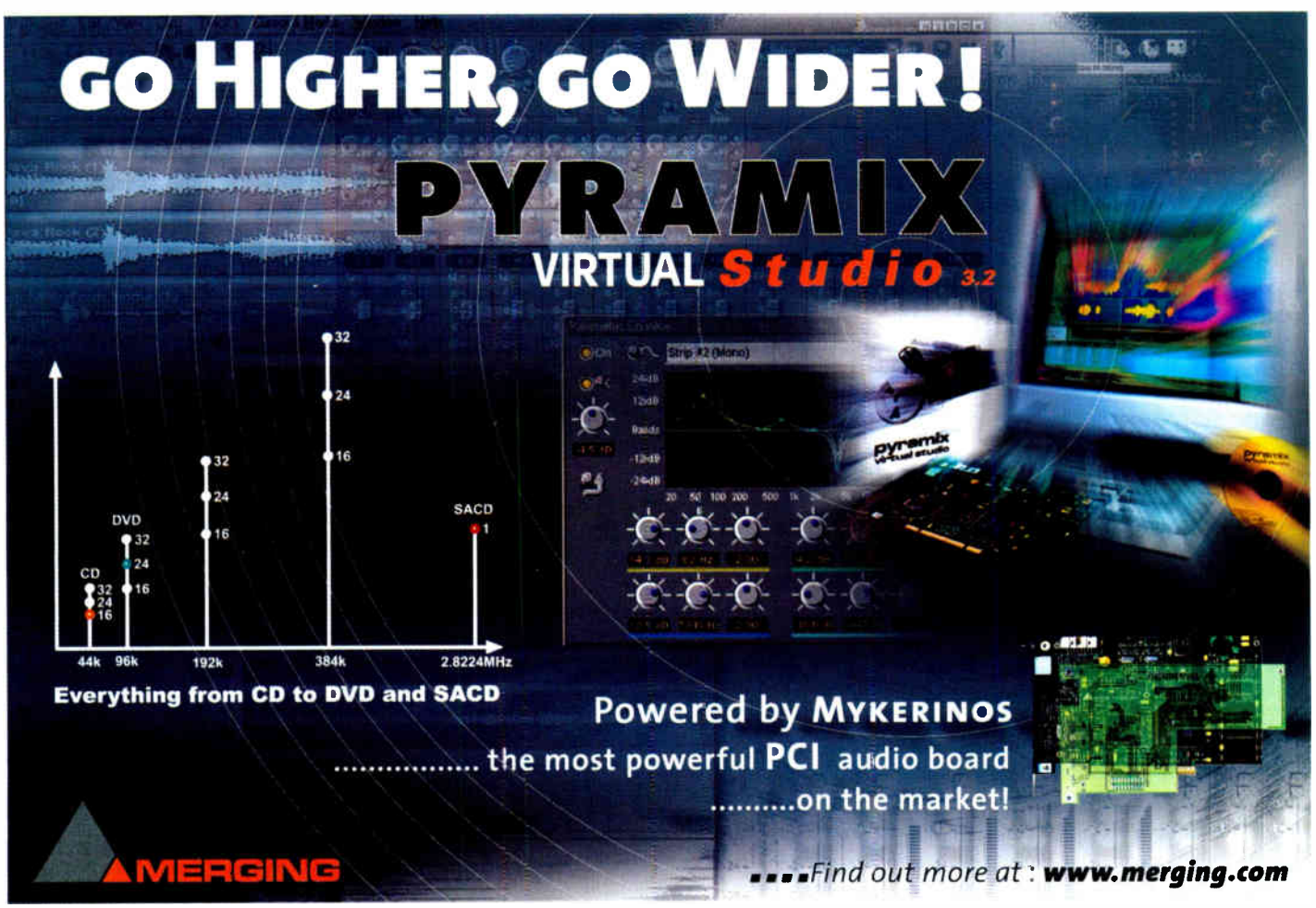
As I move into gathering more synchronous stereo ambiences for surround application, I want the ability to quickly set something out there for an extra ambient pair. Audio-Technica's new AT835ST stereo shotgun microphone, featuring independent line-cardioid and figure-eight condenser elements, is a candidate for this and many other uses.

Features

At 9.29 inches long and 3.6 ounces, the AT835ST is as unpretentious a stereo mic as you may ever see. It sports a low-profile, three-position switch for three stereo modes: nonmatrixed M/S, internally matrixed LR-W (wide pattern) and LR-N (narrow pattern).

This is one of the most "kludgeless" stereo microphones I have come across. An added benefit of this low profile is easy compatibility with almost all my suspension mounting hard-

continued on page 24



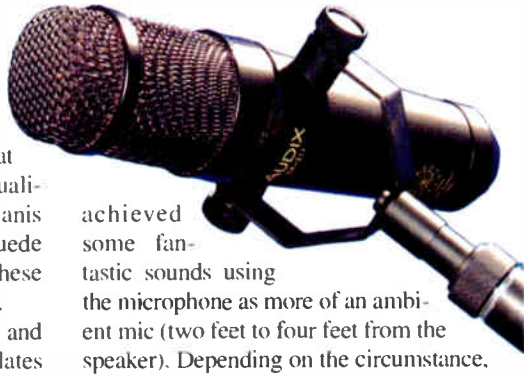
World Radio History

Audix CX-211 Microphone

by Russ Long

Audix has built a strong reputation in the sound reinforcement community with its OM-5, OM-6 and OM-7 handheld vocal microphones. These mics are durable and sound great — a rare combination in microphone qualities. Bruce Springsteen, Foo Fighters, Alanis Morissette, Pulp, Annie Lennox and Suede lead the long list of artists who use these microphones for live vocal applications.

I was excited to try the new CX-211 and see how well the Audix quality translates into the recording studio.



Features

The CX-211 ($649) is a rugged, large-diaphragm, multipurpose condenser mic for studio, live or broadcast applications. The microphone is finished in the classic Audix black satin finish and is housed in brass with a steel mesh grille screen. It requires 48-52 V phantom power for operation. The microphone has a cardioid polar pattern and features a 1-inch gold vapor diaphragm.

The CX-211 is equipped with a switchable low-frequency rolloff and –10 dB pad. The microphone has the ability to handle sound pressure levels greater than 145 dB, fairly impressive for a large diaphragm condenser.

The mic kit includes a mic stand adapter, external foam windscreen and a lunchbox-sized road case. Optional accessories include a two-channel phantom power supply unit (APS-2).

In use

I used the CX-211 in a variety of circumstances and had good results. In most applications the mic sounds open and smooth on the top end and full and warm on the bottom.

My best results were on acoustic guitar and percussion. The microphone captured the sparkle of the instrument as well as the body and warmth. In addition to tambourine, shaker and congas, the mic worked well on high-hat and on the bottom of the snare drum (with the pad on). I would have liked a second CX-211 to use a pair to record drum overheads. This should be another good use of this microphone.

While recording electric guitars, I was unable to achieve good results using the CX-211 to close mic the guitar cabinet. I achieved some fantastic sounds using the microphone as more of an ambient mic (two feet to four feet from the speaker). Depending on the circumstance, this worked well as the sole guitar amp mic or mixed with the signal of a closer mic.

The mic beautifully captured the sound of the mandolin and dobro. In both cases the dynamics and depth of the sound had a three-dimensional feel. This was actually one of the first times I recall getting an adequate mandolin sound without using a tube mic.

Although I found vocals are not its strongest point, the microphone does a better than average job capturing their sonic portrait. On some vocals the microphone tended to lack body and occasionally sounded brittle or harsh. In other instances, however, it sounded great.

Another strong point of the CX-211 is the mic stand adapter. This flexible swivel mount allows the microphone to be quickly placed with minimum effort, even in the most awkward position. Having the microphone mounted to the adapter eliminates the chance of accidental drops as well.

Summary

The Audix CX-211 is a versatile, high quality utility mic that would make a fine addition to a major studio's microphone collection or would work well as a second and third microphone for a project studio. Although it is a studio quality microphone, it is built to withstand the vigor of the road. Another consideration for live sound applications is that the design of this microphone provides for more ambient sound rejection than most condenser microphones in its class. This gives the CX-211 an edge over most of its competitors in the live sound arena.

Contact: Audix at 503-682-6933; or circle **Reader Service 177**.

Russ Long, a Nashville-based producer/engineer, owns The White House and The Carport recording studios.

Audio-Technica continued from page 23

ware and wind protection. Very little accessorizing is necessary to use this mic.

The wide pattern was my preferred choice for ambiences. The narrow pattern offers more rejection, less ambience and works well for effects. The M/S mode is useful for documentary style work and may help find this microphone's frequent home in the world of MiniDV projects as an all-purpose tool for the hurried user.

A silk-screened notation on the back of the mic lets you know which end is up. It would be nice if more things in life were that clear.

The frequency response is respectable, with a 40 Hz to 20 kHz range. It uses 4 mA at 48 V and is a 200-ohm device. In the M/S mode, Audio-Technica's published specs show a maximum SPL level of 123 dB for the mid element and 127 dB for the side. Signal-to-noise (S/N) ratios are 72 dB at 1 kHz/Pa for the mid, and 68 dB for the side.

The XY specs are a S/N ratio of 70 dB, at 1 kHz/Pa. Switchable low-frequency rolloff is provided (80 Hz, 12 dB/octave). Also included are a durable storage/travel case, foam windscreen, a stand clamp and a stereo cable terminating in two standard XLR connectors on one end and a 5-pin XLR on the other, mating to the microphone's output connector. This microphone needs 11 to 52 V phantom power.

In use/Summary

I first listened to the AT835ST through a Sonosax SX-10 mixer and found it had a surprising amount of guts for such a slight device. There is a gradual downward slope beginning around 200 Hz, appropriate considering motion picture operating environments. There is also a slight bump starting at around 4 kHz. The net result is slightly midrangey, easily customizable at the panel.

I fired it up directly into a Fostex PD-4 with M/S monitoring and was pleased with the results. The combo is efficient for fast effects or over-the-shoulder/running-gun style work. No stringy boxes or little kludge monsters running all over the place, just a cable.

MSRP is $899. Audio-Technica also makes a 15-inch long big sister — the AT815ST, which retails for $999.

Contact: Audio-Technica at 330-686-2600; *www.audio-technica.com*; or circle **Reader Service 178**.

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

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READER SERVICE NUMBER 99

World Radio History

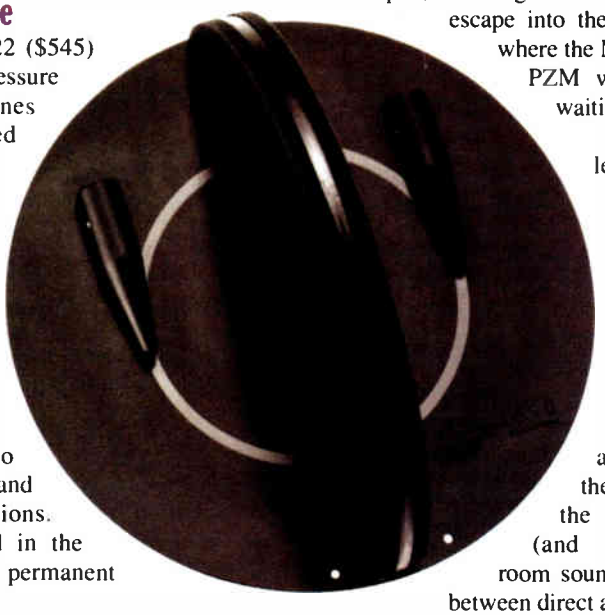
MBHO MBNM-622 Stereo PZM Microphone

by Stephen Murphy

The MBNM-622, a futuristic looking microphone from German manufacturer MBHO, is designed to mimic the way the human auditory system works. I recently took the MBNM-622 for a spin in the recording studio, using it to record a number of different sources in stereo.

Features/In use

The MBNM-622 ($545) features dual pressure zone microphones (PZM) separated by a modified Jecklin Disk baffle. The two omnidirectional condenser PZMs are mounted on an 12-inch diameter base. A felt pad covers the back of the base to prevent slippage and reduce vibrations. Holes are drilled in the base for secure or permanent mounting.



The Jecklin Disk design, pioneered by Juerg Jecklin, simulates human hearing response by spacing two omnidirectional microphones about 6 inches apart, separated by a foam-covered disc. Like our ears, this configuration uses the difference in arrival time (delay), frequency response (spectral energy) and intensity (or level) between the two microphones to provide directional information. Like most other stereo miking setups, directionality is decreased in the lower frequency range (i.e. below 250 Hz).

I first set the MBNM-622 on the wooden floor in the big room at Avalon Sound Studios, outside of Washington D.C. I was preparing to cut some drum tracks for a rock ballad. Since I wanted that ponderous, down the hall, Bonham-ish drum sound, this would be a good chance to check out the 622's stereo ambient abilities.

I set the drums up in the adjacent medium-sized drum room. The kit was close miked with an EV RE20 on the kick, a Shure SM57 and SM81 on the top and bottom of the snare, and a pair of Sony C37Ps in an XY configuration for the cymbals and overall kit. The drum room isolation door was propped open, allowing the drum sound to escape into the main room, where the MBHO stereo PZM was patiently waiting.

After setting levels and monitor balance for the close mics, I brought the PZM faders up, fed through API microphone preamps. And there it was — the classic big (and PZM-boxy) room sound. The delay between direct and room was a bit much, but I easily shifted the tracks to an appropriate timing in Pro Tools later.

After some externally triggered expansion (using the close kick and snare) and some limiting, the stereo room tracks slammed. The expander allowed the room tracks to be wide open on the kick and snare hits without getting too roomy in between.

I also used the MBNM-622 on the studio's 30-year-old Yamaha C3 grand piano — a beautiful instrument. Since this was a rock-ballad, I wanted a brighter, defined piano sound, but it also needed to fit in with the ambient drum sound as well. I decided to use a pair of AKG 451s in an XY configuration over the hammers, slightly favoring the higher strings (gotta leave room for the bass guitar in the mix!).

For the ambient piano sound, I used the 622 taped to the wide-open piano lid.

At a Glance

Applications:
Live sound; studio; location recording

Key Features:
Dual PZM omni condenser capsules; Jecklin disk configuration; 12-inch base

Price:
$545

Contact:
MBHO /MTC at 718-963-2777; *www.mbho.de*; or circle **Reader Service 179**.

After making a few positional adjustments for phase coherency, the sound came alive. For rock music, I usually use a pair of AKG 451s or 414s without any other microphones. I was happily surprised with the "third dimension" the 622, when fed in at approximately one third of the close microphone's level, added to the piano sound.

Summary

I have owned a few PZM microphones over the years, and never got all that comfortable with using them regularly. I would occasionally throw one in the piano and close the lid, but usually for isolation purposes rather than artistic choice. I have achieved good results using PZMs as overall ambient microphones on a choir or horn section, but usually I opted for something more familiar.

The MBNM-622, while still exhibiting some of the "boxy" EQ characteristics of other PZMs I have used, made me re-evaluate my position — especially when I heard its complement to the piano I have recorded so many times.

The ease of set-up, placement and use, coupled with the spacious stereo (and mono compatible) spread, make the MBNM-622 a good addition your microphone list — I just added another brush to my palette.

World Radio History

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READER SERVICE NUMBER 100

Single Slice

by Chuck Taylor

Madonna's "Don't Tell Me"

Album: Music by Madonna; the second single from this double-platinum album

Date Recorded: January 2000

Engineer: Mark "Spike" Stent

Previous Projects: Oasis, U2, Massive Attack, Spice Girls, Bjork, and Madonna's Bedtime Stories album

Producers: Madonna, Mirwais Ahmadzai

Songwriters: Madonna, Mirwais Ahmadzai, Joe Henry

Studios: Recorded at Sarm West Studios, London; mixed at Olympic Studios, London

Mastering Engineer: Tim Young

Instruments: Korg and Clavia keyboards, acoustic guitar, Emu samplers, real strings recorded at Air Studios London, Solid State Logic audio for sequencing and processing

Console: Solid State Logic Series 9000, added a Solid State Logic 4000G for mixing

Microphones: Vocals utilized a mixture of Sony CG800 and 50-year-old vintage Neumann CMVs to add distortion effects

Microphone Preamplifiers: Neve 1081s through LA2A limiters

Processors: AMS delay lines, Logic plug-in vocal effects, vocoder, Lexicon 480 effects, old-style Gates compressors

Engineer's Diary

Sarm West Studios, London

"It is always an interesting experience working with Madonna," understates Spike Stent, the engineer behind much of the diva's No. 1 Music album. "When you're in the studio with someone like her and producer Mirwais Ahmadzai, you have to stay on your toes." For second single "Don't Tell Me," Stent helmed some mighty vocal effects to give Madonna a gritty sound that complements a lyric in defiance of love lost ("Take the black off a crow/But don't tell me I have to go"). "She usually records her vocals clean and we come back afterward and reprocess the sound, which is what happened with this song," he says. "We sent it through the Neve chain of effects and distorted it so that it has an edgy top-end. We originally had a normal vocal setup, but Mirwais wanted to try something different, so we added the Neumann vintage mics from the '40s and '50s. They're not particularly hi-fi-sounding, but they have serious character. That session was a lot of fun, as was making the whole album."

Chuck Taylor, a regular contributor to ***Pro Audio Review****, is senior writer for Billboard in New York.*

World Radio History

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READER SERVICE NUMBER 101

World Radio History

Earthworks SR69 Live Vocal Microphone

by Andrew Roberts

Does the world really need another handheld condenser microphone for the live stage? If it comes from Earthworks, the company renowned for its superb reference and omni mics, the answer may be yes. The SR69 represents a foray into the rough neighborhood of live sound for Earthworks, a manufacturer whose microphones are known for being extraordinarily flat and uncolored.

Features

The SR69 ($350) makes a strong first impression. The microphone, a handheld cardioid condenser that comes in a variety of striking colors, weighs a remarkably light 135 grams. The aluminum chassis has a ported cover that unscrews revealing the diaphragm. A foam windscreen is attached to the outside of that cover.

The foam windscreen is a calculated part of this microphone's design. Without it, the SR69 has a nearly flat response from 50 Hz to beyond 20kHz, with just the slightest bump between 500 Hz and 1 kHz. With the windscreen on, the microphone has about a 2 dB high frequency roll off above 6 kHz. The windscreen is also critical in helping to reduce plosives and it plays a role in the microphone being able to handle an input of 145 dB SPL.

In use

Sonically, the SR69 makes as much of a first impression as it does physically. The first thing I did with the Earthworks was to replace a Shure Beta 58 in a public address setup. Thinking that this lightweight studio microphone would have a fraction of the punch and output of the Beta, I made no gain adjustments before attaching it to the cable.

Hello! To my surprise, the SR69 has a remarkably high output. It has a bit of mid punch that makes the microphone cut through the din of a loud band and it certainly sounds less scooped in the mid range than other popular vocal microphones.

All the vocalists who tried the SR69 enjoyed using it, with several being downright enthusiastic. One singer expressed a little dismay at the "lack of substance" when handling such a lightweight microphone, but most users enjoyed the featherweight status.

I noticed the SR69 has very little handling noise — a surprise for such a pixie. Even though the SR69 was rough enough to handle the rigors and sonic demands of a loud bandstand, it retains a certain amount of refinement. It delivers a superb vocal image that is brimming with uncolored detail and clarity.

I particularly liked how the SR69 sounded at a distance of several inches from a singer's mouth. It didn't lose all the body of its sound when someone would back off a bit while it was not overly bassy when used intimately.

Removing the windscreen opens the SR69 up to a whole new persona. While I wouldn't recommend it for vocals in this state, it was excellent for acoustic guitar. In fact, the sounds I got with the Earthworks rivaled those of my expensive pencil condensers. With its honest tonal representation, I expect that the SR69 would be excellent at reproducing a wide range of acoustic instruments in the studio or on stage.

Summary

In the SR69, Earthworks has created a microphone that is superb for live vocals. It

continued on page 32

beyerdynamic M260.80 Ribbon Microphone

by Ty Ford

Back in the mid 1980s, one of my early articles for ***Pro Audio Review's*** sister-publication, ***Radio World,*** compared 18 different microphones for voice use — primarily male and female voiceover. Four recording engineers compared the microphones, rating each on a scale of 1 through 5. The voiceover talent read soft sell, straight narration and hard sell copy.

The beyerdynamic M260 ribbon microphone surprised everyone by ranking in the top six, along with a Neumann U87, AKG C414, Sanken CU41, Electro-Voice RE20 and Sennheiser 421 microphones. The M260 became a frequent choice of radio broadcasters because many on-air studios have

less-than-perfect acoustics and the hypercardioid pattern hides those problems — also, the M260 is a relatively inexpensive $429.

Features

The M260 has been changed slightly and released as the M260.80 ($419). Interestingly, the company is not positioning the M260.80 as a close-proximity voice microphone — possibly because the M260.80 has less pop screening than the original M260 mic.

In addition to the reduction of screening, the M260.80 also has a more rolled off bottom than the M260. Being hypercardioids, both microphones exhibit considerable proximity effect. At a distance of four inches, the M260 has almost an 8 dB bump at 100 Hz. At 40 inches, the bump is reduced and the low end is flat to about 100 Hz before dipping. By comparison, the M260.80 starts its rolloff at about 400 Hz and appears to have about 2 dB less LF response at each frequency.

continued on page 32

World Radio History

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World Radio History

READER SERVICE NUMBER 102

Earthworks continued from page 30

is highly effective in the hostile world of a raucous stage, but it still has a refined sonic image. Add this to the fact that the SR69 can record or amplify a wide range of acoustic instruments and you have an impressive package.

For handheld live vocal use, this mic is not cheap. But when was the last time you could use a $175 live vocal microphone to record a great acoustic guitar track in the studio? Superior performance and versatility make this microphone an excellent bargain.

Contact: Earthworks at 603-654-6427; *www.earthwks.com*; or circle **Reader Service 180**.

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

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(or how to get real bass management)

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We could (and should) go on about the other extra's in our new gourmet offering, but the proof of the pudding is in the eating, and the PS350B is most definitely- Hmmm...Yum.

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READER SERVICE NUMBER 32

Beyer continued from page 30

Like its forebear, the M260.80 has a broad, 2 dB bump centered at 6 kHz that begins its rise at 3 kHz and returns to 0 dB at 15 kHz. While it is not as crisp and transparent as a Neumann TLM 103, neither is it as thick and wooly as a beyerdynamic M160 — although they share similar overall sensitivity. The published figure is 1.2mV/Pa.

I removed the three small screws holding the top half of the ball-shaped screen in place. The windscreen is comprised of three hemispherical layers of metal screen: a coarse outer layer, a finer mid-layer and a coarse inner layer. As I spoke into the mic while moving the screen in and out between my mouth and the ribbon, I found the screen extremely transparent.

The horizontally mounted ribbon is just less than an inch long and sits down inside a plastic throat with two curved sides. Over the ribbon sits a fine metal or brass wire mesh to prevent popping and to keep small particles from fouling the ribbon itself. The ribbon is crimped several times along its length and is attached to the capsule assembly at each end.

In use

This is a microphone with a tight pattern that thickens and broadens the upper bass and low mids. It is a natural for high transient midrange sources such as banjos, accordions, horns or individual strings — although you would have to make sure the hypercardioid pattern would not be too narrow. You might also find use for it on acoustic bass.

Although not designed for close V/O, I tried it and found that, for those who have good plosive control, the microphone worked pretty well — the results were a bit dark through my GML mic pre, however. A brighter preamp would be a better match for upfront voice work. Whether for singing or V/O, the M260.80 would work well on a peaky voice that would benefit from a bit of smoothing — just remember to use a pop screen.

Summary

Everyone has nasty, edgy sources that require taming. The beyerdynamic M260.80 is a very cost-effective taming tool and its tight hypercardioid pattern is as valuable in project studios with bad acoustics as it is in studios with good acoustics.

Contact: beyerdynamic at 800-293-4463; 631-293-3200; or circle **Reader Service 181**.

Ty Ford has been reviewing pro audio gear for more than a decade and is a regular contributor to ***Pro Audio Review****.*

World Radio History

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World Radio History

PreSonus MP20 Microphone Preamp

by Loren Alldrin

When PreSonus introduced the M80 eight-channel mic preamp, it raised some eyebrows with its combination of sonic quality and features. PreSonus' MP20 stereo microphone preamp has the same basic electronics, features and sonic character as the M80, putting it a notch or two above many of its competitors.

Features

The MP20 ($650) offers two channels of preamplification, each consisting of a Class A discrete input buffer, twin-servo gain stage and high-quality audio transformer. By changing the current through the transformer, the MP20's IDSS control allows variable generation of even-order harmonics. The ear usually hears this as a thickening or warming of the sound.

Each channel of the MP20 offers a variable gain control (10 dB to 60 dB gain), IDSS control, phase invert, phantom power, pad and 80 Hz high-pass filter. A L/R switch assigns the input to the MP20's stereo mix bus and a constant-power pan knob sweeps each input across the stereo bus.

The MP20's metering consists of 12 LEDs; 0 dB sits in the middle, with green LEDs spanning the range from -24 dB to +24 dB. Its peak indicator sits at a generous +28 dB. Each button on the MP20 glows when engaged, as does the large, round power button on the unit's right side. The MP20's numerous lights, classy blue brushed-aluminum faceplate and chrome knobs add up to a very nice-looking piece of gear.

The MP20 is well-equipped in the area of inputs and outputs. In addition to the individual channel XLR inputs and outputs, the PreSonus has a pair of instrument inputs on the front panel. Also on the front surface is a stereo headphone output that monitors the stereo bus. A knob controls level to the headphones and the MP20 puts out enough juice to drive even inefficient, high-impedance phones to strong levels.

A real surprise on a preamp at this price range is a TRS balanced insert for each channel — one usually feels lucky to get unbalanced inserts on such a product. For patching in a compressor or other processor(s), balanced inserts are the way to go. Since the MP20 has no 1/4-inch outputs, the insert send serves this purpose as well. The insert returns can be used to return a line-level source to the stereo bus.

Unlike the M80 (which uses a large, external power supply), the MP20 has an onboard power supply. Noise performance around 60 Hz may suffer a few dB for this decision, but the convenience factor is undeniable.

> The real surprise on a preamp, at this price point, is a TRS balanced insert for each channel.

Internal power supply or not, I doubt many recordists at this level will gripe about the MP20's -94 dB noise floor.

I poked around inside the MP20 a bit, and was impressed with the quality of construction. I could see no "oops" leads hand-soldered to any circuit board and the innards revealed that plenty of care went into its design.

In use

Like the M80, the MP20 has a focused and punchy sound. It doesn't have a particularly treble-heavy output, nor is it as fat and full sounding as others. With IDSS all the way down, the MP20 has a nicely balanced sound with a solid midrange response. I described the M80 as almost tough-sounding (PAR, 8/99, p. 38) and the same holds true for the MP20.

The preamp's IDSS circuit changes its sonic character dramatically. The increase in even harmonics takes some of the sheen off the MP20's sound and lowers the perceived level a bit. Boost the gain to compensate and the end result is a fuller, darker sound. With the MP20's IDSS control at 100 percent, the preamp's sound is considerably less detailed and open. Transients also take a hit, which makes for a smoother, less dynamic sound (an improvement in most cases).

The IDSS circuit lets the MP20 cover a broad range of the middle ground between ultrapure on one side and colored or thick-sounding on the other. With IDSS all the way down, the MP20 gives you sound nearly as accurate as some much pricier solid-state designs. Wind the IDSS up near the top of its range and the MP20 takes on a loose, somewhat dark character often associated with a tube preamp working up a sweat. This chameleon-like nature of the MP20 is a real plus — it's like getting several preamps in one.

continued on page 36

At a Glance

Applications:
Studio recording; live sound

Key Features:
Class A discrete circuitry; transformer-coupled design; stereo mix bus; IDSS warmth control; front-panel instrument inputs; headphone output; balanced inserts

Price:
$650

Contact:
PreSonus at 800-750-0323; or circle Reader Service 182.

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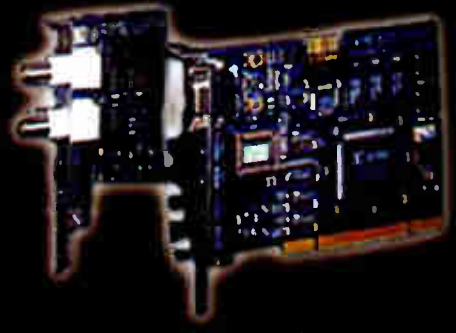

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PreSonus continued from page 34

Does the MP20's IDSS circuit allow it to nail the sound of a thick tube preamp? I wanted to answer this question, so I did a head-to-head comparison between the MP20 and a high-quality ($2,500) tube preamp. With its IDSS control at about 75 percent, the MP20's sound was quite similar to that of the tube preamp. At 100 percent, the MP20 was actually darker. The MP20 didn't quite generate the large, rich sound that the tube preamp did, but it came as close as I've heard from a solid-state design.

What the IDSS control does for a mic it also does for instruments. It was nice to be able to dial away some of the brittleness of a direct electric guitar or piezo acoustic pickup. The pseudo-compression of the IDSS circuit also helps the track sit in the mix, which was beneficial for direct electric, acoustic and bass guitars.

On the control front, the MP20 gets two big thumbs up. Knobs are arranged logically and have ample room to breathe. Switches are clearly labeled, and their bright LEDs clearly indicate their settings. The MP20's metering is greatly improved over the M80, which lacks resolution around 0 dB. The MP20 offers LEDs at 2, 4, 8, 16 and 24 dB above and below the 0 dB marker.

The MP20's stereo mix bus is a thoughtful, handy feature. Being able to pan a pair of mics through the stereo field can give live recording engineers a bit more control over their sound. Studio recordists can sum top and bottom snare mics to mono, blend an acoustic guitar's direct pickup and microphone, or dream up any number of other uses for the stereo bus. Even if used for nothing more than monitoring, it's a nice touch.

There isn't much I didn't like about the MP20. I do wish it had dedicated 1/4-inch outputs in addition to the 1/4-inch insert jacks. Switchable output levels (-10 dBV and +4 dBu) would be appreciated when interfacing the MP20 with some types of gear. Even these complaints are minor in the face of all the MP20 does so well.

Summary

I wouldn't just recommend the MP20 to folks shopping for an affordable microphone preamp — I'd also pitch it to those with as much as $2,000 to spend. I've tested more expensive stereo preamps that didn't have the sonic quality, tonal flexibility or thoughtful features of the MP20.

It looks like PreSonus has another winner on their hands.

Product Points

PreSonus MP20

Plus

- High-quality, versatile sound
- Stereo mix bus
- Headphone output
- Balanced inserts

Minus

- No switchable output level
- No dedicated 1/4-inch outputs

The Score

A great-sounding mic preamp with features and flexibility that exceed its price.

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READER SERVICE NUMBER 105

World Radio History

Women Engineers Sound Off

by Nancy Scharlau-Murman

The issue of gender in the recording industry has always been a bit mysterious. A decade ago there were only a handful of women engineers and producers being recognized for their achievements. Today the numbers are steadily growing. Discrimination and the "boys' club mentality," which once might have discouraged women from considering this type of career, are slowly disappearing.

Regardless of gender, everyone must overcome some common hurdles that would drive most people right back to college. Angela Piva, Trina Shoemaker, Judy Clapp and Sandy Palmer Grassi (see bio sidebar on p. 39) have all paid their dues and have come out on top. I had the pleasure of discussing their progress and what they believe the future holds for women entering this industry. Their thoughts are enlightening for anyone considering an engineering career.

PAR *What made each of you want to be an engineer or producer?*

ANGELA PIVA: I've been a musician since a young age and I went to the Berklee School of Music in Boston. Even before I went to Berklee I was intrigued with the whole record-making process. I did not even realize it, but I had always been studying records intensely, listening to them and sort of dissecting them.

JUDY CLAPP: Starting from the age of 14, maybe 15, I always pictured myself doing it, even though I was never inside a recording studio. I liked compiling my own tapes on my reel-to-reel at home and it was just something I pictured myself doing. Other ambitions fell by the wayside and that one just rose to the top and I pursued it.

SANDY PALMER GRASSI: I was in a program in high school for the gifted. I was sent to a recording studio, and I made a record. It was a big thing in my community to focus on the arts. My grandfather had a band and we would go and mix his band. He was gigging until he died. I guess it's true; you're a product of your community — the village bit.

TRINA SHOEMAKER: Because I thought that I could achieve it.

PAR *How did you make the transition from assistant to first engineer?*

AP: I assisted at Unique Recording for two or three years and I also did some programming and synth stuff. At a certain point I just hated it. I hated assisting. I knew if I didn't cut it off completely I would have to get out of the business. So I stopped assisting. It was hard for a while, but little by little I started to get gigs. I was very fortunate to have some recommendations from my partner, Roey Shamir.

Judy Clapp at Village Recorder, Studio A

TS: It melded at one point. Around 1994, Mark Howard was engineering for Iggy Pop and I was also doing full-on engineering on that record. I did a German record for a band called National Gallery — one of my first productions. That's when I started to coproduce for bands that were producing themselves. Half the time they didn't know what they were doing and neither did I, but I learned to produce them. I knew how to get a record made, and they knew how to make music and it worked out nice.

JC: I just took the leap. I gave my notice at Capitol Records. I had absolutely no clients lined up but I had this strong feeling inside me that it was time. Two weeks later I got a call from a jingle company. Their engineer was sick and they wanted me to do a few sessions for them. I wound up working there for eight years. It gave me some steady income while I built up more record work. That was a really nice balance for a long time.

SPG: I remember one A&R guy at BMG Classics, Carl, would always say, "I see how hard you work for me. One day I'm going to have a project for you." And then he gave me things like Marilyn Horne, another legend in classical music and the Broadway soundtrack to *Grease*. It was just a dream come true when I started engineering and they were such high-profile gigs. A lot of people aren't that lucky. People have to do the best that they can in the position that they're in and not worry about the next step because it just comes. Somebody has to take a break some time or another.

World Radio History

PAR ***What does success mean to you?***

AP: To me, the main thing is to be proud of yourself and your accomplishments. At the end of the day no one can take that away from you. That belongs to you solely.

TS: Knowing that my recordings sound good.

JC: Typically in the entertainment industry it means having a name that everybody knows and making a lot of money. But for me, it means working on music that I enjoy with people that I like.

SP: Being able to support the need to keep doing it. I remember that before I ever thought about doing this I knew I was going to be in music some way or another. People

Angela Piva (right) and multi-Platinum MCA recording artist Mary J. Blige at Electric Lady Studios in New York City

always told me I'd never be able to make a living and some people said "But you're a girl. You're interested in that?" I have been lucky to be able to make a living doing it and people need to know that it is possible.

PAR ***What issues do you feel women engineers or producers face in the audio industry?***

AP: Well, mostly I know discrimination goes on from time to time. I guess I don't ever personally see it because people aren't stupid enough to point it out to your face. But I feel that women face the same things that everyone else faces. It's just a very tough business.

TS: I don't know. It's like, what issues do women face, what issues do men face, period. I'm still trying to figure that out. I work a lot. So you definitely face long hours. I'm pretty lonely. I don't know if the rest of the women engineers are lonely. I don't know if

Sandy Grassi at BMG

the men engineers are lonely. If they are, then I am like everybody else.

JC: It is changing, but my god, it's already 2001 and it is still viewed as somewhat of a boys' club. There might be some rock bands that still want to do the sex, drugs and rock'n'roll lifestyle and don't necessarily want women around. Or maybe there are people who still believe that women aren't up to snuff technically. There are some prejudices that are still there that people may not even realize on a conscious level. Women have to overcome that.

SP: I'm not sure that they are any different than those the men face. It's a matter of doing your best. Really concentrating on doing it. There will be days when you don't go home. Complaining about it doesn't help. It's not going to get you in the chair.

PAR ***What advice would you give a woman just starting out?***

AP: If it's something you really want to do, just stick to it. You can't give up even when things are at their worst. Totally disregard people who say, 'Well, women this and that.' That should all be completely put aside. You have to look at who is talking that nonsense and filter it out. Who are they? What knowledge do they have? Take the good with the bad.

TS: I would have the same advice for a man too: It's going to be really long hours. Trust your instincts on exactly what it is that you want. I have very set goals. That makes it easier to focus. Focus is a big issue when you are just starting out. I didn't hope for too much. I was so psyched when I got a job as a maid in a studio, I thought, 'Oh, I made it, finally. I'm in the studio.' Then, 'If only I could be invited into the control room.' Then, 'I'm being invited into the control room.' Little goals — one thing at a time.

JC: You know the main thing is persistence and a good attitude. Being ready, willing and able to put in the hours. Be on the ball enough that you can jump in and take over — you never know when it's going to happen. It's a great opportunity if it does; be prepared for it. Some people get a lucky break early on but for most, it takes a while.

SPG: When you're starting out, sometimes it's hard to sit quietly in the control room,

Angela Piva

Angela Piva's discography includes albums and remixes with Mary J Blige, Naughty by Nature, Michael Jackson and Next. She has several Grammy nominations and received a Grammy for Best Rap album in 1996 with Naughty by Nature. She is a graduate of the Berklee College of Music and co-owns INFX Productions, Inc. Piva is also a partner in the startup Internet record label *ashaRecords.com* and is currently developing three artists for the label.

Trina Shoemaker

Shoemaker was chief engineer at Kingsway in New Orleans. She is now an independent producer and engineer. Her discography includes work with Sheryl Crow, Victoria Williams, Jeffrey Gaines and Throwing Muses. Trina received a Grammy award for Best Engineered Recording in 1999 with Sheryl Crow's album *The Globe Sessions*.

Judy Clapp

Clapp worked as a staff engineer at Capitol Records and as an independent engineer at Ocean Way. She recorded and mixed several records with Bill Frisell, Dwight Yoakam and Gabriela Marrone and was the mix engineer for the Grammy-nominated TJ Kirk record *All for One*. Most recently Clapp completed work on the new Bill Frisell album and mixed three songs on the latest Dwight Yoakam record, including the first single.

Sandy Palmer Grassi

Grassi engineers for the Peabody Award winning broadcast of "Jazz from the Lincoln Center" with Wynton Marsalis. She is a graduate of Berklee College of Music and was a staff engineer for RCA/BMG, where her focus was orchestral, jazz and soundtrack recording. Some of her album credits include work with Lionel Hampton, Marilyn Horne, Jerry Hadley and the Broadway cast recording of *Grease*.

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Women Engineers continued from page 39

watch everyone and everything carefully and do the things that general assistants are asked to do. You may think, 'I can operate that gear — why am I making coffee, or photocopying parts?' At that point, you just need patience. It's not just a matter of knowing how to press the buttons. This business is all about listening.

What is your current favorite piece of equipment?

AP: My goodness, I have a couple favorites right now that I am intrigued with. One of them is my lovely Manley Massive Passive Tube EQ, which just sounds incredible. I am also thrilled to have a whole set of Audio-Technica microphones, which are just great for recording drums and vocals. And my Pro Tools Mix Plus is just fabulous — a great tool to have in your arsenal.

TS: My ears and NS-10 Yamaha closefield monitors Everything else, I'm good to go.

JC: It's changing so rapidly. There is a lot more gear coming out now. I guess right now I really like old API EQs.

SPG: My favorite piece of gear might be a Neumann M 50 microphone. If I'm going to buy something, I like classic microphones, something that withstood the test of time. I would rather reach for that than any EQ or piece of gear that's going to change the sound where I should have put the right microphone on it.

When you were first starting out, how did you get people to trust your talents?

AP: Practice makes perfect — just doing session after session after session. Before I was starting to do a lot of mixing — early on when I was only tracking — every time I would do a session I would go out of my way to automate and do a great rough mix.

Constantly hone your talents. Then you will start to hear things that you're doing on the radio. That's a huge confidence booster. When people start to acknowledge your work that's a wonderful thing, and that really enforces what your doing.

TS: The real question would be at what point did I start trusting myself to get great sounds. After I became an engineer, I started to realize that when I was sitting in front of the speakers, with my back to the room, I was like 'Wow, that sounds good to me right now.' I would turn around and the room would say to me, 'Yeah, that sounds great.' Then I'd think 'I hear generally like the masses hear.' So I began to trust myself.

JC: Even if people trust you as an assistant that doesn't necessarily mean they will trust you as an engineer. I would do the work and people were happy with the results. It is just a process of growing the trust.

SPG: It probably goes back to focusing on the job at hand. When I was an assistant, I would know where bar 32 was. I remember Tom Shepard. He really showed me confidence. I remember him saying one day that it's rare that people who assist or who are engineers are musicians. He said, 'I can just turn to you and say such-and-such a line and you're there.' Somebody who isn't a musician doesn't necessarily equate EQ and what a frequency is to pitch. It shocks people sometimes when I ask 'What key is this song in? Oh, it's in C. I'm not quite hitting the tonic, that's why it doesn't sound good.'

What are your special skills that set you apart from other engineers or producers?

AP: I feel that because I am a musician originally and I play several instruments, I have a really great musical ear. A lot of engineers do not have the musicality. They are talented in different ways, but to me, the best engineers and engineer/producers have always been musicians first.

TS: That would be for someone who has worked with me to answer. I wouldn't imagine that I have anything more special than anybody else. People seem to like to have me do their records and I enjoy it immensely. I put everything I have into it. I certainly work an incredibly long day. But I'm not sure that I have any extraordinary skills.

JC: I'm a little bit old school, especially the time I spent at Ocean Way. We did so much live-to-two-track and live-to-disk stuff where the emphasis was on high fidelity. Allen Sides is such an audiophile and all the equipment there sounds so good. That really shaped me a lot. I still have an inclination to go for what really sounds good.

I also have a number of clients and producers tell me that they liked the way I related on a personal/professional level with the artist. It made their job easier. I could get the technical stuff done, but also helped the session to progress smoothly.

SPG: Being able to establish the space. Capture a moment. Doing something all at once. Whether it's in the studio or whether it's a live concert or even a jingle. Being able to make it sound as if you're in Tully Hall.

It's just a musical approach. You can put a score in front of me and mixing becomes like playing the console. Oh, the violins are coming in. Oh, Wynton is taking a solo, get ready. We try to nail it live-to-two-track and that saves money.

What do you think the future holds for women in the industry?

AP: Very exciting and wonderful things. I see a huge number of women who are the heads of major labels now. I see women in huge positions in A&R overseeing everything. I see a ton of women artists my age and younger who are taking control and who are becoming producers. You are looking at the age of no nonsense.

It's different now. Kids are growing up differently, thank goodness. It's how it should be. Sex or race or color — whatever — should be irrelevant. When you get hired, it doesn't matter if you're a woman or not. The color of money is green. You do the work. You put out what you're supposed to. That's it. Nobody really cares in the end.

TS: I'd say it is going to even out pretty well. There is no taking it back. There are women and men out there who are extraordinarily good at what they do and who have a wonderful understanding of what's going on technically, philosophically and musically. There's no going backward. It can only continue to morph into something like "one sex, one race, one world."

JC: I hope it continues in this direction; becoming more balanced. I joke that you don't need upper body strength for this job — there is nothing preventing women from doing it. I would like to see it get more equitable, and I don't see any reason why it shouldn't.

SPG: Hopefully, someday, people won't even be thinking about it.

Nancy Scharlau-Murman, *a graduate of Berklee College of Music, runs a mobile recording service and is an instructor at the Conservatory of Recording Arts in Tempe, Ariz. She would like to thank Monica Olsen for her assistance on this article.*

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World Radio History

Demeter RV-1 Real Reverb

by Russ Long

Following the audio revivals of vintage guitar pedals and ribbon microphones, spring reverb will possibly be the next Big Thing. In addition to Demeter's RV-1 Real Reverb box, Accutronics and Touched By Sound also have new spring reverb machines targeted at the contemporary studio.

James Demeter's company, Demeter Amplification, has been manufacturing professional tube-based gear for more than two decades; Demeter's client list reads like a who's who in the music business. Now the company has applied its knowledge toward the Real Reverb analog spring reverb.

Features

The rear panel of the two-channel, one-rack-space RV-1 Real Reverb ($699) is equipped with two XLR and 1/4-inch TRS inputs and two XLR and 1/4-inch TRS outputs. Each channel features a full-size, six-spring Accutronics reverb tank, which is individually shielded with mu metal to reduce noise from stray magnetic fields. The first channel has a short decay time (approximately 1.5 seconds) and the second a bit longer (approximately 3.5 seconds). The unit obtains power through a standard IEC power connector.

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Both channels have identical controls. The Phase switch reverses the phase of the effected portion of the sound. When the reverb is being mixed evenly with the dry signal or when the outputs are linked, reversing the phase results in a brighter, sparkling reverb sound. The Filter switch inserts a high-pass filter in the affected portion of the signal. A red LED lights to indicate when the input signal is overloading.

The Input control adjusts the input level to the box. The box is at its quietest when this is set just below the point of clipping. The Mix control adjusts the ratio of dry to wet signals at the output. In addition to these channel controls, the unit features an Input Link switch that combines the input signals from both channel inputs and an Output Link switch that combines the output signals of both channels. A power switch turns the box on and off.

The RV-1 has sonic characteristics unequaled in its digital counterparts.

In use

I put the RV-1 to the test while mixing the new Schfvilkus album and had superb results. I am no stranger to spring reverberation — I regularly use my Master Room Spring Reverb as well as the reverb on my Roland RE501. My first impression was how quiet the RV-1 was compared to my other spring reverbs.

Horns sound fantastic through the RV-1. The Real Reverb creates the perfect reverb tail to follow a solo trumpet or sax or a complete horn section. I also had wonderful results using the reverb on vocals. The reverb has an almost plate-like smoothness.

As is typically true with spring reverbs, the RV-1 doesn't lend itself to drums. Percussive sounds tend to emphasize the boinginess of the springs rather than the smoothness of their decay. I imagine there might be unique occasions where this sound would be desired, but these situations would be few and far between.

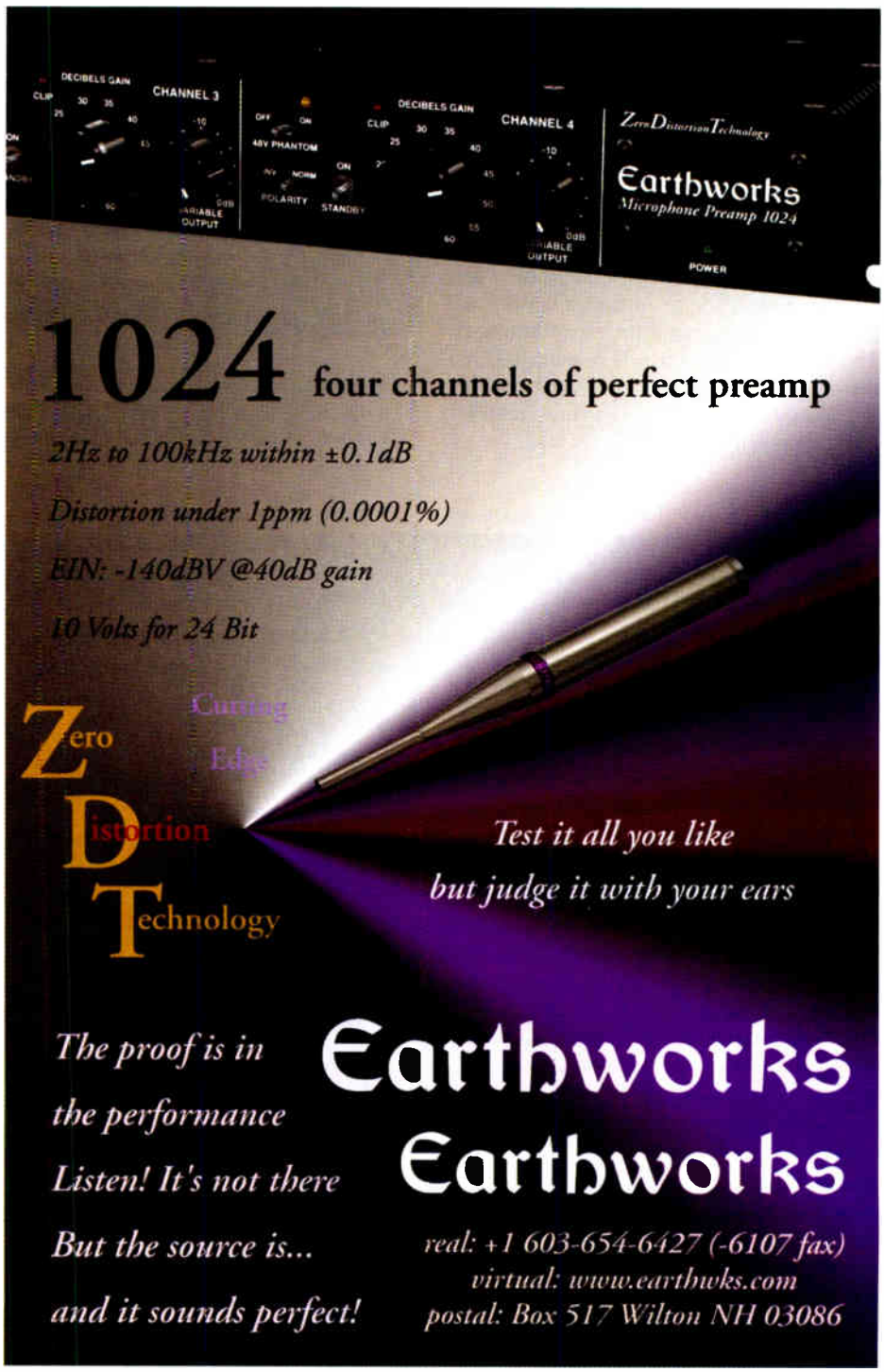
Guitars sound great through the RV-1. The classic guitar amp with built-in spring reverb sound can be duplicated with the ability to change the reverb level from one section of the song to the next.

Although the RV-1 is noisy compared to today's expensive digital reverbs, it is still extremely quiet compared to traditional spring reverbs (signal-to-noise ratio >90 dB) and it has a unique sonic characteristic that I have not heard equaled in its digital counterparts.

Summary

In this day and age of expensive digital reverbs, the Demeter Amplification RV-1 Real Reverb is the perfect piece of equipment to add unique variety to any studio's reverberation selection.

Contact: Demeter Amplification at 818-994-7658; *www.demeteramps.com*; or circle **Reader Service 183.**



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ART HPFX
Headphone Monitor System

by Alan R. Peterson

The HPFX headphone monitor system with built-in effects from Applied Research and Technology (ART) answers the need for performers in computer-based recording suites to monitor their performance with good-quality effects by the simplest means possible.

The HPFX ($299) eliminates the practice of stringing together an auxiliary mix with effects so vocalists or instrumentalists can hear reverb along with their performance. The device includes a self-contained DSP that creates a direct plus ambience mix in the headphones that can enhance performance and help generate a great take.

The device also sidesteps another problem: latency. Computer soundcards can cause delays when recording, processing and playing back mixed audio on the fly. Singers hearing a headphone mix experience delayed vocals. In some systems,

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the time delay can be quite intolerable.

Performers can create a personal mix of the computer playback and their own live performance plus effects, while sending a dry feed of their performance directly to the computer. The type and amount of a desired effect is dialed in (reverb, slapback, echo or flange/chorus effect) and heard only in the headset.

Features/In use

The front panel features Mic/Level and Effect Blend controls for two microphones, Effect Selector and Parameter rotary controls (with a Bypass button) and 1/4-inch jacks and level pots for four headsets.

The back panel has XLR jacks for Mic Input and Mic Thru. Connect the microphone to the input jack then patch the Mic Thru jack to a mic preamp or "mic in" on the computer. Run a return audio feed from the soundcard into one of the 1/4-inch TRS Stereo Mix Input jacks. Plug in the enclosed 9 VAC power pack and fire up the session.

There are some slight boinginess and grity tails in the reverbs. But the effects are meant for personal ambiance rather than the recorded product and generally are not dialed in to excess. Narrators and voiceover artists might want to select a touch of ambience, while singers can experience Memphis-like slapbacks all the way to over-the-top, Andy Williams-style vocal reverbs.

The double-sided PC board inside the ART HPFX is well made, with mostly through-board components, ALPS pots, Rubycon electrolytic caps and ART's 24-bit audio engine. An octet of Texas Instruments 5532 ICs provides the drive for the headphones.

Use your favorite phantom-powered microphones with the HPFX. The circuitry will not load down the microphone signal and a trio of 100 V-rated capacitors blocks current from blowing the hat off the HPFX.

A 1/4-inch TRS Effects Output jack lets you use the HPFX as a dedicated effect box, feeding a Mic+Effect stereo signal back into your mixer. And the Stereo Mix Input jacks automatically accept mono or stereo signals on separate or combined cables. Whether recording into a high-end PC-based system or a tabletop mini-studio, the HPFX hooks up to either with a minimum of hassle.

Come up with your own way to mount the HPFX. ART designers left off microphone stand flange mounts and rack ears. A blob of hot glue and some nylon hook-and-loop fabric rip-fasteners work for me.

Summary

Perhaps headphone monitoring has not been a big priority in your studio and you've managed just fine until now. But for those experiencing computer latency problems, try out the ART HPFX on an upcoming vocal session. Having control over the sound heard in one's own head frees the artist, helping to turn in a good performance.

Contact: Applied Research and Technology at 716-436-2720; *www.artroch.com* or circle **Reader Service 184**.

Alan Peterson teaches radio and television production in Washington D.C. and contributes to ***Pro Audio Review*** *and sister publication* ***Radio World***.

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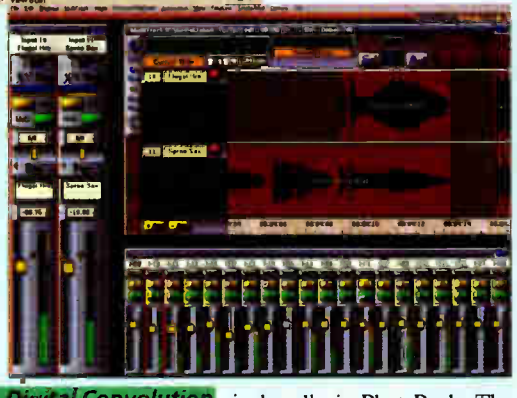
Much Software to be Seen at NAMM

by Brett Moss

If you are reading this at the Winter NAMM show, you have probably already noticed that a lot of software companies are showing. The almost complete list includes Digidesign (with its numerous partners), Waves, Arboretum Systems, Arturia, BitHeadz, Syntrillium, TC Works, Sonic Foundry, Cakewalk, Soundscape, BIAS, CreamWare, Cycling '74, E-MU/Ensoniq, Emagic, Ilio Entertainments, MOTU, Metric Halo, Native Instruments, NemeSys, Propellerheads, SEK'D, Wave Mechanics and Steinberg.

Syntrillium Software (*www.syntrillium.com*) has two new plug-in packages for the Cool Edit 2000 platform. Tweakin' Toys features a hard limiter, pan/ expander, pitch bender and "convolution." Convolution is said to use impulse sampling to recreate actual places.

The second new plug-in bundle is Phat Pack. The Pack is made up of a reverb, multitap delay, chorus and a sweeping phaser. Both packages go for $49 each.



Top: Syntrillium Digital Convolution Cool Edit plug-in; bottom, IQS SAWStudio

By the time you read this, IQS (*www.iqsoft.com*) should be shipping its multichannel mixer/editor, SAWStudio. It starts at around $2,000; current owners have several less expensive upgrade options. As traditional, SAWStudio is Windows-based and adds ME, 2000 and NT support. SAWStudio also starts out DirectX and VST-compatible.

If you're a user of SEK'D products you might want to make a sweep by the SEK'D site (*www.sekd.com*) to make sure you have the latest in soundcard drivers. Included are Windows 95/98/2000/NT4 and ASIO2 drivers for the ARC88, Siena, Prodif Plus, Prodif 96 Pro MME cards and DirectSound-based drivers for the Siena and both Prodif cards. For Mac addicts, a driver is available for the ARC88, and betas available for the two Prodif cards. There is also a Linux beta for the Prodif Plus.

SEK'D has also released a "prerelease" version of a broadcast-optimized version of Samplitude 9624 called, Sequoia ("prerelease" apparently means "highly tweaked beta" in German [and Netscapese]). Sequoia adds an enhanced crossfade module, four-point in-out cutting and an administration module — all the things needed for radio station programmed play.

Emagic (*www.emagic.de*) has pushed Logic Audio Platinum up to version 4.6. The important thing about the new version of the Windows/Mac editing/mixing platform is that it adds Rocket Network-powered on-line Internet studio capabilities. Emagic is building an on-line interactive studio community — see *www.rocketnetwork.com/emagicstudios*. For the uninitiated, the Rocket Network is an on-line community where musicians and engineers can share files/tracks, modify them and discuss them. The upgrade is free to registered Logic users but the Net studios cost.

More news on Steinberg's Version 5 Cubase VST for Mac: upgrade price is $149 and MP3 file support is added. For more, browse over to *www.steinberg.net* or *www.cubase.net*.

And TC Works (*www.tcworks.de*) has pumped up the MasterX three-band dynamics plug-in for Power Mac and Pro Tools systems. Now enhanced with a five-band big brother, the MasterX 3+5 bundle goes for $99 for registered users and a ... cough, cough ... $995 price tag for newbies (let's hope that's in those devalued Euros).

Send your software update news to Brett Moss, Equipment Editor, Pro Audio Review, P.O. Box 1214, Falls Church, VA 22041

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PRO AUDIO REVIEW 2000 Pick reviewer's

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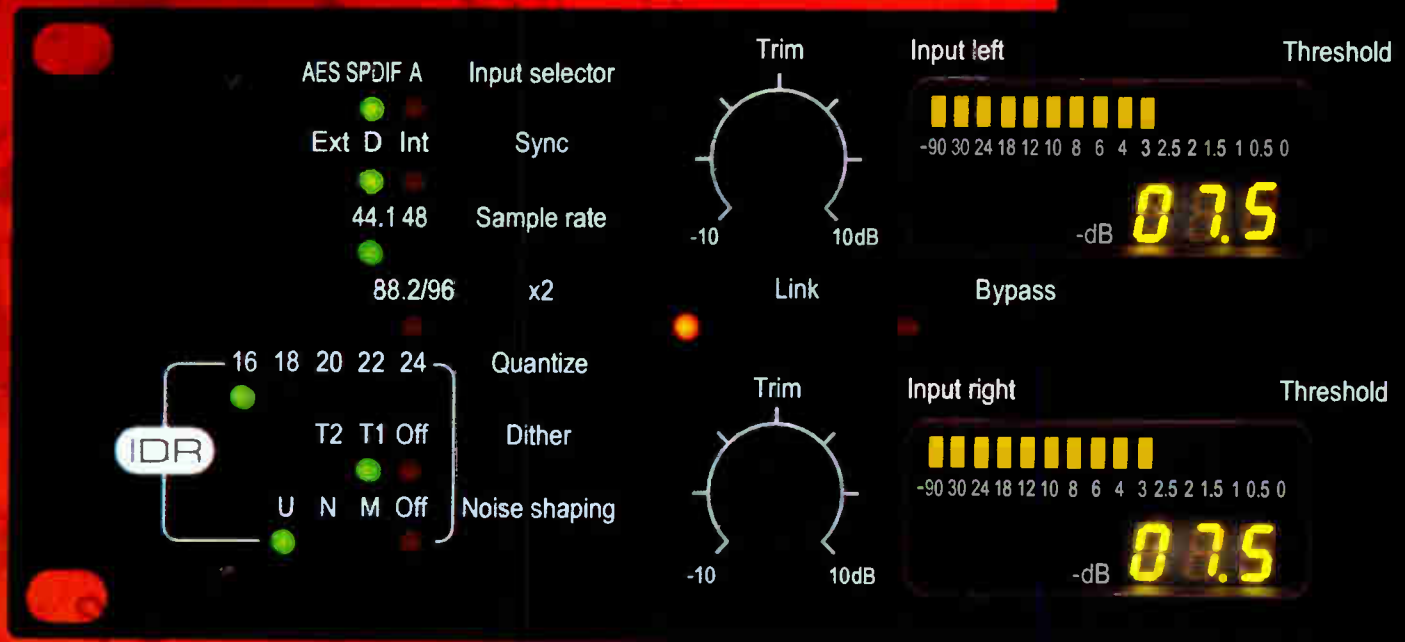

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Digigram VX222 PCI I/O Card

by Ty Ford

In the haze of audio software/hardware solutions, clear answers are sometimes elusive. Buy too soon and the next product on the market does what you wanted the one you settled for to do — and more — and for less money.

Upping the ante this time around is the Digigram VX222 sound card for Mac and PC. The VX222 is a balanced analog and digital I/O PCI card with a list price of $549.

Features

According to Digigram, PC and Mac operation is basically the same, however, the Mac Sound Manager is limited to 16-bit operation unless you use the ASIO-2 drivers. All PC drivers are 24-bit. ASIO-1 and ASIO-2 drivers, which can also be used on the PC platform, result in lower latency. Cubase, for example, is designed for ASIO drivers.

Two supplied foot-long breakout cables terminate with 15-pin male D-sub connectors on one end, which connect to the PCI card, and XLRs on the other end, for balanced analog and AES/EBU I/O.

There is also an unimplemented GPIO 9-pin sub D connector on the card. A developer's kit is available from Digigram for crafty programmers who wish to customize their own GPI implementation.

One can choose between analog and digital inputs to the card. Analog and digital outputs are simultaneously available. The PCI card also has a 3.5mm stereo minijack for headphones.

In use

Digigram sent me a copy of Peak v2.1 to use with their card, although no application software is included as standard with the VX222. Digigram lists a slew of compatible Mac and PC audio software in a FAQ on its Web site.

I tested the card in my new Mac G4. Installation of the VX222 card was easy, but then any installation is easy with a G4, due to the way the side flops down.

There are two sets of DIP switches on the card. SW1 toggles the analog input impedance from 600 ohms to 10 kilohms. SW2 toggles the inputs between +10 dBu and +4 dBu.

The VX222 card supports 24-bit operation and sample rates between 8 kHz and 48 kHz. The control panel lets you set precise input levels as well as select consumer (S/PDIF) or professional (AES/EBU) digital formats.

Given that the digital output connector is a male XLR, you'll probably want an impedance converter to step the 150-ohm AES/EBU connection down to 75 ohms for S/PDIF.

Summary

Need a professional two-track analog/digital I/O port that tops out at 24 bit/48 kHz, has a headphone jack and a great price? At $549, the high quality Digigram VX222 should be high on your list.

Contact: Digigram at 703-875-9100; *www.digigram.com*; or circle **Reader Service 185**.

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TC Works Native Bundle Plug-Ins

by Dr. Frederick J. Bashour

This article is the first in a series of reviews of software products that work in the high-end world of 96 kHz recording with 24-bit resolution. Although I've been recording my projects at 88.2 and 96 kHz for almost two years, only recently have I found multitrack hardware and software that works as reliably at that rate as the previous generation did at 44.1 and 48 kHz.

My experience has been fraught with numerous digital land mines as well as disagreements between various manufacturers as to why a particular setup didn't work, or worked for only two minutes before running out of steam. On the bright side, the past two years of frustration have given me quite an education in the perils and pitfalls of high-sample-rate recording and processing.

While 300 MHz was perfectly adequate for my multitrack classical music recording and editing (in 1998 and 1999), in this new millennium — in which I invariably use 96 kHz for all my projects — I definitely need a new G4, running at more than 500 MHz. And so do you, if you want to run lots of tracks and lots of plug-ins at the higher sample rates!

At a Glance

Applications:
Applications: Studio, multimedia, post production

Key Features:
Parametric and graphic equalization; compression; limiting; reverb; available for Mac and PC platforms

Price:
$499

Contact:
Contact: TC Works at 800-288-5838; 805-373-1828; *www.tcworks.de*; or circle Reader Service 21.

Features

The five plug-ins contained within the TC Works Native Bundle are Reverb, two EQs (both EQ-P and EQ-G are provided), DEX and L. The last two are the compressor and limiter, respectively. Just as is the case with the Waves plug-ins, they all share a common user interface design with similar controls; thus, once you learn to use one of them, you're pretty much up to speed on the rest.

Although they are, in fact, VST plug-ins, that distinction has been nearly obliterated by the recent advent of various "wrappers" that allow MOTU Audio System (MAS) users to access them. In my own case, with Digital Performer, I simply used the TC PluginShell, which installed itself automatically during the Native Bundle installation. The TC Works Native Bundle uses the challenge/response-type authorization procedure.

Some features common to all the TC Works Native Bundle's plug-ins are as follows: if you click on a parameter while holding the mouse button and move the mouse down, the value you are editing is decreased; mouse ups produce value increases. If you click on an edited parameter while holding down the Option key, the value is reset to the factory default as stored in the plug-in's ROM preset. If you double-click on a value field or a fader, a pop-up field for numeric data will open.

ROM presets provide many useful setups as starting points for user tweaking. These presets tend to be in the standard "mastering" category rather than in the "out there" sound design vein. All the plug-ins have meters — usually showing both input and output levels — with adjustable peak hold capabilities. All the plug-ins, except for the Native Reverb, contain SoftSat, a proprietary algorithm that generates a soft harmonic distortion when clipping levels are approached, preventing the plug-ins from being excessively driven to the point of hard clipping.

They all share a compare button feature that activates a temporary preset memory, allowing one to make A/B comparisons easily. To save changes, store your "user presets" within your DAW application.

In use

I'll now discuss each of the TC Works Native Bundle plug-ins briefly.

TC Works Native EQ-P is a powerful, 10-band equalizer featuring seven fully configurable bands (parametric, notch, low-shelf, and high-shelf) and three bands that can be controlled using a virtual joystick. The seven main band's shelves run at 3, 6, 9 and 12 dB/octave, and all the

continued on page 52

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PROFESSIONAL RECORDING EQUIPMENT

MANLEY Langevin

COMPANY PROFILE: Manley Laboratories, Inc. in recent years has expanded and thrived under EveAnna Manley's leadership. Our 11,000 sq. ft. building houses our own machine-shop, printed circuit board manufacture, audio transformer winding, engraving, and silk-screening facilities. All custom design, R&D, assembly, testing, and quality control processes are performed with precision and pride at the Manley factory, located just 35 miles east of Los Angeles.

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TC Works continued from page 50

bell-shaped parametric curves go from 20 Hz to 20 kHz, with Q adjustable from 0.1 to 4. The notch filter's Q can go all the way to 100 (!). All range adjustments are +/- 18 dB, except for the notch filter's, which are claimed to be infinite.

The virtual joystick's two loudness bands are at 250 Hz and 6 kHz, and can have slopes of 3 and 6 dB/octave. Its treble band shelf is a 3 dB/octave band beginning at 4 kHz. The joystick control is positioned after the seven bands in the signal flow, thus enabling one to tilt the overall frequency curve quite easily.

In stereo mode, up to 20 bands may be active (10 per channel) at once. Split gain controls for the left and right channels enable one to adjust each channel separately. Unlike Waves' Renaissance EQ, in which the frequency curve can be dragged graphically, in TC Works Native EQ-P, one uses the TC conventions for tweaking parameters. The Loudness/Treble virtual joystick works more like mouse-activated touchscreen, controlling the three shelving bands.

The aforementioned SoftSat circuit features a virtual magic eye tube display, looking just like the ones in certain consumer tape machines and FM tuners from the '60s — way cool! But even cooler is what happens to the sound; the SoftSat basically lets you (slightly) overdrive the digital circuitry without suffering the nasty hard-clipping penalty.

In fact, the sound just gets a little brighter and beefier as you see the magic eye close down. This is quite a different effect from, say, Steinberg's Magneto plug-in, which actually attempts to emulate tape compression through numerous adjustable parameters. It is actually closer to the effect of the soft limit circuit on Apogee ADCs, although that is done in the analog domain. Bottom line: it is a useful feature that I keep turned on all the time.

Speaking of turning things off and on, many of the individual features within the TC Works Native Bundle plug-ins can be activated or de-activated separately, saving a little CPU power, which is very helpful if you're running things right to the edge, as I do most of the time.

TC's EQ-P, as well as its EQ-G, have very musical sound signatures and are definitely nicer sounding than my old standby, the Motorola 56001-based fixed 24-bit EQ built into the venerable Dyaxis II processor. They also sound a lot warmer and smoother than any of the free plug-ins bundled within my three Mac DAW sequencer applications.

Yes, the TC EQs sound different from Waves' Renaissance EQ or Steinberg's Q-Metric, but that's one of the great things about them—the more EQ flavors residing within my DAW, the better.

The Native EQ-G is an interesting plug-in. TC's 28-band graphic equalizer features a touchscreen graphic interface, which enables one to intuitively access the band gain controls. Simply draw the desired frequency response curve onto the display using the mouse to set the EQ. Furthermore, you can choose between having 28 narrow-Q one-third-octave bands, 14 medium-Q two-thirds-octave bands, or seven wide-Q four-thirds-octave bands.

TC's DEX compressor provides extremely powerful and flexible dynamics processing tools — from standard single-band compression for individual tracks and de-essing of vocals, to compression for the stereo mix bus. All the basic adjustments are there: attack (0.1 to 50 milliseconds); release (20 to 2,000 milliseconds); threshold (-60 to 0 dB); and ratio (1:1 to 64:1). TC Works also includes a group of more sophisticated tweaks, including a choice of hard or soft knee (with a 40 dB adjustment range), an adjustable hold time, delaying the start time of the curve's release, and my favorite feature — automatic makeup gain.

This individually switchable feature elegantly solves one problem of standard compressors — the more one compresses a signal, the more level one loses. TC's DEX automatically brings peak levels back up to 0 dB, greatly simplifying its use on an insert channel. It also makes normalizing sound files off-line unnecessary.

The plug-in's de-esser works independently of input level and can be set up

Product Points

TC Works Native Bundle

Plus

- High-quality sound
- Excellent user interfaces
- Useful adjustment parameters

Minus

- High CPU overhead, especially at 96 kHz

The Score

Those looking for a comprehensive set of mastering plug-ins of considerable should give the TC Works Native Bundle a serious audition.

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with only two parameters — frequency and threshold. Even the threshold itself is not an absolute threshold. Rather, the circuit constantly tracks the levels in the side chain and the unprocessed signal, and calculates a relative, level independent threshold from this data.

Native L is a full-band limiter, useful for maximizing the levels of audio recordings, producing more punch and perfectly optimized levels. Like the Native DEX, it features adjustable hold time, automatic makeup gain and a huge gain-reduction meter. It also displays a comprehensive input/output level histogram.

This displays the level distribution before and after processing, and can display the before/after difference. Most of the adjustable controls are similar to the Native DEX plug-in.

I was pleasantly surprised by the quality of the TC Works Native Reverb plug-in. While it doesn't sound anything like any of my hardware units, neither does it sound yucky and electronic — words I would use to characterize most of the reverb plug-ins I've heard thus far.

In addition to all the standard level, mix, decay time and room size controls, this plug-in allows the user to edit values for predelay, shape, diffusion and color. The last three, in fact, are shown via cool graphic displays that change shape in response to changes in the parameters. The factory presets give the user numerous useful setups; the user interface makes them extremely easy to modify.

Summary

As you can probably tell by now, I really liked these plug-ins. I'm currently using the TC Works Native DEX, Native L and Native EQ-P regularly, right alongside my old favorites like the Waves Renaissance EQ 2.8, and Steinberg's Q-Metric and Magneto.

Although the Waves bundles have long set the standard for high-quality plug-ins, the TC Works Native Bundle is every bit in the same category.

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 ***Pro Audio Review*** *contributor.*

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World Radio History

Arboretum Systems Ionizer 1.3

by J. Arif Verner

In the busy world of software plug-ins, EQ programs are as common as bread and butter. That's a good thing because we all like choices. One plug-in, however, sets itself apart from the crowd with some interesting twists and turns. Arboretum's Ionizer 1.3 program ($499) is a Power Mac-native application that supports 24-bit files with 32-bit floating-point internal processing (a Windows DirectX version is in beta testing).

Ionizer offers 512 bands of EQ per channel. It also provides noise reduction, upward and downward compression/limiting, expansion and a new spectral key vocoder — and it can do all this stuff at the same time. What's more, the filters are free of phase distortion. That's hard to beat.

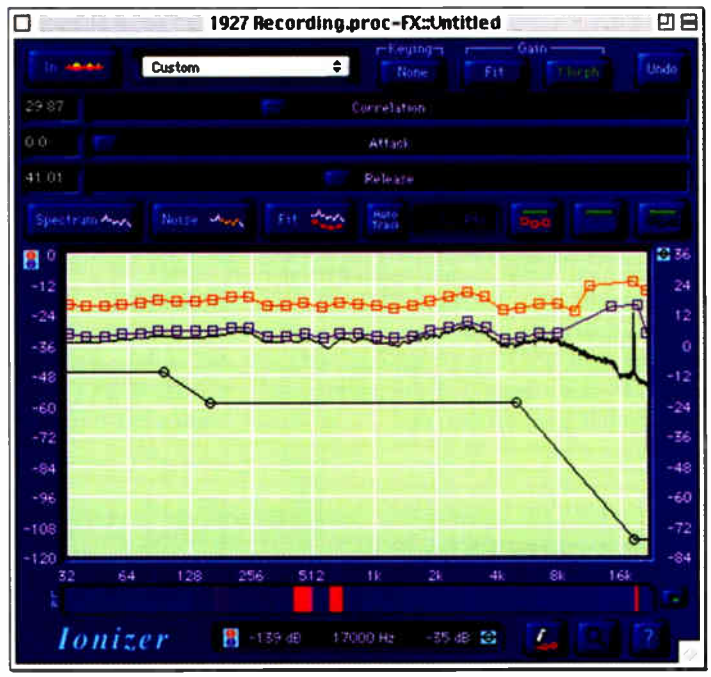
Features/In use

Ionizer is a plug-in for the MOTU Audio System within any Mac OS Premiere-compatible audio application. This includes Adobe Premiere, DECK II, Opcode Studio Vision, MOTU Digital Performer, BIAS Peak, Emagic Logic Audio, Cakewalk Metro and Gallery TurboMorph. It also works in Digidesign's Audio Suite format.

When installed in the DAE Plug-ins folder, it works with Digidesign's Pro Tools, Avid Media Composer and Avid Xpress nonlinear video editing systems. The program also functions within Arboretum's own HyperEngine application.

When a file is loaded into Ionizer's "green window," the Spectrum function analyzes the audio and maps it on an X-Y plot. Amplitude is positioned along the vertical axis, while frequencies are on the horizontal axis. By using red, blue and black curves, the program provides a visual representation of the sonic characteristics of the sound. Furthermore, the blue and red curves divide Ionizer into a grid with three different zone configurations. These zones represent the energy in each frequency band relative to the total energy. It does get a little complicated, but it is logical. Expect to spend some time with the program and the CD manual in the beginning.

Unlike other software equalizers, Ionizer does not have a read-out for level settings — it has the Mood Bar instead. This color-coded bar changes hues to indicate the amount of gate and gain processing. The host program controls the input levels. Ionizer has output controls with its native host, HyperEngine. For other hosts, such as Premiere, Audio Suite or MAS, Ionizer relies on the interface and controls for the outputs they provide.



The program provides downward expansion in the area of noise reduction. Two available modes include manual and automatic. When noise can be isolated from the source material, use manual mode. Otherwise, automatic mode is the choice. Like any other software of this type, you will need to tweak the results to your liking.

As for editing, this is done by moving fit-points on the frequency curves (and there are plenty of them). A multimode pencil tool is also available for other detailed editing chores. At the bottom of the window is a numerical readout for cursor positions.

Summary

Sound designers will appreciate Ionizer's ability to bend audio in interesting directions. Use a brick-wall filter to completely remove specific frequency regions from a song. Or maybe change the harmonic structure with a band-pass filter. The splitband compression/limiting and expansion functions provide an unlimited array of options. Try limiting the low end, expanding the midrange and compressing the high end all in a single pass.

Also unique is being able to analyze any sound and then apply its frequency characteristics to another piece of audio with Frequency Morph. This comes in handy, for example, when trying to match vocal tracks that sound different due to proximity effects. Don't expect the Frequency Morph function to make some garage band's demo sound like *Dark Side of the Moon*, however.

So what's the verdict? Ionizer sounds great — smooth and clean! Arboretum created one cool plug-in. Another added benefit is that the program is not a CPU power-hog. So stack Ionizer all over the place and get to work.

J. Arif Verner is a regular contributor to ***Pro Audio Review*** *and is the author of the new book, MIDI Basics.*

At a Glance

Applications:
Studio; multimedia

Key Features:
Power MAC MAS plug-in; EQ; noise reduction; expansion; vocoder

Price:
$499

Contact:
Arboretum Systems at 650-738-4750; *www.arboretum.com*; or circle Reader Service 186.

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World Radio History

Echo Digital Audio
Mona 24/96 Digital Studio

by Jeff Severson

Echo Digital Audio Corp. gave female names to its line of digital studio interfaces for computer-based hard disk recording systems: Layla, Gina, Darla and Mona.

The youngest, Mona, is a powerful, 24-bit/96-kHz converter digital studio with enough I/Os to handle most home studio and professional recording needs.

Features

Mona comes with a PCI card, rack mountable interface box, cables and software. The silver interface box features four analog inputs on the front panel and six analog outputs on the back. The front inputs are Neutrik combos, accepting balanced or unbalanced 1/4-inch or XLR connectors.

The rear panel hosts three pairs of XLR and RCA jack outputs, a port for computer connection, optical I/Os for S/PDIF and ADAT, and BNC I/O for word clock connections — in short, everything you need to professionally connect your music to your PC (except AES/EBU I/O).

When a guitar is plugged in, a switch (marked Guitar) must be activated to increase the 10 k-ohm impedance to 107 k-ohms. The four-input level knobs increase the volume, which is displayed on the level meter on the front panel. There is a 48 V phantom switch, a connection for remote and headphone out with level control.

Once the software (Windows 95, 95 OS2R, 98, 2000 or Millennium — Mac beta drivers are on the company's Web site, as are GSIF beta drivers) is installed, the Echo Console will flash across the screen when you boot up. The Echo Console controls the input, output and monitor selections, with buttons and faders similar to a mixing board. You can mute or solo channels, gang faders, pan, adjust record and playback levels, and set clock source and destinations.

There is also a button on the console to call up ADAT controls. Mona accepts eight channels of ADAT I/O and she is compatible with her sisters — the other Echo "gals" — and most sound cards for expandability. For synchronization, Mona generates word clock and Esync. Esync is the proprietary signal for other Monas, Ginas, Darlas, Laylas and any other models Echo comes up with.

At a Glance

Applications: Studio

Key Features:
PCI recording card with rack-mountable interface; four XLR, 1/4-inch analog mic/line inputs and six XLR and RCA outputs; optical I/O; BNC word clock I/O; Windows drivers (95 through Millennium); Mac available soon

Price:
$995

Contact: Echo Digital Audio at 805-684-4593; *www.echoaudio.com*; or circle **Reader Service 187.**

The CD-ROM also gives you a copy of Syntrillium's Cool Edit Pro, a multitrack recording and editing software program, and Reporter Software — a program that will analyze your hard drive and walk you through the minefield of hard-disk recording on a PC.

In use

I am not a PC tech guy. Of the four or five previous times I've installed different sound cards in my PC, each installation was an exercise in frustration: computer spread across the floor, the system not recognizing the card, IRQ setting conflicts, and me facing a backlog of work.

Then I got Mona. I installed it myself. It was quick. It was easy. Maybe it was my time for an installation to go right. Whichever, Mona went in as cool as Italian ice.

This brings me to the owner's manual. While there are often problems deciphering manuals, such as too much or too little technical information, not enough help or poor Japanese translations, this was not the case with Mona. The owner's manual is as well thought out as the machinery and tells you just what you need to know at the time you need to know it. And it's all done in a

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Echo continued from page 56

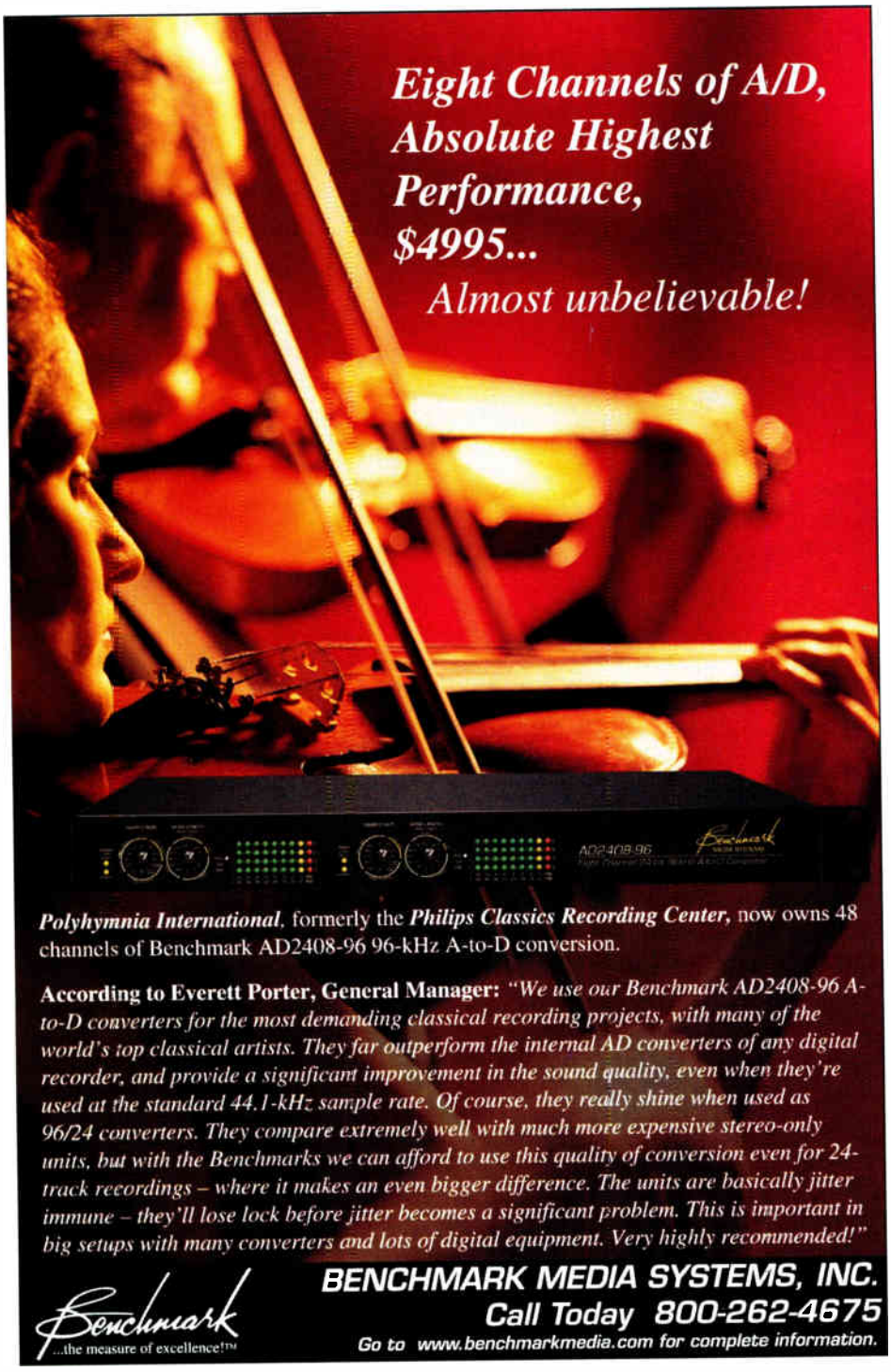
language even a non-PC techhead like me can understand.

For the two months Mona has been installed in my computer, I have been mostly using it for recording and editing in Sonic Foundry's Sound Forge. It has worked smoothly and without problems.

The microphone preamplifiers sounded good and clean. The meter on the rackmount unit lights up when you boot up, telling you it registers the signal coming from the card. The console software is easy to use and will popup when called upon without having to exit whichever program you are working on at that moment.

All in all, it is sturdily made and the software is as reliable as any I have used. I get the feeling Echo is a customer service-oriented company, and will be there for driver updates and support as needed down the line.

All in all, the Mona system is sturdily made and the software is as reliable as any I have used.



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Summary

Mona's my girlfriend now. Even at $995 a pop, she can do no wrong. If that's a little steep for you, try the Gina 24 for $495 per unit or the Darla 24 for $379. The sisters, all with 24-bit/96 kHz recording capability, are ready to satisfy your — ahem — hard-disk recording needs.

Jeff Severson, a regular contributor to ***Pro Audio Review****, is a recording engineer, producer and songwriter.*

Product Points

Echo Digital Audio Mona 24/96 Digital Studio

Plus
- Sound quality
- Ease of installation
- Flexible I/O

Minus
- No AES I/O

The Score

A well-thought-out and implemented project recording studio solution.

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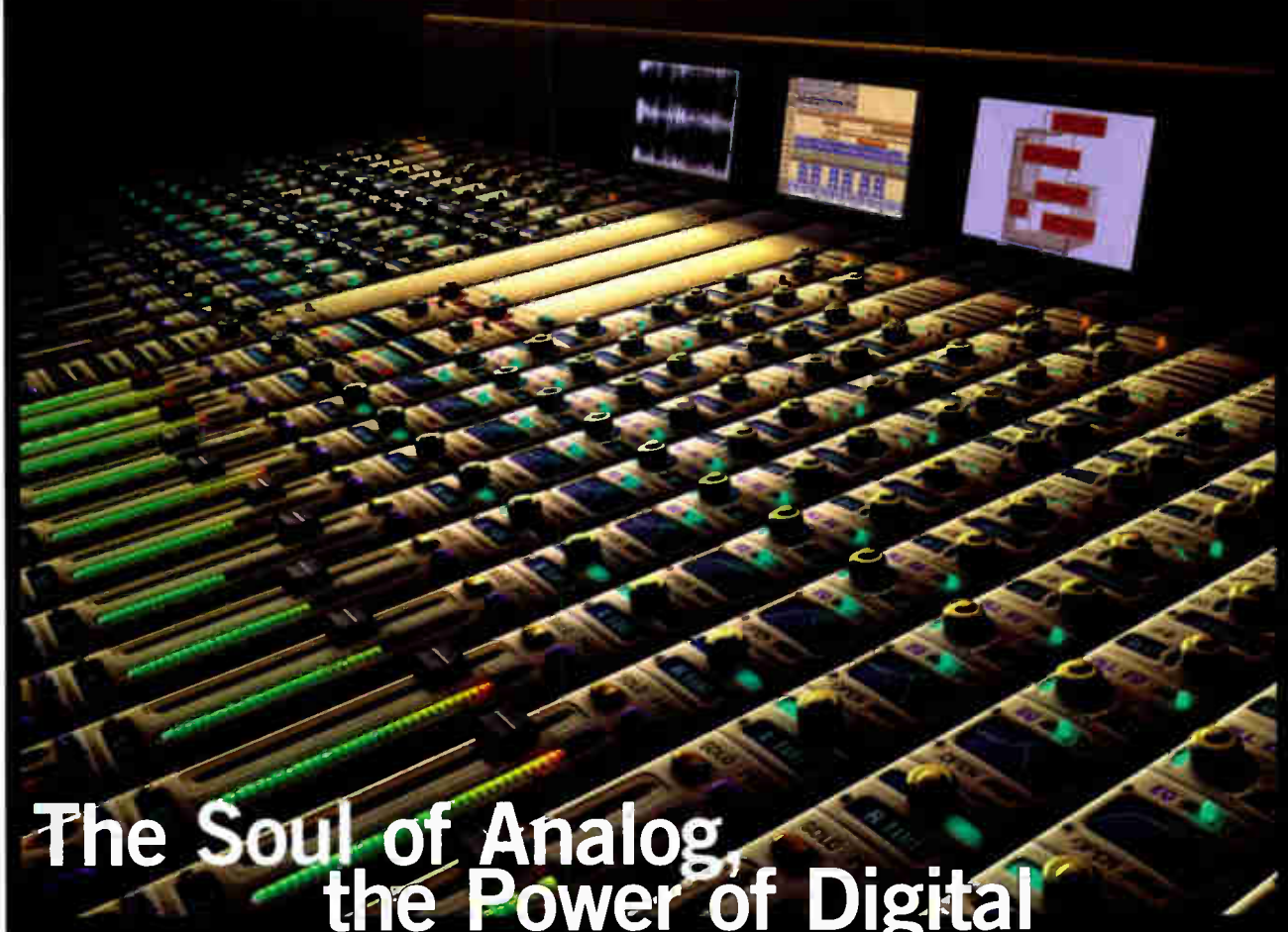

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World Radio History

Antares Microphone Modeler
AMM-1 and Plug-In

by Dr. Frederick J. Bashour

I was rather skeptical when I first read about the software version of Antares' Mic Modeler. I own a couple dozen vintage tube microphones — all with unique sonic characteristics — and I just could not conceive of their reasonable facsimiles being created in software. After spending considerable time with both the software and hardware versions of this tool, however, I've been convinced big time. This is my new favorite toy!

The idea is actually quite simple: feed in signal flowing from one particular microphone (selected from a long list of possibilities), adjust a few parameters about it, then select a different microphone (from the same long list), adjust a few of its parameters and presto — a new sound!

While I have no idea how much DSP goes on "under the hood" (as the often-amusing manual puts it), it must be considerable — a mere frequency response equalization change would never be sufficient to explain the magic I hear output from this tool. I was able to make one of my wonderfully smooth Royer R-121 ribbon mics sound amazingly similar to my highly colored Telefunken U 47 and, even more remarkably, visa versa.

I could also make either one possess the stringy smoothness of an AKG C 12A, or to go from the sublime to the practical — acquire the rock'n'roll aggressiveness of a Shure SM57!

I do emphasize that the sounds are similar — not identical. Although the process does is not 100 percent accurate, it would certainly pass the proverbial "seven points of similarity" test.

What Antares has done is to create good virtual simulations of the most salient of each microphone's identifying characteristics and, in the process, has given engineers a new creative tool. It is not equalization, and it is not "aural excitement," it is somewhere in between.

Features

The hardware AMM-1 has parallel XLR and 1/4-inch phone analog inputs and outputs on the rear panel, as well as AES/EBU digital I/O, MIDI I/O, another 1/4-inch jack for a bypass footswitch connection, and a 7-pin female DIN jack, which connects to one of the two cables emanating from its hefty multivoltage line-lump AC power supply. Its front panel has a two line by 20-character yellow LCD, three soft knobs, nine pushbuttons and a single 6-LED level display.

The software plug-in versions, simply called Antares Mic Modeler, gets its I/O from insert patching within whichever sequencer or DAW application it is plugged into (I used MOTU's Digital Performer 2.72), and has virtual equivalents of all the hardware box's knobs and switches. All plug-ins are 48 kHz, 24-bit capable.

Simply select from the source list the microphone you are using (or used previously) on a recording and select the mic you want the Antares to mimic from the model list, adjusting a few parameters on each. Technically, matching the same source microphone to one's own source mic causes Antares' DSP to neutralize its known characteristics, rendering your sound source sort of "mic-less."

The audio is then processed by a second "modeled mic" algorithm, which imposes certain characteristics of the modeled microphone onto the previously neutralized signal. Mic Modeler also contains the software equivalent of a high-quality tube pre-

At a Glance

Applications:
Studio, post production

Key Features:
Microphone modeling software and hardware; AMM-1 features XLR, 1/4-inch analog I/O, AES/EBU digital I/O and MIDI in/out/thru; software versions include TDM, MAS VST, RTAS and DirectX

Price:
AMM-1: $995; plug-in: $299 to $599

Contact:
Antares at 831-461-7800; *www. antarestech.com*; or circle **Reader Service 188.**

World Radio History

amp circuit — one that offers the possibility of injecting an adjustable amount of tube overdrive-saturation distortion into the final output signal.

The various tweaks one dials in for effective modeling include specifying the source-to-mic distance for each microphone (so that the DSP can remove the proper amount of proximity effect bass boost from the source mic's signal); the user can then apply a precise amount of proximity effect to add to the modeled microphone's output.

Similarly, any low-cut filters that have been imposed by physical switches on the source microphone must be specified — so they can be neutralized — and then one can switch any cut filters back in on the modeled microphone. The appropriate pickup pattern for any of the multipattern microphones must also be selected.

Both the hardware and software versions have input gain (up to +12 dB) and output attenuation controls. Antares has also included a fascinating pair of switches under the Preserve Source label: bass and treble. If selected, these split the source microphone's sound into two — its bass sound and its treble sound — and allows the DSP to process both, only one, or none of the two frequency ranges.

If you like your source microphone's low end, but not its treble response, it is possible to create a hybrid output microphone that has, say, the lows of a Shure SM57 but the highs of a Sony C37! One can also completely bypass either the source mic or the modeled mic (or both — leaving only with the tube preamp overdrive stage). This feature is useful for subtly changing the sonic characteristics of an entire mix.

The hardware box has a few extra system menu items for selecting sample rate (44.1 or 48 kHz) when working from an analog input, and for selecting which channel of an AES/EBU digital input pair will be processed and which will be either passed through untouched, or zeroed.

You can download new microphone model files from Antares' Web site. You can actually download such files to 100 locations in the unit's FLASH memory, view information or do housekeeping on the contents of the FLASH memory and adjust the contrast of the LCD screen.

When I received my units (both software and hardware iterations), they shared similar but not exactly identical microphone lists; the Antares Web site listed other newly modeled mics not contained in one or the other units' FLASH memory (such as the Neumann M 147 microphone). By simply downloading these models (which are actual Standard MIDI Files) and playing them within Digital Performer, I was able to load them into the hardware AMM-1. Getting them into the software plug-in's lists was even easier; I

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Antares continued from page 61

simply dragged my downloaded files into the appropriate folders (source or modeled) in the Antares folder, which, on the Mac, is found within the System folder's Preferences folder.

In use

I first set up two microphones that were also on Antares' lists —a Royer R-121 and a Stephen Paul-modified Telefunken U 47. I picked these two particular microphones because I knew their sounds very well and they were about as far apart in sonic characteristics as any I own.

I fed each into a Manley MIC EQ 500 Combo preamp and sent one set of the Manley's outputs into a pair of analog inputs in the MOTU 1296 digital interface box, and the other to a Coleman Audio MS8 switcher, temporarily appropriated to feed the AMM-1's single analog input.

The MOTU 1296 fed the mixer in Digital Performer, whose output fed an input on a Lucid DA9624 digital-to-analog converter; the AMM-1's digital output directly fed the AES/EBU digital input of the Lucid DAC. I did my listening evaluations with both Stax electrostatic headphones and Manley Tannoy speakers. With this setup I could easily compare the Antares software and hardware's effects on each of my two microphones.

> The Antares AMM-1 microphone modeler is my favorite new toy!

I spent several afternoons at this, becoming increasingly fascinated with the results I obtained from the Antares tools. I also became more proficient at doing the various tweaks, which actually made all the difference between amazingly accurate simulations and rather mediocre ones.

Since I'm a bit of an effete snob who does classical recording with ridiculously expensive condenser microphones, I had the most fun making some of them sound like other high-end microphones I don't own yet, such as the Brauner VM1 and Antares' model of a vintage AKG C 12A. I quickly learned that it was a little easier to get the Royer ribbon microphone to sound like one of these expensive condenser models than to get my U 47 to sound like them.

In fact, I'll go out on a limb and state that, in my opinion, the Royer R-121 is perhaps one of the best microphones to

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We call them 'lab rats'.

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Ray and Tom are two of our twenty or so full time designers and engineers. ...the folks we affectionately call our 'lab rats', and they are an integral part of our Yorkville team.

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Antares continued from page 62

use for modeling other mics for the simple reason that it has an extremely smooth frequency response curve and contains no electronic circuitry whatsoever. Since the modeled microphone's output retains just a smidgen of the original mic's sound character (especially that of its internal amplifier), choosing a smooth ribbon mic as a source rather than a snappy condenser makes perfect sense.

I also played back some of my multitrack classical master tapes and changed the mics around to quite interesting effect, but it was when I started using the Mic Modeler plug-in on stereo mixes that I really became hooked. If you make the stereo mix "mic-less" (by selecting Bypass on the source mic), and then choose one of the high-quality condenser microphones as an output model, you can impart subtle tonal changes to the entire mix, simulating the sound of a perfectly balanced stereo pickup as made via a single pair of expensive microphones. Amazing!

My listening tests also revealed the differences and similarities between Antares' software and hardware versions of its mic-modeling DSP. First, the hardware unit has no noticeable latency (digital delay), as its internal DSP chips are dedicated only to doing microphone modeling, not running a fancy computer at the same time. Latency in Digital Performer can be minimized — but not eliminated — by playing with RAM buffers, etc., but experienced native DAW users will appreciate the tradeoffs involved. Use the plug-ins only during mixing and, if you really need Antares' magic while recording, spring for one or two AMM-1s!

On the other hand, the one place where the hardware unit falls significantly short of the plug-in is in the sound quality of its ADC circuits. Only 20-bit and apparently not as well implemented as some of the high-quality 20-bit ADCs of days past, they are a little noisy and sort of wiry-sounding when compared to modern chips.

The difference was particularly noticeable while brightening up the sound of my Royer R-121 to mimic a Brauner VM1 or a Sony C800G. The AMM-1's ADCs added a bit of hiss to the preamplified signal coming from my Manley microphone preamplifier, while the plug-in version — using the same mic preamp but a better converter — added no hiss whatsoever, and sounded considerably smoother.

I recommend the AMM-1 only if a better converter is used ahead of it. In that case, I found its sound output became identical to that I obtained from the plug-in and, of course, didn't have any of the plug-in's latency factor — which would surely bother a singer trying to monitor his or her sound in headphones.

While I'm being critical here, I find it hard to believe that any product as good as the AMM-1 (or Antares' plug-in software) can be released without high sample rate capability. (*Antares plans to release 96 kHz versions of its software by June 2001 — Ed.*)

Summary

For those who work at 48 kHz and below, the two Antares Mic Modeler tools are highly recommended without reservations. Don't use them merely as a means to increase the number of microphones in your locker — these are highly functional effects devices in their own right, entirely worthy of being put in the same category as your favorite equalizers and spectral modifiers.

Product Points

Antares AMM-1 Microphone Modeler

Plus

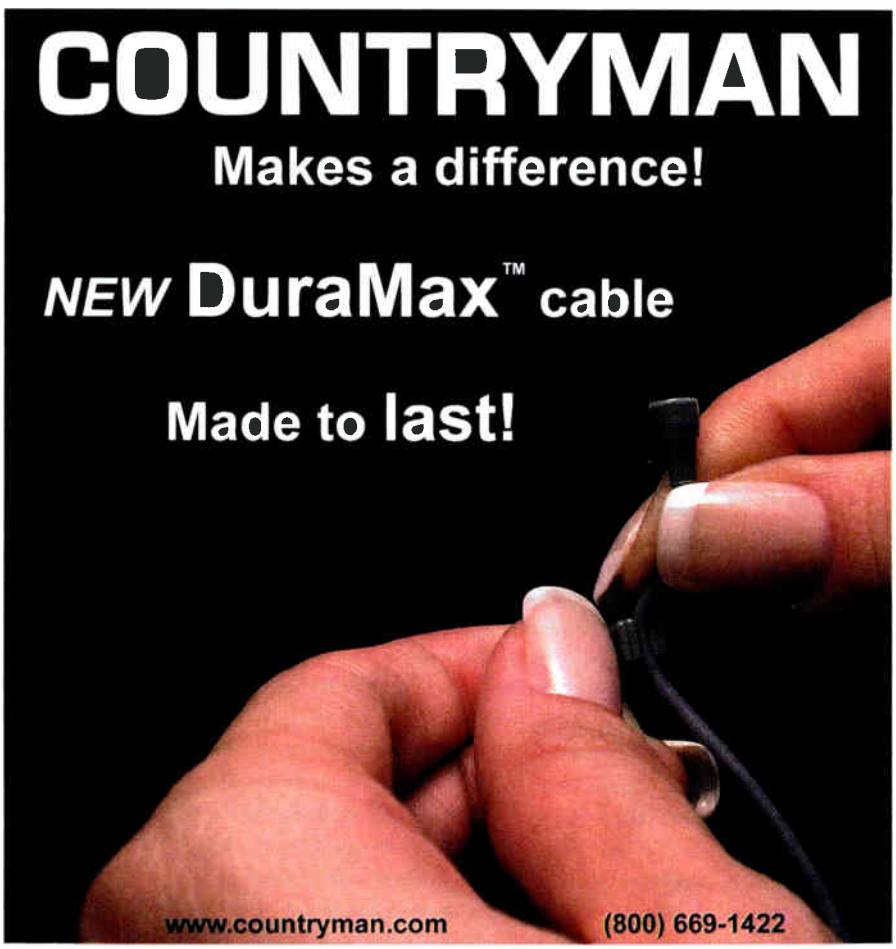
- Close-to-perfect mic emulation
- Good for effects processing on prerecorded tracks and mixes
- Plug-in has good tube preamp emulation

Minus

- No support for higher sample rates of 88.2 and 96 KHz
- Hardware version A/D converters could be better

The Score

Highly recommended and impressive microphone modeling hardware and software with a large selection of mic emulations.



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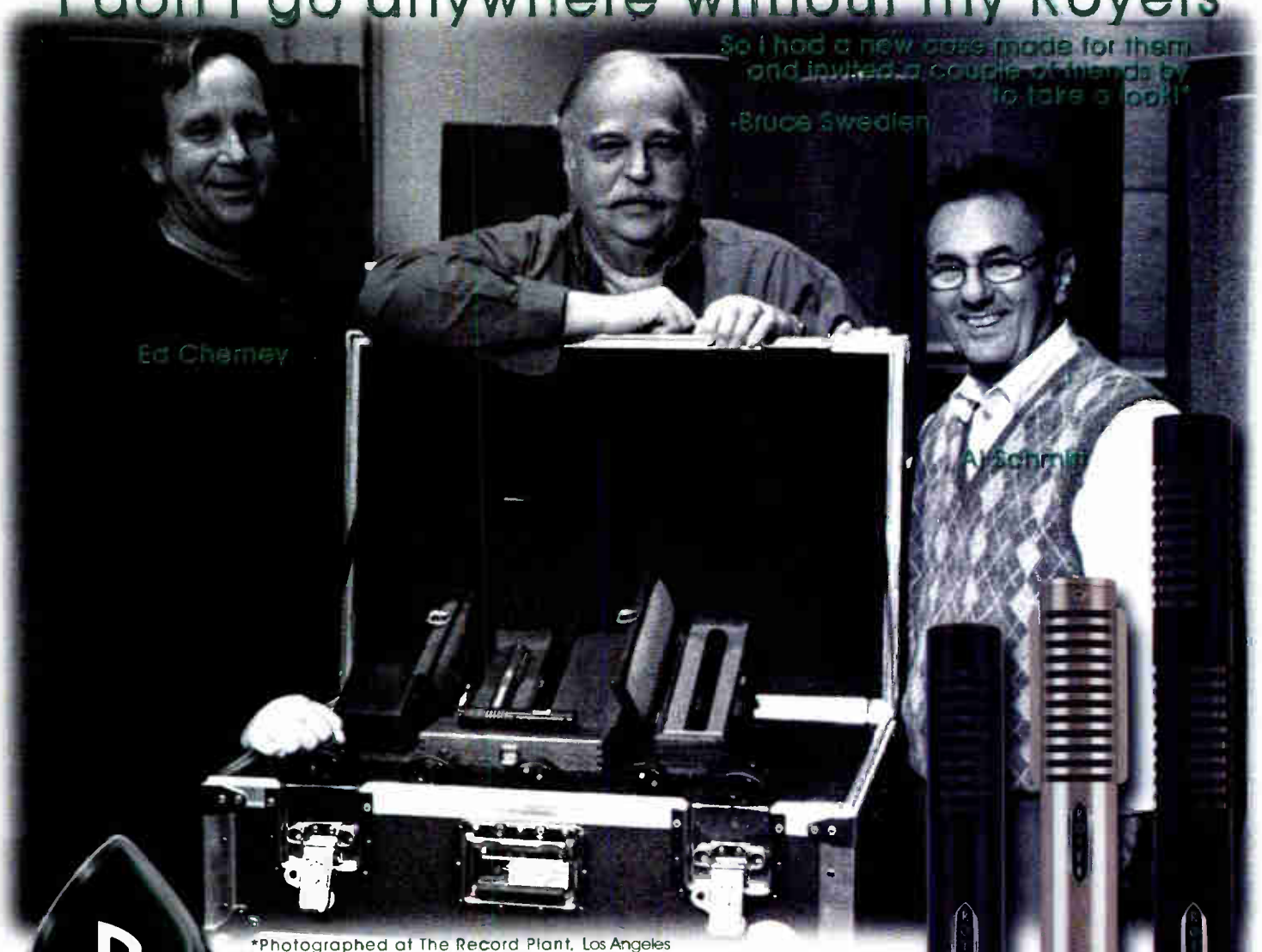
"I don't go anywhere without my Royers



*Photographed at The Record Plant, Los Angeles

Royer Ribbons
www.royerlabs.com

"...The Royer's sound was unbelievable; warm, clear, and incredibly lush."
- Pro Audio Review, July 2000

"This is a microphone that will make you question what "natural sound" is"
- Recording Magazine, July 2000

"...the R-121 and SF-12 absolutely shine"
- EQ, September 2000

"...a very satisfying and rewarding microphone that can lend itself to a huge variety of applications"
- Studio Sound, November 1999

"The Royer R-121 gets my heartiest recommendation"
- Electronic Musician, May 1999

"Beautifully flattering sound quality with almost any source, and unusually high SPL capability"
- Sound On Sound, April 2000

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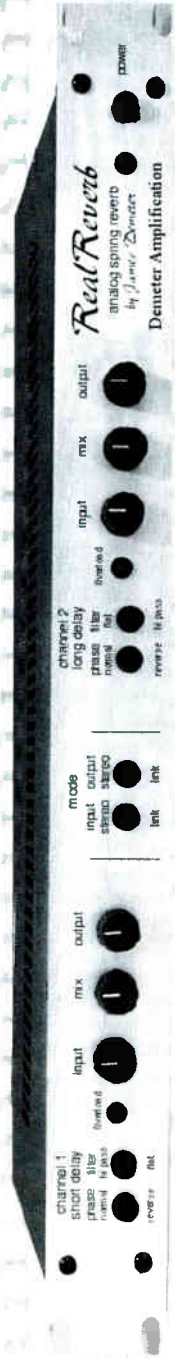

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Quested VS3208 Self-Powered Midfield Monitor

by Bruce Bartlett

On The Bench, Page 67

Since the 1970s, Quested has supplied high-end studio monitors to major studios such as Abbey Road, The Hit Factory and many more. Quested's largest self-powered monitor, the VS3208 reviewed here, is a three-way design with a built-in 400 W power amp. Applications include midfield use in large rooms and main monitors in small to medium rooms.

Features

This is a big, heavy speaker. Each monitor weighs 104 pounds and measures 19 inches wide, 24.25 inches high and 16.5 inches deep. Cabinet construction is rock solid.

Two 8-inch diameter ported woofers, a 3-inch soft-dome midrange and a 1.25-inch soft-dome tweeter are located on the front. Crossover frequencies are 450 Hz and 4500 Hz, 24 dB/octave. Each driver is housed in its own chamber. Since the tweeter and midrange domes are not physically protected, care must be taken during installation. An LED glows green when the power is on, flashes red 0.5 dB below signal clipping, and glows red if the amp overheats and is muted.

A large, three-channel amplifier with heat sinking and an on/off switch is on the back of the cabinet. It works on 230 V or 115 V. Total power is 400 W continuous. A temperature monitor shuts off the amp if it overheats and automatically turns it back on when the temperature is safe.

An optional kit lets the user remove the electronics and mount them away from the speakers — permitting the VS3208 to be mounted in soffits where no cooling is available. Also optional is the VS1115 subwoofer, which extends the response down to 15 Hz. Magnetic shielding is another option. Also available is a pair of 38-inch tall steel speaker stands ($290 each) that place the speakers at the optimum height for most applications.

Three easy-access toggle switches are used to contour the LF, mids and HF. Input is via a 3-pin XLR-type connector, which works with balanced or unbalanced signals. A trim pot adjusts the monitor's sensitivity over an 18 dB range in 2 dB steps.

According to the user manual, maximum SPL is 112 dB C-weighted at 1 meter. Frequency response is reported to be 40 Hz to 18 kHz +/- 2 dB. Sensitivity is adjustable between + 4 dBu and -14 dBu for 100 dB SPL at 1 meter. Amplifier continuous power is 230 W LF, 110 W MF, and 100 W HF. Claimed THD is less than

At a Glance

Applications:
Studio monitor

Key Features:
Three-way midfield powered monitors; dual 8-inch woofers; 3-inch midrange, 1.25-inch tweeter; 230 W LF, 110 W MF, 100 W HF amplifiers

Price:
$7,400 (pair)

Contact:
Quested at 608-251-2500; *www.quested.com*; or circle **Reader Service 189.**

World Radio History

0.03 percent up to 1 dB below clipping, while hum and noise are at least 100 dB below the clipping level.

The user manual covers, positioning, connections, controls, specs, accessories and driver replacement. List price is $7,400 per pair with a five-year guarantee.

In use

Using CDs and my master tapes, I listened to the Quested VS3208 before making any measurements. I placed the speakers vertically on stands, several feet from the walls, with the tweeters at ear height. Quested recommends the speaker axes cross one-half to one meter behind the listener. In my control room, the VS3208 sounded best with the tone controls flat. Here are my impressions:

- Piano: Realistic, uncolored. Big and strong, authoritative.
- Acoustic guitar: Naturally bright. Not boomy or harsh. The speakers convey a sense of the physical wire of the strings.
- Vocal: Natural. Not sibilant (unless the recording is sibilant).
- Drums: Good impact. Snappy and clear.
- Kick drum: Tight, with a well-defined attack.
- Cymbals: Realistic. Sounds like brass. Naturally crisp, but not annoyingly tizzy.
- Percussion: Same as cymbals. Well defined.
- Bass: Tight, deep, full and gutsy. Uniform volume of different notes.
- Sax: Good balance between warmth and edge. Realistic.
- Electric guitar: Neither puffy nor lean in the lower mids. Appropriately aggressive but not harsh.
- Orchestra: Slightly forward in the midrange compared to, say, the B&W 801. Not bad. Cutting the mid switch helps.
- My own mixes (done on Vergence A20s) translated quite well to the Questeds. The VS3208 transient response was terrific: I could hear each string being plucked in a strummed acoustic guitar, or each bell in a sweep of a bell tree.

> The Quested VS3208's transient response, clarity and detail are exemplary.

Overall, I was struck by the presence and detail of these speakers. Their transparency makes instruments so palpable you can almost feel them. Imaging is very sharp. The VS3208 offers fine resolution of reverb as well.

In my lab at home, I was not able to mount the VS3208 in a wall. That would boost the lows and tame the mids (due to the lack of cabinet diffraction). Quested offers a free soffit-mount kit that flattens the woofer's response when the monitor is flush-mounted.

Summary

The Quested VS3208 has many strengths — its transient response, clarity and detail are exemplary. Off-axis coloration is minimal, as is the THD. The tone controls let you adjust the response easily. The VS3208 can be cranked up really loud without noticeable breakup or congestion. Overall, it sounds gutsy and authoritative, yet accurate.

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

Product Points

Quested VS3208 Self-Powered Midfield Monitor

Plus

- Accurate, well-balanced response
- Deep, tight bass
- Clear, present and detailed imaging

Minus

- Big and expensive

The Score

If you are shopping for an active midfield monitor, be sure to audition the Quested VS3208. I recommend this fine product.

On The Bench

Quested VS3208 Self-Powered Midfield Monitor Bench Measurement

I measured the Quested VS3208 from one meter away with the microphone at the height of the tweeter. The tweeter switch was set to boost. As **Figure 1** (turn to page 110 for all graphs) shows, the anechoic frequency response in full space measured +/- 3 dB from 42 Hz to 20 kHz. Although the highs shelve down uniformly above 2 kHz, the speakers' tonal balance sounded just fine.

Not shown in Figure 1 is the effect of the tone controls. The LF contour switch raises or lowers the response about +/-2 dB from 20 Hz to 150 Hz. The range of the mid switch is +/-1 dB from 600 to 3 kHz, and the HF switch varies the highs by +/-2 dB from 3 kHz to 20 kHz.

Also not shown is the response at 30 degrees off-axis. It is virtually the same as the on-axis response up to 5 kHz, and down only -3.5 dB between 10 and 15 kHz. That means the speaker has a wide sweet spot. **Figure 2** is the Energy Time Curve, which correlates with the transient response. It looks very good. The direct-sound spike is sharp and delayed-sound radiation is down 8 to 19 dB from the direct-sound level. A sharp ETC like this indicates fine resolution of detail.

Figure 3 shows the Total Harmonic Distortion vs. frequency at 90 dB SPL, 1 meter. The THD of the Quested VS3208 is among the lowest I have seen. It is only 6.4 percent at 32 Hz, and well below audibility above that. This low distortion contributes to low listening fatigue. **—Bruce Bartlett**

World Radio History

Minimizing Acoustic Distortion in Project Studios

by Dr. Peter D'Antonio

Recording studio design has changed dramatically since I first entered the audio industry. In 1971, project studios were called semiprofessional studios because they did not possess the electronic and acoustical performance of the state-of-the-art professional 16-track studios of the day. Loudspeakers were typically suspended from the ceiling.

In the intervening 29 years, the hardware gap has been narrowed — if not erased — by electronic digital technology. On the other hand, the acoustical gap has widened because professional studio designers have made extensive use of advanced computerized acoustical measurement tools, computer modeling and simulation, room acoustics and psychoacoustics research and innovative acoustical products. Loudspeaker placement has varied from freestanding to flush-mounted and, in some cases, back to freestanding.

Until recently, project studios have concentrated primarily on the electronic gear and essentially ignored or worked around acoustical issues. As project studios become more popular and gain acceptance on the Billboard charts and in post production, acoustical issues have become the most sonically glaring omission.

Hear vs. gear

In view of the way project studios have evolved, the emphasis on electronic hardware is understandable. Project studios have historically grown by sequential addition of gear. Owners initially purchase the necessary gear to get started, and as budgets allowed, they added new microphones, signal processors or loudspeakers.

In this scenario, at some point a critical mass of gear is installed and the project studio owners then must decide whether to add even more gear or improve their acoustic surroundings. With the amount of hardware in mass circulation, many owners are in this position and studio acoustics has now become a very real issue.

Recently, a growing number of project studios are incorporating acoustic solutions from the start. More people recognize the need to accurately hear what is being accomplished in the studio. Also, as the cost of acoustical materials for project studios has dropped and more choices are available, including acoustics does not necessarily have to be an either/or choice.

Additionally, as computerized measurement and acoustical-optimization programs have become more affordable, project studio owners can determine for themselves the improvement even modest acoustical design can offer.

Other rooms

The most relevant point is transferability. The audio product created in a project studio must sound similar in a wide range of listening rooms and must be transferable to these different listening environments. The first step in this process is to understand the sonic ramifications of potential acoustical problems in the room in which the audio product is created. The recording engineer must be aware of the acoustical signature of the room he/she is working in, so that the room's signature is not embedded into the audio product.

continued on page 70

Acoustic Distortion Problem	Solution
Below 300 Hz	
Modal response	1. Room dimensions 2. Speaker/listener placement 3. Damping 4. EQ
Speaker-boundary interference	1. Speaker/listener placement 2. Damping 3. EQ
Above 300 Hz	
Comb filtering	1. Absorption 2. Diffusion 3. Surface treatment placement
Poor diffusion	1. Diffusion 2. Reflection 3. Surface treatment placement

Figure 1: Problems and solutions to minimize acoustic distortion below and above 300 Hz

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Audio History

Acoustic Distortion continued from page 68

A simple example of this is mixing in too little low end in a room with significant low-frequency modal emphasis. When played back in a room with uniform or deficient low-frequency response, the mix will sound thin. More importantly, it will sound different.

Another example is mixing with close-field speakers in a console arrangement with strong console reflections. The mixer will subconsciously and unsuccessfully try to equalize the resulting comb filtering. When the audio product is played back in another listening environment, timbre and imaging corruption will be heard.

Since we have little control over the acoustical design of the environments into which the audio product will be transferred, every effort should be made to provide good acoustics in the creation environment. We don't want to build the proverbial boat and not be able to take it out of the basement.

The interaction between the room, the loudspeaker and listener may produce what I call acoustic distortion. Everyone in the recording industry is conscious of electronic distortion, but acoustic distortion is sometimes overlooked.

Here I will share the relevant acoustical issues facing project studio design and make some suggestions about addressing these problems.

Sources of acoustic distortion

The acoustic distortion introduced by the room can be so influential it dominates the overall sonic impression. The causes of acoustic distortion are:

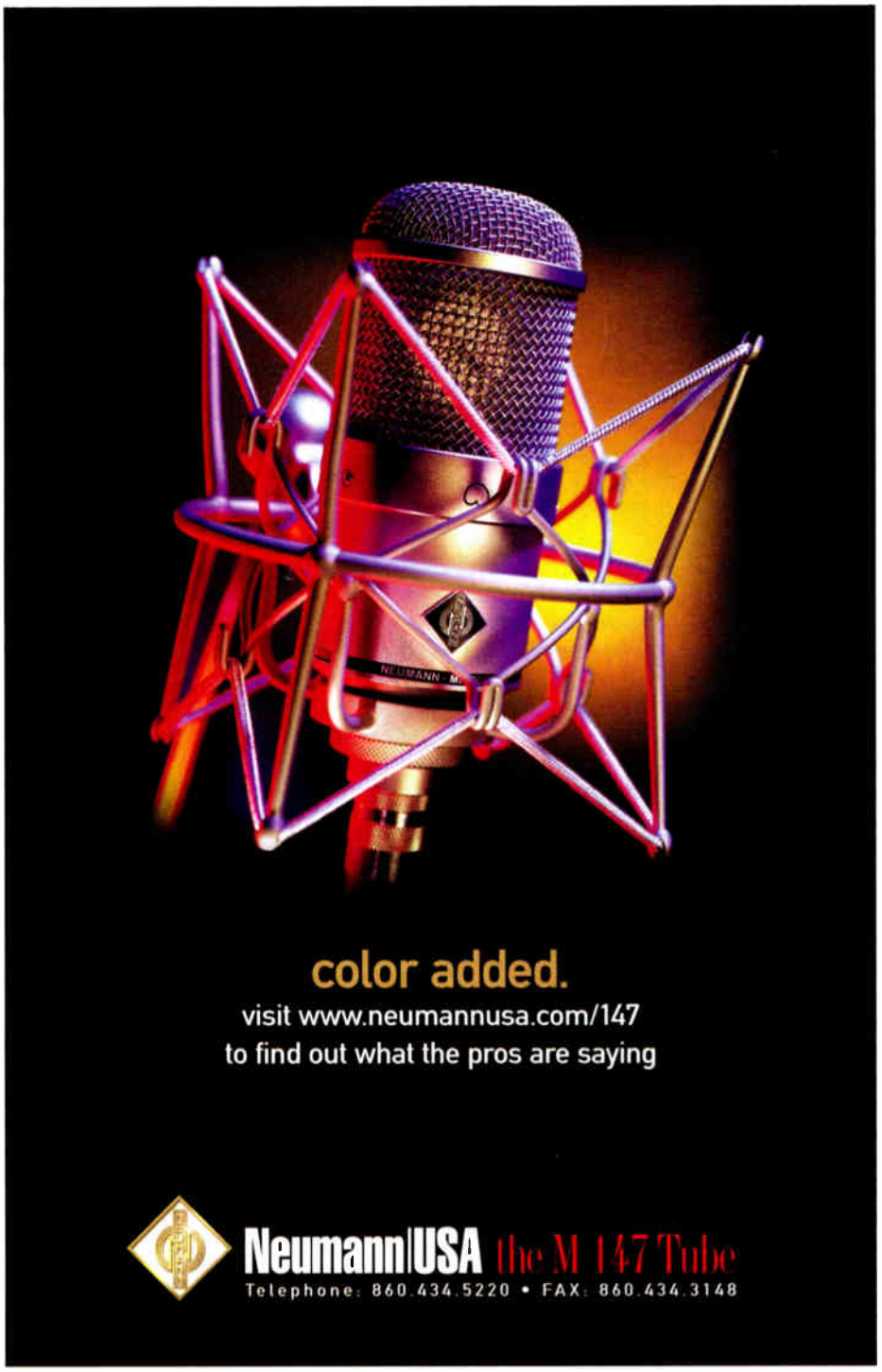
- Modal Coupling — the acoustical coupling between the loudspeakers and listener with the room's modal pressure variations or room modes.
- Speaker-Boundary Interference — the coherent interaction between the direct sound and the omnidirectional early reflections from the room's adjacent boundaries.
- Comb Filtering — the coherent constructive and destructive interference between the direct sound and early reflections.
- Poor Sound Diffusion — the sparse spatial and temporal reflection pattern due to mid- and late-arriving reflections.

Dividing the frequency range roughly at 300 Hz can summarize the potential acoustical distortion problems and possible solutions (**Figure 1**, p. 68).

Below 300 Hz the focus is on modal coupling and the speaker-boundary interference. Modal coupling can be addressed by optimal room dimensions and loudspeaker/listener placement, dedicated low-frequency absorption (damping) and low-frequency electronic equalization.

Above 300 Hz the focus is on specular effects, which results in comb filtering and the lack of adequate sound diffusion. Comb filtering can be minimized through the strategic application of absorptive, diffusive, or custom combination surface treatments. Poor diffusion can be improved by applying efficient diffusive surfaces and strategically placing a coupling of reflective and diffusive surfaces. (RPG has published several white papers that can be downloaded from *www.rpginc.com/news/library/lib_home.htm*)

continued on page 72



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Acoustic Distortion continued from page 70

Starting right

It is best to design a critical listening room from the bottom up. Choosing optimal room dimensions and properly arranging your speakers and listening position cost nothing — repairing problems resulting from ignoring these issues can be costly.

If you are designing a new room, a room dimension analysis should be carried out to minimize potential modal problems. If the room already exists, this tool cannot be used and you must rely on placement, low-frequency absorption and/or equalization.

Acoustic design software lets one automatically determine the best room dimensions from available ranges in the length, width and height. My research has developed new algorithms, which combine multi-dimensional optimization with geometrical image modeling. RPG's Room Sizer, for example, is a software program that determines optimum room dimensions.

Once the optimal room dimensions are determined, the speakers and the listening position must be determined. This may be possible by manual trial and error for a stereo pair of loudspeakers, but with multiple-loudspeaker surround formats, it is virtually impossible. One must rely on multidimensional optimization (essentially an automated computerized trial-and-error search), to simultaneously minimize the modal response and speaker-boundary interference at the listening position.

With these two determinations completed, the low-frequency response has been optimized as best as possible. If more control is needed, there are two remaining tools at your disposal: dedicated low-frequency absorbers and electronic equalization.

One can achieve low-frequency absorption using several approaches, and formulas have been published in many of the reference acoustical books. It is difficult, however, to accurately determine the resonant frequency, the Q or the bandwidth of the device and the absorption coefficient. Standardized reverberation chamber measurements are only accurate down to the 100 Hz third-octave band. At RPG, we use a 2 foot by 2 foot by 24 foot, 7-ton impedance tube to measure from 10 to 285 Hz. Using this measurement system, we developed diaphragmatic-membrane pressure transducers, which provide 100 percent absorption at the 1/3-octave center frequency bands of 40, 50, 63, 80, and 100 Hz. These modules may be used individually for narrow-band or corrective modal modification, or combined for broad-bandwidth low-frequency absorption from 40-100 Hz. The absorption range can be extended for full-spectrum absorption by integrating porous absorption chevrons on the face.

The last tool to address the modal response is electronic equalization. This should be used with care and only to provide attenuation of peaks — not to boost dips in the response.

In the frequency range above 300 Hz, comb filtering and poor diffusion are essentially addressed with surface treatment.

In 1983, RPG developed two new concepts in control room design, which were extensions of Don Davis' Live End/Dead End (LEDE) design. One involved creation of a temporal reflection free zone (RFZ) by reflecting and/or absorbing first order reflections between the listener and loudspeakers.

The other concept was using reflection phase grating (RPG) sound diffusing surfaces on the rear wall to control interfering rear wall reflections, maintain a natural ambience in the room, widen the sweet spot and create a sense of passive surround-sound envelopment.

When budget is the over-riding consideration, cost-effective stackable acoustic foam, molded reflection phase grating diffusers and bass traps are available.

Figure 2 (p. 74) shows a room before and after acoustical treatment. The wall, ceiling and floor reflections apparent at the top were minimized by strategic application of absorption, creating an RFZ 24 dB below the direct sound. The temporal and spatial density of the sparse rear wall reflections was dramatically increased by application of optimized sound diffusers.

The absence of interfering reflections, and the omnidirectional diffuse sound field, enable accurate monitoring in an ambient and comfortable environment over extended time periods without fatigue.

Listen to the music, not the room

The following 10 tips will help you listen to the music — not the room:

1. Listen to your recordings in a variety of environments to convince yourself that the acoustics of the room play a vital role in what is heard.

2. If you are building a new room, use optimal dimensional ratios to provide uniform modal-frequency distribution.

3. Design a symmetrical listening environment for good imaging. Place speakers

continued on page 74

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Introducing Eve/Net -

The Eve/Net™ Network Remote Control System provides flexible, total remote control for the Orville™ Harmonizer® processor family - without the overcomplications and high costs of other multi-channel effects processor controllers. And perhaps best of all, there's no steep learning curve. The Eve/Net system links one or more Eve/Net remote controllers with multiple Orville or DSP7000/7500 processors in any combination.

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Face it. If there's an Eve/Net remote sitting conveniently on your console, or if perhaps you've installed multiple Orville processors in a central machine room, you may never use the Orville's own front panel controls. So why pay for them? Eventide's new "no faceplate controls" Orville/R model has all the capabilities of the standard Orville, but is designed for use exclusively with Eve/Net. You can mix and match standard Orville and Orville/R processors. You could pay many $1000s more for a competitor's multi-channel processor system and still not equal the versatility, quality and ease-of-use of Eventide's Orville system.

Introducing the DSP7000 -

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Acoustic Distortion continued from page 72

symmetrically and on axis for best response.

4. Locate the subwoofers, loudspeaker woofers and listening position to optimize the acoustical coupling with the room's pressure variations and speaker-boundary interference, i.e., optimize the bass response.

5. Minimize first-order reflections from the walls, ceiling and floor between the loudspeakers and the listening position using absorption, diffusion, or custom combination treatments. Be conscious of the effect of console reflections and minimize.

6. Diffuse rear wall reflections over roughly 60 percent of the surface area beginning three feet off the finished floor.

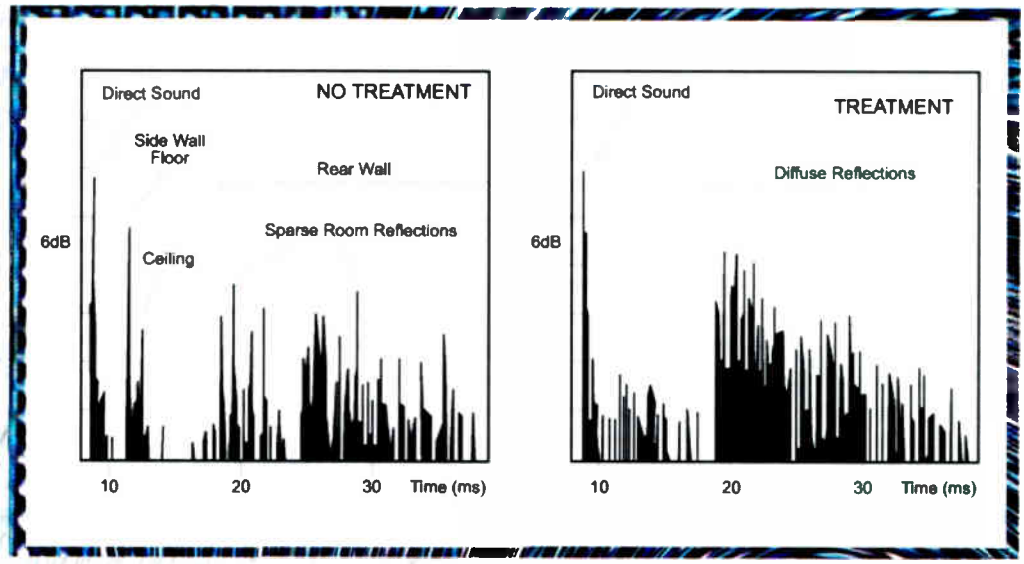


Figure 2: Time response before and after acoustical treatment

7. If possible, utilize wall/ceiling soffits for bass control, heating, ventilating and air conditioning (HVAC), and lighting. In addition, hanging clouds over the listening area are useful to conceal low-frequency absorbers on the ceiling, and provide a mounting for HVAC, lighting and other acoustic treatments.

8. If necessary, provide low-frequency absorption in the modal region on the front/back, floor/ceiling and/or left/right wall surfaces.

9. Electronically equalize remaining low frequency modal emphasis. Reconsider equalizing frequency notches in the room response.

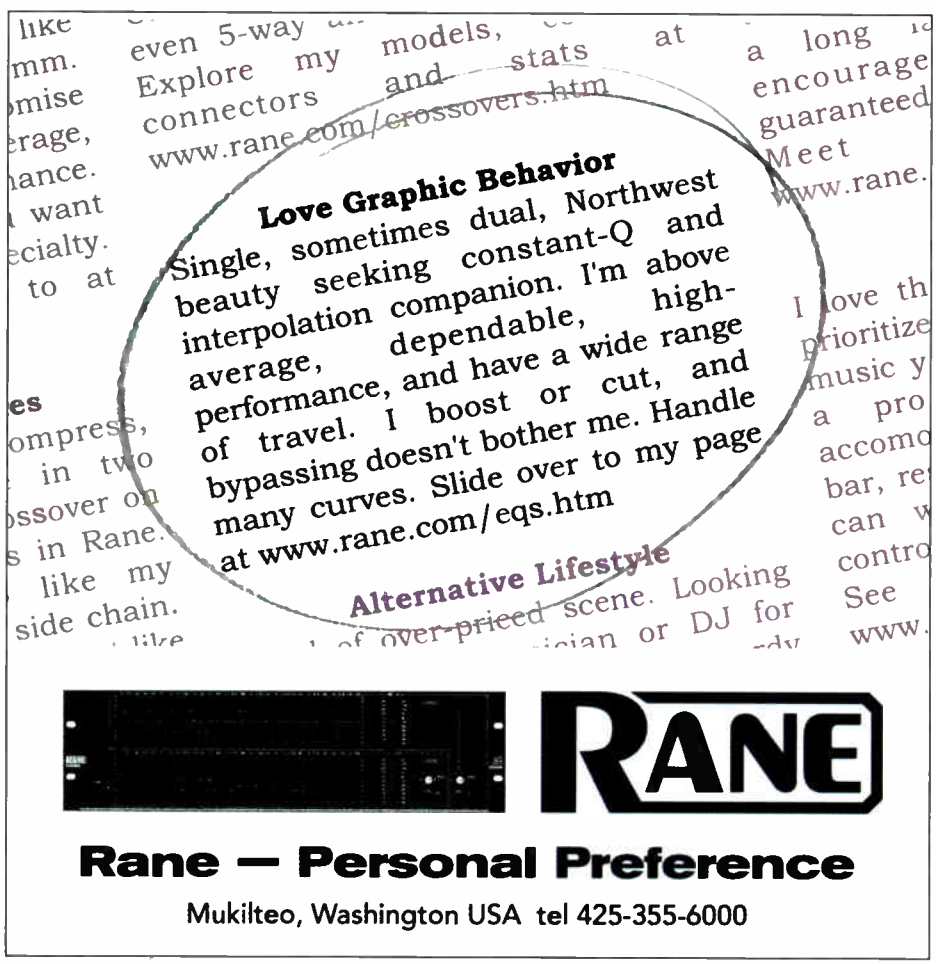
10. Measure the room's time and frequency response at several listening positions using any of the excellent transfer-function or stimulus-response approaches. Analyze the results and tweak to taste.

Summary

There are many excellent books on studio design. You can find a suggested reading list at *http://www.rpginc.com/news/reading.htm*. I have had the pleasure of collaborating with F. Alton Everest and I highly recommend the latest (4th) edition of the *Master Handbook of Acoustics*, published by McGraw-Hill.

Studio design is a multidimensional assignment. I have only touched on the key room acoustic elements. One must also consider the HVAC issues, sound isolation, ergonomics, lighting, etc. Consider conferring with an acoustical consultant. Many of the firms specializing in studio design offer budget packages and advice. A little professional advice may save you a lot of time and money in the long run.

Dr. Peter D'Antonio is president/CEO of RPG Diffusor Systems, Inc., Upper Marlboro, Md. He is a fellow of the Audio Engineering Society and the Acoustical Society of America and is the current chairman of the AES Working Group for the Characterization of Acoustical Materials. He has authored acoustical papers and book chapters and made presentations at industry trade shows for nearly 20 years.



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-Gary Barlough and Richard Zwiebel, Mix

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-Tim Goodyer, Studio Sound

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Gemini
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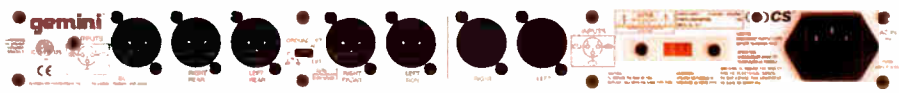
by Sid Vanderpool



In the 1990s Rocktron created Circle Surround, a new spin on the surround world that could produce front-channel stereo, rear channel psuedo stereo (with an apparent separation of 30 dB) and a phantom center channel — all from a regular stereo input. SRS Labs of Santa Ana, Calif. later purchased the Circle Surround technology. Gemini incorporates the Circle technology into its new SP-1 surround analog processor.

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- Roger Williams III, *Pro Audio Review*

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(Steely Dan, George Benson, Doobie Brothers)

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Ted Blaisdell, *Music Biz Magazine*

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Features

At first look, the Gemini SP-1 Circle Surround Sound processor ($399.95) appears to be just another gimmicky effects processor. In fact, the SP-1 turns out to be a professional and effective enhancement to live sound systems.

The case is one standard rackspace high in silver with large brushed-aluminum control knobs in to the left that control the main volume and effects. Five smaller, more precise thumb knobs, are located to the right, which individually control each of the five outputs.

A bass enhancer switch and test switch can also be seen on the front. On the back of the unit, are XLR inputs for right and left and five XLR outputs, right front, left front, right rear, left rear and subwoofer.

When designing its first surround unit, the engineers at Gemini Sound Products were so impressed with the SRS Labs' Circle Surround technology, they licensed the chipset. These components let the SP-1 not only decode regular surround sound, but work with the standard analog stereo output signal produced by most traditional DJ systems and club PA systems to produce awesome effects in the music.

At a Glance

Applications:
DJ; live sound

Key Features:
SRS Circle Surround chipset; XLR balanced connectors; bass enhancer

Price:
$399.95

Contact:
Gemini Sound Products Corp. at 732-969-9000; *www.geminidj.com*; or circle Reader Service 190.

In use

Setting up the SP-1 for a demo was a breeze — balanced main out of the mixer to the unit and balanced outputs to the power amplifiers.

After the SP-1 was hooked up, I calibrated it with the on-board white noise generator, tweaking each channel until I was

continued on page 78

World Radio History

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TEC NOMINEE

2000 EDITORS CHOICE

- Transformer coupled input stage
- Class A Discrete Input Buffer
- Dual Servo Gain Stage
- XLR Balanced Output on each channel
- Assignable Stereo Mix Bus for accurate Mic/Instument Stereo Imaging
- Separate direct outputs for each channel
- IDSS Control for adjusting Harmonic Distortion
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Gemini continued from page 76

satisfied. The SP-1 gave me four effect choices. The two-channel stereo and two-channel four-speaker stereo settings are pretty much self-explanatory.

The third choice was two-channel four-speaker stereo diagonal. The owner's manual states that this setting is useful for large rooms and club environments. I could see how this would accent a venue like a large gymnasium or clubs; but still, it is just stereo with a different twist.

With a flip of the knob, I was in Circle Surround heaven and standing in the middle of the Glenn Miller orchestra (test source: *Glenn Miller, In the Digital Mood*). I could literally close my eyes and see ol' Glenn directing the band — I was blown away! I experienced this type of sound in movie theaters, but never at a dance or musical event.

The Gemini SP-1 analog processor is a professional and effective enhancement to live sound systems.

Unlike the surround sound I had listened to before, the SP-1 gave me full separation of the rear channels, which added more depth to the music. The processing made the music as crisp, if not crisper, than running it in regular stereo while the sub pumped out hard-hitting bass.

Next up was a 128-kbps MP3 file. Since the encoding of this file was not the best, I used it as a reference to see if the SP-1 could make up for the deficiencies found in some MP3s. With a little help from the subwoofer enhancer, the MP3 file rocked in all modes and was greatly enhanced by the Circle Surround setting.

In a "live" test at a wedding later in the day, the crowd concurred with my original findings, the music sounded terrific. Suddenly they were all dancing in the center of the mix. Synths are whirling around their heads, yet the vocals are coming only from the front speakers. The sound was truly spectacular. The other interesting thing is that the sound pressure (SPL) on the dance floor seemed really loud, yet when you walked to the sides of the room you could converse at normal levels. It was weird; people are always telling me I play good music, but with the SP-1, it wasn't what I was playing as much as how I was making it sound so good.

Summary

Over the 24 years I have been a DJ, I have tried a number of processors that enhance recorded music. The SP-1 surprised me in many ways. The unit itself is solid and where most all DJ equipment has unbalanced hookups. I was impressed that Gemini went the extra mile with balanced connections.

The effect it produced was way beyond what I had expected and I might say it was quite the experience to go through my music library and discover a whole new sound coming from my CDs. I found the initial effect it had on me was carried over to the dance floor full of guests. If you have room in your rack and the support equipment to hook it up, the SP-1 will greatly enhance your system.

Sid Vanderpool, a contributor to ***Pro Audio Review****, is editor of DJzone.net, an online DJ publication. He was named the 1999 Technical DJ of the Year and has been a disc jockey/sound man for the past 24 years.*

Product Points

Gemini SP-1 Circle Surround Analog Processor

Plus
- Simple operation
- Pro connections
- Effective surround enhancement

Minus
- None

The Score

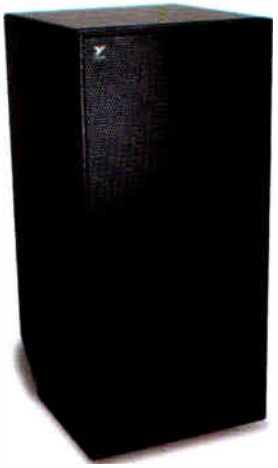
An easy to use live sound surround processor that effectively adds life to your system.

World Radio History

Yorkville TX Four-Way Speaker System

by Will James

When I reviewed the EF508 speaker, part of Yorkville Sound's Elite series (*PAR*, 11/99, p. 16), it impressed me. When Yorkville sent in the TX series — a level above the Elite, I looked forward to reviewing it.



Features

The TX series I tested consisted of a three-way cabinet (the TX8; $2,899) and a sub-bass cabinet (the TX9S; $2,149). The three-way section of the array is comprised of two 15-inch B & C woofers, an 8-inch Audax cone midrange driver and a 2-inch B & C high-frequency driver.

The two 15-inch woofers are arranged in a manifold-style mount, at 90-degree angles to each other, and 45 degrees to the front baffle. The 8-inch Audax midrange speaker is coupled to a cabinet-integral horn, as is the 2-inch B & C high-frequency compression driver.

The cabinet is constructed of 13-layer, 3/4-inch Baltic birch plywood, well braced and supported. The TX8 cabinet has a heavy-gauge, black powder-coated, perforated metal grille. Behind the grille, black acoustic foam hides the components, making the TX8 suitable for dress applications.

The TX8 speakers have reinforced ATM Flytrack points that make it possible to hang a four-cabinet-high cluster from two points. Connectors for the TX8 are located on a panel on the rear of the speaker cabinet, which has two Neutrik NL8 connectors

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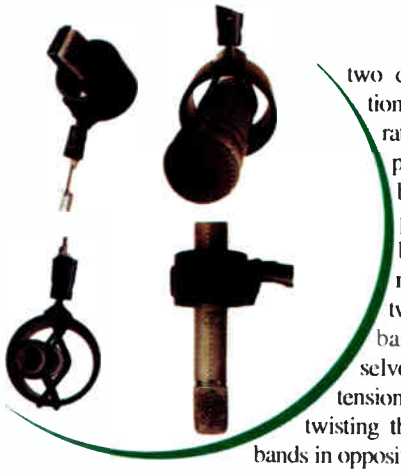
World Radio History

Shock Mount Microphone Shockmount

by Richard Alan Salz



Anyone who has ever suffered the agony of breaking a Sennheiser 421 clip or paying $100 (or more) for a microphone shockmount can tell you ... there has got to be a better way! Gary Young, ex-drummer/producer of the band Pavement, has developed a great, inexpensive shockmount that holds most mics and provides good isolation.

Features/In use

The Shock Mount ($25) consists of an outer ring, made of 1/4-inch black plastic, attached to a threaded mount (for installation on a standard mic stand) and two thick elastic cords that run parallel through the top and bottom of the plastic ring. That's it. It is finished to a nice — but not elaborate — standard.

While it won't be confused with a Neumann shockmount, this is a simple product that works. I used it with mics ranging in size from small to medium-large. Its elastic cords can be used in two different configurations. The first configuration consists of slipping the microphone between the two parallel elastic bands. The second method requires twisting the elastic bands over themselves, creating more tension. I had good luck twisting the top and bottom bands in opposite directions.

I tried the Shock Mount with a variety of microphones. The Shure 57 worked well, with a good fit, especially using the second method. A Sennheiser 421 also had a good fit, provided the microphone was pushed through so that one elastic cord wrapped around the bottom of the grille. Otherwise, due to its smooth finish and tapered body, the microphone could slip out.

The Shock Mount fit my Microtech Gefell M71k really well and provided a good amount of isolation from mic-stand-induced vibration. On an Audio-Technica 4060, although the factory shockmount seemed a bit more secure (due to its locking thumbscrews, which prevent the microphone from falling), I noted that the Shock Mount seemed more immune to vibration transmission.

Summary

This is a good product at a great price. The only possible reservation that I have concerning its use would be that the body of the Shock Mount is solid (whereas other microphone shockmounts are usually perforated or constructed in a "spider" fashion), which could provide a reflective surface — perhaps changing the response of a microphone. In all fairness, simply making sure that the microphone's diaphragm is as far as possible from the shockmount itself can eliminate this effect.

Contact: Shock Mount at 209-931-5409; *www.shockmount.com*; or circle **Reader Service 192.**

Richard Alan Salz, a contributor to Pro Audio Review, owns and operates a recording a studio in Vermont that provides Web-oriented media.

Yorkville continued from page 80

Yorkville. Depressing the Calibrate button twice emits a test tone from the processor for each group of frequencies as the processor measures the voltage and current output of each amp. Once the processor is calibrated, it is not necessary to calibrate again, long as you use the same power amplifiers.

The next step was to EQ the Yorkville TX rig. I analyzed the system with an Audio- Control one-third-octave spectrum analyzer with pink noise and the system was quite flat. Analyzers don't tell the full story about a speaker system's fidelity and quality — the proof is in the listening!

After 15 years of equipping and engineering the orchestra, I have the mix down pretty good, and I am quite familiar with what to expect from my own speaker system. I could not believe the first notes I heard from the Yorkville system. I was instantly impressed with the clarity of the TX speaker system.

Live amplification of the orchestra had never been better or clearer. The double basses were exact through the TX9S subs, and the violins were smooth through the TX8s.

A nice feature of the TX8's cone-driven mids was the cleanliness of those frequencies at any distance from the speakers, from two feet to 200 feet, at off-axis angles of up to 45 degrees.

I took the entire rig to Phoenix Symphony Hall to put it through another test — a Symphony Pops show with Doc Severinson conducting and performing. The Yorkville system sounded equally at home indoors, exhibiting all the same full-range characteristics it had at the outdoor show.

I took the same rig to a Fourth of July concert featuring Freddy Fender performing at a local casino for about 2,000 people. At sound check one of the band members came out to the console. The first thing he remarked about was the clarity of the TX system's vocal range.

During the show, I measured the sound pressure level, and it was at about 105 dB, A-weighted scale, with the console outputs barely registering –15 dB. The power amps barely showed signal present, so needless to say, I was quite impressed with the TX system's headroom.

The TX9S subs rocked solidly and sounded extremely natural in the lower extremities of kick drum and bass guitar, with the TX8s providing the remainder of the audio spectrum with great clarity.

Summary

I was quite impressed with the performance of the Yorkville TX speaker system. The TX8s exhibited excellent vocal and orchestral clarity. The subs were tight and never muddy. The minor amount of equalization required (three frequencies with no more that 3 dB of cut) was amazing.

The TX system provides incredible quality at a reasonable price. In my opinion, the Yorkville TX system is a "must have" for serious live audio professionals.

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

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World Radio History

Rolling Your Own
With the Sony DRE S777

by Tom Jung

Anyone who saw the review I did on the Sony DRE S-777 Sampling Reverb (*PAR*, 12/99, p. 40) knows how into this great piece of equipment I am. In fact, I was so fascinated with the technology that I got myself involved in the U.S. sampling tour, recording many of the locations on the new DASK-702 American Acoustic Spaces CD-ROM.

For those of you who have not heard about the S777, this is not your ordinary digital reverb. The awesome DSP power of the S777 makes it possible to realize all the early reflections and reverb content of actual acoustic spaces, not synthesized translation like most digital reverbs.

Sampling tour

On the sampling tour, we recorded studio spaces as well as the usual halls and churches. Studios recorded were Avatar Studio A in New York City (alias, the Power Station), Ocean Way Studio B in Los Angeles, Enterprise Studio E2 in Los Angeles and Giandomenico Studio, a unique space just outside of Philadelphia.

We also recorded Mechanics Hall in Worcester, Mass., and St. John the Divine Cathedral in New York City, along with a few of its wonderful sounding side chapels. For the utmost in American acoustic treasures, the Grand Canyon was even sampled (in one of Paul Winters' secret recording places).

After we recorded or sampled these spaces, Sony engineers took the data back to Japan for compiling, a procedure required to turn the samples into a reverb program. Working on this project made me appreciate even more the difference between digital reverb as we know it and the recording of a real acoustic space. Even though I had worked in some of these venues before with musicians, I never had the opportunity to record just the acoustic space itself, without a single complaint about the headphone mix.

The playback for the sampling setup consisted of a pair of JBL LSR8P powered monitors with a Sunfire subwoofer to play back as much of the DC to 50 kHz sampling sweep as possible. The samples were recorded using four switchable pattern omni/cardioid Scheops microphones feeding Avalon Class A mic preamps. dCS 96/24 A/D converters were connected to two SEK'D Pro PCI cards on a PC running Windows NT. One of the attractive things about capturing reverb this way is, with the placement and polar patterns of the microphones, many different perspectives of the space can be selected and realized by the end user.

Rumor becomes reality

The rumor floated around for some time that Sony was working on software to allow the recording of samples and compiling within the S777. Since the S777 Sampling Reverb has mega DSP horsepower and inputs that can accept microphone preamplifiers and outputs to feed power amplifiers and speakers, new software is all that is necessary to turn this gem into an even more powerful and useful piece of gear.

The DASK-S704 Sampling Function Software consists of a CD-ROM and a 64 MB Memory Stick — that is it. Either outboard or the optional plug-in A/D or D/A converters can be used for sampling. For 2Fs (88.2 or 96 kHz), or for reverbs in excess of 5 seconds in decay time, the optional DABK-703 DSP expansion board is required.

The DASK-S704 uses what Sony calls the Time Stretched Pulse (TSP) signal to feed the amplifier and speakers. What this amounts to is a 6-second sine sweep starting at DC and going out to 50 kHz. I doubt if there is much reverb life at these extreme high frequencies since some of the older better-sounding digital reverbs only have response out to 8 kHz or so. Nevertheless. sampling over this wide spectrum cannot hurt, and who knows, maybe there is some useful information up there we do not totally understand just yet.

The TSP is normally set to repeat 16 times in row to average the samples and reduce noise not common to the individual samples. A 3 dB increase in signal to noise can be had by setting the repeat from 16 to 32 and a 6 dB improvement with a 64 repeat setting. Sony recommends an SPL of 100 dBA for the playback level, so ear protection is strongly recommended while sampling.

A simple intuitive display walks you through the process, starting with the Rehearsal Mode. Two output meters show a level of 0, as in 0 dB full scale, so make sure you have a way to turn down the level of your power amps or powered speakers. This could be dangerous to both your health and that of your equipment.

Two additional meters indicate input level or the output of the microphone

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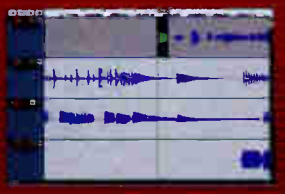

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High End continued from page 84

preamplifiers. You set the gain of the mic preamps as close to 0 as possible (without going over) and then move on to the Sampling Mode. Here the actual recording of the TSP sequence, from the microphones to the Memory Stick, is made. There are two choices for sampling time 5.5 seconds or 11 seconds, the later reserved for canyons and very large cathedrals.

The data file size for a 5.5-sec, 1 Fs (44.1 or 48 kHz) 16 repeat sample sequence is about 2 MB. The supplied Memory Stick is 64 MB as I mentioned earlier, but only 24 MB is available for storage of samples or reverb programs. Additional Memory Sticks can be had in sizes from 4 to 64 MB and used for storage only. Sony says that up to 42 reverb programs can be stored on a clean 64 MB Memory Stick.

After sampling, you are asked to store the recorded samples on the current or another Memory Stick and are given the opportunity to swap them at this time.

The next and final step is compiling the samples. This is where the 16 or more samples are turned into a Reverb Program. The S777 chugs away for while during this process, since lots of number crunching is going on inside the S777 while in the Compiling Mode.

Compile and listen

When you are finished compiling, the S777 asks you if you would like to listen to the reverb it has just made for you. A pulse is generated so that you may listen to the reverb decay. The new reverb can best be heard on headphones since reproduction of the reverb in the space it was recorded is a bit redundant, if you know what I mean.

The community where I live has a pavilion that is used for meetings and parties and with its two second reverb time, it seemed to be the perfect place to try out the S777.

I set up a pair of Hafler TRM8 powered monitors on one speaker stand, along with a Sunfire subwoofer in front of and on the floor below. Sony recommends placing one speaker on top of the other, with one speaker facing forward and the other in the opposite direction — just as was done on the sampling tour.

I recorded the pavilion using a pair of ultrasmooth Shure KSM32 cardioid microphones feeding the new Earthworks 1024 microphone preamplifier, first facing forward about 4 meters from the speakers and about 1.5 meters apart.

The next sample was recorded with the same microphones but facing the back of the hall and about 6 meters from the speakers. The third sample was taken (sounds like a blood test) using a pair of Earthworks QTC-1 omnidirectional microphones located approximately 5 meters from the source and 1.5 meters apart.

I should mention that there seemed to be a lot of noise going on around the pavilion with lawn mowers, leaf blowers and even some repair work hammering in the back of the building. After recording the three sets of samples, I went into the Compile mode and saved all three reverb programs to the Memory Stick.

I was very skeptical of the S777's ability to sort out all the noise I heard during sampling, since I never went beyond the default 16-time repetition setting. Much to my surprise, when listening to the finished reverb programs back in my studio I could detect no signs of pounding or lawn mowers whatsoever in the reverb tails.

I did not expect the reverb quality to match that of the dedicated sampling computer and software I became familiar with during the sampling tour. But when you think about it, the S777 probably has more DSP horsepower than most computers and is not burdened by the Windows operating system.

In some ways the reverb sounds better coming out of the S777 than it does live. It is amazing how good it is at reducing background noise.

The Sampling Function Software not only makes use of the power of the S777, but it takes it to a new level of flexibility, making it possible to sample any space you happen to record in. In post production you can have the ability to call on the original recording venue to smooth and cover edits as well as to breathe life into those dry overdubbed tracks recorded who knows where.

I would think the S777 would be ideal for ADR work. For about $900, the DASK-S704 software turns the S777 into a new piece of equipment, and it just might make the DRE-S777 my favorite piece of gear for next year as well.

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

World Radio History

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Gig Magazine, November 1998

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World Radio History

It's About Time, Part III

by Loren Alldrin

The potential for recorded parts to shift out of place is great, especially in computer-based recording systems. This month, let's look at creative uses of audio time-shifting.

In the pocket

Shifting recorded parts by a few milliseconds in one direction or another can have a dramatic effect on the feel of your music, even after all your parts are lined up with clinical accuracy. Experiment with small nudges of whole tracks.

Try pushing a sequenced shaker part in front of the beat, or pulling a bass track behind. If you cannot easily shift and reset audio tracks to audition the change, make a virtual copy of the part before shifting it, then alternately mute and unmute the shifted and original parts.

With most human sound sources, you will need to apply some groove control to individual sections of the music. By carefully dividing recorded parts, you can slip chunks of audio in time at the phrase, note or word level.

The best place to perform such timing surgery is in the virtual safety of a nondestructive recording package. This allows you to experiment with time shifts to your heart's content, without affecting the original audio file. Simply divide your audio region before and after the part in question, and shift the new segment until it feels right.

This leaves a gap either before or after the segment, which can be filled by adjusting the end of the preceding clip or the beginning of the following one (or changing the length of the shifted segment itself). If the edit does not sound clean (solo it to be sure), you may need to do a quick crossfade in and out of the shifted segment. In a worst-case scenario, you may have to grab a small chunk of ambient sound or breath from a different part of the take to cover the gap.

With care, you can perform similar surgery destructively with a waveform editor. Start by backing up your audio file before editing, just in case. Then, find the section of audio that needs to be shifted (a single note that's late, for example). Go to the space just before the offending note, and cut 10 or so milliseconds of audio to your clipboard. This pulls the note, plus everything that follows it, forward slightly in time. Go to the silence after the note and paste the clipboard back into the file. This shifts the following audio back to its original position. Listen to the track, and repeat the process as necessary.

Zooming in tight on the waveform is the best way to shift things in time, as you can usually see where a part should have started on the timeline grid (an eighth note or sixteenth note, for example). Your software may even snap segments into position automatically. If you don't have a good visual or snap grid to work with, compare your audio track's waveform to that of another percussive track that is in the pocket.

Fun in time

Here are some ideas for time-shifting parts that can breathe life into your music:

- Shift a track or phrase by some musically relevant value (an eighth, sixteenth or thirty-second note, for example) to create a whole new part. The results can be amazing.
- Create a delay effect by copying a track or phrase and shifting it back in time. If you have more playback tracks than plug-in power, this nets you a free delay effect. You can also cut up the delayed track to repeat only the notes or words you want.
- Copy a track and shift it forward to create a ghostly pre-delay. Apply effects (resonant filters, distortion, etc.) to tweak the sound, or use the advanced track to trigger reverb (regular or reverse) before the original sound.
- Fly parts from one part of the song to another. Use your snap grid to move and repeat a guitar lick from the chorus to the verse, for example, just to see how it sounds. The resulting harmonic tension can be delicious.
- Cut up drum parts and create a new pattern out of the pieces. Try moving all your individual drum tracks as a unit, or experiment with rearranging just a single audio track (kick drum alone, for example).
- Drag drum overhead or room mic tracks forward in time to line up with close-miked tracks. This can give drums more impact, and make them sound more "focused."

No rules

Hard disk recording throws out the rules where time is concerned — where a piece of audio lands on the timeline is not where it has to stay. Whether you're shifting your audio by 15 milliseconds or seven bars, this freedom will allow you to both tighten up and really open up your music.

*Loren Alldrin is **Pro Audio Review's** project studio editor.*

READER SERVICE NUMBER 17

World Radio History

THE MUSIC OBSERVER

CARTERET, NJ

FINAL EDITION

SUNDAY, NOVEMBER 15

EXTRA!! EXTRA!!

XPB AMPS "Racks Up To The Competition"

Stable down to 2 Ohms!

Carteret NJ-

In a stunning upset, Gemini's new XPB series power amps have surpassed the competition in a head to head battle for the mobile DJ and install markets. Sound contractors and DJ's alike have been left scratching their heads wondering how it is possible for this low cost series of power amps to go head to head with the "big three" amplifier manufacturers and emerge victorious. Gemini credits it's over-sized toroidial transformer, filter and heat sinks and 5-way protection circuitry that allows this 2U workhorse to out perform the competition. When working with difficult impedance loads down to 2 ohms, most amps heat up and shut down, but the XPB handles the load with no problems. The crystal clear low end remains intact even after hours of use.

Reports are coming in from all over the world on how both XPB amplifiers offer a wide range of features to meet the most demanding audio professional's needs. Three modes of operation--stereo, parallel mono and mono bridge with front panel mode indicators as well as the ability to daisy chain the active balanced inputs together, make these amps versatile enough to handle any set-up configuration. Other features such as True clip LED's, front to rear airflow with 2-speed fan, turn-on in-rush current limiting circuitry and dual aluminum extrusion heat sinks provide the thermal stability and reliability that are necessary in today's competitive amplifier market, all backed by Gemini's rock solid 5 year parts and labor warranty. Contractors, live sound engineers and mobile DJ's around the world agree – The XPB series "rack up to the competition".

MAKE	MODEL	2 Ohms	4 Ohms	8 Ohms	4 Ohms	8 Ohms
		Stereo	Stereo	Stereo	Bridged	Bridged
GEMINI	XPB-750	350 W	275 W	175 W	750 W	350 W
CROWN	Power Tech 1	N/A	305 W	220 W	N/A	400 W
CREST	V450	325 W	225 W	150 W	650 W	450 W
QSC	USA 400	250 W	200 W	125 W	N/A	400 W

MAKE	MODEL	2 Ohms	4 Ohms	8 Ohms	4 Ohms	8 Ohms
		Stereo	Stereo	Stereo	Bridged	Bridged
GEMINI	XPB-1600	800 W	500 W	300 W	1600 W	1000 W
CROWN	K1	750 W	550 W	350 W	1500 W	1100 W
CREST	V1100	700 W	550 W	300 W	1400 W	1100 W
QSC	RMX 1450	700 W	450 W	280 W	1400 W	900 W

SP-1 Circle Surround Processor

Carteret, NJ- Gemini discovers a new way to give DJs more control of their mix with the SP-1 Circle Surround(tm) Processor. With the help of SRS™ labs, Gemini has merged function with technology in creating this 2 input, 5 output pre-amp/processor for the DJ market. The product Development team at Gemini reports that Circle Surround™ is a spatial 4 speaker plus subwoofer effect that requires no encoding or decoding. The SP-1 works well with any audio source. The 5 individual level controls and onboard white noise generator provide precise control to help the DJ achieve the exact balance required for the venue. Sid Vanderpool, editor of DJ Zone Magazine, was quoted as saying: "I heard many of my old discs in a completely new way when played in Circle Surround™ through the Gemini SP-1."

The SP-1 has three modes of operation in addition to the Circle Surround(tm) mode (1) Two channel stereo, (2) two channel, four speaker stereo and (3) 2 channel, 4 speaker diagonal stereo.

gemini
geminidj.com

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READER SERVICE NUMBER 201
2094 1100
World Radio History

Winter NAMM 20

Welcome to the first show of the official Trade Show Season, Winter NAMM, January 18 - 21, 2001. Thankfully, NAMM is being held in one contiguous location, the Anaheim convention center. I don't know about you but that walk between the two LACC buildings was killing me.

Pro Audio Review will be at the show (booth 5916). Stop by, say "Hi." We like to meet our subscribers.

Over the last couple of years Winter NAMM has definitely seen an increase in the pro audio presence. More and more pro audio-only companies attend, and those companies such as Peavey, which offer MI and pro audio equipment, are beefing up the pro audio equipment displays and a few will actually debut equipment.

Equipment concerns

At press time everyone is responding to ***PAR*** queries with, "NAMM?" but here are some things to look for.

For the pro audio crowd, the big interest may be in newcomer iZ Technologies. Wizards of iZ are reprising its AES success by showing permutations of the newly price-reduced RADAR multitrack hard disk recorder. Also at NAMM are a control surface and the UFC-24 Universal Format Converter (yes, another former Otari product).

Peavey, in amongst the MI equipment, is bringing out the triamped XR 1600F 20-channel powered mixer. In other mixer news, Spirit is upgrading the software for the Digital 328 and the 324 Live digital mixers.

Soundcraft, which may debut some products at the show, is definitely showing the Series TWO and Series FOUR live sound consoles.

STK, distributed by Redwood Marketing, is debuting the VX2043FX, a four-bus 20-input mixer.

Electro-Voice is bringing out an updated Eliminator (improved performance), an Eliminator Double (twice the woofers), an Eliminator Monitor (floor monitor), an Eliminator subwoofer and an Eliminator amplifier to power the lot (380 W per channel at 8 ohms).

Bridging the gap between mixers and speakers, Electro-Voice is now bundling its PSX powered mixers with its own Sx series speakers. At the small end is the 340W per channel (2X) PSX600 and the Sx100+ (12-inch woofer, 1-inch tweeter) speaker package while at the big end are the PSX2200 with 760W per output channel (2X) and the Sx500+ speaker (15-inch woofer, 1-inch tweeter).

Community Loudspeakers has brought four new models to Anaheim. All are joining the previously released XLT500 speaker. The group includes the XLT505 full-range stage monitor, XLT509 subwoofer, XLT525 two-way speaker and the XLT530 three-way speaker.

Peavey XR 1600F mixer

Kurzweil PC2R processor

Above: iZ Technology RADAR HD recording system; below, Electro-Voice Cobalt microphones

READER SERVICE NUMBER 90

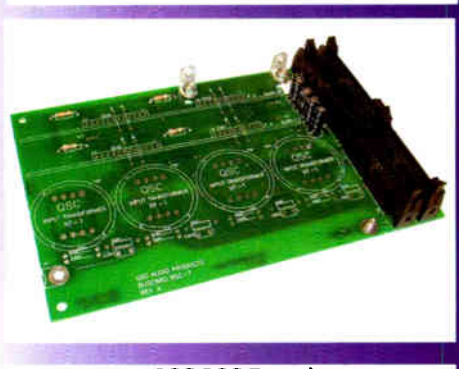
World Radio History

01 Preview

by Brett Moss

Neutrik Patchlink SPL

FBT Maxx 9S2 PA system



QSC BSC 7 card

FBT is bringing out a full-range PA system based on the Maxx 9S subwoofer and a pole-mounted upper-range speaker.

To control some of the systems being shown at the show, Electro-Voice is debuting the ACONE Audio Controller. The unit is designed to process (crossover, filter, EQ…) for powered two-way systems with subs.

If big stage monitors are not to your liking then toddle over to the Sennheiser booth to check out the new deal between Sennheiser and Future Sonics. To whit: Future Sonics will provide the business ends (the part that goes in your ears) for the 300 IEM in-ear monitor system.

QSC is debuting a new signal-processing module for its CX contractor amp and DCA cinema amp lines. The BSC-7 is a four-channel card for EQ, limiting and filtering.

At the Crown booth look for the CE 4000 amplifier to head the display.

HHB is fattening up the Fat Man line of processors. New for NAMM is the FAT Man 2, a single-channel tube-based preamp/compressor. Also from HHB, part of its growing relationship with TLA, is the VP-1 tube-based preamp/voice processor. The VP-1 contains a preamp, compressor, parametric EQ, expander/gate, de-esser and offers word clock and digital output options.

At the Kurzweil demo rooms, the new KSP8 is on show. The KSP8 is an eight-channel processor upgrading the KDFX processor (oodles of reverbs, choruses, flangers, EQs, filters…).

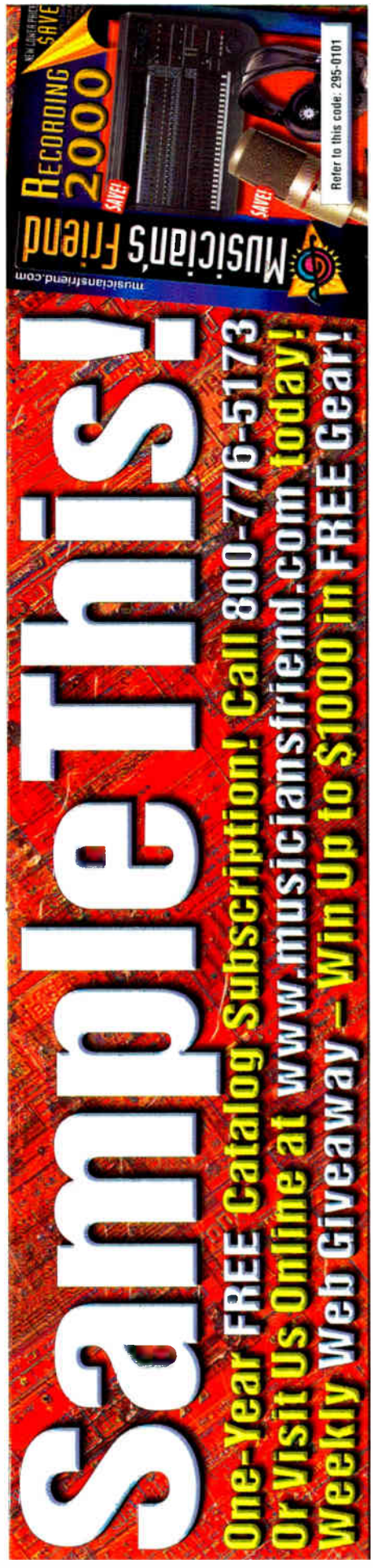
Also in the rackmounted processor game, API is showing its new 2500 Stereo Bus Compressor and the 7600 Channel Strip (mic pre, limiter, EQ).

Earthworks is showing the new 1024 preamp — a two channel model with Earthworks' Zero Distortion Technology. And if you drop by the booth you can enter Earthworks' mic giveaway contest. The prize? A Z30X mic. Crown is showing the CM-150MP and CM-700MP microphones (available in stereo pairs).

Electro-Voice is updating the Cobalt line with several new members — the Co4 instrument microphone, Co5 vocal mic, Co7 vocal mic and the Co9 vocal mic.

Over in the wireless system world, Electro-Voice is introducing a new UHF wireless receiver, the SCU. The SCU is part of the N/DYM line and will be the center of the usual choice of bodypack or handheld wireless microphone system.

NAMM-goers are getting a look at the latest from the old Rean Patchlink patch bay family in the new Neutrik Patchlink SPL for 1/4-inch plugs. Neutrik is also showing a new two-pole Speakon.



READER SERVICE NUMBER 91

World Radio History

Little Labs PCP Distro DI Box

by Jeff Severson

The PCP Instrument Distro is a multi-purpose distribution, impedance and level-matching box, priced at $950. In a mixing situation where you want to run the recorded guitar track back through an amp, the PCP Instrument Distro re-amp capabilities will solve your impedance and level problems.

The active direct has 16 dB of gain — it can be plugged in at line level, avoiding the mixer's mic preamp. The PCP — which jokingly stands for Professional to Cheesy Pedal — is powered by a regulated low-impedance 48 VDC power supply with large-reservoir capacitance and a 250-mA current capability.

If you have ever split a signal coming from the guitar and noticed the immediate fidelity loss, the PCP will allow the split without loading down the instrument pickups. It does this with a specially wound transformer. A phase reverse switch, a ground lift switch and trim level for all three outputs add flexibility.

The I/Os include three XLR inputs on the rear panel for balanced mixers or tape machines, three instrument-level outputs, an unbalanced direct out for long cables, an XLR direct box output and an I/O for expanding to other PCPs.

The beauty of the box is its versatility. You can gang all three inputs at once, plug into any +4 dBu outboard gear before your amp, slice and dice, and mix and match.

For professional studio engineers, the PCP really opens up creative doors using its multiple re-amp I/Os. For example, a mix engineer can simultaneously run a DI-recorded guitar or bus track to an amp, a keyboard through a chorus pedal and a vocal through a vintage tape echo — all without impedance problems or loss of fidelity.

The PCP is handy for professional studio engineers, a small studio with a big budget or for live performers playing a guitar through multiple amps or effects routings. It is well built, versatile and extremely useful for solving those impedance-matching problems or running long lines for guitars from control room to studio.

Contact: Little Labs at 323-851-6860; *www.littlelabs.com*; or circle **Reader Service 83**.

Jeff Severson, a regular contributor to ***Pro Audio Review****, is a recording engineer, producer and songwriter.*

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World Radio History

VLZ® PRO Series with XDR™ mic preamplifiers. Precise creative tools for serious artists.

If you're serious about your creative product, your equipment list should start with a really good mixer like our VLZ® PRO Series. The industry standard for compact mic/line mixers, they're used day-in and day-out by more professionals to create more albums, demos, movie and broadcast sound tracks, commercials and web casts than any other brand.

XDR. The finest microphone preamp design ever built into a compact mixer.

Because the preamps in mixers have long been considered a poor second to $1000 to $2000-per-channel outboard preamps, Greg and our Analog Engineering Department spent two years of meticulous experimentation creating a sonically comparable mic preamp circuit.

According to numerous cynical recording engineers, magazine reviewers and a lot of satisfied owners, we succeeded.

One reason is the advanced 2068 op-amp that is a foundation of the XDR design. It blows away our competitors' op-amps in terms of noise and distortion. Consider these real, measurable XDR™ (Extended Dynamic Range) microphone preamp specs:

- **0.0007% CCIF Total Harmonic Distortion**
- **0.0008% CCIF Intermodulation Distortion**
- **130dB total dynamic range to handle hot digital sources**
- **3Hz to 192kHz bandwidth**
- **Ultra-low mic E.I.N. at practical gain levels**

The VLZ PRO Compact Mixer Series:

■ Premium XDR mic preamps and VLZ circuitry for ultra-low noise ■ New high-performance 2068 op-amps ■ Musical, sweet-sounding equalization at useful, logical frequencies ■ Sharp 18dB/octave Low Cut filters ■ Stereo In-Place Solo ■ Easy channel level setting via Solo ■ Constant Loudness pan pots ■ Inserts on all mono mic/line channels ■ 60mm long-wearing, logarithmic-taper faders (except 1202-VLZ PRO) ■ Sealed rotary controls ■ Thick MIL-spec fiber-glass circuit boards ■ Built-in high-current power supplies ■ Steel chassis ■ Easy-to-understand manuals ■ Best Technical Support in the industry

Call your nearest Mackie office for a 72-page brochure/ hook-up guide that explains the VLZ PRO line in excruciating detail. Or log on to our web site. Then visit a Mackie dealer to decide which VLZ PRO model best meets your creative needs.

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READER SERVICE NUMBER 202

World Radio History

Microphones

Royer Labs R-121 Ribbon-Velocity Studio Microphone

Applications: Recording studio, broadcast.
Features: Figure 8 pattern; 2.5-micron aluminum ribbon; Neodymium magnet; high SPL. Price: $995.
Contact: Royer Labs at 818-760-8472; or circle **Reader Service 29**.

GT Electronics AM40

Applications: Recording studio, project studio.
Features: Replaceable capsule; 15 dB pad; Class A FET; high-pass filter (75 Hz); ships with cardioid capsule; 1" gold evaporated 6 mm Mylar diaphragm. Price: $999.
Contact: GT Electronics at 310-255-3400; or circle **Reader Service 30**.

Audix VX-10

Applications: Live sound, studio, broadcast.

Features: Cardioid pattern condenser; .66mm gold vapor deposited large diaphragm; steel mesh grille; ships with foam windscreen, mic stand adapter. Price: $599.
Contact: Audix at 503-682-6933; or circle **Reader Service 31**.

Neumann KMS 105 Vocalist Microphone

Applications: Live sound, broadcast.
Features: Supercardioid pattern; condenser element; triple acoustic noise filter; internal shockmounting. Price: $595.
Contact: Neumann at 860-434-5220; or circle **Reader Service 33**.

Danish Pro Audio 3541 Vocalist and Instrument Microphone Kit

Applications: Studio, live sound, broadcast, film, location.

Features: Omnidirectional; stainless steel diaphragm; prepolarized; kit includes two-channel tube/solid-state preamp; power supply, cable, shockmount, windscreen. Price: $6,000.
Contact: DPA/TGI North America at 519-745-1158; or circle **Reader Service 34**.

RØDE NT2 Large Diaphragm Microphone

Application: Recording studio.
Features: Cardioid, omnidirectional patterns; condenser element; 10 dB pad; 1" gold sputtered diaphragm; high-pass filter; ships with shockmount. Price: $649.
Contact: RØDE/Event Electronics at 805-566-7777; or circle **Reader Service 35**.

Audio-Technica AT815ST and AT835ST Stereo Shotgun Mics

Applications: Field, broadcast.
Features: Line cardioid, figure 8 patterns; AT815 — 15" barrel; AT835 — 9.25" barrel; M/S; separate Mid/Side outputs; high-pass filter (80 Hz). Price: AT815ST: $999; AT835ST: $895.
Contact: Audio-Technica at 330-686-2600; or circle **Reader Service 36**.

Manley Reference Cardioid Microphone

Applications: Recording studio.
Features: Cardioid; 1" six micron gold diaphragm; 10 dB pad; 6072A tube; internal shockmount; ships with shockmount, swivel mount, power supply, cable. Price: $3,000.
Contact: Manley Labs at 909-627-4256; or circle **Reader Service 37**.

Carvin CM98ST

Applications: Recording studio, live sound, broadcast.
Features: Multipattern; 1" five micron gold sputtered diaphragm; 10 dB pad; tube; low-cut filter; ships with shockmount, power supply; carrying pouch, cable, aluminum flight case. Price: $700.
Contact: Carvin at 800-854-2235; or circle **Reader Service 38**.

Sony F-780/9X

Applications: Live sound.
Features: Hypercardioid; dynamic element; copper clad aluminum voice coil; Alnico magnet; urethane coating; ships with stand adaptor. Price: $375.
Contact: Sony at 800-635-7669; or circle **Reader Service 40**.

continued on page 96

World Radio History

Finally, a machine that does everything but deliver your demo to the A&R guys.

MasterLink ML-9600™. Think of it as a complete mastering house in a box. The ultimate do-it-yourself mixing and mastering system, with features like advanced 24-bit/96kHz hard-disk recording. Built-in editing and finishing tools. And the ability to burn your choice of industry-standard Red Book or state-of-the-art CD24™ formats. Whether you're cutting a new demo, or releasing your latest hot tracks to your adoring fans. And all wrapped up in one hot little package – yet priced so low, the question isn't whether you can afford it – but how can you possibly go on living without one? So don't wait. Call 800-5-ALESIS or visit www.alesis.com today. Or better yet, just get off your musically inclined little butt and buy one. After all, it's only your career we're talking about here.

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READER SERVICE NUMBER 203

World Radio History

Microphones

AEA R44C Bi-Directional Long-Ribbon Microphone

Applications: Recording studio, broadcast.
Features: Bidirectional pattern; 1.8 micron ribbon element; replica of RCA-44; ships with cushion mount, carrying case; optional high-output version ($2,795). Price: $2,395.
Contact: Audio Engineering Associates at 800-798-9127; or circle **Reader Service 51.**

MBHO/MBNM 622

Applications: Recording studio, live sound.
Features: Twin omnidirectional PZM mics on a Jaecklin disc; condenser elements. Price: $545.
Contact: MBHO/MTC America at 718-963-2777; or circle **Reader Service 46.**

Studio Projects T3 Microphone

Applications: Recording
Features: Sweepable omni-figure 8 patterns; 1" six micron diaphragm. Price: $1,099.
Contact: Special Projects/PMI at 310-373-9129; or circle **Reader Service 47.**

Microtech Gefell UM 900 Microphone

Applications: Recording studio.
Features: Five pattern - omnidirectional, cardioid, hypercardioid, wide cardioid, figure eight; twin gold-coated membranes; 48 V phantom power; 10 dB pad; bass rolloff; internal shock mount; ships with wooden case, cable. Price: $3,750.
Contact: Microtech Gefell/G Prime at 212-581-8938; or circle **Reader Service 49.**

AKG C4500B-BC

Applications: Broadcast.
Features: Cardioid pattern; gold-coated large diaphragm; 20 dB pad; rolloff filter (120 Hz); condenser element; internal pop filter; magnetic shielding; ships with suspension mount. Price: $438.
Contact: AKG at 615-360-0499; or circle **Reader Service 50.**

Earthworks SR71

Applications: Live sound, broadcast, recording studio.
Features: Cardioid pattern; test mic-style body; high SPL. Price: $399.
Contact: Earthworks at 603-654-6527; or circle **Reader Service 41.**

Baltic Latvian Universal Electronics The Kiwi

Applications: Recording studio.
Features: Multipattern; Class A; modified BLUE B-6 capsule; ships with shockmount, cherry box. Price: $2,299.
Contact: B.L.U.E. at 805-370-1599; or circle **Reader Service 54.**

Sennheiser MKH800

Features: Omnidirectional, wide cardioid, cardioid, supercardioid, figure 8; 6, 12 dB pads; low-pass filter (50 Hz); presence boost. Price: $2,950.
Contact: Sennheiser at 860-434-9190; or circle **Reader Service 87.**

Behringer B-2

Applications: Studio.
Features: Omnidirectional, cardioid patterns; 10 dB pad; low-cut filter (150 Hz); dual 1" gold-sputtered diaphragm; condenser element; ships with case, shockmount, windscreen. Price: $249.
Contact: Behringer USA at 425-672-0816; or circle **Reader Service 56.**

Marshall Electronics MXL V77S

Applications: Recording studio, project studio.
Features: Cardioid pattern; 1" three micron diaphragm; condenser element; 6072 tube; ships with power supply, shockmount, cable, foam windscreen. Price: $700.
Contact: Marshall Electronics at 800-800-6608; or circle **Reader Service 57.**

Brauner Valvet

Applications: Project studio, recording studio.
Features: Cardioid, omnidirectional patterns; twin large diaphragms; EF 86 tube; RF filter; phase and ground lift switch; ships with shockmount, power supply. Price: $2,699.
Contact: Brauner/Transamerica Audio Group at 805-241-4443; or circle **Reader Service 59.**

continued on page 98

World Radio History

Speakon®

We're still the one setting standards.

The Speakon series of professional speaker and amplifier connectors continue to evolve with innovations that set the industry standard. As a leader in revolutionary designs, Neutrik meets its customers' needs by maintaining a vast product line.

Reliable, cost effective, and extremely durable the Speakon product line offers the "quick lock" latch system on the 4 & 8 pole cable ends and a new slide type locking sleeve on the 2 pole. The cable inserts feature recently redesigned solderless screw type terminals with captive pressure plates. Speakon is totally field repairable. The 4 pole version also offers gold contacts. These touch proof contacts are provided to prevent damage from arcing if disconnected under load. This ensures safe operating conditions for both the equipment and the user. Speakon is patented and meets the safety standards of IEC65, IEC348, CE, CSA and are UL recognized.

The Speakon product line performs correctly and precisely everytime. There is nothing else exactly like Speakon to provide the industry with reliable performance. For more information, contact your local representative.

The Speakon product line features receptacles with contact terminations that include solder tabs or PC mount vertical or horizontal configurations, non-sealed versions for non-airtight applications, and adapters for extended cable runs.

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READER SERVICE NUMBER 204

World Radio History

Microphones

SoundField Mark S Microphone System

Applications: Post production, broadcast, film, video.
Features: Multipattern; stereo, M/S, mono, B; four-capsule head; ships with controller, shockmount, foam windscreen, cable. Price: $9,000.

Contact: SoundField/Transamerica Audio Group at 702-365-5155; or circle **Reader Service 60**.

Gold Line MK10 Measurement Microphone

Applications: Test microphone.
Features: Omnidirectional pattern; .5-inch prepolarized condenser element; 9-52V phantom power; brass body; ships with carrying case, mic clip. Price: $250.

Contact: Gold Line at 203-938-2588; or circle **Reader Service 63**.

CAD VX2 Dual Valve Condenser Microphone

Applications: Recording studio.
Features: Cardioid, figure eight, omni patterns; dual 3 micron gold sputtered diaphragms; dual tube (12AX7 and 12AU7); 8, 16 dB pad; high-pass filter; digital output option. Price: $2,249.

Contact: CAD at 800-762-9266; or circle **Reader Service 64**.

Shure KSM32

Applications: Recording studio
Features: Cardioid pattern; gold-layered 2.5 micrometer Mylar diaphragm; Class A; transformerless; 15 dB pad; low-frequency filter; internal shockmount; integral pop filter. Price: $1,029.

Contact: Shure Bros. at 800-257-4873; or circle **Reader Service 69**.

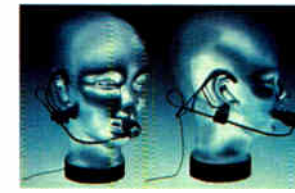
Countryman B6 Lavalier Microphone

Applications: Film, theater, broadcast.
Features: Omnidirectional pattern; electret condenser; available for wired and wireless systems; optional three-pin Lemo connector ($438). Price: $389.

Contact: Countryman Associates at 800-669-1422; or circle Reader Service 70.

Crown CM-311A Headworn Microphone

Applications: Live sound.
Features: Cardioid pattern; flexible over-the-ear frame; beltpack. Price: $300.



Contact: Crown at 800-342-6939; or circle **Reader Service 71**.

SD Systems STM 99 Modular Microphone

Features: Omnidirectional, cardioid, hypercardioid pattern interchangeable capsules; preamplifier; optional instrument mounts.

Contact: SD Systems/Advanced Sonic Concepts at 609-726-9202; or circle **Reader Service 85.**

Coles 4038 Studio Ribbon Microphone

Applications: Recording studio, broadcast.
Features: Figure 8 pattern; ribbon element; vocal and instrument applications. Price: $1,195.

Contact: Coles/Independent Audio at 207-773-2424; or circle **Reader Service 75**.

Lawson L251 Vacuum Tube Microphone

Applications: Studio.
Features: Variable pattern; Telefunken ELAM 251 capsule; 6922/6N1P tube; internal shockmount; 10 dB on power supply; ships with cable, carrying case; swivel-mount. Price: $2,295.

Contact: Lawson at 615-269-5542; or circle **Reader Service 77.**

Electro-Voice PolarChoice

Applications: Installation.
Features: Switchable omni, cardioid, supercardioid, hypercardioid patterns; electret element; 12" or 18" gooseneck; optional flange or shockmount kits. Price: 12" - $300, 18" - $310.

Contact: Electro-Voice at 616-695-6831; or circle **Reader Service 81**.

Soundelux U99 Microphone

Applications: Recording studio.
Features: Sweepable omni-cardioid-figure 8 patterns; dual membrane capsule; gold-aluminum sputter; Teflon/silver wiring; internal shockmount; ships with power supply, cable, external shockmount, ship case. Price: $1,999.

Contact: Soundelux at 323-464-9601; or circle **Reader Service 82**.

World Radio History

Accuracy – from A to B.

Genelec's Digital Double Play.

The 2029A
S/PDIF

Today's audio control rooms and media production facilities are fast becoming all-digital environments. With the proliferation of digital workstations, the only tools which *aren't* digital are microphones and audio monitors. Until Now.

The **2029A** and **2029B Digital Active Near-field Monitoring Systems** are complete digital solutions that complement the interface from digital bitstream to acoustic energy. The extremely linear, integrated D-to-A converters circuitry used in both models offers a precision-matched electrical interface to the active electronics and amplifiers. This results in the best possible resolution and reproduction of your carefully-crafted, all-digital productions – whether they're from a desktop suite or a mega-studio facility. Developed from our highly-acclaimed **1029A** analog near-field monitor, the 2029A or 2029B can also be used in conjunction with our **1091A** subwoofer to create an incredible power-packed, full-bandwidth stereo monitoring system. The 2029A's are precision-aligned and balanced – from the single stereo 24-bit **S/PDIF digital input** – to their highly-efficient, 110dB/SPL matched drivers. The 2029A is 48kHz compatible.

The 2029B
AES/EBU

The 2029B offers the same precision alignment with an **AES/EBU digital interface** on a digital XLR-type input. The 2029B is 96kHz compatible.

In both models, stereo listening level is controlled with a single, front-mounted adjust knob. And like any other Genelec Active Monitor, rear-mounted room response controls let you match the speaker's response to your room's response.

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World Radio History

READER SERVICE NUMBER 205

Microphone Preamplifiers

Manley Labs Dual/Mono Mic pre

Features: Two-channel; 48V phantom power; phase reverse; feedback/gain control; input attenuator; tube-based; 1/4" front panel input. Price: $2,400.
Contact: Manley Labs at 909-627-4256; or circle **Reader Service 127**.

Schoeps VMS 5 U

Features: M/S matrix; gain, balance, width controls; 48V phantom power; low-cut filter (150 Hz); headphone controls; battery power meter. Price: $1,885.
Contact: Schoeps/Posthorn Recording at 212-242-3737; or circle **Reader Service 128**.

Focusrite Red 1 Quad Mic-Pre

Features: Four-channel; 48V phantom power; phase reverse; gain control; scribble pad; VU meter. Price: $2,795.
Contact: Focusrite/Digidesign at 800-333-2137; or circle **Reader Service 129**.

GT Electronics Vipre

Features: Single-channel; 48V phantom power; phase reverse; low-cut filter (100 Hz); mic impedance control; front panel 1/4" Hi-Z input; tube-based; switchable VU meter. Price: $2,199.
Contact: GT Electronics/Alesis at 310-255-3400; or circle **Reader Service 130**.

Earthworks 1024 Zero Distortion Technology Preamp

Features: Four-channel; 48V phantom power; phase reverse; gain controls, variable output controls per channel. Price: $3,500.
Contact: Earthworks at 603-654-6427; or circle **Reader Service 131**.

Benchmark Media Systems MPS-400/2000

Features: Four-channel; 20 db pad; gain controls per channel. Price: $1,345.
Contact: Benchmark Media Systems at 800-262-4675; or circle **Reader Service 132**.

Demeter Amplification HM-1

Features: Two-channel; gain, volume controls per channel; 20 dB pad; phase reverse; low-cut filter; 12AX7A tubes; front panel 1/4" inputs; switchable LED meters. Price: $1,299.
Contact: Demeter Amplification at 818-994-7658; or circle **Reader Service 138**.

True Precision Eight-Channel Microphone Preamplifier

Features: Eight-channel; 48V phantom power, phase reversal, level controls per channel; M/S; Hi-Z inputs; LED meters. Price: $2,695.
Contact: True Precision/Neumann at 860-434-5220; or circle **Reader Service 137**.

Audio Technologies (ATI) ML200

Features: Two-channel; gain control; 20V phantom power; peak LED. Price: $299.
Contact: ATI at 215-443-0330; or circle **Reader Service 136**.

dbx 386 Tube Preamp and A/D Converter

Features: Two-channel; 48V phantom power; 20 dB pad; phase reverse; low-cut filter; analog, digital output level controls; onboard analog to digital converter; tape emulator. Price: $599
Contact: dbx at 801-568-7660; or circle **Reader Service 135**.

Rane MS 1a Mic Stage

Features: Single-channel; 48V phantom power; phase reverse; gain control. Price: $199.
Contact: Rane at 425-355-6000; or circle **Reader Service 134**.

D.W. Fearn VT-2 Microphone Preamp

Features: Two-channel; attenuation controls; input controls; 48 V phantom power; polarity; Lo-Z input; four 6072A triode tubes; VU meters. Price: $3,500.
Contact: D. W. Fearn at 610-793-2526; or circle **Reader Service 133**.

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World Radio History

ESSENTIAL READING

HHB CDR850/850PLUS CD Recorders

HHB CDR830 BurnIT CD Recorder

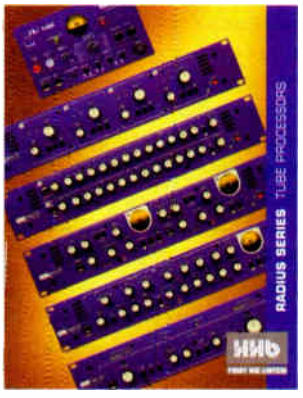
PORTADISC Professional MD Portable

HHB Circle Active/Passive Monitors

HHB Advanced Media Products

Genex GX8500 Multi Format Recorder

TLA VTC Vacuum Tube Console



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FIRST WE LISTEN

World Radio History

Microphone Preamplifiers

Pendulum Audio MDP-1 Preamplifier

Features: Two-channel; 48 V phantom power; phase reverse; 20 dB pad; Class A; gain, output controls per channel; variable low-cut filter; Jensen transformers; soft start; front panel 1/4" input; dual 12AX7A, dual 6922 tubes; switchable VU meters. Price: $2,495.
Contact: Pendulum Audio at 908-665-9333; or circle **Reader Service 139.**

Joemeek VC-2 Tube Channel

Features: Single-channel; microphone preamp/optical compressor/enhancer; output gain, input gain, compress, attack, release, drive, enhance controls; tube gain makeup stage; 20 dB pad; phantom power; phase; high-pass filter; switchable VU meter. Price: $2,000.
Contact: Joemeek/PMI at 310-373-9129; or circle **Reader Service 140.**

HHB Fat Man 2 Tube Preamp/Compressor

Features: Single-channel; preamp/compressor; 48V phantom power; low-cut filter (90 Hz); gain input, output, makeup controls; threshold, ratio; controls for compressor; 12AX7A tube; VU meter. Price: $469.
Contact: HHB Communications at 310-319-1111; or circle **Reader Service 141.**

Raven Labs APD-1 Active Passive Direct Box

Features: Two-channel; phase reverse; 10, 20 dB pad, 6 dB boost; side chain; dry/wet blend effects; effects loop; battery operable. Price: $349.
Contact: Raven Labs at 818-368-2400; or circle **Reader Service 142.**

Drawmer 1969 Tube Mic Pre/Compressor Mercenary Edition

Features: Two-channel; 48V phantom power; phase reverse; low-cut filters (50, 100 Hz); tube-based DI section; compressor; Burr-Brown op amps; VU meters. Price: $2,949.
Contact: Drawmer/TransAmerica Audio Group at 702-365-5155; or circle **Reader Service 143.**

TL Audio VP-1 Tube Processor

Features: Preamplifier, compressor/limiter, parametric EQ, expander/gate, de-esser; 30 dB pad; variable high-pass filter; controls for each section; EF86, 12AX7A tubes; LED meters; VU meter. Price: $2,495.
Contact: TL Audio/ HHB Communications at 310-319-1111; or circle **Reader Service 148.**

Peavey VMP 2 Tube Microphone Preamp

Features: Two-channel; phantom power; gain, EQ controls; 20 pad; Lo-Z input; high-pass filter; triple magnetic shielding for transformer input; bypass; three 12AX7 tubes, one 12AT7 tube. Price: $950.
Contact: Peavey at 601-483-5365; or circle **Reader Service 147.**

Symetrix 302 Dual Microphone Preamplifier

Features: Two-channel; 48V phantom power; 15 dB pad; phase reverse; gain controls. Price: $299.
Contact: Symetrix at 530-644-7743; or circle **Reader Service 146.**

Millennia Media STT-1 Origin

Features: Single-channel; one solid state mic preamp; one tube mic preamp; 48V phantom power; phase reverse; one solid state parametric EQ; one tube parametric EQ; one discrete opto compressor path; one tube opto compressor path; VU meter; front panel 1/4" input. Price: $2,895.
Contact: Millennia Media at 530-647-0750; or circle **Reader Service 145.**

Requisite Audio Engineering Y7s

Features: Two-channel; 48V phantom power; 20 dB pad; phase reverse; tube-based; 1/4" Hi-Z input; switchable VU meter. Price: $2,900.
Contact: Requisite Audio Engineering at 818-247-2047; or circle **Reader Service 144.**

Prism Sound MMA-4

Features: Four-channel; gain controls, phase reversal per channel; 48V phantom power; LED meters. Price: $3,160.

continued on page 104

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READER SERVICE NUMBER 221

Microphone Preamplifiers

Contact: Prism Media at 973-983-9577; or circle **Reader Service 149.**

Klark Teknik DN422M Preamp/Equalizer

Features: Two-channel; 48V phantom power; pad; phase reverse; four-band parametric EQ; twin XL4 preamps; onboard compressor/limiter/expander/gate switches; insert points. Price: $1,880.
Contact: Klark Teknik at 616-695-4750; or circle **Reader Service 150.**

Aphex Thermionics Model 1100 Microphone Preamplifier

Features: Two-channel; onboard A/D converter; tube-based preamp section; 48V phantom power; 20 dB pad; phase reverse; limiter; low-cut filters. Price: $2,000.
Contact: Aphex Systems at 818-767-2929; or circle **Reader Service 151.**

Sound Devices USBPre

Features: Two-channel; 48V phantom power; 24-bit; USB port; Windows, Mac-compatible; direct input; headphone control; LED meters. Price: $695.
Contact: Sound Devices at 608-524-0625; or circle **Reader Service 152.**

Avalon Design AD2022

Features: Two-channel; 48V phantom power; phase reversal; 20 dB pad; gain control; front panel 1/4" Hi-Z inputs; variable high-pass filter; Class A; VU meter. Price: $3,000.
Contact: Avalon Design at 949-492-2000; or circle **Reader Service 153.**

Graham-Patten SoundPals DMIC-20

Features: Two-channel; gain control; 20-bit A/D converter; digital output; sensitivity jumpers; LED meter. Price: $699.
Contact: Graham-Patten at 800-422-6662; or circle **Reader Service 154.**

Valley Audio 401 Mic Processor

Features: Single-channel; mic preamp; 48V phantom power; mic preamp gain control; three-band EQ; gate/expander; LED meters; master output gain control. Price: $680.
Contact: Galaxy/Valley Audio at 800-369-7768; or circle **Reader Service 160.**

Audio Toys, Inc. (ATI) 8MX2 Preamplifier

Features: Eight-channel; 48V phantom power; phase reverse; gain level, limiter threshold, channel level, pan controls per channel; linkable; headphone jack controls; LED meters. Price: $2,795.
Contact: Audio Toys, Inc. at 800-642-8063; or circle **Reader Service 159.**

API S12C Preamp Module

Features: Mic preamp module for API Lunch Box modular processors frames; 48V phantom power; 20 dB pad; 1/4" Hi-Z input; mic/instrument switch. Price: $825.
Contact: API/Transamerica Audio Group at 702-365-5155; or circle **Reader Service 158.**

SPL Goldmike

Features: Two-channel; 48V phantom power; pad; phase reverse; low-cut filter; vocal presence circuit; tube-based; Class A. Price: $999.
Contact: SPL/Group One at 631-249-1399; or circle **Reader Service 156.**

Gordon Instruments Preamplifier System

Features: Two-channel; 48V phantom power; phase reverse; Hi-Z input; optional gain control ($300). Price: $3,500.
Contact: Gordon Instruments at 615-665-1005; or circle **Reader Service 155.**

Phoenix Audio GTQ2

Features: Two-channel; 48V phantom power; phase reverse; gain control; front panel 1/4" Hi-Z inputs; high-pass filter (80 Hz); three-band EQ; Class A. Price: $1,995.
Contact: Phoenix Audio at 323-462-4373; or circle **Reader Service 161.**

Amek Pure Path Channel in a Box

Features: Single-channel; 48V phantom power; phase reverse; four-band parametric

continued on page 106

World Radio History

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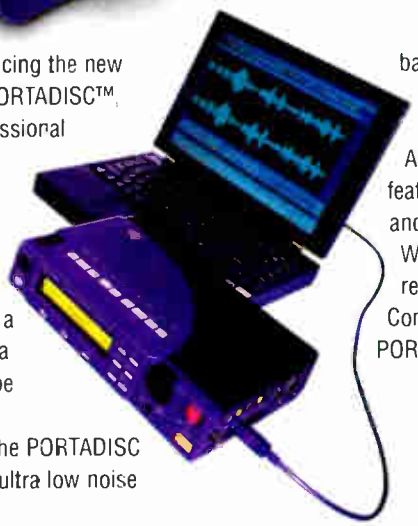

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FIRST WE LISTEN

READER SERVICE NUMBER 208

World Radio History

Microphone Preamplifiers

EQ; compressor; high, low-pass filters; side chain. Price: $3,250.
Contact: Amek at 888-286-9358; or circle **Reader Service 162.**

Crane Song Flamingo

Features: Two-channel; gain, attenuation controls per channel; phase reverse; "Iron" and "Fat" effects; Class A; LED meters. Price: $3,125.
Contact: Crane Song at 715-398-3627; or circle **Reader Service 163.**

Grace Design Model 101 Preamplifier

Features: Single-channel; 48V phantom power; high-pass filter; gain, trim controls; front panel 1/4" input. Price: $699.
Contact: Grace Design at 303-443-7454; or circle **Reader Service 164.**

LA Audio PS10

Features: Preamp; 48V phantom power; phase reverse; de-esser; four-band EQ with sweepable mids; compressor; noise reduction; LED meters; optional A/D converter. Price: $799.
Contact: LA Audio/Sevans Audio at 215-949-8300; or circle **Reader Service 165.**

Fairman Tube Recording Channel

Features: Mono mic preamp/compressor/EQ; six-band EQ; compressor knee, boost, dip, Q-Hi, gain, threshold, attack, release, output controls; VU meter. Price: $5,900.
Contact: ATR Service Co./Fairman at 717-852-7700; or circle **Reader Service 166.**

Applied Research and Technology Model 21S Pro Channel Preamplifier/Multiprocessor

Features: Preamplifier/variable Mu compressor/four-band parametric EQ; tube-based; 48V phantom power; 20 dB pad; low-cut filter; phase reverse; VU meter. Price: $799.
Contact: Applied Research and Technology at 716-436-2720; or circle **Reader Service 172.**

Bellari MP10S Round Sound Tube Mic Preamp

Features: Single-channel; gain, level controls; 48V phantom power; phase reverse; 37 dB pad; 7025 tube. Price: $150.
Contact: Bellari/Rolls at 801-263-9053; or circle **Reader Service 171.**

Summit Audio MPE-200

Features: Preamp/EQ; two-channel; four-band EQ; 48V phantom power; Class A; coarse/fine gain controls; phase reverse; high, low-pass filters; Mr. Rupert Neve-designed analog end. Price: $4,495.
Contact: Summit Audio at 831-728-1302; or circle **Reader Service 170.**

Martech MSS-10

Features: Single-channel; 48V phantom power; so dB pad; phase reverse; mic gain control; line out control; calibration control; VU meter. Price: $1,995.
Contact: Martech/Martinsound at 800-582-3555; or circle **Reader Service 169.**

DaviSound TB-3 Inner Tube Compressor Amp

Features: Two-channel; drive, compress, recover, release, mic controls; phantom power; 12AX7 tube; bypass; activity LEDs. Price: $995.
Contact: DaviSound at 803-276-0639; or circle **Reader Service 168.**

Uncle Albert's Amplifier V.T.D. Direct Box

Applications: Live sound, studio.
Features: Buffered output; 12AX7 tube; filament heater. Price: $525.
Contact: Uncle Albert's Amplifier at 800-416-2444; or circle **Reader Service 167.**

Mindprint En-Voice Preamp/Processor

Features: Single-channel; 48V phantom power; three-band EQ; frequency, cut/boost controls per band; tube saturation; compressor; threshold, compression controls; master output level; LED meters. Price: $749.
Contact: Mindprint/Steinberg NA at 818-678-5100; or circle **Reader Service 200.**

continued on page 108

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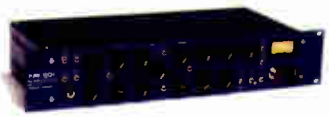
READER SERVICE NUMBER 209

World Radio History

Microphone Preamplifiers

Tube-Tech MEC 1A

Features: Preamp/EQ/compressor; single-channel; tube operation; high, low-shelving filters; manual, fixed attack and release controls; 48V phantom power; 20 dB pad; phase reverse; high-pass filter; switchable VU meter. Price: $3,995.



Contact: Tube-Tech/TC Electronic at 805-73-1828; or circle Reader Service 173.

PreSonus VXP Preamp/Processor

Features: Single-channel; preamp/compressor/expander/de-esser/four-band semiparametric EQ/peak limiter; 48V phantom power; 20 dB pad; master output control; LED meters. Price: $800.

Contact: PreSonus at 800-750-0323; or circle Reader Service 174.

On The Bench

Yamaha AW4416 Integrated Recorder/Mixer Bench Measurements

Yamaha continued from page 22

Input Sensitivity

Gain at minimum, input fader full up	4.46 V, +15.2 dBu
Gain at maximum, input fader full up	16.6 mV, -33.4 dBu

Input Overload

Input gain at minimum	8.55 V, 20.9 dBu
Input gain at maximum	33.3 mV, -27.3 dBu

Output Level

At stereo out, full scale input	2.87 V, +11.4 dBu
At monitor out, full scale input, stereo fader full up	1.9 V, +7.8 dBu

Output Polarity

Relative to audio on incoming digital signal	noninverting

Output Impedance

Unbalanced stereo outputs	994 ohms
Balanced monitor outputs	85 ohms

Frequency Response

44.1 kHz f_s	
Input gain at minimum	+0.0, -0.1 dB 20 Hz - 15.0 kHz
	-3.0 dB at 21.2 kHz
Input gain at maximum	+0.0, -0.5 dB 20 Hz - 20.3 kHz
	-3.0 dB at 21.2 kHz
48.0 kHz f_s	
Input gain at minimum	+0.0, -0.1 dB 20 Hz - 16.0 kHz
	-3.0 dB at 21.2 kHz
Input gain at maximum	+0.0, -0.5 dB 20 Hz - 22.0 kHz
	-3.0 dB at 23.5 kHz

Total Harmonic Distortion

Input level -0.3 dB below full scale

44.1 kHz f_s	< 0.0025% 20 Hz - 400 Hz
	< 0.03% at 6 kHz
	< 0.007% at 20 kHz
48.0 kHz f_s	< 0.0025% 20 Hz - 400 Hz
	< 0.03% at 6 kHz
	< 0.002% at 20 kHz

Linearity Error

44.1/48.0 kHz f_s	< +1.0, -0.0 dB 0 to -130 dB FS

Signal to Noise Ratio

44.1/48.0 kHz f_s, input faders at 0, input signal just shy of A/D overload

Input gains at maximum, input signal at -28.4 dBu wideband	70.5 dB
A-Weighted	80.3 dB
Input gains at minimum, input signal at +20 dBu wideband	71.0 dB
A-Weighted	100.0 dB

Channel Separation

44.1/48.0 kHz f_s	
Adjacent channel	> 110 dB 20 Hz - 1 kHz
	> 88 dB at 20 kHz

Note:
Unless otherwise noted, all measurements are for Channels 1 and 2, 24-bit operation, high impedance instrument load (200K ll 270 pf).

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World Radio History

On The Bench

Yamaha AW4416 Integrated Recorder/Mixer Bench Measurements

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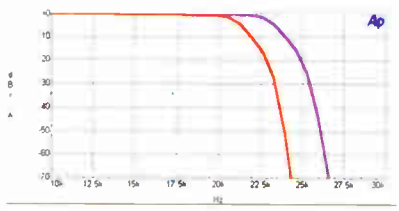

Figure 1: Frequency response of the AW4416 as a function of sampling frequency

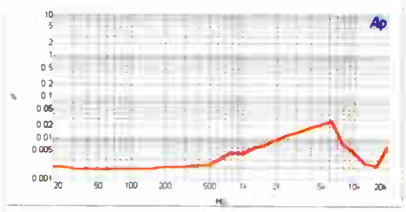

Figure 2: Total harmonic distortion vs. signal frequency for a sampling frequency of 44.1 kHz

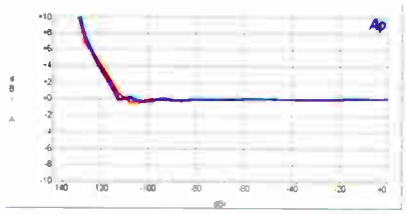

Figure 3: Deviation from linearity

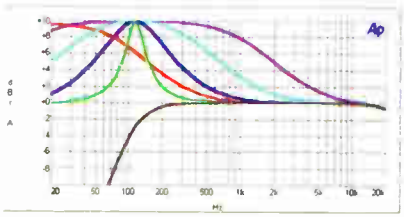

Figure 4: Low-band EQ set to 125 Hz, 10 dB of boost as a function of Q control: red = LF shelf (CW); magenta = 0.1; cyan = 0.32; blue = 0.9; green = 3.2; gray = HPF (CCW)

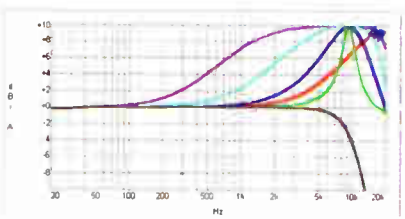

Figure 5: High-band EQ set to 10 kHz; 10 dB of boost as a function of Q control; red = HF shelf (CW); magenta = 0.1; cyan = 0.32; blue = 0.9; green = 3.2; gray = LPF (CCW)

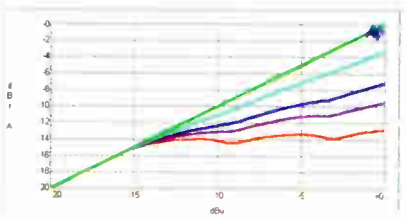

Figure 6: Effect of compression with threshold set at -15 dBu and ratio varied; red = 10:1; magenta = 3:1; blue = 2:1; cyan = 1.3:1; green = 1:1

On The Bench

Quested VS3208 Self-Powered Midfield Monitor Bench Measurements

continued from page 67

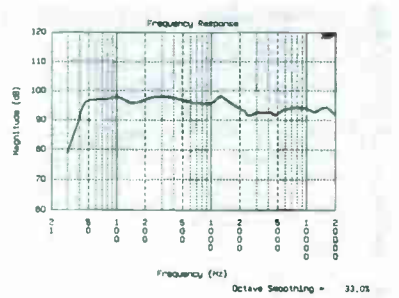

Figure 1: Anechoic frequency response

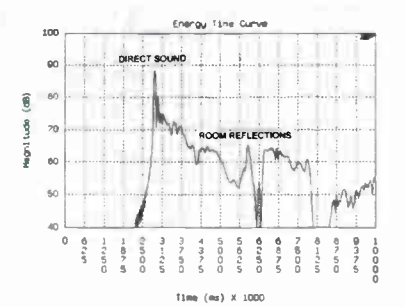

Figure 2: Energy time curve

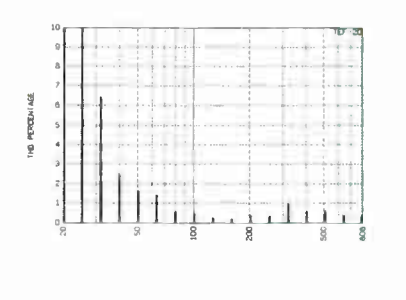

Figure 3: Total harmonic distortion vs. frequency at 1 meter

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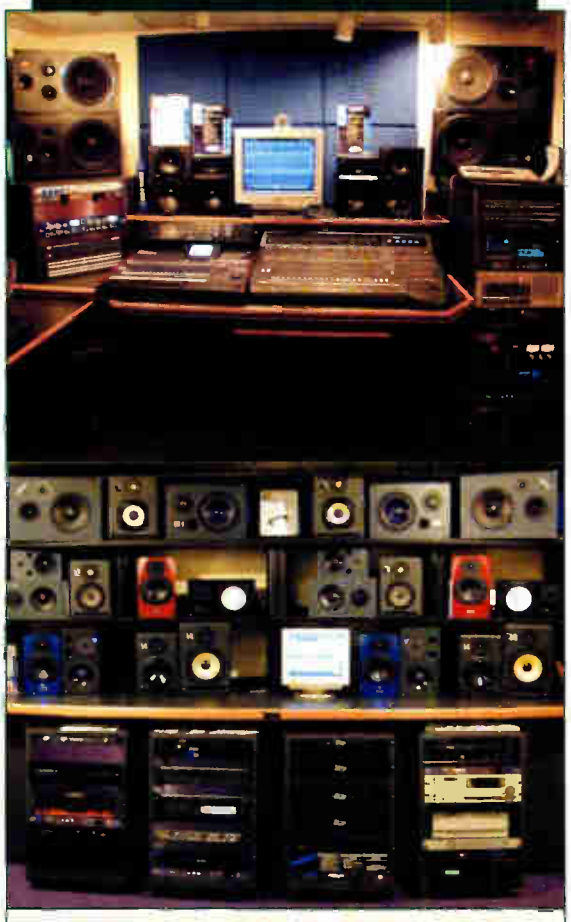

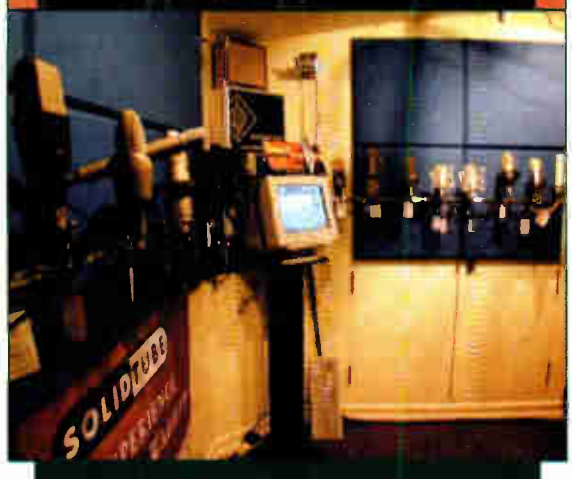

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PRO CD RECORDERS

ALESIS Masterlink ML-9600 High-Resolution Master Disk Recorder

The MasterLink ML-9600 combines stereo hard disk recording, CD burning, DSP and mastering functions to deliver compact discs in the standard "Red Book" 16-bit/44.1kHz format, or high resolution 24-bit/96kHz CDs that utilize Alesis' revolutionary CD24 technology. The ML-9600's amazing sonic quality and powerful built-in tools offers a uniquely versatile and affordable solution for everyone from large commercial facilities to project studios and recording musicians.

FEATURES–

- Reads/writes 16-bit 44.1kHz Red Book Audio CDs as well as files in Alesis' CD24 24-bit/96kHz high-resolution mastering— an AIFF compatible file format that can be read by MacOS, Windows and Unix computer platforms
- 24-bit 128x oversampling A/D/A converters
- Built-in 3.2GB IDE hard drive
- 4x CD burning using standard CD-Rs
- Up to 20-40k Hz frequency response
- 113dB S/N ratio (A-weighted)
- Supports 16- 20- and 24-bit wordlengths and 44.1, 48, 88.2, 96 kHz sample rates
- Built-in sample rate conversion & noise shaping
- Create and store up to 16 playlists containing as many as 99 tracks

Inputs and Outputs

- **Analog-** XLR-balanced and unbalanced RCA connectors
- **Digital-** AES/EBU (XLR) and coaxial S/PDIF (RCA) I/O
- 1/4" headphone out w/ level control

Editing

- Gain control
- Cropping allows adjusting start and end points
- Join and Split for combining and separating song sections

DSP Finishing Tools

- Equalization, Compression, Normalizing and Peak Limiting

Includes

- Infra red remote control and rackmount brackets

HHB CDR850 Professional CD Recorder

The new HHB CDR850 is one of the most comprehensive CD-R, CD-RW recorders available today. It delivers the outstanding sound quality that HHB is known at a lower price than previous models. Equipped with a complete range of analog and digital I/O and easy to use one touch recording modes make the CDR850 suitable for any audio environment no matter how sophisticated or demanding.

FEATURES–

- CD-R, CD-RW compatible
- Balanced XLR and unbalanced RCA analog I/O, AES/EBU digital in, coaxial & optical S/PDIF digital I/O
- Sample rate converter accepts any digital signal from 32 to 48 kHz including varispeed (pitched) signals
- All functions are front panel accessible
- Automatic digital source synchro recording- all or 1 track. Ideal for compilation recording
- Manual digital source recording recording mode is used for recording from digital sources when manual control of the recording is required. Recording is started and stopped manually.
- Copies all CD, DAT, MD, DVD and DCC track starts
- SCMS management can create discs that cannot be copied, copied once or are not copy prohibited.
- Includes full function IR remote control
- ***CDR850 PLUS*** adds word clock I/O (BNC)

TASCAM® CD-RW2000 CD Recorder

The CD-RW2000 is the Tascam's most advanced stand-alone CD Recorder. Building on the success of the Tascam CD-RW5000, the CD-RW2000 introduces a host of features demanded by professional users including comprehensive analog and digital I/O, word sync input, input monitoring and digital gain adjustment which allows level adjustments without going back to the analog source. A RAM buffer is included to ensure ID markers won't clip the start of a track and the adjustable auto cue function lets you locate right to the start of actual audio, rather than the track ID.

FEATURES–

- CD-R, CD-RW, CD-R-DA & CD-RW-DA compatible
- XLR balanced and RCA unbalanced analog I/O
- AES/EBU, coaxial and optical S/PDIF digital I/O
- Records and plays 74min and 80min CDs
- 24-bit A/D/A converters
- 32 - 48 kHz sample rate conversion to 44.1kHz
- Word Sync input and 15-pin parallel port
- Automatic and manual track numbering
- Selectable SCMS copy protection
- Adjustable gain on digital I/O
- One touch digital fade in/out w/ user specified fade time
- Built-in RAM buffer for precise ID markers
- Wired remote included

SONY CDR-W33 CD Recorder/Player

The Sony CDR-W33 is a rack mountable CD recorder that supports audio format CD-R and CD-RW media. Features include built-in DSP functions, unbalanced analog inputs and outputs with 24-bit converters, digital I/O (coaxial and optical) and CD -Text support.

FEATURES–

- Supports CD-R-DA, CD-RW-DA discs
- On-board, selectable DSP functions: Parametric EQ, Limiter & Super Bit Mapping which provides the near 20-bit dynamics
- High quality 24-bit A/D/A converters
- CD-Text support (up to 23 characters per name)
- Optical & coaxial digital I/O
- Unbalanced analog RCA jacks
- 2x finalize
- Built-in 32kHz - 48kHz sample rate converter
- Flexible remote interfaces includes Control-S & PS/2 (for PC keyboard)
- Full status fluorescent display
- Supplied wireless/ wired remote
- 2U rack mountable

Free CD Walkman With Purchase

PORTABLE DAT-RECORDERS

TASCAM DA-P1 Portable DAT

Built for the engineer on the move, the DAP-1 is Tascam's professional, portable DAT that sounds as good as its studio-cuffed big brothers.

Features–

- Rotary 2 head design, 2 direct drive motors
- XLR mic/ line inputs (w/phantom power)
- Analog and S/PDIF (RCA) digital I/O
- 32/44.1/48kHz sample rates and SCMS-free recording
- Built-in AMC limiter and 20dB pad
- TRS jack w/ level control for monitoring
- Includes shoulder belt, AC adapter, and battery
- **BP-D1** rechargeable battery pack
- **CS-D1** carrying case
- **Porta Brace ARDAP1** field case

HHB PORTADAT PDR-1000TC+

Designed with the help of leading location sound recordists, the PORTADAT series redefines the standard for sonic quality, performance and reliability in a portable field recorder. The PDR-1000TC Plus with master sync timecode module and headphone matrix is guaranteed to provide world-class performance. Features include 4-head, 4-motor direct drive transport, XLR mic/line inputs, S/PDIF and AES/EBU digital I/O, -48v phantom power, and are supported by a wide range of optional accessories.

Buy a PDR-1000TC Plus For Our Special Low Price and Get (100) 125 Minutes DAT Tapes, 4-Bay Fast Charger and Aluminum Carrying Case Free!

FEATURES–

- The most accurate timecode DAT recorder available, it includes the MS-1000 Master Sync module to ensure that drift doesn't exceed 1 frame every 10 hours.
- Supports 16-bit quantization at 44.1 and 48 kHz and 12-bit 32khz (Long Play) recording.
- 4-head design allows off tape confidence monitoring while recording.
- Highly reliable transport uses 4 direct drive motors.
- 2-XLR balanced switchable mic/line inputs.
- XLR-balanced AES/EBU and coaxial (RCA) S/PDIF I/O.
- Switchable 6dB/octave High Pass Filter at 100Hz, 30dB pad, peak limiter and 48v phantom power.
- Back-lit LCD display shows clock and counter, battery status, peak level metering, margin indicator, source/tape monitor, transport status, and selected sample rate.
- Built-in monitor speaker and 1/4" stereo headphone output with monitor level control.
- Lockable record level feature.
- Supplied NiMH battery, with no memory effect, lasts for 2 hrs and 1.5 hours with timecode operation.
- Built-in clock - time and date stamps every recording.
- Record, generate and reference to SMPTE/EBU timecode in all existing standards, jam sync and conversion of absolute time into linear timecode.
- Selectable frame rates- 24, 25 (PAL), 29.97 DF/NDF and 30 fps.
- Timecode I/O via XLR connectors. Word sync out, video/word sync input and thru via BNC connectors.
- Timecode can be recorded as time of day, preset for free /record run, and can be set to internal or external timecode generation. Built-in chase synchronizer allows it to slave to an incoming timecode source.
- Lemo socket for compatibility with Aaton film cameras.
- Facilitates pull up from 29.97DF fr/sec. to 30 fps drop.
- HM-1000 headphone matrix offers 5 selectable monitoring configurations: stereo, mono left, mono right, mono sum and mid-side stereo.

Standard Included Accessories-

- RB-110 AC adapter/2-bay charger
- MHB220 NiMH battery • HHB-15 DAT tape
- Carrying case

PROFESSIONAL CD PLAYER & MINIDISC

SONY MDS-E11 MiniDisc Recorder

A professional space saving MiniDisc player/recorder with XLR balanced analog I/O and comprehensive remote control capabilities. Ideal for live theatre, video production, installation, broadcast and studio.

FEATURES–

- Compact single rack space design
- Balanced XLR line inputs and outputs switchable from +4/-10 dB, unbalanced RCA (phono) I/O
- Coaxial S/PDIF digital I/O
- Automatic sample rate converter to 44.1kHz with 18-bit processing offers low jitter and superior signal to noise
- Automatic pause feature at the end of each track ideal for live sound effects or narrations
- RS232, Parallel fader start, control-S and relay record/play remote capabilities
- Relay remote function allows you to cascade several MDS-E11's together for uninterupted sequential play and record
- Comprehensive LCD display
- Headphone out with level control
- **INCLUDES:** Infra red remote control

SONY CDP-D11 1RU Professional CD Player

The CDP-D11 is a single rack space CD player, with a durable chassis/transport ideal for the road and installation use. The elegant 1U rackmount design provides economy of space and easy transport while the heavy duty transport is designed to withstand the rigors of production and mobile use. Features include Balanced and unbalanced as well as digital outputs and a 4MB RAM buffer.

FEATURES –

- Compact 1U rack height
- RCA unbalanced and XLR balanced outputs
- Optical and coaxial digital outputs (S/PDIF)
- ±12.5% Vari-speed
- Instant start
- Flexible control interface (parallel & RS-232)
- Auto Cue and Auto Pause
- Advanced shock protection w 4Mb D-Ram memory
- Relay play control bus
- Dual mode remote.
- Mark locate feature
- Dual mode remote functions as wired or wireless IR remote and includes direct numeric entry of track numbers

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DIGITAL MIXING

YAMAHA®

01V Digital Mixing Console

The ideal digital mixer for project studios, broadcast, private studios, live sound applications and more. The Yamaha 01V is simply the most flexible digital mixer available for the money. The offspring of the popular 02R & ProMix 01, the 01V features professional level signal routing, processing and mixing options as well as crystal clean sound and 105dB dynamic range. You can even link two together for 48 input channels! Best of all, it's here now!

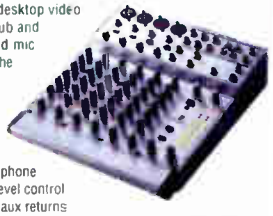
FEATURES-

- 24 input channels, including 16 built-in analog inputs (w/+48V phantom powering on 12 channels), *plus* 8 optional digital inputs (ADAT, Tascam AES/EBU formats available)
- 4 freely assignable analog outputs, *plus* expansion options for 4 additional analog outputs, or 8 assignable digital outputs
- Digital I/O expansion slot for optional multitrack recorder interface card (ADAT, Tascam, AES/EBU format options) *plus* 8 channels analog input card options
- Coaxial digital stereo I/O and balanced XLR stereo outputs
- Total 120 bands of 44-bit EQ including 4-band parametric EQ on all main input & output mixing channels & 2-band EQ on sec. input channels *plus* a library with 40 preset & 40 user programs
- Dedicated central panel controls for the 4-bands of EQ - like the 02R - & dedicated pan control
- 2 internal stereo multi-effects processors with the same DSP as the Yamaha ProR3 and REV500, and an effects library with 42 preset programs and 57 user programs
- Input delays of up to 250ms and output delays of up to 300ms
- 22 dynamics processors for individual processing, and a dynamics library with 40 preset programs and 40 user programs

MIXING BOARDS

MX-602A & MX-802A

Sub-Compact Mixers



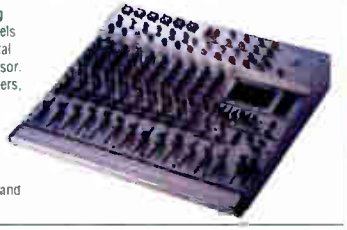
The professional MX-602A and MX-802A are ideal for project studios, desktop video production, small club venues and much more. They for MIDI suites, sub and monitor mixer and as handy tools for level and impedance matching and mic preamp. Any broadcast studio or AV/film application can benefit from the transparent "big console" audio performance and features.

FEATURES-

- Total of 6 inputs- 2 mic/line and 2 stereo (**MX-602A**)
- Total of 8 inputs- 4 mic/line and 2 stereo (**MX-802A**)
- 2 aux sends and 3-band EQ per channel
- 1/4" balanced Master and Monitor outputs
- 1/4" balanced Mute 3/4 Bus Outs
- Stereo RCA tape inputs and outputs
- 1/4" Headphone out with level control
- 2x stereo aux returns

MX-1804X

14 x 2 x 2 Rack Mixer With 24-bit Digital Effects



Part of a new generation of high-performance compact analog mixers, the MX-1804X offers six mono and four stereo channels and provides functions that are quite commonly found in digital consoles– namely a built-in 24-bit stereo multi-effects processor. The multi-effects processor offers 20-bit A/D and D/A converters, and 32 presets of reverb, delay and modulation effects algorithms based on Behringer's Virtualizer rackmount effects unit. Whether for stage or studio, the 7-band graphic EQ assigned to the main outputs of the MX1804X allows you to adapt the mixer to various room acoustics and during mixdown gives your overall sound the finishing touch and sparkle it deserves.

SM82 Stereo Rackmount Mixer

The Rane SM 82 is a sixteen channel line mixer divided into 8 stereo channels and housed in a single rack space. It is ideally suited for mixing keyboards, synthesizer expander modules and drum machines, as well as effects mixing in guitar racks. It also functions as an excellent submixer for stereo line inputs and effects to a larger console.

FEATURES-

- 8 stereo (two channel) 1/4" input channels with rotary input level control, a stereo aux send level control slider and a left to right balance control
- Will accept mono inputs, converting the balance control to a pan pot
- Aux return with a rotary return level control and a slide control for left to right balance
- 1/4" TRS output section with a rotary output level control and a slide control for left to right balance
- Fully expandable using 1/4" TRS main expand In and Out jacks
- Short internal signal paths for clean sound
- Only 5.25 inches deep

SIGNAL PROCESSING

WAVES

L2 ULTRAMAXIMIZER

Brick Wall Peak Limiter

The L2 is a proprietary brick wall look-ahead peak limiter with IDR (Increased Digital Resolution) dithering technology based on the award-winning L1 software. Featuring 48-bit internal processing and support for 96kHz sampling rates as well as digital and analog I/O with 24 bit A/D and D/A converters means the L2 is ideal for the maximum number of audio applications, from mixing to mastering to concert sound. The L2 Ultramaximizer performs high quality re-quantization to 24, 22, 20, 18, and 16-bit outputs, plus the Waves ARC (Auto Release Control) technology continuously controls the optimal release time for maximizing levels and minimizing audible distortions.

FEATURES-

- 2U rackmount limiter with 48-bit processing significantly increases the average signal level of typical audio signals without introducing audible side effects
- 44.1, 48 kHz, and x2 88.2 and 96 kHz sample rates
- Linked stereo and dual mono operation
- Dedicated rotary controls and numeric displays for threshold (-30 C to 0.0dB in 0.1dB steps), output ceiling (-30.0 to 0.0dB in 0.1dB steps) and release (0.01 to 1000ms)
- The left and right rotary threshold controls transparently reduce transient peaks by several dB allowing the overall signal level to be raised several dB
- The use of look ahead technology allows the L2 to anticipate peaks before they happen, thereby minimizing the possibility of artifacts.
- **ARC (Auto Release Control)** technology bypasses the variable release control to dynamically control release times to fit the human ear's expectations. This allows a greater amount of limiting and therefore maximum level without distracting artifacts.
- **IDR (Increased Digital Resolution)** is Waves' proprietary word-length-reduction (quantization), dither and noise shaping technology which preserves and even increases the resolution of digital signals.

Three push button controls allow simple control over IDR parameters-

- Quantization- The wordlength of digital signals can be quantized and output to 24, 22, 20, 18 or 16 bit resolution. For example wordlength reduction can be used to re-quantize 24 bit input signals to 16 bit— ideal for DAT and CDR applications.
- Dither- There are two types of dither. Type 1 provides no nonlinear distortion. Type 2 exhibits lower dither (hiss) level. L2's Dither function can also be completely switched out (off).
- Noise shaping- choices include Moderate, Normal, Ultra, or non (off).
- Dedicated bargraph meters for input, output and attenuation with infinite peak hold and peak meter reset
- 24-bit Balanced XLR, and unbalanced RCA analog I/O
- AES/EBU (XLR) and S/PDIF (coaxial) digital I/O
- Internal S/PDIF (RCA), AES (XLR) external word sync (BNC) sync capabilities

Applications include Analog to Digital and Digital to Digital mastering. Digital recording 16 bit dithered/ 24bit, Analog limiter insert, Digital limiter insert, mixdown through the L2 to DAT and A/D/A conversion.

lexicon

MPX-500 24-Bit Dual Channel Effects Processor

The MPX 500 is a true stereo 24-bit dual-channel processor and like the MPX100 is powered by Lexicon's proprietary Lexichip and offers dual-channel processing. However, the MPX 500 offers even greater control over effects parameters, has digital inputs and outputs as well as a large graphics display.

FEATURES-

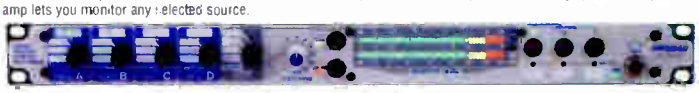
- 240 presets with classic, true stereo reverb programs as well as Tremolo, Rotary, Chorus, Flange, Pitch Detune, 5.5 second Delay and Echo
- Balanced analog and S/PDIF digital I/O
- 4 dedicated front panel knobs allow adjustment of effect parameters. Easy Learn mode allows MIDI patching of front panel controls.
- Tempo-controlled delays lock to Tap or MIDI clock

SIGNAL ROUTER

FURMAN

SRM-80 Signal Router

The new SRM-80 Signal Router/Monitor makes mixdown and dubbing simple, professional and affordable. It facilitates mixdown and dubbing between different media types without tying up additional console channels. For added convenience, a speaker selector switch that accommodates up to three sets of speakers and a high power headphone amp lets you monitor any selected source.



FEATURES-

- Signal routing and monitoring for four stereo devices such as DAT machines, cassette decks, CD in addition to main mix from board
- Balanced TRS input and output jacks for Source, "A" input and amplifier sends. RCA jacks for "B", "C", and "D" inputs and outputs
- Speaker select function switches between two high powered pairs of speakers and one self-powered pair
- Gain adjust for each speaker pair allows for equal loudness when switching between them
- High power headphone amp
- 40-segment high resolution metering for L/R monitor outputs with peak or average response switch
- DIM button reduces level by -15dB during interruptions
- MONO sum button to speakers and headphones only allows easy identification of mix problems
- Line Level may be set to -10 or +4 dBu sensitivity
- Ground lift switch
- Optional SRM-RU Remote Control Unit: Duplicates the MONO, DIM, and SPEAKER SELECT push button controls of the SRM-80. Uses a standard MIDI cable, and is supplied with 10' length cable.

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MICROPHONES

AKG C2000B Condenser Mic

For A Limited Time Only Get A Free H-100 Shockmount

The C 2000 B is an all-purpose cardioid condenser microphone perfectly suited for both recording and live sound situations. The newly developed small-diaphragm transducer capsule is made using a unique manufacturing process that ensures high sensitivity, lowself noise, and excellent bass response.

FEATURES-

- Cardioid polar pattern
- Switchable bass rolloff filter (6 dB/octave @ 500 Hz) and -10dB pad
- Built-in pop screen reduces unwanted noise
- Rugged construction, elegantly styled die-cast metal housing, and silver-gray finish
- **30 Hz to 20 kHz frequency response**

SHURE KSM44/SL Multipattern Condenser Mic

The KSM44/SL is a multiple pattern dual large diaphragm condenser microphone built without compromise using premium electronic components and gold-plated internal and external connectors. The KSM44/SL is a premium vocal mic and is equally adept for close miking a wide range of acoustic instruments, amplifiers and for ambient room miking.

FEATURES-

- Dual 1- inch gold-layered Mylar diaphragms
- Class A discrete, transformerless preamplifier
- Cardioid, omni and bidirectional polar patterns
- Subsonic filter eliminates rumble from mechanical vibration below 17 Hz.
- Integrated 3-stage pop grille and shock mount
- 15 dB pad and 3-position switchable low-frequency filter virtually eliminates unwanted background noise and controls proximity effect
- Includes ShureLock elastic-suspension shock mount and swivel mount, protective pouch and locking aluminum carrying case
- **20 Hz - 20 kHz frequency response**

VP88 MS Stereo Mic

A single point mid-side stereo microphone made to withstand rigorous production environments. Phase accurate and natural sounding for any stereo miking situation such as drum overheads, sound effects gathering and live music recording.

FEATURES-

- Time-coherent Mid-side stereo condenser
- Adjustable stereo spread controls the amount of stereo effect
- Mono compatible ideal for broadcast applications
- 105 dB dynamic range
- 129 dB Max SPL
- Switch selectable phantom power or 6 V battery operation
- 80Hz Low-cut filter (12dB/oct)
- LED power indicator
- Internal shock mount for reduced stand vibration and handling noise
- Built-in "pop" screen
- Brass and nickel-plated aluminum construction with stainless steel grille. Finished in satin black vinyl enamel
- Includes Windscreen, swivel adapter and 30 inch Y cable
- **Frequency Response 40 to 20,000 Hz**

OPTIONAL ACCESSORIES-

- **A88SM** isolation mount with 6 mounting options including camera shoe **152.50**
- **C110** 25 ft. 5 conductor, long life extension cable **64.50**

SENNHEISER MKH-416 P48U3

A high-end shotgun microphone offering highly accurate sound reproduction and a rugged weather-proof design. The pressure gradient and short interference tube principals allows a wide frequency response while retaining a hypercardioid polar pattern in the low and mid frequencies while an even tighter lobar pattern is achieved above 2kHz. Ideal for long distance miking for film and video or as an ENG or lecture microphone.

FEATURES-

- Pressure gradient/ short tube interference shotgun mic
- Super-cardioid/Lobar polar pattern
- High sensitivity, Low self-noise
- 128dB @ 1kHz maximum SPL
- 48 V phantom power required
- **Frequency Response 40Hz - 20kHZ**

AUDIX OM-2 Dynamic Handheld Mic

The DM2 is a dynamic handeheld microphone designed to provide high quality sound for a wide variety of vocal styles. The exceptional feedback rejection of the DM-2 is considered a benchmark by which other handheld mics are judged.

FEATURES-

- Hypercardioid dynamic
- Proprietary VLM (very low mass) capsule technology
- 50Hz-16kHz frequency response
- 140 db SPL handling
- Durable zinc alloy construction
- Electronically cut blast filter with black E-coat finish
- Includes cordura carrying case and nylon mic clip

audio-technica. AT-841a Boundary Mic

This rugged omnidirectional boundary mic when placed on an unobstructed flat surface such as a conference room table or floor offers increased sensitivity and signal to noise characteristics over standard microphones. This is because the microphones half space design rejects out of phase reflections coming from the flat surface. A perfect solution for theatrical stage, television production and conference recording.

Features:

- Micro omnidirectional condenser boundary microphone
- 40Hz - 20kHz frequency response
- Battery or phantom power (9-52v) operation
- 25' detachable cable terminates
- 80hz Roll-off switch (18dB/Octave)
- Includes AT8531 power module, battery and protective soft pouch
- Also available as **AT841Wa** white version of above

WIRELESS MICROPHONES

SONY UHF Wireless Microphone system

Consisting of multiple handheld and bodypack transmitters and receivers, Sony's UHF Synthesized Wireless Microphone system is widely recognized as the outstanding wireless mic system for professional applications. Operating in the 800 MHz UHF band range and equipped with a PLL (Phase Locked Loop), they provide up to 94 channels of interference-free operation. Additional features, like space diversity reception, LCD indicators, reliable and sophisticated circuit technology assure low noise, wide dynamic range, and extremely stable signal transmission and reception. Ideal for broadcasting stations, film production facilities, and ENG/EFP work.

MB-806A Multi-Channel UHF Synthesized Diversity Receiver

- 19-inch rack mount tuner frame accommodates up to 6 WRU-806A tuner modules (sold seperately)
- When used with a WD-520A Antenna Divider up to 3 systems providing 18 mics can operate simultaneously
- Six XLR-balanced output connectors plus an XLR balanced mix output
- Auto channel assignment for extra tuner modules, detects and skips unusable channels
- Built-in antenna divider with 9-volt DC power
- Mic/line output level switch
- Rear mounted antennas

WRT-807A

- High sound quality for vocals - powerful, crisp and clean sound as well as presence in the low end and mid frequency range
- Dynamic microphone capsule, same as used in the Sony F-780 professional vocal microphone
- LCD for display of channels, attenuator and accumulated hours
- Up to 5 hours of continuous use with a single AA battery
- Battery alarm transmitted to compatible receivers
- Newly-developed lockable power switch to prevent accidental operation

WRT-808A Plug-In Transmitter

- Plug-in transmitter works with any dynamic microphone with an XLR connector
- 94 channel frequency agile
- Runs on two AA batteries
- Battery level indicator
- Level control
- AF/Peak indicator shows condition of audio input level
- Low-Battery alarm works with compatible receivers

WRT-805A

- Smoothly tapered body with compact lightweight design
- 6 hours of continuous operation with a single AA battery.
- LCD display of channel, attenuator and accumulated hours.
- Accepts ECM-122BMP and ECM-44BMP and ECM-77BMP lav mics
- Low-Battery alarm works with compatible receivers

WRT-822A

- Accepts all Sony BC Series lavalier mics including the ECM-44SC/BC, 55 SC/BC, 66 SC/BC and 77 SC/BC. Use for wireless guitar applications with optional K-1161 cable.
- Backlit LCD information display
- 8 hrs. operation with 2 AA batt.

AZDEN 411DRH System

The 411DRH is a half rackmount crystal controlled PLL synthesized UHF receiver with 63 user-selectable channels in the 794-806MHz band. Up to 9 systems may be used simultaneously. It has both 1/4-inch and XLR output jacks as well as volume adjustment.

41HT Handheld Mic Transmitter

- Newly-designed handheld with super-cardioid uni-directional mic element or Au-tix DM2 head and 63 user-selectable channels. Uses 2 AA alkaline batteries or Azden ni-cads with the AMC-2A Charging Station.

41BT Bodypack Transmitter

- 63 user-selectable channels, input level control, standby switch, Hiroshi 4-pin connector and metal clip. Available w/ EX-03H or Sony ECM-44H lavalier microphones

41XT Plug-In Transmitter

- 63 user-selectable UHF channels Allows you to use your favorite dynamic microphone with an XLR output. Adjustable output volume control, power on/off and audio mute switches. LED AF Peak and Power indicators

SHURE UC Wireless Series

The Shure UC Wireless Series is a new, easy-to-use UHF wireless system featuring over 100 fully selectable frequencies for flexibility in a variety of applications. UC systems are available with hand-held, bodypack, lavalier, headset and cable transmitters and up to 16 can be used simultaneously.

UC4 Receiver

- Compact 1/2 rack design and exclusive MARCAD technology.
- Choice of over 100 user selectable frequencies
- Two 5 segment RF LED meters and 7 segment audio LED meter
- 2-band adjustable EQ
- Balanced XLR and unbalanced 1/4" outputs.

UC2 Handheld Transmitters

- Available with SM58, Beta 58A, SM87 and Beta 87 capsules
- Combined power on/off and mute switch
- Adjustable audio gain control
- Internal antenna
- 8 hours battery life, 9V battery (included)

Beta 87 Shown

UC1 Bodypack Transmitter

- Tini-Q-G or optional Lemo connector
- Remote audio mute connector allows external audio and/or RF muting capability.
- Two-position attenuator (0 and -20dB) to accommodate different input sources

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POWER AMPLIFIERS

crown AUDIO — CE1000/2000 Power Amplifiers

From chest-thumping lows to crisp clean highs, the CE Series power amplifiers by Crown provide high power with low distortion and a substantial set of features at an affordable price.

FEATURES–
- 1/4" balanced phone plug X-R and barrier strip inputs
- Neutrik Speakon output connectors
- Proportional fan-assisted cooling
- Short circuit protection
- SST (System Solution Topologies) module allows customized features such as stereo crossover capabilities
- Front panel detented level controls
- 3- Year, No-Fault, Full Warranty that covers everything

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

QSC AUDIO — RMX SERIES Professional Power Amplifiers

The RMX Series power amplifiers are available in three models of designed for musicians, DJs, clubs, and churches. The line features a high-current toroidal transformer power supply and the latest output circuitry that provides clean, dynamic with up to 2,400 watts of power in a 2RU package.

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

FEATURES–
- Compact size with up to 2400 watts in 2 rack spaces
- Professional quality performance incorporates road-proven QSC designs
- High-current toroidal transformers for greater two-ohm power and low noise
- Independent user-defeatable clip limiters reduce distortion
- Selectable low-frequency filters (30 Hz or 50 Hz) protect speakers and increase headroom
- Balanced 1/4" TRS, XLR and barrier strip inputs.
- Binding post and Neutrik Speakon outputs
- Front mounted gain controls for easy access
- Signal and Clip LED indicators to monitor performance
- Independent DC and thermal overload protection on each channel automatically protects amplifier and speakers
- 3-year warranty plus optional 3-year extended service contract

Hafler — TRANS•NOVA SERIES Power Amps

Hafler power amplifiers have a long reputation for being invisible with a wide, open three dimensional sound stage. Their patented Trans-nova and Diamond technologies drive the output MOSFETs to higher output levels resulting in wide dynamic range and low distortion. Surface mount technology (SMT) is used throughout Hafler's product line offering significant sonic advantages over hand assembled designs. SMT utilizes very small components with very close tolerances that are assembled by computerized machines. This means that there is less mass to the components and therefore less chance of RF interference, hum and noise.

FEATURES–
- Trans-nova Amplifier Topology
- MOSFET Output Devices
- Electronic Fuse
- No Fan Convection Cooled
- 5 year warranty
- 3.5" Rack Mount (2-rack spaces)
- Stereo/Bridged Mono
- XLR or 1/4" Balanced Inputs
- Gold-Plated 5-Way Binding Posts
- Power Lamp, Signal, Clip, Thermal, Short LEDs
- 10dB Incremental Gain Controls
- Chassis/Post Ground Switch
- Serviceable Modules

P7000 ADDS–
- Dual Internal Fans
- 7 Year Warranty
- Gain Control Security Covers
- Rack Mount Handles

5 YEAR WARRANTY

Model	Watts Per Channel
P1000	50 Watts @ 8Ω
P1500	75 Watts @ 8Ω
P3000	150 Watts @ 8Ω
P4000	200 Watts @ 8Ω
P7000	350 Watts @ 8Ω

PA SPEAKERS

Electro-Voice® — SX-500+ 400-Watt Two-Way Speaker System

The Electro-Voice Sx500+ is a 400-watt, 15-inch two-way, biampable, high-efficiency, constant-directivity speaker system featuring a vented-horn woofer section. Through extensive use of computer-aided design and modeling, Electro-Voice engineers have developed a state-of-the-art professional loudspeaker system.

FEATURES-
- Ring-Mode Decoupling (RMD TM) Technology for increased intelligibility
- Durable structural-foam enclosure with integral handles and stand mount
- DL15Sx 15-inch woofer and DH2T compression driver for great sound and reliable performance
- Asymmetric constant-directivity 75° x 60° high-frequency horn
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- Molded-in attachment points for secure suspension with optional brackets
- Dual Neutrik Speakon® high-current connectors
- Biampable, passive network with PRD circuit for high-frequency driver protection

MACKIE — SRM450 ACTIVE LIVE SOUND MONITOR

From the company that revolutionized the audio industry with their unparalleled small format and 8 bus mixer technology comes an active sound reinforcement monitor so accurate you can compare it to a high-end studio monitor. A unique three piece horn assembly derived from studio monitor technology, creates a wide dispersion characteristic with precise voice reproduction, even at high SPL's. The high-impact composite enclosures assymetrical design allows the monitor to be pole mounted, flown or even used as a floor wedge. Light weight and easy to carry with two handles on either side and one on top.

FEATURES-
- 2-way biamplified active monitor, no power amplifier needed
- 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
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- XLR balanced mic/line input and thru
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- 25.98"x15.58"x14.75"
- 51lbs.

PPM SERIES POWERED MIXERS

The new Professional Powered Mixer Series or PPM series from Mackie combine the best of their world renowned mixer technology with the High-Current, Fast-Recovery amplification spec of their FR-Series power amplifiers. Available in both mono and stereo configurations and housed in impact resistant injection molded cases and custom die-cast heat sink with all of the features you need in a road worthy compact powered mixing system. There are a total of 5 models to choose from.

FEATURES-
- 32-bit custom EMAC digital effects processor with 16 different effects and 2 parameters per effect
- Special EFX WIDE effects enhancement switch enhances stereo image of effects when speakers are placed close together
- BREAK SWITCH mutes channels 1-6 during breaks leaving stereo channels 7 & 8 and the tape input active
- Rugged injection-molded case with custom die-cast heat sink
- Input gain control with level-set LED that lets you know when input level is set properly
- 2 audiophile quality 9 band graphic EQs: one on the master output and one for the monitor output w/ 75Hz rumble filter
- Amp routing switch to select both power amps for mains or mains and monitor
- Phantom power
- 3 band active EQ on each channel

MODELS	# OF CHANNELS-	POWER
808S	• 6 mic/line channels w/ inserts • 2 stereo mic/line inputs	• 500 + 500W into 2-ohms • 450 + 450W into 4-ohms • 300 + 300W into 8-ohms
808M	• 6 mic/line channels w/ inserts • 2 dual mic/line inputs	• 500 + 500W into 2-ohms • 450 + 450W into 4-ohms • 300 + 300W into 8-ohms
408S	• 6 mic/line channels w/ inserts • 2 stereo mic/line inputs	• 250 + 250W into 2-ohms • 200 + 200W into 4-ohms • 125 + 125W into 8-ohms
408M	• 6 mic/line channels w/ inserts • 2 dual mic/line inputs	• 250 + 250W into 2-ohms • 200 + 200W into 4-ohms • 125 + 125W into 8-ohms
406M	• 6 mic/line channels w/ inserts 125 + 125W into 8-ohms	• 250 + 250W into 2-ohms • 200 + 200W into 4-ohms

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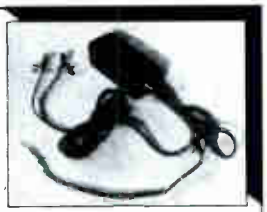

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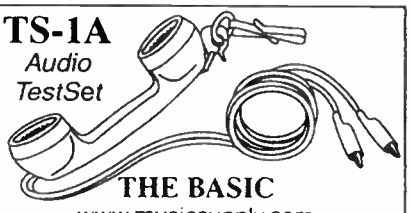

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World Radio History

Midas Heritage 3000 Consoles Go the Distance at the Sydney Olympics

by Michele Kramer

Norwest Productions, the Sydney-based audio contractors for the Summer 2000 Olympics, used Midas Heritage 3000 consoles to run the opening and closing ceremonies. The highly detailed, fast moving shows were set in a massive stadium, which complicated requirements. Norwest sought reliability and routing and patching flexibility when it spec'd two Midas desks. All equalization was done with Klark Teknik DN360s.

Midas Heritage 3000 console at the 2000 Olympics in Sydney last September

StageSmart and Musician's Friend joined forced to launch the StageSmart.com Web site (*www.StageSmart.com*), a business-to-end user Web site for the pro audio industry. The site, which is said to have signed up more than 5,000 dealers selling pro audio equipment nationwide, provides a fast and efficient way to compare features and specs and to locate and purchase products. The user logs on, locates the gear he or she needs and places a request for price quote from the system. Sellers offering the equipment or services sought are immediately notified and respond to the request and depending on what is most crucial to the user (price, availability, shipping options, etc.), a dealer is selected.

Director Maureen Gosling chose Music Annex and engineer Amy Hunter to record, edit and mix her documentary *Blossoms of Fire*, about the women of Juchitán, in Oaxaca, Mexico. The audio tracks were brought to Music Annex on 16mm mag stock and transferred to New England Digital's Post Pro digital workstation. They were then edited and mixed, using a Soundcraft DC-2000 console, and laid back to an eight-track master on a Sony PCM-80 recorder.

The People's Church in Franklin, Tenn., purchased Crest Audio gear for its newly enlarged sanctuary. A 52-input Crest Century Vx console and Crest CA Series power amplifiers were installed in the 2,000-seat sanctuary. The church's performance needs are varied — it plays host to rock groups and orchestras, as well as choirs.

Grace Design's Michael and Eben Grace specified Neutrik connectors for their eight-channel microphone preamplifiers. Neutrik was able to meet the Grace brothers' needs for the correctly angled connectors for their PC board-mount XLRs. Neutrik is also the chief supplier of connectors to GTC Industries — known for its Tone Plug XLR-based test equipment.

The Dave Matthews Band is now using a comprehensive in-ear monitoring system controlled by an ATI Paragon II. They also use Neumann KMS 105 live vocal microphones.

Alesis recently let us in on who has been using the company's MasterLink ML-9600: the latest Doobie Brothers album was mixed to a MasterLink, as was the DVD version of the new Steely Dan album, *Two Against Nature* and Patty Loveless's *Strong Heart* release. Capitol Studios recently purchased three MasterLink high-resolution master disk recorders.

Touring in support of their 16th album, *Pop Trash*, Duran Duran is using two **Fostex** D1624 multitrack recorders for live recording and preparation of new tracks for the groups next studio album.

FotoKem Film & Video in Burbank is using Fostex NF-1A nearfield studio monitors in its audio restoration suite.

Comparisonics Corp. recently debuted *FindSounds.com*, a Web search engine for finding sound effects on the Web. Thousands of sounds are listed, such as the sound of a racing car, siren, screams, etc. Unlike general-purpose search engines, FindSounds excludes songs and speech recordings from its audio index - if you type in "elephant," you'll get elephant sounds, not songs about elephants or people talking about elephants. Typical users of the search engine include audio/video content creators, videographers, filmmakers, Web site developers, teachers and students.

Williams Marketing operates a state-of-the-art broadcast production facility in Austin, Texas that creates radio spots for airing on more than 550 radio stations nationwide. Recently Williams Marketing upgraded its studio microphone by purchasing a hand-built Brauner Valvet to record a major holiday radio campaign for Chicken Soup for the Soul, publisher of the inspirational book series.

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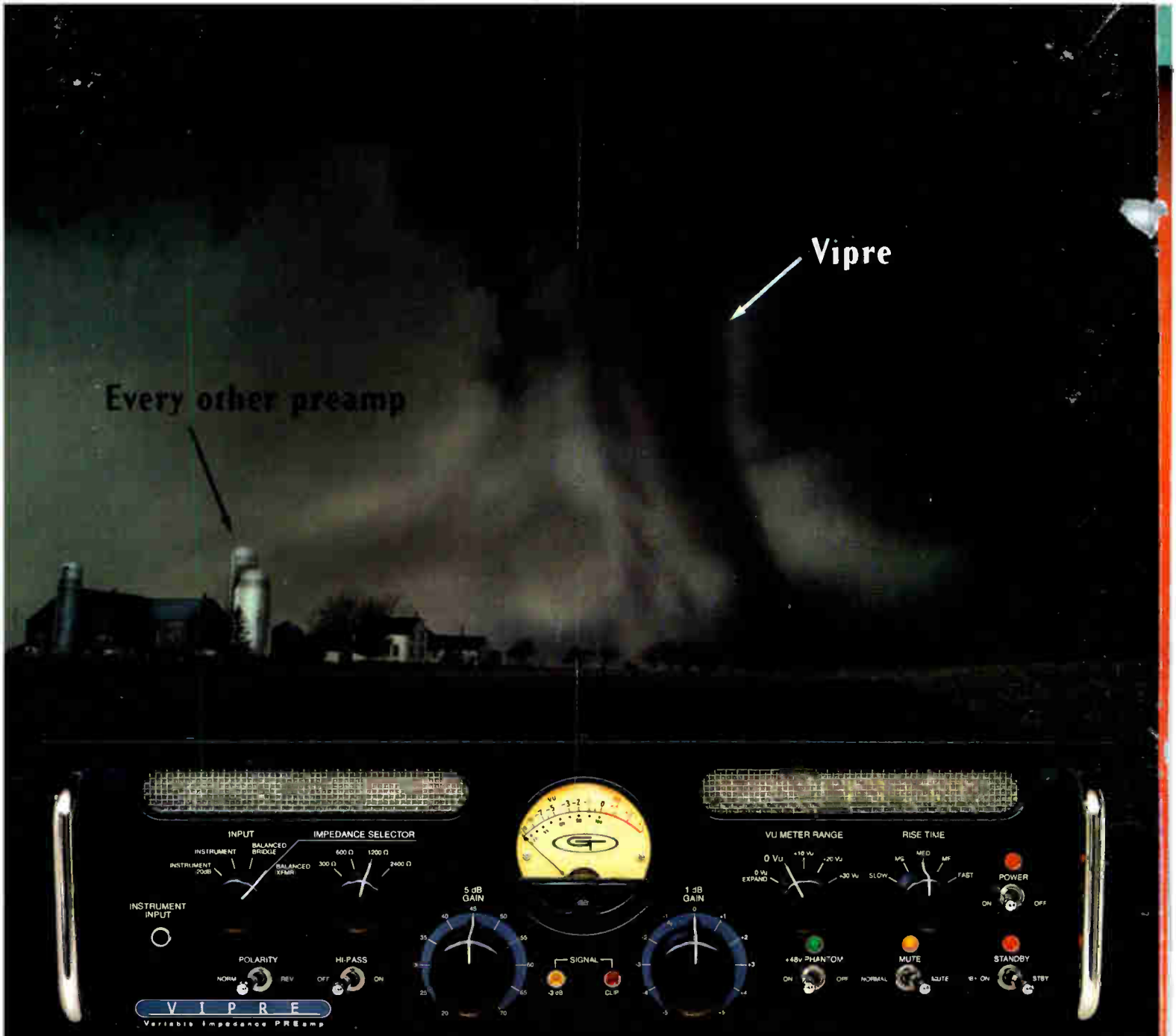

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