

**10 NEARFIELD MONITOR AUDITIONS**

**EQ**

**THE PROJECT  
RECORDING &  
SOUND  
MAGAZINE**

1996 • ISSUE SIX

**EQ LIVE  
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BOXES ON  
STAGE**

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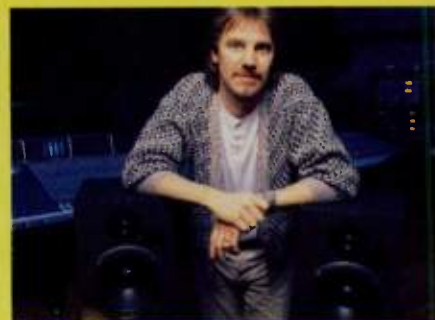
**ALESIS**

CIRCLE 03 ON FREE INFO CARD

# EQ



PROJECT RECORDING  
& SOUND TECHNIQUES  
VOLUME 7, ISSUE 6  
JUNE 1996



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Brian Wilson at Western Studio by the Michael Ochs Archives.

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# The Console Kings



Jeep

Colin

Greg

Recently happened upon an issue of *Inc* magazine and discovered that Mackie Designs, a company that helped define the project studio era, was ranked number 78 in the *Inc 100*. The *Inc 100* lists the fastest-growing publicly held U.S. companies ranked by their total revenues over the past five years; as a barometer of how quickly the project studio revolution has taken off, Mackie's sales have increased 1583 percent during that period, from \$3.8 million to \$64 million. No wonder why every competitive console manufacturer these days mutters the name "Mackie" with a mixture of jealousy and awe. Mackie is indisputably today's Console King.

The Console King, in my book, is the console innovator whose boards largely define their times. Just as a recording studio is identified by the console it keeps, the recording era is defined by its Console King. His technology reflects the period's music. His business reflects worldwide economic trends. And, yes, he usually ends up very, very rich.

Start with the first Console King — Jeep Harned of MCI, a Hi-Fi tinkerer from Fort Lauderdale, FL, who responded to the needs of a local recording studio (Criteria) by building the first popular stock recording console. No longer built to order, these MCI boards were the Chevrolets of their era — good, solid, affordable rides. No doubt the boom in independent recording studios in the '70s was as much a reflection of the fact that someone had finally built an affordable, modern mixing console as it was of the explosion in rock 'n' roll recording. At the beginning of the Japanese business investment in the Americas, MCI was purchased by Sony and by a young executive named Mickey Schulhof who, until last year, managed that company's entire operations in the U.S.

Just when Harned was set to retire, the next Console King was beginning to emerge. In the small town of Stonesfield, England, a project studio owner named Colin Sanders saw a need to automate the mixing process. At the same time as Apple and IBM were bringing forth the personal computer, Sanders was bringing his proprietary PC into the recording studio. The birth of his SL 4000 E Series console and his company, Solid State Logic, changed the way hit records were made around the world and, fifteen years later, the 4000 Series remains a mainstay of the company that Sanders ultimately sold to Carlton Communications at the beginning of the audio-for-video age. While some argue that Rupert Neve's designs were of greater sonic integrity, nobody would disagree with the fact that throughout the '80s and into the '90s, SSL helped invent the platinum recording studio and established new standards for music recording, postproduction, and broadcast audio.

At the same time as Harned and Sanders were building their Console King ransoms, a young audio designer named Greg Mackie was going in and out of business. Like many other entrepreneurs, he was simply waiting for the times to match his designs. Mackie's ultimate success story in the '90s — not surprisingly — is taking place in the Great Northwest, home of Microsoft and the grunge movement. As another sign of the times, this console company hasn't been sold off to a foreign company nor to a megaconglomerate; it has gone public in an industry that is, for the very first time, gaining public recognition. Like the *Inc* article says, "...sensing a strong trend toward downsizing in the recording, video, and multimedia markets, Greg Mackie identified the need for a mixer that would be affordable to a far wider market."

EQ's readers are that market. And, for those of us who spend our lives making music in project studios, it's inspiring to note that today's King of Small Consoles is also the Biggest Console King of all.

—Martin Porter, Executive Editor



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CIRCLE 35 ON FREE INFO CARD



**BUSTING THE STEREOTYPE**

I enjoy your magazine very much. I appreciate any and all articles relating to repair and maintenance — better informed customers make our job easier (I own Inner Sound, the largest audio service/repair facility in Oregon and a regional service center for Korg/Marshall).

I object to your choice of images for "Ed's Audio Service" (April 1996 issue, page 52). While this may in fact be the appearance of Eddie Ciletti (your "Main Maintenance Man"), I doubt it. The image of a balding, older gentleman, not able to keep his pants in place, and using inappropriate tools, is not one I desire for my profession. While we all "know" that journalists are all sleazy, unethical, hypocritical, frustrated, and incompetent novelist-wanna-be's, we still give you the benefit of our doubt every time we purchase your work and believe anything you write. I expect a similar courtesy.

*Jay Moskovitz*  
Owner  
Inner Sound  
via the Internet

**NEW-FOUND FAN**

Re: EQ Live February '96

Thank you for that wonderful Pete Anderson article. I'm a hungry guitarist/semi-producer myself, and I received some great tips. I also appreciate your magazine. I have never seen your magazine before (I saw it in the dark corners of a huge bookstore), and I'm pretty lucky to find it! Thank you.

*Ronnie L. Tom*  
Albuquerque, NM

**THUNDEROUS APPLAUSE**

I loved Bob Ludwig's interview with Lou Reed in the April issue. Ludwig is obviously a master at more than mastering, and got Reed and Rosenthal to really open up.

Rosenthal's comments on Tony "Thunder" Smith ("...saved our collective lives because he knew how to play this stuff. A regular drummer can not just sit down and play it — it's not gonna happen.") provides only a small inkling into the quality and versatility of this man's talents. I'm sure his contributions to the Reed project were far more extensive than the cursory,

though laudable, mentions he receives in the interview. I think Tony "Thunder" Smith probably warrants his own feature article!

Keep up the good work on your fine magazine.

*Hank Stewart London*  
Maximum Sound & Vision  
San Francisco, CA

**IS THERE AN ECHO IN HERE?**

This is in answer to the question from James H. Powelson in the May '96 EQ&A. Years ago, the band I was with had two Echoplex units that were always in need of a new tape. Being the poor musicians we were, we tried making our own replacements with Scotch 226, which, of course, did not work. One night in a fit of "the show must go on," we used the only tape available, which was the 8-track cartridge version of *Are You Experienced*, and lo and behold, the thing worked. We finally figured that it must be the tape thickness that was the answer. The new tape should be made from a little used 8-track cartridge (never played if possible) and the total length of the new loop should be matched to the original. It may take a little time to get it back on the cartridge properly, but it sure beats a worn out piece of tape. These replacements usually lasted about 2-3 months with heavy use.

*Doug Gent*  
Media Productions  
via the Internet

**MORE ON ECHOPLEX**

While I don't know where you can get replacement cartridges for the Echoplex, I do know that you can reload old worn out ones with conventional broadcast cartridge tape. Ask your local radio station if they have any cart machine tape and a cart reloader sitting around; it's not hard to do.

*Scott Dorsey*  
Kludge Audio  
Williamsburg, VA.

**EVEN MORE!**

Regarding the EQ&A in the May issue asking about the availability of Echoplex tapes, from the pages of *Vintage Guitar* magazine comes an ad for the following that says they have

Echoplex tape cartridges for \$20.00:  
Stringman Vintage Guitars  
1222 10th  
St. Cloud, FL 34769  
Chris Watson, Tel: 407-892-6969  
Evenings, Tel: 407-892-3185

The following place is even better. They not only carry cartridges, but also a bunch of parts for Echoplexes:  
Parts Is Parts  
P.O. Box 369  
Wilmington, VT 05363  
Tel: 802-464-0014 or e-mail  
sprung@sover.net  
Good luck.

*Bill Armstrong*  
via the Internet

**FROM THE PITS**

Thanks for the naked glimpse into the world of recording given in your recent issue. There's Bruce Swedien running cables under the control room door so he can bypass the board, and achieve that perfect, pristine sounding choir. And then Sophie B. Hawkins is using a Shure *Beta 58* to a Mackie for her room sound. And they're both making hit records. It truly shows that it's not tons of money or perfect technique that's needed, but simply good sounding stuff going into those microphones. Maybe we're closer to the way it used to be. Talent having a chance to be heard, and rising to the top. Thanks for a good mag. I have to admit, I skim the live section, but it's partly so I can get to Roger sooner. Anyway it's good "pit" reading.

*Nick DiFabbio*  
Guitarist  
Les Miserables National Tour

**TRACK BUSTER**

Gary Adante and Rob Arbittier should be banned from every studio for their poor job on the Steve Wonder *Natural Wonder* live production [EQ Tracks; April, '96]. It is the most unexciting live CD I have yet to hear. The dynamic of the CD is dead, and when Stevie asks the crowd to make some noise, it sounds embarrassingly quiet. It was only after hearing the CD several times that I read about an orchestra being on the CD. I couldn't tell because the mix was so bad.

If Adante and Arbittier want to hear a proper live album, pick up a copy of *Elton John Live in Australia*.



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CIRCLE 57 ON FREE INFO CARD



*Natural Wonder* is an audio disgrace and a truly unfitting live tribute to Stevie Wonder, one of the most talented and respected musicians around today.

Nate Goyer  
via the Internet

### SITE ME

I would like to mention a worthy site that uses Real Audio. The site is called Sonarchy and it is based at <http://www.sonarchy.org>.

This site is a project of the Jack Straw Foundation, which is partly a nonprofit studio in Seattle. The foundation offers an Artist Support Project that allows unique, up-and-coming composers to use professional recording environments to realize their artistic goals. Some of the results are posted on this site.

The site is also the home of two weekly radio programs that are broadcast from Jack Straw Studios. *The Live Room* showcases local Seattle bands and *Sonarchy* features the fringe of music and sound.

You won't find a lot of rock 'n' roll on this site, but you *will* find a plethora of interesting sounds from all over the world.

Sonarchy is made possible by an endless list of volunteers, of which I am one.

Scott Colburn  
GRAVELVOICE  
<http://www.serv.net/~gravel/>

### CORRECTIONS

In our February '96 issue, we mistakenly dubbed ART's mic pre the Tube MPI, when, in reality, it is just called the Tube MP. Also, in our May '96 issue, the "Big Fix" article in the Software Section was written by David Miles Huber, not Craig Anderton as is listed. Craig did, however, write the sidebar to that piece.

### WRITE TO US

Send your letters to:  
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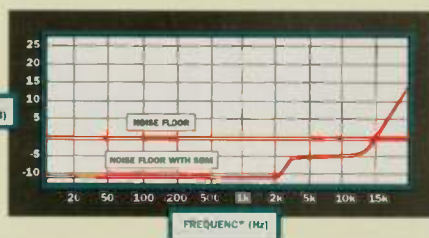
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## GROUND CONTROL

**Q** In my maintenance class we have been talking about grounding. I would like to know why we need to ground, how we ground, and with what do we ground. Is grounding as simple as connecting a piece of gear to a wire that is in turn connected to the earth?

Brian Cinski  
via the Internet

**A** An in-depth explanation of grounding is beyond the scope of this section of the magazine, so keep an eye on my regular column. The following brief response should help.

Ground is the electronic "point of reference." It performs its function in a manner similar to the way the main floor of a building does, or, for that matter, sea level. In most cases, electronic ground is earth ground, unless the system is "floating," in which case it could potentially be a shock hazard. In my April '95 column there is an article on internal console grounding. You may want to request that back issue.

All electronic hardware that is part of the same system wants to be at the same electrical potential. This is easier said than done. When a device has a built-in power supply, its transformer can put a charge on the chassis, offsetting its "ground" slightly above another. The third (round) pin of an AC power connector is supposed to drain this charge to earth. That pin should never be cut off or lifted. Though this is a common practice, it is not safe or legal.

Gear that has a separate supply, such as those using wall warts, have less potential for "ground loops"; yet another monkey wrench in the electronic works. Suffice to say that if you stopped to analyze how many times a rack mounted product gets "grounded," it is a wonder we can work at all. It is also the reason professional gear has balanced inputs that are designed to cancel the induced noises that are a fact of electronic life.

Simply attaching a wire from chassis to an established, known ground point will not always do the trick, partially because wire has resistance and, at great distances, that resistance can diminish its effectiveness.

Eddie Ciletti  
Contributing Editor  
EQ Magazine

*I am a student graduating from an electronics technician course and I am very ambitious about working in professional audio. I have read nearly all of your articles. I have been considering modifying my cheap 16-channel [console] for some time now. Is there a source for op amps and metal-film resistors? I've leafed through countless catalogs of electronic components without luck. Thank you for the best column in any pro-audio magazine; it's the reason I buy EQ.*

Michael Sizer  
Sudbury, ON, CANADA

**A** Thank you for the positive response. Please check out the article again; you'll see a mention of Digi-Key as a parts source. Call 800-DIG-IKEY or 218-681-6674. For that quad op amp upgrade, please e-mail: saxman@liberty.com.

Eddie Ciletti  
Contributing Editor  
EQ Magazine

## GO TO THE SOURCE

**Q** Thanks for the great "Consoletation" article [in the March '96

## SLAVE TO THE SYSTEM

**Q** What's the difference between the Pro Tools system's SMPTE Slave Driver (SSD) and the Video Slave Driver (VSD)? When would I use one versus the other?

Althea Gebhardt  
Decatur, GA

**A** The SMPTE Slave Driver is used to reliably lock Pro Tools to an incoming SMPTE source. The SSD tracks incoming LTC (Longitudinal Timecode) and either speeds up or slows down the playback of Pro Tools, creating reliable lock. The SSD accomplishes this task by analyzing the incoming SMPTE and calibrating the sample-rate clock of Pro Tools to match any drift or deviation in the incoming SMPTE.

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# STUDER

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The Video Slave Driver is used to resolve Pro Tools to a black-burst generator (commonly referred to as "black" or "house sync"). Resolving Pro Tools to house sync forces Pro Tools to reference the same clock as the other devices in the studio, which are also resolved to black. The VSD does not have built-in timecode capability. Therefore, a SMPTE/MTC converter or MIDI interface is required. The VSD and SSD can be used together, but for only one purpose: to generate resolved timecode from the SSD.

Tom Cockrell  
Technical Support Manager  
Digidesign

## GET DOWN

**Q** Can you tell me how to get samples from online to my sampler? I use a PC and Sound Blaster with MIDI interface.

Jacque Terry  
via the Internet

**A** First, you need a sound editing program for your PC that supports the sampler you are using. Check SampleVision by Turtle Beach, Sonic Foundry's Sound Forge, and Samplitude Studio by Sek'd to see if one of them supports your sampler.

Second, download a WAV (i.e., PC-friendly format) sample to your hard drive. Open the program and import the sound you downloaded. If needed, convert it into a suitable format for your sampler, then export the sample to the sampler through the computer's MIDI or SCSI interface (depending on whether the sampler supports MIDI or SCSI transfers). Note that some samplers can now read WAV files directly from disk.

Craig Anderton  
Technology Editor  
EQ Magazine

## SEQUENCER EVENTS

**Q** I've been using the Roland XP-50 in my project studio for some time, but only recently have I tried to incorporate my sequences in a live playing environment. My working procedure when sequencing has been to select one of the preset "Performances," make any part changes, and then insert a bulk dump into blank measures at the

beginning of my sequence in order to call up all of my intended instruments. I know I can use program changes to do this, but sometimes they don't call up my specific patch or "Performance."

My problem is this: When attempting to trigger an Alesis SR-16 drum machine to give my drummer a click, if I have increased the tempo to speed through the bulk dump, my drum machine flips out until the actual tempo begins. Why does this happen if there is no note information on my transmit channel 10, and do you know a different or better way to go about this?

Brad Simpson  
Systems Technician  
ProMix, Inc.

**A** If you are syncing the SR-16 to the XP-50's sequencer, the problem is related to the faster tempo you set, as the XP-50 is trying to reload your sys ex data, which is very intense MIDI data, at the faster tempo. In addition to the faster tempo, the XP-50's Track Output defaults to both Internal and MIDI; so the XP-50 is probably sending a copy of all your sys ex data out [via] MIDI even though your SR-16 is going to ignore it, at best, or choke on it at worst. This leaves the XP-50 working overtime to maintain data integrity on both sys ex streams, and the clock may be taking a back seat.

With Roland drum machines, setting the XP-50's Track Output for the track with sys ex to Internal only allows the XP-50's sys ex to be loaded at the fast tempo, yet still lets the clock be maintained at MIDI Out to the drum machine. To do this on the XP-50, press Sequencer, then Edit, then Track. Press Edit again to turn it off, then use the 1-8/9-16 Track buttons to select the track with your sys ex data. Cursor up until you see Output Assign and set it to INT. Track Output is saved per track per song, so resave your song to disk with this new setting.

Douglas Hanson  
Keyboard Product Manager  
Roland Corporation U.S.

Send your queries to:  
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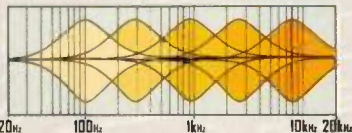


# MORE BUSES, MORE PREAMPS, INTRODUCING THE NEW 16-CH.,

Four submix buses, swept mid EQ, AFL/PFL, new materials, new technologies and the soul

The original CR-1604 defined the modern compact mixer. Now we've "raised the standard" by adding over 20 new features like true 4-bus design with assign switches on every channel, 16 high-headroom/low noise mic

preamps, separate stereo Control Room/Phones bus, effects return to monitors — for just \$100 more\* than the original CR-1604! No matter where you mix or what you mix, you'll find a lot to like on the new CR1604-VLZ. Call for a free 40-page brochures and applications guide today.



**MORE THAN JUST SWEEPED MIDRANGE.** Most mixers (except very expensive ones) have narrow EQ bandwidths — OK for drastic corrections but not very useful for gentle tonal changes. The CR1604-VLZ has wide, midrange EQ bandwidth that is far more musical-sounding and can be used more generously than narrow mid EQ.

**5-WAY PHYSICAL CONFIGURATION** via our famous rotating input/output "pod." Out of the box the CR1604-VLZ comes in with jacks to back. Use on a tabletop ① or rack-mount it with the free rack rails included ②. In minutes, with just a screwdriver, you can rotate the pod for an ultra-compact 8-rack space configuration ③. Optional RotoPod-VLZ bracket places the input/output jacks on same plane as the controls (rackmount ④ or tabletop ⑤).

**Stereo AUX RETURNS 1 & 2** with 20dB gain above Unity for boosting weak effects.

**NEW AUX SEND 1 & 2 MASTERS.**

**NEW AUX SEND 1 & 2 SOLO** switches with LEDs.

**NEW Aux Return 3 ASSIGN SWITCHES** to Main Mix, Subs 1 & 2 or Subs 3 & 4.

**NEW Aux Return 4 ASSIGN** to Control Rm/Phones.

**NEW PHANTOM POWER LED.**

**NEW CONTROL ROOM/PHONES level control.**

**NEW TAPE INPUT LEVEL control and TAPE TO MAIN MIX switch.**

**NEW CONTROL ROOM/PHONES SOURCE MATRIX.** Just like our 8\*Bus monitoring system, this creative feature lets you route any combination of Tape, Subs 1 & 2, Subs 3 & 4 or Main Mix to Control Room/Phones bus. Lets you create custom headphone mixes (press MAIN MIX and let

performers in the studio hear what you're hearing in the control room), run simultaneous broadcast or live 2-track recording mixes, monitor 2-track tape deck output (if you're doing commercial production, press TAPE and share it with VO talent In the studio), route a cue/click track to phones or create a second stereo main output with its own level control.

\*THE BIG ASTERISK: Suggested U.S. retail for the CR1604-VLZ is \$1199. This is actually LESS than the combined price of the old CR-1604 and XLR10 mic preamp expander (needed to get a full 16 mic preamps). Priced higher in Canada.

**NEW TRIM control** (on the channel strip) with 60dB total mic gain & -10dB "virtual pad" for line inputs.

**6 AUX SENDS** per ch. Aux 1 & 2 switchable pre/post. Aux 3 & 4 (post-fader) become 5 & 6 via Shift switch.

**HI EQ.** ±15dB shelving at 12kHz.

**NEW SWEEPABLE MIDRANGE.** Wide, musical peaking EQ with 100Hz to 8kHz range. ±15dB range.

**LO EQ.** ±15dB shelving at 80Hz.

**NEW LOW CUT FILTER** is a must for live sound and acoustic (microphone) recording. Sharp, 18dB/octave @ 75Hz high-pass filter lets you add Low shelving EQ to vocals without boosting undesirable mic thumps, stage rumble, wind noise, P-pops, etc.

**PAN** control with constant loudness to maintain stereo perspective.

**MUTE** switch.

**NEW MUTE & OVERLOAD LED.**

**NEW -20dB SIGNAL PRESENT & SOLO LED.**

**SOLO.** in-place AFL or PFL (pre fade listen).

**NEW BUS ASSIGN** for Subs 1-2, 3-4 & Main L/R.

**NEW 60mm FADER** with true log taper, special lip seal & long-life wiper material.



**MACKIE**  
CR-1604-VLZ  
16-CHANNEL MIC/LINE MIXER

**ASSIGN TO MAIN MIX**

**ASSIGN OPTIONS**

**STEREO AUX RETURNS**

**PHONES MAIN L/R MIX**

**BNC lamp socket.**

**NEW EFFECTS TO MONITORS** controls fold Aux Return 1 & 2 back into Aux Sends 1 & 2 so that on-stage performers can hear outboard effects.

**Stereo AUX RETURNS 3 & 4** with 20dB gain above Unity for boosting weak effects.

**Global AUX RETURN SOLO** with LED.

**LED METERS** with -30 to +28 range.

**NEW LEVEL SET LED.** In conjunction with individual channel Solo lets you quickly and accurately set input levels to Unity Gain, minimizing noise and maximizing headroom.

**Global SOLO level control.**

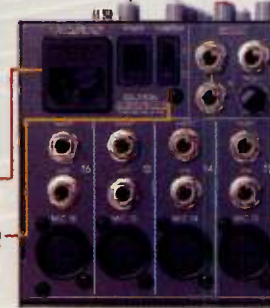
**RUDE SOLO** light.

**NEW Global AFL/PFL SOLO** switch.

**HEADPHONE output.**

**NEW BUS ASSIGN** to Left and/or Right Main Mix.

**NEW 60mm SUB-MASTER & MAIN L/R** faders with accurate, 8\*Bus log taper.



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## 4-BUS CR1604-VLZ MIC/LINE MIXER. JUST \$1199.\*

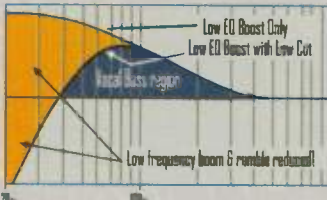
of our 8•Bus...we packed the new CR1604-VLZ with a 5-year "wish list" of the most-requested mixer features.

\*\* Everything except noise... There's even LESS of that thanks to VLZ circuitry.

**NEW VLZ** (Very Low Impedance) **CIRCUITRY** developed for our 8•Bus consoles, reduces noise and crosstalk in critical signal path areas.



**SOLID STEEL** main chassis.



**SEALED** rotary controls resist dirt, smoke and diet cola. Maximum **RFI INTERFERENCE PROTECTION** via metal jacks, blocking capacitors, etc.

**NEW LOW CUT FILTERS** on all channels. Low Shelving EQ can be very useful on vocals. But adding Low EQ also boosts stage rumble, microphone thumps and wind noise that aren't good for your PA system. Our sharp 18dB/octave filter cuts out the bad stuff below 75Hz and leaves the good stuff (unlike the shallow 6dB/octave or 12dB/octave "low cut" filters on some mixers that also slice off audible low bass & don't fully cut out subsonic stuff).

**NEW 16 STUDIO-GRADE MIC PREAMPS** with -129.5dBm E.I.N. — the same ones as on our acclaimed 8•Bus consoles that are regularly used to record platinum albums. **DIRECT OUTS** (bal./unbal.) channels 1-8.

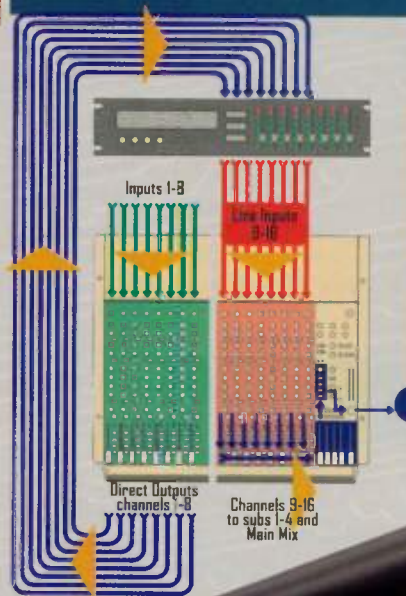
**NEW MONO OUTPUT** (bal./unbal.) has separate volume control.

**NEW RCA TAPE** inputs & outputs (unbalanced).

**NEW Separate CONTROL ROOM OUTPUT** (bal./unbal.) so you don't tie up your headphone output with an amp.

**NEW INSERTS** on every channel **SUBMASTER OUTPUTS** (bal./unbal.).

The perfect mixer for use with 8-track digital recorders.



Record on chs. 1-8, routing tracks to your 8-track recorder via post-fader direct outputs (separate inserts let you add compression or other effects as you record) — and/or combine chs. to tape using the 4 submasters. Monitor and then mixdown via chs. 9-16.



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CIRCLE 51 ON FREE INFO CARD



# EQ

## PRODUCT VIEWS

### DMM AND DMMER

**A**udio Design's DMM-1 is a compact four-channel digital mixer designed for specialized applications such as DAT editing and dubbing, as well as copying and dubbing digital audio-for-video. The DMM-1 has two stereo digital inputs to a stereo output. Each stereo input can accept AES/EBU or S/PDIF signals via XLR, coaxial, or optical input connectors at any sample rate from 25-55 kHz. In addition, the DMM-1's asynchronous sample-rate converter allows for varispeed inputs. The unit also includes dual faders and pan controls, and each input can operate in ganged stereo or dual-mono mode. For more information, contact HHB Communications, Inc., 43 Deerfield Road, Portland, ME 04101-1805. Tel: 207-773-2424. Circle EQ free lit. #101.



### THE CLEAR CHOICE

**A**ccusonics manufactures a line of transparent acoustic panel systems for stage and studio use. Its latest Clear-Sonic Panel system's design incorporates new improvements including a new gapless full-length transparent hinge, Butyrate channel edge protectors, a no-slip steel-reinforced rubber base channel, and a cable cutout that now comes as standard equipment. Standard 8-foot wide systems are available at 4- or 5 1/2-foot tall. Clear-Sonic Panels fold accordion-style for easy storage or portability. Heavy-duty covers and/or sound absorbing acoustic foam attachments are optional. List prices start at \$325 for a 4-foot high system. For more information, contact Accusonics Mfg., 20221 Shipley Terr. #301, Germantown, MD 20874-3708. Tel: 800-888-6360. Circle EQ free lit. #102.

### ROLL WITH IT

**T**he RA53 five-channel headphone amplifier from Rolls offers a variety of input options to its users. There are four different ways to send a master mix to the RA53: discrete 1/4-inch L/R inputs, L/R RCAs, a 1/4-inch stereo TRS plug connected to the right input (tip = right, ring = left), or a 1/4-inch mono TS plug connected to the left input (yields a mono signal from the left and right outputs of RA53). In addition to the four master mix input configurations, three separate mixes can be monitored using the main inputs and two insert jacks on channels 1 and 2. A 1/4-inch link input/output jack is provided for connecting two RA53's together, allowing up to ten channels of headphone monitoring. For more information, contact Rolls Corporation, 5143 South Main Street, Salt Lake City, UT 84107. Tel: 801-263-9053. Circle EQ free lit. #103.



### A NEW GENERATION

**T**urn your audio, duplicating, or mastering facility into a total turnkey system with the Audio CD Generator from MediaFORM. The system centers around the Genesis CD 2500 Autoloader to provide duplication of up to 25 unattended disks utilizing a Yamaha 4X CDR100, which is located inside the Autoloader. The system also provides both completion and rejection hoppers, for identification of successfully recorded media. Hohner's "Red Roaster" provides software control of the Autoloader as well as Red Book audio features like full manual PQ-subcode editing, index number, track number, track start time, length, pause between tracks, offset, emphasis, and copy protection. Analog and digital interface to your CPU is provided by Digital Audio Labs CardD and the digital I/O. The system also includes an SCSI controller, 25 caddies, 25 CDs, and a 12-month warranty. Retail price is \$8995. For more information, contact MediaFORM, Eagleview Corporate Center, Exton, PA 19341. Tel: 800-220-1215. Circle EQ free lit. #104.



## DESK JOB

If your project studio is lacking in the organization department, check out Middle Atlantic's Multi-Desk. It's comprised of modular units that can be configured to a variety of arrangements. The MD-48 Multi-Desk is the central figure of the system. Its measurements are 48 inches wide x 30 inches deep, and it features a granite-speckled laminated top supported by steel tube legs. There are optional Multi-Bridges and Multi-Racks available to add to the Multi-Desk. Other options include the MD-KB retracting keyboard tray, MD-TL Twist Loop Cable Management System, MD-MP Modesty Panel, and an MD-HS Ventilated Shelving Kit. For more information, contact Middle Atlantic, 8 North Corporate Drive, P.O. Box 29, Riverdale, NJ 07457. Tel: 201-839-1011. Circle EQ free lit. #105.



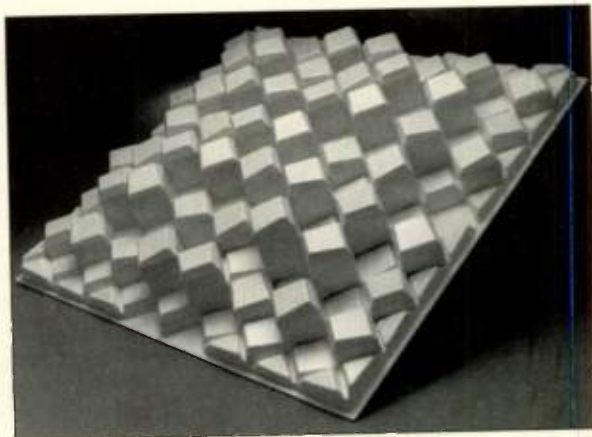
## SILENCE IS GOLDEN

Switchcraft's Silent-Plug has been designed to prevent hums, squeals, and pops from occurring when a plug is inserted and removed from a jack. A circuit-closing device inside the Silent-Plug is what makes this possible. The Silent-Plug features a switch near the base of the plug that when depressed at the time of connection or disconnection prevents the noise. This two-conductor, 1/4-inch plug can accept cable up to .370 inches in diameter and is available with screw terminals (Switchcraft part no. 172) or solder lug and cable clamp (Switchcraft part no. 181 and 182). For more information, contact Switchcraft, Inc., 5555 North Elston Ave., Chicago, IL 60630. Tel: 312-792-2700. Circle EQ free lit. #106.



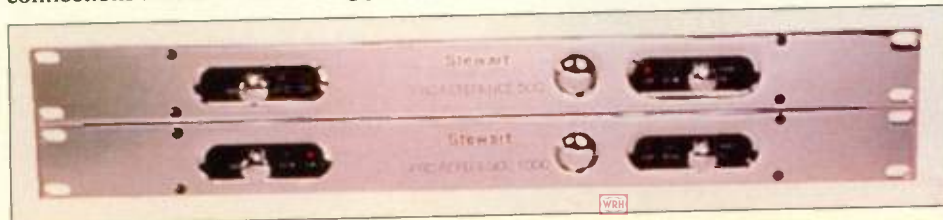
## MODEL DIFFUSOR

The Art Diffusor Model C is a two-dimensional diffusor from Systems Development Group. It is molded of 1/8-inch thick thermoplastic, and weighs less than five pounds. Installation involves dropping the Model C panels into a 2x2-foot T-bar grid in place of ceiling tiles. There are two other versions available as well, the Model DL and the Model WM. The DL incorporates a cutout for a standard, recessed drop-light fixture, allowing diffusion to be spread over large ceiling areas. The Model WM panels carry the sculpted appearance and acoustic characteristics of the Model C and spreads over wall surfaces as well. Without use of the T-bars, these panels can be wall-mounted against each other with construction adhesive. For more information, contact Systems Development Group, Inc., 5744 Industry Lane, Suite J, Frederick, MD 21701. Tel: 800-221-8975. Circle EQ free lit. #107.



## WHAT A PRO

Stewart Electronics' Pro Reference Series power amplifiers (which includes two models) feature convection cooling, a polished chrome face plate, gold-plated input/outputs, and occupy a single rack space. A five-year parts and labor warranty is standard fare with the Pro Reference amps. XLR or 1/4-inch TRS inputs are both featured on the amps, while output connections are made via binding post or 1/4-inch phone jacks. For the PR-500, power ratings are 4 ohms stereo @ 190 W RMS and 8 ohms stereo @ 100 W RMS.



The PR-1000 rates at 4 ohms stereo @ 350 W RMS and 8 ohms stereo @ 200 W RMS. For more information, contact Stewart Electronics, 120 Blue Ravine Rd., Ste. 2, Folsom, CA 95630. Tel: 916-985-7200. Circle EQ free lit. #108.



# EQ PRODUCT VIEWS

## MOUNT FUJI (IN YOUR DAT MACHINE)

**N**ow available are Fuji professional-use DAT tapes. Recording times include: 15-, 34-, 48-, 64-, 94-, and 124-minute cassettes. The Fuji DAT cassettes feature specially formulated Super-Fine Metallix magnetic particles that handle the full range of signals from ATF to PCM. The cassette shells are equipped with anti-static lids to protect the tapes from dust and other contaminants. Rib guides in the hub stopper provide a locking action that holds hubs during transportation and storage. For more information, contact Fuji Photo Film, 555 Taxter Road, Elmsford, NY 10523. Tel: 914-789-8148. Circle EQ free lit. #109.

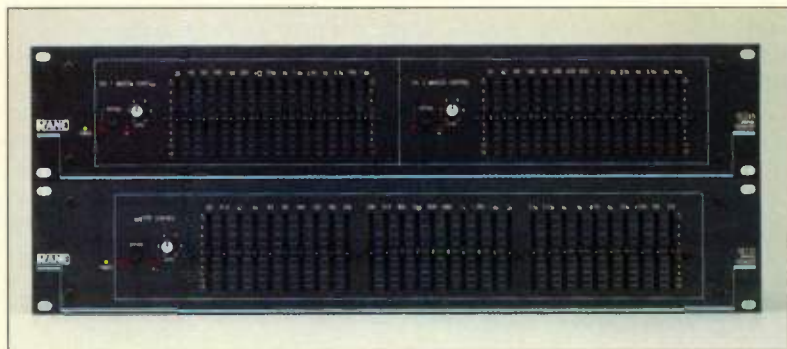


## DEOXIFYING

**D**eoxIT, now available in a mini-spray, cleans, preserves, and lubricates metal connectors and contact surfaces. The spray contains improved deoxidizers, preservatives, conductivity enhancers, anti-tarnishing compounds, arcing, and RFI inhibitors, and provides extended temperature range. DeoxIT also prevents dissolved oxides and contaminants from re-attaching to metal surfaces. For more information, contact CAIG Laboratories, 16744 West Bernardo Drive, San Diego, CA 92127. Tel: 619-451-1799. Circle EQ free lit #110.

## CHANTILLY LACE

**I**f your studio doubles as your living room, have we got an amp for you. The Lace Electro-Furniture Model A Guitar amplifier is designed after the masterpiece radios of the late '30s and '40s. Gone is the "taboo" on placing guitar amps in the living room, this unit fits right in with the couch. The cabinet utilizes two 12-inch Celestion 25-watt "green back" speakers wired in stereo. It features a McIntyre Blues Maker, Class A, 3-watts-a-side, all-tube amplifier. This amp also features dual-speaker emulation. The cabinet is made of solid alder sides and has a hand-rubbed brown/cherry finish. The Model A has a removable 3U rack in it for the addition of signal processors. For more information, contact Actodyne General, 5561 Engineer Drive, Huntington Beach, CA 92649. Tel: 714-898-2776. Circle EQ free lit. #111.



## TOO GRAPHIC

**R**ane's GE 215 is a two-channel graphic equalizer with 15 bands and a 2/3-octave design. The GE 130 is the one-channel, 30-band 1/3-octave version. The active filter sections feature Rane's constant bandwidth design. Front-panel controls and indicators, aside from the sliders, include an overall level control for each channel as well as overload indicators. For more information, contact Rane, 10802 47th Ave., West, Mukilteo, WA 98275. Tel: 206-355-6000. Circle EQ free lit. #112.



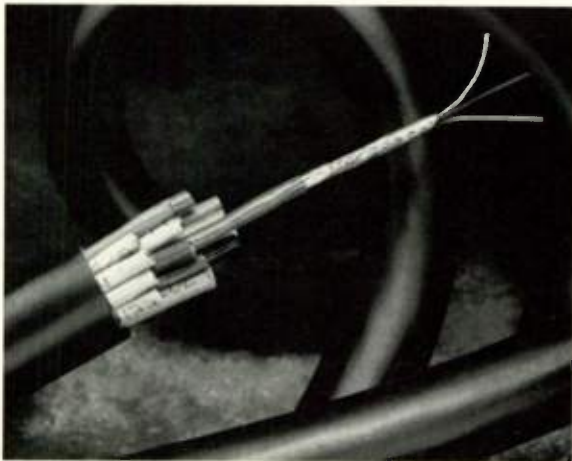
## IT'S A DA8

**Q**uantegy has announced its Ampex DA8 recording tape for use in DTRS format digital multitrack recorders. DA8 is available in three lengths (30, 60, and 113 minutes), and is a metal-particle tape designed for use with the TASCAM DA-88 and Sony PCM-800 DTRS 8-track recording formats. The tapes come with a newly designed cassette shell and low-friction binders. For more information, contact, Quantegy Inc., 1025 A Terra Bella Ave., Mountain View, CA 94043-1829. Tel: 415-903-1100. Circle EQ free lit. #113.



## MUSICAM I AM

**C**DQPrima codecs contain MUSICAM digital audio encoding, an advanced compression algorithm developed by MUSICAM USA. This algorithm is compatible with the standard ISO/MPEG Layer II decoders. CDQPrima codecs offer both encode and decode, mono, dual-mono, stereo or joint-stereo capabilities. A wide range of transmission and sampling rates come standard with 18-bit A/D and D/A converters. So what does this all mean? Your studio can send and receive CD-quality sound over one ISDN phone line, SMPTE can be sent and received, automatic reconfiguration to accept calls from different remote codecs, broadcasts to six users simultaneously, and control tape recorders at a remote location. For more information, contact MUSICAM USA, 670 North Beers St., Building 4, Holmdel, NJ 07733. Tel: 908-739-5600. Circle EQ free lit. #114.



## HOW BRILLIANT

**B**elden Wire released a new line of multiple-pair audio cables called Brilliance AudioFLEX Snake Cables. Typical uses for these cables include connecting multiple audio channels in low-level and high-level componentry such as console equipment. The cables feature Belden's exclusive French braid double shield, which is a double spiral bare copper shield tied together by one braided strand. Available now are 2, 4, 6, 8, 12, 16, 24, or 32 pairs of high strand count (41 x 40) 24 AWG bare copper conductors with polyolefin insulation. The pairs are individually shielded and jacketed, so they can be split out of the overall jacket as needed. The pair jackets are numbered and color-coded with nonrepeating colors for easy identification. For more information, contact Belden Wire & Cable Company, P.O. Box 1980, Richmond, IN 47375-1980. Tel: 1-800-BELDEN-4. Circle EQ free lit. #115.

## MR. MAN

**T**he Keyman 49 MIDI controller keyboard is now available. This undersized keyboard is targeted at the starting musician and home multimedia setup. Keyman has 10-note simultaneous output and supports a standard sustain pedal. Its dimensions are 24.2 x 5.6 x 1.92 inches and its weight is 3 pounds. Other Keyman 49 features include: 49 keys, MIDI channel select switch, transpose octave up and down switches, program bank and program select switches, bank select switch, set key



velocity switch, data enter switch, and 10 numerical keys. Retail price is \$129.95. For more information, contact Midiman, 45 E. St. Joseph Street, Arcadia, CA 91006-2861. Tel: 818-445-2842. Circle EQ free lit. #116.





# UNITY™

S E R I E S

## When the Artist, Soundman, and Engineer is You.

Compact console advertisements don't usually talk about sound quality, perhaps that's because they don't have anything to talk about. Every console in the Unity™ Series uses ultra-low, noise-discrete, transistor microphone preamps. These are the same transistors we use in our \$20,000 recording consoles. These preamps come within 2 dB of a theoretically perfect, "noiseless" preamp. If you could find a quieter preamp for any price the noise difference wouldn't be audible.

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We don't have room to talk about every trick we've learned in thirty years of designing professional sound reinforcement equipment. Just about anybody can make a mixer sound like a million bucks for a million bucks, the magic is doing it for \$349 (U.S. suggested retail for the Unity™ 500).

Please, don't take our word for it. Make your dealer plug in and compare any one of these Unities to the most expensive console in his store. We know how it will turn out because we've already done it. Prepare yourself to be amazed.

**Unity™ Series – Designed  
For The Artist Who Does It All...**



# Unity™ 500



Good things do come in small packages. The Unity 500 delivers recording studio sound quality in a compact mixer with compact mixer pricing.

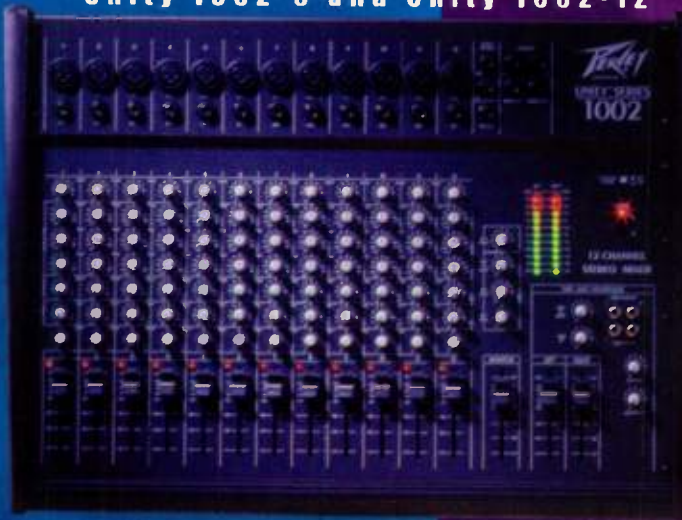
- U.L. approved for your safety
- 6 ultra low noise, low-impedance mic preamps
- TRS insert patch points on Low-Z inputs
- Hi and Low frequency Baxandall type-EQ
- 2 auxiliary sends on each channel
- 4 stereo Line Input channels
- +48V true phantom power (switchable)

Don't be misled by its compact size. The Unity 1002 Series is professional to the core. Low-noise, discrete transistor mic preamps complement our no-compromise approach. High quality 60MM faders sound as good as they feel.

- U.L. approved for your safety
- 8 or 12 ultra low noise, low-impedance mic preamps
- 3-band EQ, Hi and Low shelving type, mid-peaking type
- 1 pre monitor send and 1 post EFX send
- +48V true phantom power (switchable)
- 1 monitor master fader
- Rugged, smooth feel 60MM faders

# Unity™ 1002 Series

Unity 1002-8 and Unity 1002-12



- U.L. approved for your safety
- 8 or 12 ultra low noise, low-impedance mic preamps
- 3-band EQ, Hi and Low shelving type, mid-peaking type
- 2 pre monitor sends and 2 post EFX sends
- +48V true phantom power (switchable)
- Rugged, smooth feel 60MM faders

# Unity™ 2002 Series

Unity 2002-12, Unity 2002-16 and Unity 2002-24

The Unity 2002 Series carries the success of the 1002 Series one step further with two pre monitor sends and two post EFX sends per channel. Providing up to 24 low-Z mic channels in a compact 2 bus console.



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UNITY™



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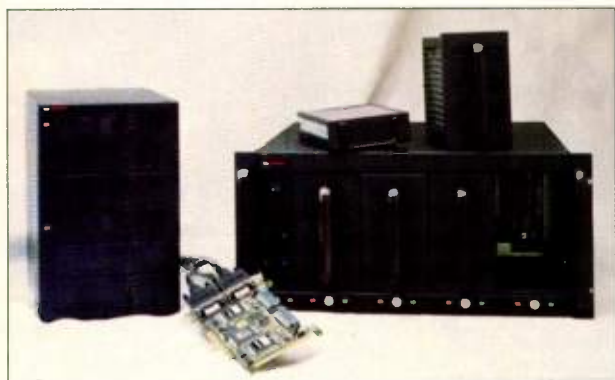
Circle 58 on free info card



# EQ STUDIO WARE

## FOR MACS TOO

Now Mac users can take advantage of Steinberg's Cubasis. It employs a new generation-enhanced graphic user interface. The key to user friendliness is the newly-designed Arrange window, which utilizes color to help users keep track of complicated arrangements. Three editors are available: Key, List, and Score. Key Edit offers additional graphic modification of controller data. List Edit displays the aspects of a MIDI recording in an Event list. Score Edit provides a view of music as it really is and users can do editing by moving notes around on-screen. Retail price for Cubasis Mac is \$99. For more information, contact Steinberg North America, 9312 Deering Ave., Chatsworth, CA 91325. Tel: 818-993-4091. Circle EQ free lit. #117.



## TO THE MAX

The MAXARRAY disk array storage sub-system is PCI-based. It features a 4-drive, split bus, dual-channel PCI optimized accelerator designed to conserve PCI slots for other boards. The MAXARRAY meets or exceeds 1996 OEM high-resolution video specs as announced at MacWorld. Custom configurations include: single or dual-channel PCI host boards with available Fast/Wide SCSI-3 interface, fault-tolerant RAID configurations, 3 1/2- or 5 1/4-inch hot swappable drives, and CD-R, DLT, DAT, and/or optical redundant power supplies. Additional specs include: 2-36 GB of capacity, and 4:1 video compression ratio with the capacity for recording up to 8 audio tracks simultaneously. For more information, contact Rorke Data, Inc., 9700 W. 76th St., Eden Prairie, MN 55344. Tel: 800-328-8147. Circle EQ free lit. #118.

## THREE'S COMPANY

Apple has licensed SRS Labs' patented SRS (Sound Retrieval System) 3D sound technology. SRS 3D sound produces three-dimensional sound imaging from any sound source with only two speakers based on the human hearing system. Whether the signal is mono, stereo, or surround sound, SRS expands the audio image with no sweet spot, eliminating the speakers as point sources of listening material. For more information, contact SRS Labs, 2909 Daimler St., Santa Ana, CA 92705. Tel: 714-442-1070. Circle EQ free lit. #119.

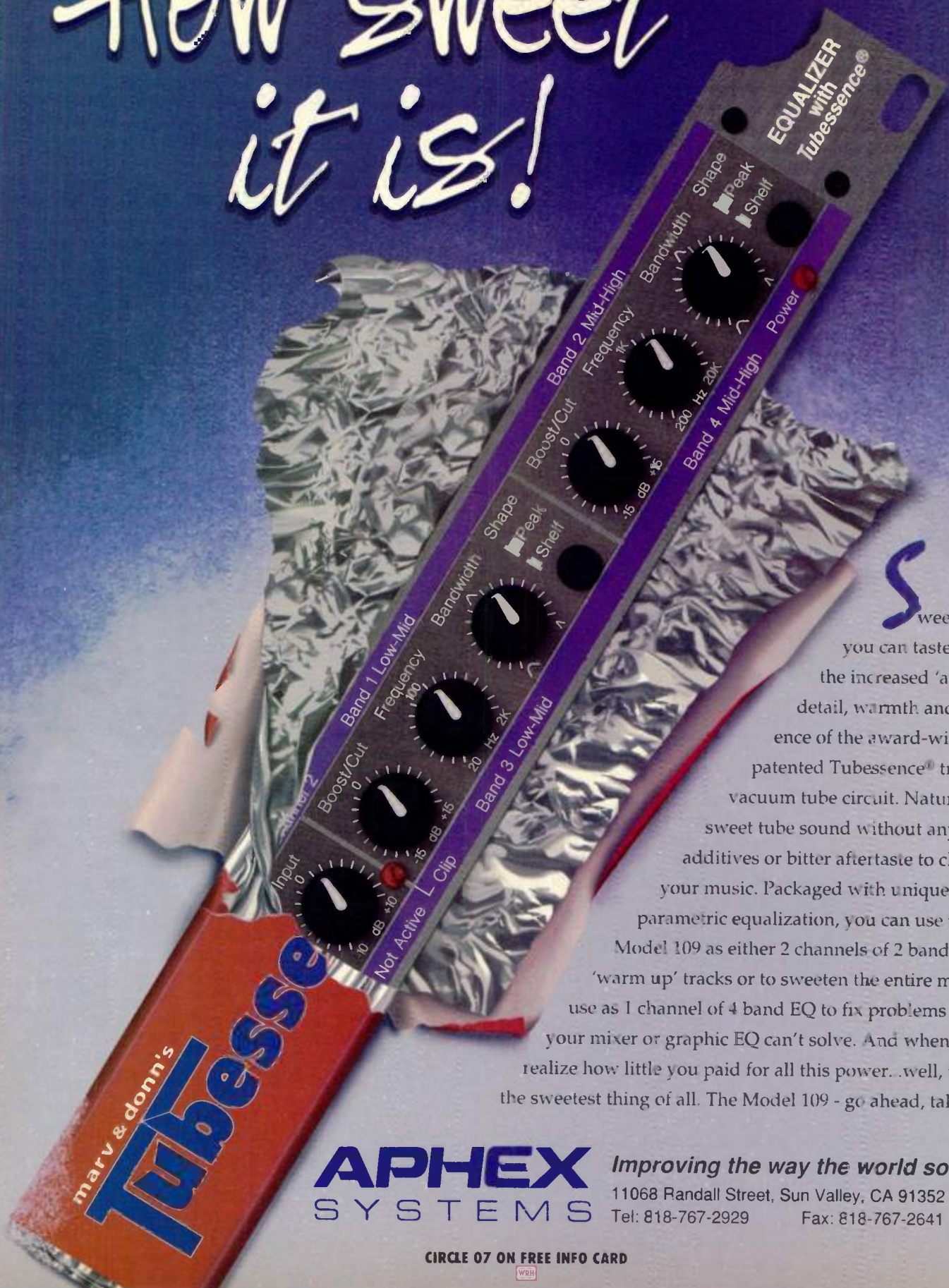


## GET UPDATED

Opcode and Apple Computer announced updates to their multimedia software product lines with the release of OMS version 2.1 and QuickTime 2.2. Apple's QuickTime 2.2 will include integrated support for OMS, allowing QuickTime music tracks to be directed to any MIDI-compatible device attached to the computer. For the uninitiated, QuickTime is Apple's multiplatform software and hardware architecture for editing, storing, and playing synchronized media such as video, audio, MIDI, and text. OMS provides music studio management and routing of MIDI data. By integrating support for Opcode's MIDI-management software into QuickTime 2.2, Apple increases the power and flexibility of the QuickTime Music Architecture. For more information, contact Opcode, 3950 Fabian Way, Suite 100, Palo Alto, CA 94303. Tel: 415-856-3333. Circle EQ free lit. #120.



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CIRCLE 07 ON FREE INFO CARD







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workstation, Pro Tools III, with mountains of record tracks, I/O, and real-time effects and mixing.

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**CIRCLE 26 ON FREE INFO CARD**



# Richard Elliot's "City Speak"

The saxmaster himself speaks to *EQ* about his latest hit record

BY STEVE LA CERRA

## Where was "City Speak" recorded?

The entire CD was recorded at my project studio in Woodland Hills, CA. What made this recording different from my last several was that this was pretty much recorded live. In the past we recorded a few instruments at a time and layered the songs. In my studio, I have a control room and one small isolation booth where we put the drums. The rest of the instruments — guitar, bass, and keyboards — went in the control room. Percussion was overdubbed at a later time. Most of the

time the guitar was being taken direct. On a couple of occasions we miked an amp, but that was for overdubs so isolation wasn't an issue. The lower part of my house has an area right outside the control room that has become the "hang out" area of the studio. That was where I did the sax.

## Were you attempting to get any of the room sound?

I'm not a big room-sound person, so I basically was not looking for any kind of ambience. I was mainly interested in the tone I was getting from the horn. I wanted as wide a spectrum of frequencies from the horn as possible, without having to doctor it up with EQ.

## How did you go about miking the sax?

There were a couple of different mics. I used a Manley Gold Tube Reference that I have had for a few years and I really like. We also used a Neumann U47 tube and — believe it or not — we

did a couple of interesting things, including double miking the horn with a Shure SM98A.

## Were you using the mics simultaneously to achieve a blend?

Yes. For example we'd use the U47 and the SM98 together in a combination of close and far miking. It was totally by chance that we tried the SM98. It was there in the studio, so we started goofing with it. And we found we were able to get a nice bite and attack from the horn using that mic close, in front of the bell. Then we put the tube mic further back and off-center from the sax and it created a really nice blend of body and focus on the tone.

## How far was the tube mic?

About two to three feet away from the instrument, but not directly in front of the bell. As you were facing the mic it would be off to the right a little bit. A lot of the lower frequencies tend to come from the side of the horn, emanating more from the tone holes, not out of the bell.

## Does the attack of the instrument come more from the bell?

Yes, but the problem is that when you mic it close, you get a lot of the upper frequencies and attack. You will have a lot less body and it tends to sound more nasal. I always hate it when I hear horns on recordings where the sound is irritating or fatiguing to the ear. Maybe you can get through a couple of songs, but if you listen to a whole recording, it can start to wear you down a little bit. The problem is that if you are thinking along those levels, then you tend to go to the other extreme and make the horn real dull sounding. Now you have plenty of body and there is no punch. I find that if I go too far to that extreme, I can be blowing until I am blue in the face — really playing intensely — but that intensity isn't coming across. It's finding the right marriage of the body and the attack (the upper frequencies) so that it's not fatiguing and you can listen to it for hours. And at the same time, when the performer is really bearing down, it comes across. In terms of whether I have actually pulled that off, it is really in the ears of the beholder.

EQ



**SAX APPEAL:** *City Speak* has produced three chart-topping hits, including the title track.



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\*The EURODESK, like all Behringer mixers, is the only one in its class using 4580 operational amplifiers which provide 30% quieter performance overall.

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For a free EURODESK brochure, please call 1-800-328-2882 and ask Behringer Sales, fax (516) 364-3888 or write to Behringer Sales, Samson Technologies Corp., P.O. Box 9031, Syosset, NY 11791-9031.

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**CIRCLE 11 ON FREE INFO CARD**



# KRK: Up Close

## RoK•Bottom

The perfect addition for anyone requiring better low-end response in a near-field monitoring application, the RoK•Bottom kicks some serious butt. The sub-woofer utilizes a unique enclosure shape similar to the popular K•RoK, minimizing parallel walls to maximize low-end punch. The 2.1 cubic enclosure features a 12-inch long-stroke polyglass woofer with a metric sensitivity of 91 dB and is available in non-powered and 140 watt powered versions with an LCR summing amp and an internal crossover.



## K•RoK

The K•RoK personal monitor, featuring radical new designs in driver and enclosure technology, has developed into one the most popular near-field monitors on the market. The unique cabinet shape, which minimizes parallel walls, was designed to optimize linearity and maximize low-end punch. This provides extremely accurate reproduction of instruments and vocals. Perfect for all near-field applications, the K•RoKs not only out perform the competition, they also represent an incredible value at \$495.00 per pair.



## POWER BLoK

The 140-watt KRK POWER BLoK represents a revolutionary concept in near-field monitor amplification. Offering a cost-effective alternative to conventional rack-mount amplifiers, the class A POWER BLoK is available as an internal option to all KRK monitors, including the RoK•Bottom sub-woofer, or may be purchased separately and used as an outboard amplifier. The proprietary power module features regulated power supplies to all voltage gain stages and heavy duty Neutrik combo connectors as well as extensive DC protection circuitry. Distortion is less than 0.05% at 140 watts, while noise (A weighted) is specified at -100 dB EIN input open.



NEW

NEW



Keith Klawitter  
Captain K•RoK

## Keith Klawitter,

KRK Systems, Inc. president and chief design engineer, started the company in 1986. Previously, Keith had worked as an independent recording engineer at many of the world's major recording and film studios and has gained numerous film credits with projects at Metro/Goldwyn, Paramount, MGM and Universal. KRK's phenomenal success can be attributed to a unique combination of exotic driver materials, proprietary crossover, stylized cabinet design and Keith's vision of uncompromising sonic quality.



Chris Fichera  
with KRK mascot, "Pinky"

## Chris Fichera,

vice president, Group One Ltd., exclusive distributor of KRK Systems products worldwide, has gained international recognition as both a Grammy Award winning engineer and industry marketing veteran. "We have intentionally limited KRK distribution," says Fichera. "KRK dealers were selected on their ability to effectively serve the professional audio market with product knowledge and a thorough understanding of the recording process."



# And Personal

## Imaging Is Everything

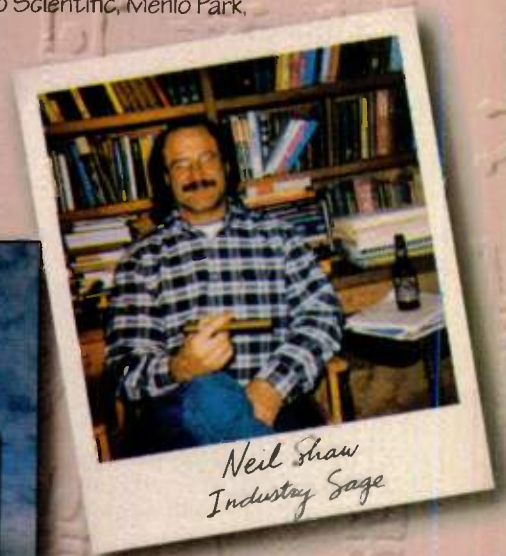
KRK monitors have become an integral tool in many of the world's top recording and post-production studios. The KRK line of near field monitors are without peer for accuracy and imaging. Each driver is extensively tested to ensure a zero failure rate out of the box and monitor pairs are matched to within one-tenth of a decibel for unequalled accuracy. With a complete family of near-field products to choose from, KRK has a product for every application, including video-shielded and powered versions.



## Questions About The Universe?

Just ask Neil.

Neil Shaw, Menlo Scientific, Menlo Park, California



Neil Shaw  
Industry Sage

**NEW**

## Veneer Options

If the "granite-type" look in a monitor is not your cup of tea, KRK offers veneered versions to complement the most demanding interior. Available in attractive oak or rosewood, the optional models include the K•RoK, 6000, 7000B and 9000B. They are also available in powered and non-powered versions and with optional video shielding.



KRK Old RoK Dude



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CIRCLE 47 ON FREE INFO CARD



# RCA Type 77-A

Hearken back to recording's early days with this classic ribbon

**MICROPHONE NAME:** RCA Type 77-A  
**FROM THE COLLECTION OF:** Terry Hughes, Rubber Ball Productions  
**YEAR RELEASED:** 1924  
**PRICE:** \$2500–\$5000 (depending on who you ask)

**TYPE OF MIC:** Ribbon

**POLAR PATTERN:** Unidirectional

**FREQUENCY RESPONSE:** 60 Hz to 10,000 Hz  
**SENSITIVITY:** 317 microvolt output for a sound pressure of 10 dynes/square centimeter

**RATED SOURCE IMPEDANCE:** 250 ohms

**MIC NOTES:** The Type 77-A was the first unidirectional (cardioid) microphone. While this made the 77-A quite popular with the broadcasting contingent, it also introduced the audio world to proximity effect. Later models of the 77 (as well as models from other manufacturers) would feature low-frequency rolloff switches to compensate for the effect. The 77-A is a quite-rare predecessor to the better known 77-D and 77-DX. However, unlike those mics, the Type A has a fixed unidirectional pickup pattern and does not employ the "M/V" (music/voice) switch found in the 77-D for reducing the proximity effect. The 77-A can also be distinguished by its flat bottom, which was rounded in later versions.


**USER TIPS:** Terry Hughes notes: When recording vocals with the Type 77-A, I use a Popper Stopper filter 10 to 12 inches from the upper section of the mic and then try to get the singer's mouth about a half-inch away from the Popper Stopper. The 77-A has an unusual sensitivity to proximity effect that can be quite useful in finding the sweet spot when recording vocals or acoustic instruments. I usually route the output of the mic to a modified 1959 MA 422 valve mic preamp, Altec 1591-A compressor, and a Symetrix SG-200 gate, and then to analog multitrack. The 77-A is not perfect for every studio application, but when the choice is correct, you know it right away. 



Photo by Edward Colver



# "So, how 'bout the truth? I know quality, I know power, and I really know sound...PowerLights are the best."

**Michael Adams**

Live Sound Engineer, Sound Image  
Jimmy Buffett and the Coral Reefer Band  
(and Restorer of Classic Machines)

When PowerLight™ Professional Amplifiers were introduced in late '94, we said they were the best sounding amps we had ever made. Now that they've passed the ultimate road test, you can take somebody else's word for it. While on tour with some of the best sound engineers and hottest acts, PowerLight amplifiers have delivered on every kind of performance and musical demand—without missing a beat. In fact, two international tours using over 240 PowerLight 1.8's have been on the road continuously for the past year with **not one channel failure!** PowerLight has emerged as the new standard in sound quality and reliability by which all other amps will be compared.

## 4 PowerLight Models

| Model          | 2Ω*       | 4Ω**       | 8Ω**       |
|----------------|-----------|------------|------------|
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| PowerLight 1.4 | 300 Watts | 500 Watts  | 700 Watts  |
| PowerLight 1.8 | 400 Watts | 650 Watts  | 900 Watts  |
| PowerLight 4.0 | 900 Watts | 1400 Watts | 2000 Watts |

\*20 Hz-20 kHz, 0.1% THD. \*\* 1 kHz, 1% THD

## What makes PowerLight amps work so well?

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CIRCLE 66 ON FREE INFO CARD





# Samson QMIC

Samson's new  
microphone is truly a  
feedback fighter

**MICROPHONE NAME:** Samson QMIC

**PRICE:** \$199 MSRP

**TYPE OF MIC:** Moving coil dynamic

**POLAR PATTERN:** Hypercardioid

**FREQUENCY RESPONSE:** 20 Hz to 18.5 kHz

**SENSITIVITY:** -47 dBV @ 94 dB SPL

**RATED SOURCE IMPEDANCE:** 150 ohms

**MAXIMUM INPUT SPL:** 137 dB

**DIMENSIONS:** 6.75 inches (overall length) x 2.012 inches (maximum diameter)

**WEIGHT:** 8.7 ounces

**MIC NOTES:** Due to its tight hypercardioid pickup pattern, the Samson QMIC is highly resistant to feedback — making it a strong contender for sound-reinforcement use. A unique silicone “anti-dent” ring surrounds the QMIC’s windscreen for protection from physical damage and the unusual shape of the windscreen stems from the QMIC’s integral multistage wind screen and filter.

**USER TIPS:** While the QMIC’s resistance to feedback will make it attractive to live-sound engineers, the microphone can also be used in the recording studio. To get a live feel while recording lead vocals, try tracking them in the control room using the QMIC and the studio monitors instead of headphones. Position the lead vocalist facing the studio monitors while singing into the QMIC. Since the QMIC has a hypercardioid pattern, rejection of sound from the monitors reaches a maximum when the monitors are at about 135 and 225 degrees to the mic (this is similar to the position you might mix from). For additional rejection of sound from the monitors, wire one out of phase while recording the vocal. Since the element of the QMIC is enclosed in a multi-axis shock mount, you can allow the vocalist to hold the microphone without degrading the quality of the recording. **EQ**



Photo by Edward Colver



# WHY BUY THREE RACK UNITS WHEN ONE WILL DO?




If you're not already considering buying a 410, you probably have an unlimited budget or roadies that are weightlifters. However, if you live in the real world you probably have a budget like the rest of us. The DOD 410 Series II packs the features of a graphic equalizer, a notch filter and a compressor/limiter into one box. It's affordable and convenient. Think about it... perfect monitor mixes every night with no feedback *plus* speaker protection, all from the same compact, one-rack spaced box.

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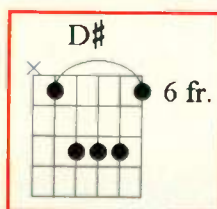
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polished. Cakewalk Pro Audio's staff notation supports dynamic markings, expression text, enharmonic spellings, and even guitar chord grids.

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# AES Europe '96

A look at some of the major announcements from Copenhagen

Copenhagen might be more well known for its blondes and its brews, but for at least one week-end in May, members of the international audio community turned to the Danish city for the annual European Audio Engineering Society (AES) Convention. If there was one thing evident at this, the 100th AES Convention, it was that digital mixing desks and storage systems are mushrooming and permanently changing the studio world. Digitally based consoles were introduced by at least a half-dozen manufacturers, and digital storage systems occupied the rest of the mind space reserved for "major show news" introductions.

The big buzz of the show was the AMS Neve Libra console. The Libra, which processes and routes audio fully in the digital domain, is the little brother to Neve's Capricorn desk. The Libra is aimed at the music recording market, which may not surprise you. But it is exciting to note that the Libra is priced

at the post- and music-production environments, the Virtua consists of an assignable controller surface that is optically connected to an I/O rack. The rack has 32 mic/line inputs, eight group outputs, eight aux outputs, and 16 direct outs. Each Virtua channel strip provides 4-band parametric EQ, and two built-in dynamics sections, as well as access to all eight auxiliary sends. ADAT owners will be happy to know that the console has 16 channels of ADAT optical I/O (DA-88 support is on the way) and onboard transport control via MMC and Sony 9-pin configurations.

Meanwhile, the FAME digital audio console, which has buried Fairlight workstation technology beneath the hardware of an Amek worksurface continued to draw crowds, with the announcement that the company has sold (but not yet delivered) 21 units since the introduction at the 99th AES Convention last fall.

In the land of the "digital giants," Sony announced the first order for its Oxford OXF-R3 console from Guillaume Tell studio in France. This OXF-R3 will be replacing an SSL in Guillaume Tell's Studio B along with a pair of 24-bit Sony 3348HR multitracks. Both the OXF-R3 and the 3348HR's process audio with 24-bit resolution, allowing transfer of 24-bit audio data

music production room that can maintain 24-bit resolution from tracking through mixdown.

Sony also held the first public showing of its new digital recording technology called "DSD" — Direct Stream Digital. This is a 1-bit conversion process with an effective sample rate of 2.8224 MHz, providing a frequency response up to 100 kHz and a dynamic range of 120 dB for frequencies up to 20 kHz. Although DSD is primarily intended for recording, mastering, and long-term archival of 2-track masters, don't be surprised to see it make its way into the multitrack universe.

As far as workstations go, the big news in Copenhagen was Digidesign's announcement of Pro Tools 4.0. Slated to be available in August, the software upgrade will offer users an improved appearance of screens, mute automation, and dynamic automation of TDM plugins. It will also provide new fader groupings to create mix groups and edit groups (very useful for multitrack editing), while the faders themselves can still maintain relative levels. In conjunction with Digidesign, Mackie Designs followed up on its recent NAB announcement that they will soon be introducing a low-cost hardware interface for Pro Tools that can also be used for other DAE-based (Digidesign Audio Engine) products. Mackie's hardware pack will have touch-sensitive moving

faders, transport control functions and dedicated controls for basic editing.

On the digital recorder front, a war is about to brew among hard-disk recorder manufacturers for the hearts and minds (not to mention pocketbooks) of the post production and film industries. Otari showed the PD-80M multi-track, an 8-track



DIGITAL IS IN: The European AES was filled with new digital products, like TimeLine's MMR-8 hard-disk recorder.

machine that can simultaneously record up to four tracks. A screen display is included with the PD-80M, but the unit does not require a computer for operation. Some of the PD-80M's

in the neighborhood of around \$150,000 (US), which makes Neve digital available to a whole new market. Speaking of choices, Soundtracs showed its Virtua digital console. Aimed directly between console and tape without additional conversion. Coupled with a Sony PCM-9000 (24-bit) mastering recorder, this gives Guillaume Tell what is probably the first



dedicated function buttons include copy, cut, and paste transport controls and a jog/shuttle wheel. Studer also introduced a removable MO (2-track) recorder, the D424-2, which offers 16-, 20-, or 24-bit linear recording with the option of 20-bit converters.

Disk recorders aimed at the post-production market came from Dolby and TimeLine. Dolby premiered the Dolby Drive. Details are light on this now, but watch this space for more information. The MMR-8 is TimeLine's 8-track disk recorder that (like the Dolby unit) was designed to replace the traditional 35mm magnetic dubber. The MMR-8 is a modular recorder — up to 100 of the units can be synched together and generate or chase to SMPTE (linear and VITC) or biphasic sync. TimeLine supplies the MMR-8 with a 2.0 GB removable hard drive and a 2.6 GB magneto-optical drive, making the switch from project to project much less of a hassle than with non-removable disk recorders.

In comparison to the U.S. shows, where project recording is starting to dominate the floor, the European AES still is populated mostly by buyers from major studios and national broadcasters and, not surprisingly, the product mix remained tilted toward the high-end of the marketplace. Still, two companies introduced recorders that use the MiniDisc format for data storage. TASCAM introduced the MD-801R, a 2-track recorder, and Yamaha introduced the MD4 multitrack.

But for those gossiping outside the exhibition hall at the convention bar (yes, this civilized society serves alcoholic beverages even at the booths), the big news is the coming world of DVD. Will it be 24-bit/96 kHz? Will it be surround? Will it be both? Everyone on the show floor had their own opinion, though there seems to be an emerging consensus that we (our industry) need to give the consumer (our customers) "what they want," which means multichannel to most of those who were surveyed between sips of Tuborg. The most intriguing projection came from industry sage Paul Gallo (our publisher), who maintains that a multichannel DVD format may, in fact, be the biggest boon to our business since CD-remastering. Imagine, all the business in store for studios equipped to remix record archives for a six-channel format.

Maybe we should have been paying more attention to the multichannel-capable boards. Oh well, there's always Los Angeles.



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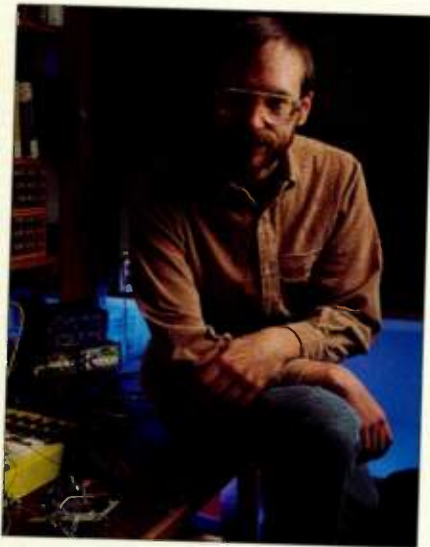
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EQ JUNE 39



# Dust Off Your Two-Track



How to get perfect analog tape compression for digital recording using stuff you (probably) already own

BY CRAIG ANDERTON

If you've been trying to get true analog-tape sound out of your 8-track digital recorder or hard-disk recording (HDR) system, you're gonna laugh when you read this column. You can get a true analog sound more easily than you think, and, no, it doesn't involve the messy process of syncing a digital deck with an analog tape deck.

Before we reveal The Big Secret, here are some specifics to whet your appetite:

- True analog tape sound — not a simulation or “emulation”
- Comparatively inexpensive (\$500–\$700)
- Ability to provide sounds of different tape types

- Variable tape compression effects, from light to extreme
  - Unlimited undo if you decide you didn't get it right the first time
  - True stereo processing
- ...and what would *you* pay for a signal processor that does all this? Well, read on.

## THE SECRET SIGNAL PROCESSOR

The secret ingredient is a three-head analog tape deck. This can be anything from a cassette deck to a spiffy Otari 2-track. I use a TASCAM Model 32, which you can pick up used for a reasonable price (ever since DAT hit, the price of used 2-track reel-to-reel decks has plummeted in musical circles; although I'm told reel-to-reel remains popular in the broadcast industry).

Fig. 1 shows how to patch the reel-to-reel deck into your system; here's the step-by-step procedure.

1. Feed the already-recorded 8-track digital recorder or hard-disk recording tracks you want to “analogify” into the reel-to-reel recorder inputs.

2. Send the reel-to-reel outputs (monitor from the playback head) to two open 8-track digital recorder or HDR tracks. Set these to record.

3. Load a reel of analog tape with the preferred sonic characteristics.

4. Put the reel-to-reel into record mode and roll tape.

5. Start recording with the 8-track digital recorder or HDR. The tracks to be

processed play into the reel-to-reel, while the open tracks record the processed sound.

6. Do a trial run and adjust the reel-to-reel input level for the desired amount of crunch. Remember, you have to monitor from the playback head for this to work.

7. After getting the sound you want, rewind to the beginning and transfer the tracks for reel — er, I mean, real.

We're not done yet, though, because the “crunched” signal will be delayed compared to the original, noncrunched track. No problem: use the 8-track digital recorder or HDR track-shift function to compensate. Eight-track digital recorders can delay but not advance tracks, so you have to delay the straight tracks to line up with the crunched tracks.

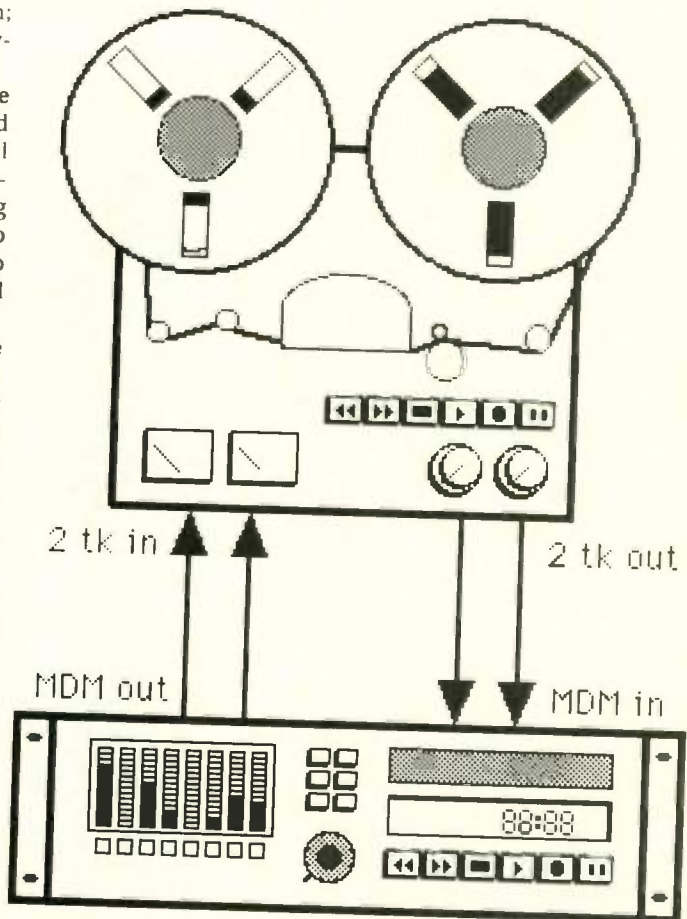


FIGURE 1



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## MI INSIDER

With HDR, you have the option of advancing the crunched tracks in time rather than delaying all the straight tracks.

Monitor the crunched and non-crunched versions mixed together, then offset the original tracks until they line up with the crunched tracks (you'll hear a "flanging" sound as you get closer; go for the flanging "null" point). Now mute the original tracks, and you'll be left with pure analog tape sound. You need to figure out the appropriate offset only once, unless you change speeds on the reel-to-reel.

I did this with an ADAT/BRC combination and found that the right delay time for a TASCAM Model 32 was about 75.3 ms at 15 ips. I also discovered the wonders of flanging via track delay, but that's another story for another time.

One more tidbit: Delay effects obtained by mixing the straight and processed sounds together can sometimes sound very cool. I generally prefer having the straight sound hit late compared to the processed sound.

### NOW, THAT DIDN'T HURT AT ALL

Not only is this technique simple, it allows your 2-track to once more be a productive citizen of your increasingly digitized studio. As a bonus, as long as you keep your original tracks, you can always go back and recrush should you decide you crunched too much or too little (this is what I meant in the beginning by "unlimited undo").

And that's all there is to it. Now you don't have to give up that analog tape sound, and, best of all, you won't erase some high frequencies every time you play it — and you can create as many digital safety "clones" as you want.

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*Craig Anderton thinks that his daughter's laugh is one of the very few sounds that's better than a 1966 Telecaster.*



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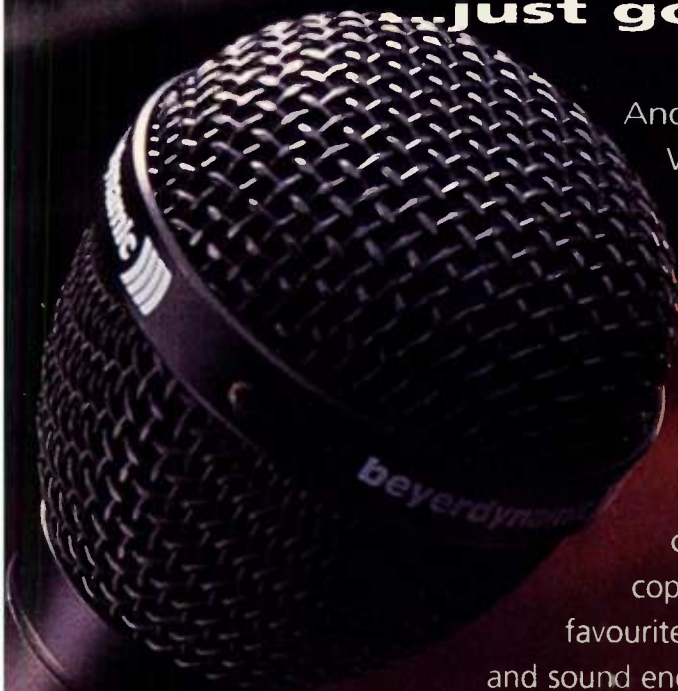
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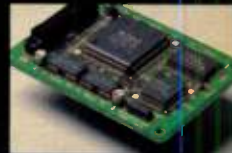
Eight primary tracks with eight levels of virtual tracks give you the ultimate in recording flexibility. Record multiple takes, edit or undo edits and compile the best parts of various takes to create the perfect track without compromise. You can accumulate up to 64 instantly accessible tracks and choose eight for final mixdown.

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The VS-880 is fully digital and has digital in and out. This makes it compatible with all your existing digital equipment, both linear tape-based and non-linear hard disk format.



The rear panel has four RCA and four 1/4" inputs, digital in/out, MIDI in/out for sync and automation, a programmable footswitch input, headphone jack, two aux sends, master outs, and a SCSI port for archiving or adding additional storage devices.



The user installable VS8F-1 Effect Expansion Board adds two completely independent stereo multi-effects processors. There are 200 patches, extensive effects including 3-D RSS capability, and guitar effects chains with COSM-based guitar amp simulator.

## Digital Editing

With the VS-880, you get fully non-destructive editing capabilities. You can copy, move, exchange, insert, cut and erase tracks. Because it functions like a word processor, you can select the perfect chorus of your song, copy it or move it somewhere else without re-recording it. Or cut out another section and have the remaining material slide over and fill the open space automatically. And if you're not satisfied with a particular edit, simply return to the previous performance. Instant locate points make editing on the VS-880 as user-friendly as it gets. For advanced applications, functions like Scrub Preview or Time Compression/Expansion are available.

## Two Digital Effects Processors

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# Just Say Yes

Getting ready to record their classics, Yes gets inspired to put down some new tracks

BY KEVIN DICKEY

Last summer lead vocalist Jon Anderson had a vision for reforming Yes (Steve Howe, Chris Squire, Rick Wakeman, and Alan White) to do some recording. Jon had just moved to San Luis Obispo, a small town in California where I had been working for ages in the local music scene (though I was priming myself to hop into Silicon Valley for a computer tech job). Through a series of circumstances, I basically got a phone call out of the blue saying, "Kevin, this is Jon Anderson. Do you want to come up tomorrow and see about helping me

put my studio together." Talk about falling into the lap. I had a great meeting with Jon and for the next month and a half or so I spent three days a week putting his studio together.

Jon's studio has a lot of gear, some of which I'd never worked with before (but I'm a fast learner). I was familiar with the console (a Mackie 32-channel 8•Bus) so that wasn't a problem. Jon and I did some recordings and then he got a deal with Windham Hill to release a project he did a couple of years prior. The recording was on tape, but had not been mixed, so I now had a chance to be his mixing engineer. That was around September of 1995, and all the while I knew in the back of my mind that the Yes thing was in progress. Jon mentioned that when Yes reformed, I'd be his tech guy.

## BANKING ON YES

Jon really wanted to do this Yes project in San Luis Obispo, and he convinced the rest of the band to come work here. His vision was to find a building and turn it into a studio for the project. Downtown we found an old bank building that had been closed for

about five years. It was an "A" frame shape with about 3000 square feet of space in the main downstairs area. The interior cavity was almost three stories tall. Upstairs (in what was probably the executive meeting room) was where we decided to put the control room. Building on Jon's home studio as a hub, we decided on 40 tracks of TASCAM DA-88 and a Mackie 8•Bus 32-channel console with two 24-channel expanders (80 inputs). Then we set about converting the main downstairs area to something that was acoustically acceptable to record and rehearse in (Clair Brothers brought in a PA system for rehearsal). At this point, it was incredibly live, so we built a huge bass trap at one end of the building, covered all of the windows, carpeted the floor, and *still* ended up with a really live room simply because it was so big.

Initially, the plan was for the entire band to show up, rehearse, and record Jon's vision of the "masterworks" of Yes (I had a feeling that Jon wanted to record it live). We'd come up with a venue, but there were some scheduling problems — we couldn't get Rick here right away with the rest of the band. Taking advantage of the space and the equipment we had put together (and I would venture to say that Jon had this in his head the entire time) it only made sense for these guys to make some new music. While they wrote and rehearsed the material for a couple of weeks, producer Tom Fletcher and I were upstairs recording everything and mixing late into the night. The next day we would get the guys to come up to the control room for a listen to get their enthusiasm going. Tom and I were getting the band comfortable and proving to them that we had the technical ability to realize their vision. Whatever the words "project gear" mean, we were recording some great stuff here in the Bank.

## YES IT IS

As we approached Thanksgiving they wrote two new songs: "That, That Is" and "Be The One." A few days before Steve left for all of December (he had other commitments) we recorded this new material, which the band tracked live. After Steve left, Tom also left, but Alan, Jon, and Chris stayed to write more new



YES MAN: Author/engineer Kevin Dickey stands backstage at Yes's recording area.



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bank. In addition to getting the band on a rehearsal schedule for the "masterworks," we started thinking about how we were going to stage a show there. The Fremont stage is 17 by 25 feet across, barely enough to hold their gear packed in the road cases! In a few weeks Steve and Rick would have to leave again, so we negotiated with the Fremont to get the theater Sunday at midnight for load-in and construction, a dress rehearsal on Monday, and then shows on Tuesday and Wednesday nights. Looking at the recording aspect, there was a small dressing room in the rear that was just big enough to fit the Mackies and the TASCAMs.

About five days before the show (the beginning of March), Monday night was changed to a performance, so there would be no rehearsal. And the soundcheck was more of a line check. We ran a Mackie 32 from a three-way snake split (monitor/FOH/recording) and had five TASCAM DA-88's. There was another Mackie 32 just for Rick's keyboards and effects (an ART Multiverb Alpha SE), which we grouped to eight busses and recorded

in 4 stereo pairs (there was a ninth track dedicated to his two Moog synths). As the producer, Tom (who also mixed FOH) was very patient with me because I was kind of green going into this whole thing. While Bill Smith ran the recording gear, I ran monitors and I'm pretty sold that I'll never be a monitor mixer again (running PAs in bars is a whole lot different). In any case, the shows went off pretty well.

The band was on fire Monday night — especially Steve. It was the first time this lineup had performed in 16 years (*Union* was totally different). Tuesday was much better sound-wise because we had Monday to dial things in. And by Wednesday we had it down. We recorded three hours per night for the three shows.

Around the middle of March, Tom and I started mixing and editing at the bank. Fortunately, the multitrack product manager at Sonic Solutions is a huge Yes fan, and he set us up with a 32-track system with 18 GB of hard-disk space. We needed the 18 GB to be able to load in 32 tracks for each of three performances of the first song: "The Revealing

Science Of God" (which runs about 20 minutes). We picked the best night — really the best night for Alan — and made that the foundation. Tom pretty much told me "Kevin go for it." Now was my chance to be the digital producer and multitrack editor. While we began postproduction, there was another obstacle looming: our stay at the bank would have to end soon because a banking company wanted the space.

It was very important to Jon that the Fremont recordings be musically and sonically the definitive recordings of these songs. In keeping with Jon's vision, there was a minimum of overdubbing — just editing. Once we had determined Alan's best performance of a song (typically Tuesday's), we used that entire performance without comping parts from other nights. And we didn't edit takes from the other nights for the rest of the band either. The only chunk of music that came from a different night was Jon's harp on "Awaken" because Wednesday night was the only good recording of the harp. But the Tuesday

*continued on page 144*

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WRB



# Demo Queen Under Fire

The queen of the daily demo uses germ warfare to help put the finishing touches on a song

BY C. REEDER

As I listen to my vocal on a demo that is due the next morning on the desk of a certain publisher, I find myself paddling down that ole Egyptian river called "De-Nial." Well, maybe she won't hear the phlegm on that low note, the nasal sounding, pinched high notes, or the way the vocal leaves you with an overall feeling of despair, like a poor soul lost, crawling along a parched, cracked desert floor with buzzards circling overhead. Yeah, right — and I'm really the Queen of Sheba and just slumming it as a Demo Queen this time around.

A lead vocal reminiscent of the death rattle in a dying man's throat is not the way to impress the publisher of a multiplatinum artist like Lucy Lovelips, who is looking for a couple of up-tempo, light-hearted, love songs to round out her latest project. Miss Lovelips is dedicating this current project to the latest escort on her arm and who in her own words is, "the greatest love of my life." Tell that to the four hard bodies before him. (Joe Scratchthroat would have been a better pitch for my current track, but he just finished mastering his new album last week and is on his way to Crete.)

A blitzkrieg of germ warfare started marching through the soft tissues of my body two days ago, and it was all I could do to round up enough Kleenex to wipe up the debris left behind from the assault. This is War!

In a last-ditch desperate attempt to clear my head and ear canals, I line up my arsenal. Let's see, I have Acetaminophen, Pseudoephedrine hydrochloride, Diphenhydramine hydro-

chloride, and a bunch of cellulose, glycol, starch, and God knows what else to choose from in either capsule, caplet, hot liquid, or the old faithful tablet form — needles not being an over-the-counter choice. I consider for a nanosecond the homeopath approach, but my gut tells me this battle needs Patriot Missiles, not Geneva Peace Talks.

The warnings are enough to scare even the most daring druggie: *Warning: Do not ingest these harmless drugs if you are pregnant* [no problem], *have*

*asthma, heart disease, high blood pressure* [only on holidays], *enlargement of the prostate gland* [not this Queen], *glaucoma, emphysema, or difficulty in urination*. Suddenly I'm feeling much, much better. And what about no alcohol (who can go to an ASSPAP party and not drink) and caution operating vehicles (guess it's the limo or taxi)?

Still, I have this demo to wrap up and it would be nice to turn off the phlegm faucet. Perusing the front jackets of the "Best That Western Medicine



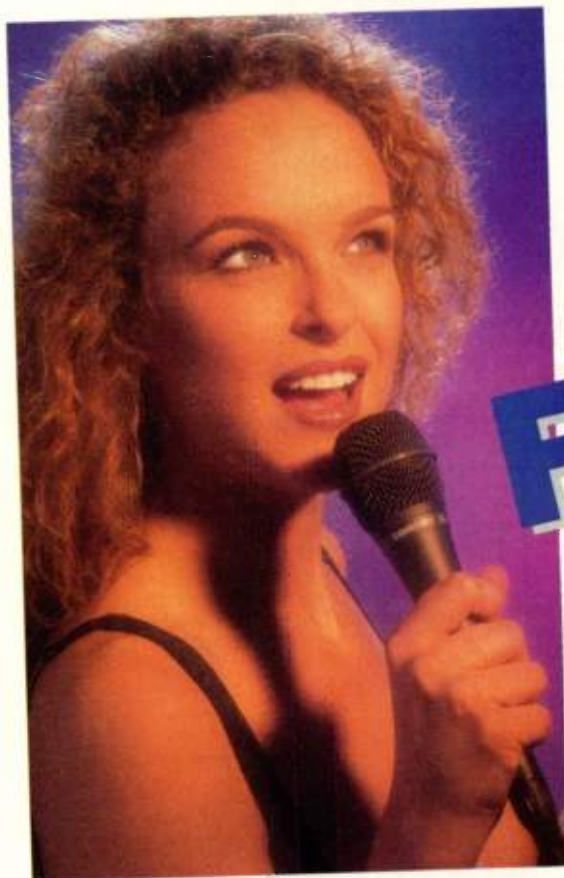
Illustration by Amy Hill

**SHE BE 'ILLIN:** Even diabolical infections cannot stop the Demo Queen.



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Has To Offer" the choices are clearer. I must decide if I have a flu, cold, severe cold, common cold, allergy, or sinusitis. By narrowing down my symptoms, which are achy, sneezy, drippy, coughy, drowsy, antsy, and grouchy, I'm not sure whether I need drugs or a fairy tale with a happy ending.

After some further study, which entails looking up my horoscope to see if I'm still alive, I ceremoniously swallow the chosen drugs with the appropriate sacrament, 8 oz. of distilled water, go to bed with a technical manual I've been putting off reading, and wait for the fog to clear.

Ten pages into, "One path goes from device A to ground via the ground terminal of the three-conductor AC power cord, but A also sees a path to blah blah through the shielded cable and AC ground of device B that blah blah blah..." I am well on my way to dreamland.

In my dream I enter my body and see ugly looking blobs of sticky, gooey monsters marching through what looks like my lungs, trudging unhampered on up into my throat and blasting into my Eustachian tubes. These monsters wreak havoc, leaving mutilated body cells in their wake and gross-looking debris. In despair I ask to no one in particular, just as Einstein did many moons ago, "Is the universe a friendly place?"

I hear the war cry "Charge," and thousands of what look like little mercurial Sergeant Yorks are riding red coruscals and carrying big bazookas to the rescue. The attack is swift and merciless. Behind the little Yorks are the rear guard, which mop up the putrid mess and throw it in little bags labeled hazardous waste. Not a moment too soon either, since my dog strategically jumps on my face demanding her daily gruel, and with a newfound vigor I arise to face the real world and the tasks at hand.

I finish the demo and it turns out pretty good and with a title like "Kiss Me Till It Burns," how can Lovelips not like it? Love is a fickle thing though, and my label spy just called to tell me that Lucy has broken up with Hard Body #5 and she's decided to finish her album with a couple of broken hearted, egy ballads. What a drag for the Queen. But never fear, the Queen will endear. I've got a tune that'll bring a tear to Lucy's eye. It's a demo I wrote after an audit by the IRS titled, "You One, Me None."

Hey ho...

EQ



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It was 30 years ago today, Brian Wilson taught the band to play. Indeed, Paul McCartney cites Wilson's pop music masterpiece as the singular inspiration for The Beatles's *Sgt. Pepper* album. This collection of symphonies in miniature has been Brian Wilson's crowning achievement to-date (he's still around and doing just fine, thank you!). And every year since 1966, people turned-on to the musical statement of a lifetime from The Beach Boy's leader are inspired to create anew. *Pet Sounds'* following verges on religion, and it is widely regarded as the perfect album.

Capitol Records has taken matters to heart with a reissue

that is easily the most intensive study of one single record ever released. *The Pet Sounds 30th Anniversary Collection* is dedicated entirely to the making of *Pet Sounds*, and out-does even Polygram's landmark *Layla* (Clapton) 20th anniversary set. Over the course of four CDs, this box set reinvents (in a first time ever, anywhere, true stereo mix), rediscovers (bunches of alternate versions), reveals (fascinating tracking sessions demonstrating Brian's meticulous studio wizardry and ear for detail), and ultimately restores this pop classic (in a 1996 mono mix newly remastered from original tapes using the latest 24-bit HDCD technology).

The best part about this is that Brian himself was heavily involved in the production process alongside engineer and production whiz Mark Linett, ensuring a level of quality and vision heretofore only accomplished by Frank Zappa in his 54-CD library restoration.

#### **DID THE '50S END IN 1965?**

John Sebastian recently commented during his J-Band concert tour that to get to the '60s one really has to jump ahead to 1964. It is fair to say that *Pet Sounds* marked a crossroads of the '50s and the '60s musical culture, as the last remnants of '50s and early '60s influences were reinvented.

Take a look at the output



# Pet Project



The Beach Boys'

classic album

proves to be

"made for these

times"

BY MARK SMOTROFF

from that time period: The Beatles turned out a complete collection of songs with zero-percent filler (*Rubber Soul*). Dylan had gone electric with *Highway 61* and was working on the landmark *Blonde on Blonde*. Frank Zappa delivered his 2-LP debut with *The Mothers of Invention* to an unsuspecting music world (*Freak Out*) — the first two-record rock album ever. The 33-1/3 RPM LP was no longer simply a collection of singles. There was a concept to be delivered and a mood to be set. The listening experience was now two (or more) album sides long, and the effect was invigorating.

In the early '60s, Brian and Phil Spector were two of the

hottest hit makers around. On *Pet Sounds*, Wilson took LA's finest session players on a truly magical mystery tour into very real new musical spaces. A virtual "who's who" of musician-ship, time has built up the legend of the sessions.

Fortunately, tapes were running throughout most of the sessions to affirm the legend, so we can actually today hear Brian assembling *Pet Sounds*, step by step, almost a sonic equivalent of watching Michaelangelo paint.

We hear the starts and stops, the leading and coaxing of this pop orchestra to create the perfect musical statement. It's a marvel to hear Brian cut what sounds like a perfectly

good take and work the musicians to achieve — sometimes in a matter of minutes — and draw out the performances we've come to know and love.

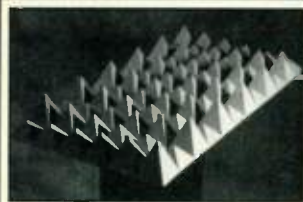
## THROUGH THE LOOKING GLASS

Let's set the "way back machine" for early 1966 in Southern California. Brian Wilson was clear minded. The Beach Boys were on the road and he was now in his safe haven of the recording studio to pursue his vision. His records were at the top of the charts and he, having the record company under his thumb, was able to do exactly what he wanted. In his quest for broad-based artistic respect, Wilson took on the



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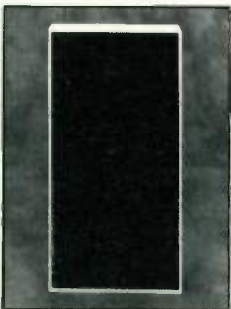
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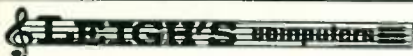
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# Pet Project



the back, facing the booth. Strings were generally overdubbed, but

if they were live, they'd be in back behind baffling.

recorded to 3-track to have some control, but it was never the intention to pull out entire tracks. The uniqueness of the blend into various mics had a lot to do with getting the tonal quality that is *Pet Sounds*.

"Brian set everyone up playing pretty much live and balanced in the room, which is why you can hear him say things like 'move a little closer' or 'play a little louder,' things you almost never hear today. It's a lost art really," Linett adds.

Brian set up the musicians like an orchestra, not a rock band. Strategically placed sound baffles created cubicles for the musicians who would sit with their backs to the side walls. Pulse-meister Blaine sat at his kit front and center without much baffling. Basses were located to his right, and behind them was an organ. Horn players were in the back against the right wall or, if there were only a couple of horns and no organ, they'd be right behind the bass.

Closest to the booth, on the left, was the guitar section, all in a row with small amplifiers facing Hal. The baby grand faced the booth while the tack piano and occasional second organ were behind them along the left wall. Percussion was spread wall-to-wall in

if they were live, they'd be in back behind baffling.

"Brian knew basically every instrument he wanted to hear and how he wanted to hear it," says engineer Chuck Britz. He called in all the musicians at one time, which was very costly. Brian would work with that instrument until it had the sound he wanted. The process often took hours.

"When Brian would come in, there were usually no charts, no written music. Everything was going on inside his head," said Britz. "A lot of times he didn't even have a title for the song. He would play it for Ray Pohlman; Ray would take what Brian was telling him and write it out. That was the chord structure. There'd be a guy in the horn section (usually Steve Douglas) who would take Brian's idea and transpose it for the other horn players."

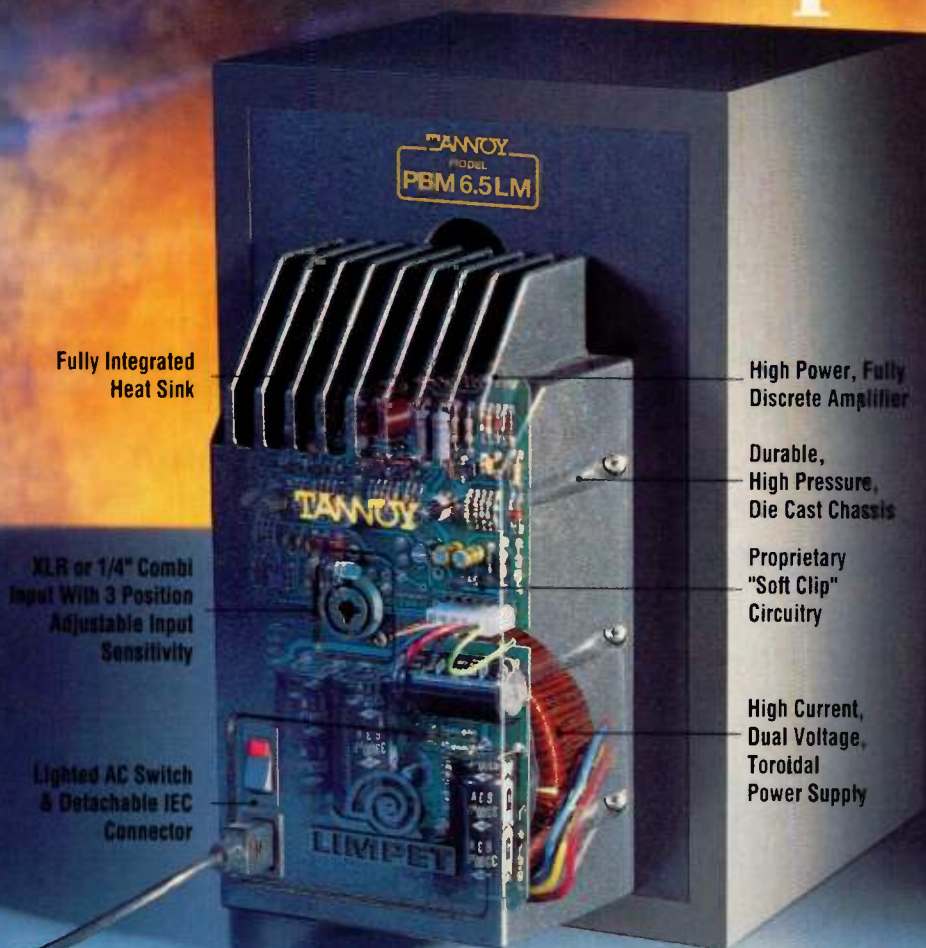
Britz adds, "Brian could go over to the piano and play what he wanted, which was great. Then, they would play it and he would finally get them to realize what he heard. He'd say, 'I want you to play such and such here. Hal, give them a beat. Tempo,' and they'd play it. That's how it worked. Step by step. All this time I was in the booth by myself, except if there were musicians in the booth going direct."



GIVING A FEW POINTERS: Brian Wilson instructs Bruce Johnson, Al Jardine, and Dennis Wilson.



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# Pet Project



The only effects used on *Pet Sounds* are tape slap and reverb. "They had a left-center-right switch," says Linett. "If you had a mic assigned to the left channel/bus, the echo send automatically went to the left echo bus, and in most cases you'd return that reverb/slap to the same bus. This meant that if you were using reverb, the bus compression was working on the whole signal, including the reverb."

"I am not sure how much they were using the live chambers versus their EMT plates, but to my ears, it sounds more like the plates rather than chambers. It should be mentioned that you get a significantly different sound from a chamber when you record it 'live' as opposed to doing it off tape, and one reason these records sound the way they do is that the reverb was being printed as part of the recording — unlike today where we'll record 'dry' and add the effects later."

"Monitors were Altec 604B's in Putnam's cabinets powered by UA amplifiers, which were basically Dynacos built into his own chassis. The tape decks were Scully four-track 288's."

A wide range of microphones was used on *Pet Sounds*. Western was equipped with Electro-Voice EV666's, AKG C60's, Shure 545's, and a few Neumann U47's and RCA 77DX's. The EV666 was the predominant mic, and the Shure 545 came in a close second.

"It varied a lot as to what got used where," explains Linett. "There were no rules, but they certainly knew what they were doing. The AKG C60 got used as a drum overhead as often as the Shure 545. Drums would typically get three to six mics. The bass would often be miked with one of the 77's. Horns would be 77's or C60's."

The tape used was Scotch 201 or 203, and the tape condition for the remastering project was excellent even though they were stored randomly and not in any controlled conditions. He says the biggest tape problems came from the splices. "On 1/4-inch tapes, the splices sometimes fall out, and in at least one case, the splice had bled and pulled the oxide off the next wrap. On the 4-track session master, the beginning of 'God Only Knows' posed a problem that I had to correct: a big

drop out caused by a splice. It was only half-a-second long,

but it sounded weird. Fortunately, I was able to lift some of the same arrangement piece from two seconds later to fill the gap."

## CREATING A STEREO PET SOUNDS

In 1966, *Pet Sounds* was only mixed in mono (the faux "Duophonic" stereo issue from the '60s does not count since that was made from a mono master tape). The process of making a stereo multitrack from the multitude of source material was no quick task.

"Recording the tracks in stereo was never a goal for Brian," Linett states in the box set liner notes. "The division of the instruments was only done with an ear toward what sounds Brian might want to highlight later."

"Like his main production influence Phil Spector (not to mention The Beatles, who were more concerned with the mono mixes up until after *Sgt. Pepper*), Brian felt that making records in mono allowed the producer to present the record exactly as he wanted it to be heard without any interference from the listener's stereo, which could be set up in many different ways. Also in those days, rock records were made

to be heard on car radios which were all mono, so the producers deliberately mixed for their main market.

"Whether the instrumental track had been dubbed down to a single track on a 4- or 8-track, the backing tracks were all premixed in mono, the technical reason why there could not be a true stereo mix in 1966 — all the instruments were locked in mono," Linett explains.

"The only way to have a true stereo instrumental track to use for this new stereo mix was to sync the vocal overdubs to the original master track. To do this, the original instrumental multitrack tape was transferred onto a digital multitrack and then, after carefully matching tape speeds of the track and vocal tapes, the vocals were manually synchronized to the track using the (1966) dubbed track on the vocal tape as a guide. The result was a single multitrack master tape of each song with all the discrete tracks that Brian recorded in 1966 in sync."

Fortunately, 99 percent of the multitracks were there according to Linett, enabling him to create this fascinating new mix.

"The object was to create a stereo mix the way we would do it today, only





using the material we had. The goal was to produce a stereo mix that was true to the original. A '60s mix for the '90s, if you will.

"It was not like on The Who reissue series where the intent seems to have been to remix things and change them around," Linett explains. "The original mix is a tremendously important part of these older records. You can improve them using proper mastering techniques and hopefully get back to the original masters as much as possible, but the notion of trying to remix them simply because 'you can' seems pointless. I've heard a couple of the redone Who records, and they sound completely different (and to my ears worse) than the originals.

"I wouldn't try to remix *Pet Sounds* in mono," Linett says matter-of-factly, "because it is the way Brian made it. It's often a dangerous job to give a remix job to someone because they'll often find something to do whether it's a good idea or not. The goal of creating a stereo mix of *Pet Sounds* was not to re-create history, but to make an interesting new experience."

Linett went back to an original Scully tape machine for the 3- and 4-track playback on the box. "They were brought as close to modern standards as possible," he explains "I used the Scully for most of the transfers and playbacks for the box set, though in some cases I used an Ampex ATR 104."

The *Pet Sounds* multitrack instrumentals and vocals from the 8-track machines were transferred to a Sony PCM-3324S digital 24-track. Remixing at Linett's project studio, Your Place or Mine Location Recording Service, was accomplished on a customized API-2488 with Flying Faders, but using the UA610 board modules as the line amps "because there is a sound to the old boards," Linett admits. "Some reverb was added, mostly plate or spring, and a little Lexicon 300. In a couple of places, I used slap to duplicate what was done on the original. I did some bus compression, mostly with an SSL or a Calrec."

The new stereo master of *Pet Sounds* was mixed on to 1/4-inch Scotch 996 using Dolby SR at 15 ips. "We didn't do any major Sonic Solutions clean up work on this project apart from some declipping. For the sessions part of the box, we did 60 percent of the editing using razor-blade tape splicing and the remainder on the Sonic Solutions system."

The project was mastered at Oceanview Digital by Joe Gaswirt, who employed a custom Neumann board with no additional compression. "We tried to keep it pretty accurate," says Linett. "Just some EQ.

"The remaster was done using the new HDCD 24-bit process, which I think makes a big difference. The detail that you get even dithered down to 16 bit is much more accurate, and the ambient stuff holds up a lot better.

"We've improved the playing field a bit with this reissue. You've got to keep these things in mind with the reissue process. The bigger the number of tracks, the harder it is to duplicate. With *Pet Sounds*, we have the advantage of having the sound that they had 30 years ago locked down. I am not trying to put my stamp on this record. I am honored to have been a part of this reissue, but I don't presume to think that I could improve Brian's masterpiece." **EQ**

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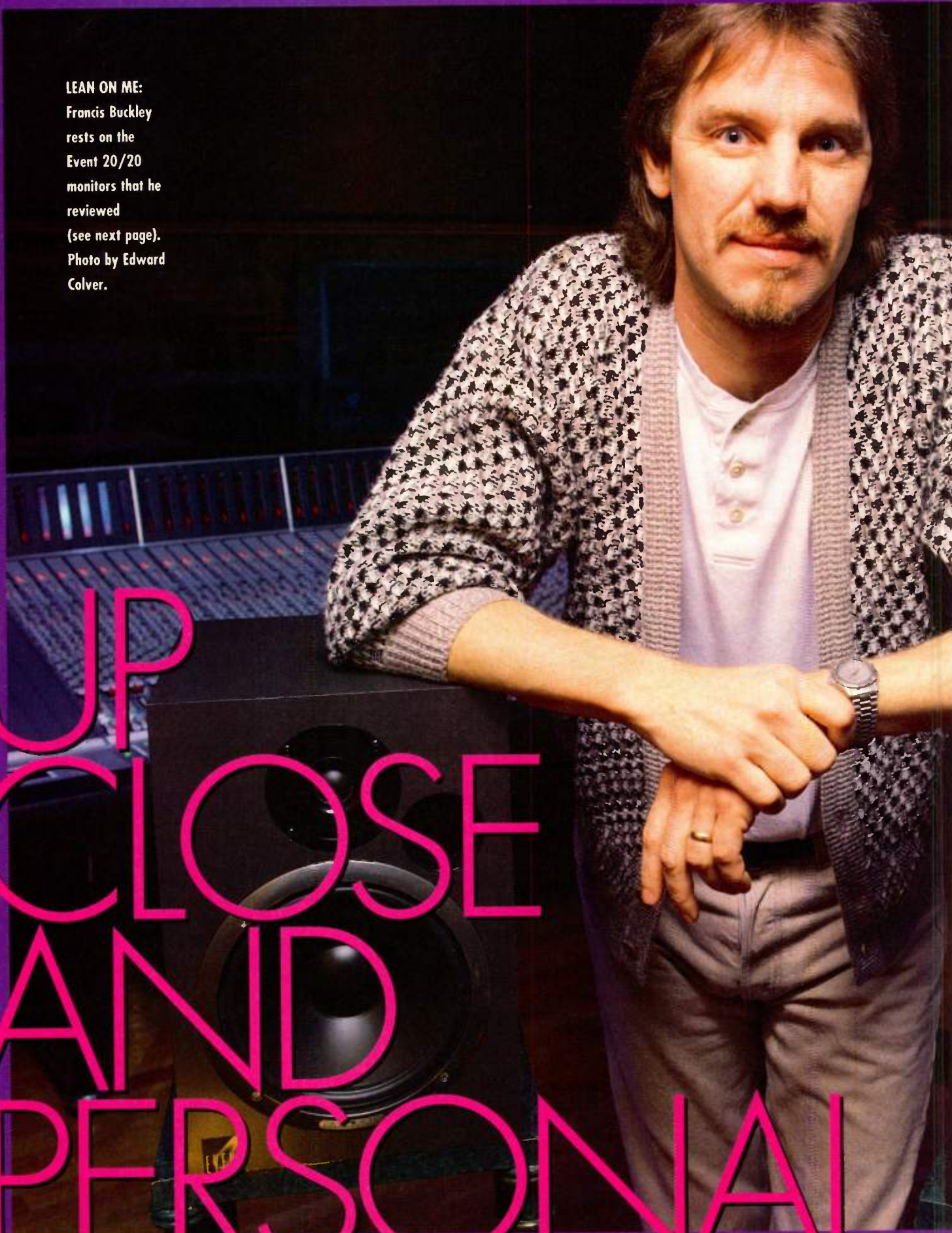
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LEAN ON ME:  
Francis Buckley  
rests on the  
Event 20/20  
monitors that he  
reviewed  
(see next page).  
Photo by Edward  
Colver.

A photograph of Francis Buckley, a man with shoulder-length brown hair and a mustache, leaning on a stack of black Event 20/20 studio monitors. He is wearing a white polo shirt under a grey and black patterned cardigan, and light-colored trousers. He has a watch on his left wrist and a ring on his right hand. The background is dark, suggesting a studio or rehearsal space.

UP  
CLOSE  
AND  
PERSONAL





# ***EQ's Second Annual Look at The Newest Nearfields***

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*"So how's it sound?" Four simple words that have no simple answer. How does it sound? The only way to know is through your headphones or your monitors. If you want to share the mix with the crowd, headphones are out. We hope you've got good nearfields.*

*If you are in the market for a new set of monitors, you are in luck. The following pages hold reviews of some of the most talked about new speakers to hit the shelves. We've also thrown in some user tips for good measure.*

*So clean out your ears and grab your favorite sound source — we're going speaker shopping.*



# UP CLOSE AND PERSONAL

## Event Electronics 20/20 Biamplified Monitor

Ever since the first pair of nearfield monitors perched themselves on the recording consoles of the world, the debate has raged and the contenders have raved about which speaker is the best, most accurate, cutest, and most likely not to give you one thing in the studio and another thing at home. As an independent engineer, I encounter, and am subjected to just about every driver, crossover network, and enclosure imaginable. Some find permanent homes in my array of gear and some find a home on a shelf in the garage. Some manufacturers overload me with technical jargon I don't understand and some let the monitors speak for themselves. I prefer the latter.

Enter a new contender: Event Electronics and the 20/20 bas biamplified studio monitors. My first comment to new contenders is always "show me your credentials." Any idiot can put two drivers in a box, solder a bit of wire to them, tout them as the most accurate studio monitors ever made, and then ask for your money. The 20/20's, though, were designed by the team of Walter Dick and Frank Kelly, whose combined credits got my attention. Walter was the chief engineer at JBL during the '70s and with Gauss during the '80s. Frank spent 17 years with UREI working on such things as the 1176. Together they developed the superb Alesis Monitor One.

The 20/20's enclosure houses an 8-inch polypropylene woofer and a 1-inch silk-dome tweeter for smooth

response out to 20k. There is a large diameter front port to help maintain the punch of your kick drum and the snap of a slap bass.

On the back of the cabinet are combination XLR-1/4-inch input connectors and continuously variable high- and low-frequency controls for tailoring the speakers to your liking. The internally mounted amplifier consists of two separate amps — a 130-watt amp driving the woofer and a 70-watt amp for the tweeter. The crossover is set at 2500 Hz/24 dB per octave. According to Frank Kelly, the crossover is "designed using tight tolerance audio-grade components for accuracy and longevity." The boxes also offer an input sensitivity control and LED clip indicator.

I used the 20/20 bas system while remixing "Slow Jams," the second single from the new Quincy Jones album, *Q's Jook Joint*. My usual mixing setup is Genelec 1031A's and Yamaha NS10M's. Frank Kelly called to see if I would give the 20/20's a listen. The initial listening was very impressive. The sweet high end and the massive tight bottom made me think I was listening to a much larger cabinet. The smooth mids and accurate imaging make the speakers easy to listen to, and that's important if you're spending long hours in front of them.

"Slow Jams" provided me with a full complement of instruments and voices to send through the 20/20's. The slow R&B ballad featured Babyface, Tomia, Barry White, and Portrait on vocals. Plus, it had real acoustic drums as well as drum samples; two basses (not sampled); guitars; keyboards; and a 14-player horn section, including tuba and flute.

I pounded the speakers pretty hard, and was unable to make the woofers pop or hear any clipping in the amps. (Frank attributes this to the

"nonaudible, yet prudent protection circuitry," via a circuit breaker.) There are other powered monitors on the market that offer protection circuitry that restricts your ability to crank them up, but the 20/20's were able to handle all the juice the console could deliver because they utilize linear power amps with sufficient headroom. The amps are rated for continuous power, not short term peak power, which makes them basically bulletproof under normal operating conditions.

The most enlightening moment came when I took the mix to mastering. I always master my projects at Grundman Mastering in Hollywood. I gave the tapes to Bernie Grundman and he put them on and did his initial listen. Generally during mastering there is always some degree of EQing, a little top for air and a little bottom for warmth, but for the first time ever with one of my mixes, Bernie turned to me and said, "I don't think you need any EQ on this, maybe just a little limiting to fill the meters."

Now I won't say that the 20/20's are 100-percent responsible for the outcome of the mix, but if you're building a house and you don't have an accurate tape measure, you're going to end up with a most unusual looking house. There is no such thing as the perfect speaker and no single speaker will hand you a perfect mix. When I mix I try to have as many reliable types of speakers around as possible. The Event 20/20's will be a welcome addition to my mixing speaker array.

—Francis Buckley

**Price: \$999, powered version (as auditioned); \$399, passive version. For more information, contact Event Electronics, P.O. Box 4189, Santa Barbara, CA 93140-4189. Tel: 805-566-7777. Circle EQ free lit. #121.**

### EVENT ELECTRONICS SPECIFICATIONS

- Frequency Response:** 48 Hz–20 kHz,  $\pm 2$  dB, ref. 500 Hz
- HF Driver:** 25 mm ferrofluid-cooled natural silk dome
- LF Driver:** 8" mineral-filled polypropylene cone w/1-1/2" diameter, high-temperature voice coil and damped rubber surround
- Crossover:** Active fourth order
- Acoustical Crossover:** 2.7 kHz
- HF Amplifier Power:** 70 watts continuous
- LF Amplifier Power:** 130 W continuous
- Protection:** RF interference; output current limiting; over temperature; turn-on transient; subsonic filter; resettable mains circuit breaker
- Dimensions:** 10-1/4" W x 14-3/4" H x 11-3/4" D



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# UP CLOSE AND PERSONAL

input gain with a unity calibration mark and click-stop.

KRK has set the gain structure of the POWER BLoK conservatively, and we found in our tests that setting the control to unity resulted in higher-than-normal settings for the console volume knob. With the control set to unity, some consoles might not be able to drive the amp hard enough to achieve desired volumes levels — so you might need to experiment with the position of the gain control. When we maxed the gain control, resulting volume levels were more typical for a given volume control position.

The Powered K•RoKs are on the lightweight side in the bass region (which can be expected of a monitor this size), but make no mistake — these things can rock. Although they do not produce much low-frequency response below about 60 cycles, what they do reproduce is tightly controlled and accurate. If you are a fan of sloppy bass, these monitors are not for you. Stereo separation was very good, due to the fact that the Powered K•RoKs are inherently “dual mono.” Strings and horns sounded smooth, and male voice was natural and uncolored. When pushed hard — around



102 dB — the speakers became a bit edgy on cymbals, but, in general, whatever the K•RoKs were producing was consistent regardless of volume level. Like a good monitor should, the Powered K•RoK will make any residual noise in your audio system quite apparent.

KRK has achieved a very good match with the K•RoK and the POWER BLoK. Even with the console volume maxed (far louder than we'd normally listen) and the input gain control open all the way, neither the amplifiers nor the speakers were straining or distorting. During normal use, the heat sinks ran barely warm, and even when the monitors were run hard continuously, the fins never became too warm to touch. We felt that the rear panel was not such a great place for the protect light since after initial setup, you really won't be seeing it much. For a reasonable price, the Powered K•RoK offers

clean, accurate sound and you won't have to worry about finding a power amp to match your monitors.

—Steve La Cerra

**Price:** Powered K•Roks. \$1695/pair. For more information, KRK Systems, Inc., 16612 Burke Lane, Huntington Beach, CA 92647-6496. Tel: 714-841-1600. Distributed by Group One, Ltd., 80 Sea Lane, Farmingdale, NY 1173. Tel: 516-249-1399. E-mail: krksys@msn.com. Circle EQ free lit. #123.

## S2 Multimedia HPM-4100

The S2™ Multimedia HPM-4100 loud-speaker system consists of four units: one subwoofer with integrated preamplifier and 100-watt amplifier; two satellite speakers; and a remote control module. The entire system, available in either charcoal black or computer gray, is magnetically shielded to prevent distortion on video monitors.

The subwoofer's vented enclosure contains a dual-voice coil, 8-inch treated paper cone woofer mounted as a side-firing driver. The solidly built enclosure is constructed of medium-density fiberboard (MDF), and its symmetrical design allows for flexibility in placement, such as on either side of a desk. The amplifiers are built into this unit. The subwoofer is powered by a 50-watt RMS amplifier while two 25-watt amplifiers drive the satellites. The two pairs of line-level RCA-type inputs on the subwoofer are switchable between A and B via the remote unit. There is also a microphone input via an 1/8th-inch phone plug that can be mixed with either of the other two inputs using a small potentiometer near the jack. In addition, there is an 1/8th-inch (3.5mm miniplug) stereo headphone/line out jack on the rear panel whose volume is controlled by the main volume control. All connections, power and the power switch are

### KRK MANUFACTURER SPECIFICATIONS

#### POWER BLoK:

**Amplifier Section:** 0–5 watts, pure class A; 5–140 watts, class AB

**Maximum Output:** 140 watts @ 8 ohms

**Distortion:** Less than .05% from 20 Hz to 20 kHz

**Noise:** 102 dB below full output

**Slew Rate:** Greater than 50 V/uS

**Frequency Response:** 0.5 Hz to 50 kHz, ±3 dB

**Fault Protection:** 6-second turn-on delay; DC output protection; high current limiting; 160 degrees F thermal shutoff; AC line fusing

**AC Power:** Input: 100, 120, 230, or 240 volts, 50-60 Hz

**Dimensions:** 11" H x 6.75" W x 3.9" D

#### K•RoK Monitor:

**Drivers:** 7-inch latex-coated woofer, 1-inch silk dome tweeter

**Crossover:** Passive two-way @ 2.5 kHz

**Frequency Response:** 57 Hz to 19 kHz, ±3 dB

**Sensitivity:** 92 dB (1 watt @ 1 meter)

**Maximum Power Handling:** 100 watts

**Maximum SPL:** 106 dB

**Nominal Impedance:** 8 ohms

**Dimensions:** 14" H x 12" W x 9.75" D



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Model BM15 mid-field monitor

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to the flagship M4 active main monitors, Dynaudio Acoustics delivers sonic accuracy you can trust. Try a pair today. When your work sounds more balanced, more dynamic - simply better - you'll know what top professionals worldwide have already discovered.

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located on the rear panel, near the subwoofer's substantial heat sink.

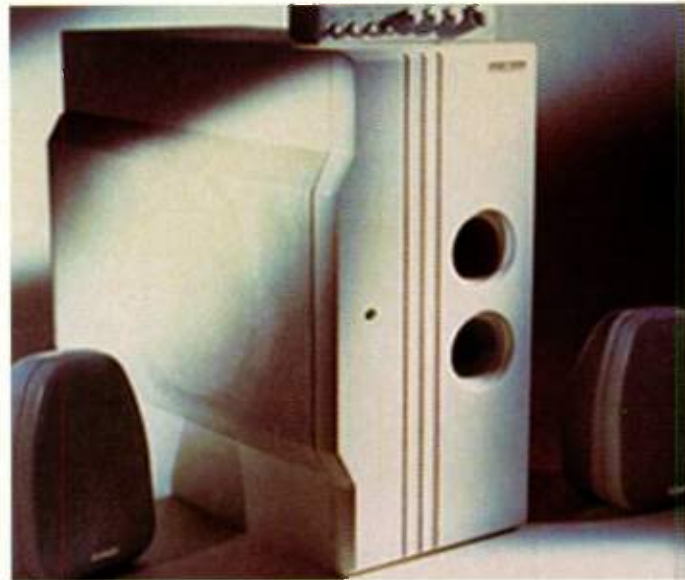
The satellite speakers are two-way units with 4.5-inch drivers and 13mm polypropylene/aluminum trilaminate dome tweeters. Their enclosures are constructed of die-cast aluminum and have 1/4-inch/20 threaded brass inserts on the rear for mounting with standard commercial brackets and speaker stands. The drivers are protected by a metal grille. The satellites connect to the subwoofer unit via spring-activated bayonet terminals that accommodate up to 12-gauge wire. All input and output connections are gold plated.

The remote control module is a small plastic box that provides control of volume, balance, bass, treble, 3DSP™ (more on this later), input (A or B), mute, and loudness. It does not affect microphone mix as this is controlled by a small potentiometer near the microphone input. (This will probably not matter to the large majority of users who may never need to plug a microphone into the unit.) The remote control module is conveniently small so that it can be placed anywhere on a desktop out of the way. It connects to the subwoofer unit via an included cable that is plenty long for most situations. The remote module is far more convenient than adjusting knobs on the subwoofer unit (which may be on the floor behind the desk) or on the fronts of the speakers. The package includes small rubber feet for the control unit for desktop mounting and hook & loop tape may be used for under-desk (or monitor) mounting. The control box can be mounted in the standard 5.25-inch half-height drive bay found on most computers.

A nice touch is the included slot cover with a connector for attaching the control cable to the subwoofer unit. Inside the PC, the back of the slot cover connector attaches to the rear of the control module via a ribbon cable. This ribbon cable is not shielded, but it carries only control signals (no audio) and is not susceptible to noise and interference. All necessary hardware is included for mounting inside a

PC. The control cable is a standard 9-pin D-sub (i.e., straight-through serial) computer cable making it easy to buy an extension if needed.

Setting up the system was straightforward. All of the connections are clearly labeled and all necessary cabling, even speaker wire, is included. All included cabling is ten feet long, which should easily cover most installations. The satellites were placed about four feet apart at slightly above ear level. Several subwoofer positions were tried both for conve-



nience and sound quality. Since the subwoofer crossover frequency is 130 Hz, it ventures into the range of frequencies that can be located by the ear. For this reason, the final test position was on the floor underneath the desk and somewhat centered near the wall. This position was chosen for the smoothness of the bass response provided by the floor-wall corner-loading and the fact that any sounds generated that would divulge the location of the subwoofer would show up in the center of the stereo field. The control module was carried to a few different listening positions and now sits underneath the computer monitor. To test the magnetic shielding, one of the satellites was held near the computer's screen. It caused absolutely no distortion on an otherwise magnetically-sensitive monitor; even when held face-to-face with the glass.

All controls except microphone mixing level and power are located on the front of the remote control unit. The power switch's otherwise inconvenient location is not an issue as the system features a power-saving "green" mode that makes turning the unit on and off unnecessary. The unit



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# UP CLOSE AND PERSONAL

turns off automatically in the absence of input signal and turns on when a signal is present. A notable feature is the lack of speaker pops when the unit's power is turned on and off.

The first switch is to activate the 3DSP feature. With this switched in, the stereo image seems wider and a bit brighter. This feature is similar to that found on other units and provides a "pseudosurround" sound. Though the sound stays musical, the imaging is sacrificed a bit with a slightly smeared center image and an increase in out-of-phase information. This increase in out-of-phase information tends to exaggerate the reverb present in a recording.

The second switch chooses which of the two line inputs are selected for listening. This could be useful in a number of situations; for instance, switching between two VCRs or a PC and a VCR.

The third switch brings in the loudness equalization — the standard loudness function that boosts the low end for low-volume listening.

The mute button is handy when it is not convenient to stop the sound another way. The mute features a Soft On and Off so that it does not pop or click when engaged or disengaged. The sound fades out quickly enough as to go quiet virtually instantaneously, but not so fast as to pop. Likewise, the fade up when unmuting is fast enough to not pop, but it is not startling.

The bass and treble controls are standard with  $\pm 12$  dB control at 100 Hz and 10 kHz, respectively. The tone controls have a center detent, making it easy to find the "flat" setting without looking. During the listening tests, it was found that the speakers sound good with the knobs set flat.

The balance control also has a center detent and provides a smooth range of control. Rejected-channel attenuation is good when the knob is at an extreme. The volume knob is larger than the other three and is conveniently located at the end of the line.

There is no need to pinch a little knob among others to change the volume. With the knob turned all the way down, no leakage was heard, even with loud sources.

A variety of CD tracks of various musical styles were used in the listening tests. Since these speakers are billed as multimedia speakers, some computer games, CD-ROM-based encyclopedias, and a movie played from a Hi-Fi VHS deck also were used in the testing. All listening tests were performed with the tone controls set flat, loudness off, and 3DSP switched out.

These speakers sound quite good with music. They really shine with vocals and anything else going on in the mid to upper midrange. This makes for very good imaging. As with any low-frequency speaker or subwoofer, it took quite a bit of experimentation to find the ideal location for the subwoofer. The ideal spot was found in the under-desk location previously mentioned. The first location on the floor next to the chair provided a somewhat "bonky" bass that left some holes in the bass response. Placing the subwoofer in the leg space underneath the desk was an improvement in the frequency response range, but it was still "small" sounding. Though the subwoofer unit is magnetically shielded and could be mounted on the desktop, this position was not tried as it would occupy significant desk real estate and its proximity to the listener would probably cause the bass to be overwhelming. There is no separate subwoofer volume control and the bass control would not provide the necessary control in such a situation.

When the ideal location was found, the bass response smoothed out dramatically. Previous holes in the bass response were filled and transition between subwoofer and satellites was quite transparent. Some people who listened while seated in front of the computer screen (the sweet spot in this test) were unable to locate the subwoofer unit without listening for it specifically.

The speakers did quite well with a variety of musical selections and styles. Male and female vocals are reproduced with surprising clarity. Classical and symphonic music also fared well. The response is nicely balanced throughout the spectrum. Only once was a problem with the speakers found. While listening at high volume (Yes, these things can crank if needed!)

to a techno CD with a synthesized low end, the subwoofer delivered a couple of noticeable pops trying to reproduce some near-sinusoidal lows around 30 Hz. This is understandable, as very few speakers would have done well in this high-volume situation, especially "multimedia" speakers. Backing off the bass slightly eliminated the pops, but still delivered plenty of gut-pounding low end. A selection of tracks from a couple of film soundtracks did well, even with their extended low end. Again, the response was smooth and the crossover points were not readily noticeable. Their sound reproduction was very impressive, indeed.

As far as woofer/satellite combinations go, this system sounds great. Given these are billed as multimedia speakers, they sound phenomenal. The speakers were playing CDs during the entire writing of this evaluation. When properly set up, these speakers can provide hours of enjoyable listening without ear fatigue. —Marc Farly

**Price: \$599.** For more information, contact Diamond Audio Technology, Inc., 3030 Pennsylvania Avenue, Santa Monica, CA 90404. Tel: 310-582-1121. WWW: <http://www.diamondaudio.com>. Circle EQ free lit. #124.

## Dynaudio Acoustics BM15

Dynaudio Acoustics' BM15 is a passive, two-way nearfield monitor with a 210 mm (8.4") woofer and a 28 mm (1.12") tweeter that is designed for console-top placement. The BM15's are supplied in mirror-image pairs and the cabinets can be placed with the tweeters on the outside or the inside according to user taste. (Dynaudio recommends vertical orientation of the cabinets in order to obtain proper tweeter dispersion. The cabinets should be positioned so the tweeters are slightly above the listener's ears. Also recommended are a solid set of speaker stands that can provide a slight forward tilt.)

The one-page owner's manual for



## DYNAUDIO BM15 SPECIFICATIONS

**Dimensions:** 435 mm H x 270 W x 335 L  
(16.96 x 10.53 x 13.06 inches)

**Weight:** 10 kg (22.05 lb.)

**Max. Recommended Amplification:** 1000 watts per channel

**Long-Term Power Handling:** 250 watts

**Sensitivity:** 88 dB/W/m

**Typical SPL @ Mix Position:** 108 dB @ 1.25 m, both cabinets driven

**Frequency Response:** 40 Hz to 20,000 kHz,  $\pm 3$  dB

**Max. THD:** Less than 0.1% @ 88 dB

**Crossover:** 2-way passive at 2.5 kHz

**Nominal Impedance:** 4 ohms

the BM15 stresses that they should be "broken in" at a moderate volume for 24 hours prior to serious use. The reason for this is that materials used to manufacture the drivers (plastics, adhesives, etc.) need to be brought to operating temperature for a certain period of time in order to "cure" the drivers. According to the manufacturer, these drivers can handle peaks of 1000 watts *each*, and a pair of speakers are capable of a maximum SPL around 108 dB. In addition to the aforementioned drivers, the front panel also holds a small port. On the rear panel are a pair of gold-plated, five-way binding posts that are spaced to

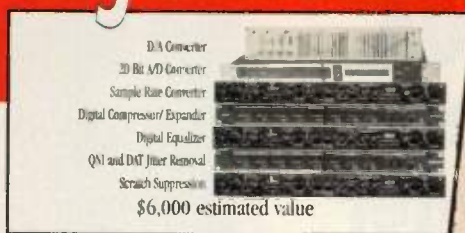
accommodate dual-banana connectors. The cabinetry is finished in black wood-grain with a removable black cloth grille. We auditioned the BM15's with the Hafler trans•nova 9505 and Bryston 3B amplifiers.

By the time we had received our pair of BM15's, the folks at Dynaudio had already run

them for about 20 hours. Whether or not the speakers had been fully broken-in, it was immediately apparent that this is a quality monitor. High frequencies were clean and extended, and, for the cabinet size, bass response was surprisingly solid. The BM15 is capable of producing a decent amount of "chest factor" — the ability to make you feel kick drum and bass guitar sounds.



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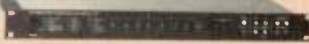
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# UP CLOSE AND PERSONAL

The BM15's cabinet is physically deeper than the average bear — and this must be at least partly responsible for the extended bass response. The cabinet's footprint actually outsized the shelf above our console (in depth), but it didn't present any problems. If you're worried about teetering tweeters, the BM15's can be mounted on audiophile-type stands that raise them up above the console and put the tweeters at proper height.

The BM15's provide excellent imaging and are capable of revealing quite a bit of detail without sounding sizzly or taking your head off, giving it a plus in the "tracking monitor" category. When recording live drums, room ambience was clearly audible on mics that were used to close-mic the snare drum and hi-hat. Differences in sound with or without the front grilles were very subtle — the highest frequencies were a hair less pronounced with the grilles on.

Included with the BM15's are a pair of round foam plugs designed to be inserted into the ports as a means of modifying the bass response. Dynaudio suggests experimentation with and without the plugs when the speakers are free-standing, but recommends inserting the plugs when the monitors are placed in front of a wall or near a corner. They do make an audible difference in the sound of the monitor. In general the BM15's produce a tight bottom-end that can be maintained by using the plugs in certain situations.

You might recall from your physics lessons that placing a monitor near a boundary will reinforce the bass response. Placing the BM15 in front of a wall will do precisely that, but the problem is that now the bass will be over-exaggerated. Put the plugs in, and the BM15's low-frequency response becomes more tight and less flappy (if you need low-frequency response flat down to 35 Hz, consider adding Dynaudio Acoustics' Active Bass Extension System subwoofer).

In general, the BM15's will play as loud as your common sense will let your ears tolerate. But, unlike a lot of monitors, the BM15's don't sound like they are getting squeezed when you turn up the volume. We also noticed that their tonal character really doesn't vary much with changes in playback level, which made them easy to mix on.

Dynaudio emphasizes that these monitors require a serious power amplifier — which should be a consideration whenever purchasing speakers of this caliber. Amps such as the Hafler trans•nova 9505, Bryston 4B, Crown Studio Ref 1 and 2, or the Chord 1032 are suggested as units that are up to the task (the 4-ohm cabinets want to see at least 150 wpc). Run the Dynaudio BM15's with a major-league power amp and they will reproduce the transients and dynamic range of your music, giving you an accurate reference monitor for both mixing and tracking.

—Steve La Cerra

**Price: \$1599/pair. For more information, contact Dynaudio Acoustics Limited, distributed by Audio Exchange International, 357 Liberty Street, Rockland, MA 02370. Tel: 617-982-2626. Circle EQ free lit. #125.**

## Tannoy AMS210A Powered Subwoofer

There is no better application for a self-powered loudspeaker than to deliver subbass. This is where the damping factor (an indicator of the amplifier's ability to control the movement of the driver and usually limited by the cable between amplifier and loudspeaker) of the amplifier is most important and where the greatest amount of amplifier power is usually required. Placing the power amplifier right at (or in) the subwoofer can be the most efficient and reliable way to achieve high-quality subbass. Understanding this, Tannoy has added the AMS210A subwoofer to its new line of

powered monitor loudspeakers while maintaining its focus on quality in sound and construction.

The AMS210A employs two 10-inch drivers in individual chambers that share a common port in a single, integrated cabinet. The result is a low profile and relatively compact unit capable of significant output to below 30 Hz when connected to a line-level source. The amplifier section includes a range of input connections (unbalanced RCA and balanced Neutrik Combo XLR/phone jack) and crossover settings to allow this unit to interface to both high-end domestic equipment and professional audio gear. There is a level control that covers a wide range of monitor output levels and a polarity switch to compensate for errors in wiring.

The unit is intended to sum to mono the subbass derived from a stereo signal but send a high-passed stereo signal on to your full-range loudspeaker amplifier. This allows a single unit to be very effective in providing subbass for a stereo monitor system. Mono subbass will suffice for most studio monitoring and other playback applications, and is typical of most home theater setups. However, for those that insist on stereo all the way to the infrasonic depths of audibility, a pair of AMS210A's should suffice.

The internal crossover provides line-level outputs for sending the stereo audio signal (sans subbass) to



your studio monitor amplifier and two controls allow you to adjust the crossover frequency. You can even select asymmetrical slopes, as the low-pass and high-pass frequency controls are separate. A switch can bypass the low-pass filters if you already have a



crossover with a subbass output. There is another switch to select the optimally flat response by using an internal EQ or bypassing the filter, leaving a bump in the response at the resonant frequency of the system. There may be circumstances where this latter switch is useful, but I found that the best results were achieved with the EQ switched in.

The important thing is that all of this control allows you to make the best use of a very good sounding subwoofer. The punchy output of this unit is just the thing for regaining the excitement of a good mix — something often reserved for those with access to big studio monitors. Now your nearfields can achieve the same apparent size and allow you to keep track of the good and bad things going on in the low end of your mix. For many studios that rely heavily on their nearfields, the AMS210A will give them the confidence that not only is the mix happening, but that they haven't overlooked any thumping or rumble that nearfields usually miss. They also reduce the strain placed on nearfields when trying to live up to the needs of modern recording bandwidths.

Be forewarned that Tannoy expects the user to be sensible, and so therefore did not include protection or limiting (which can potentially distort the output of the amplifier). This also requires the user to take a little care when making connections or soloing tracks with the monitor system on.

My preference would have been for a more heavily damped response that would offer a little more tightness, but clearly the AMS210A is optimized for the punch needed to reproduce rock/pop music. However, if carefully adjusted to balance with the full-range loudspeakers, it is capable of making all music genres sound natural and clear. The tendency to accentuate the punch does not mask the ability to hear notes or detect timbre, and the output level capability is sufficient for all but the most extreme monitoring applications. Be careful when you try out the AMS210A, it can shake-test all the gear in your project studio and may leave you breathless.

—Wade McGregor

**Price: \$2195/each. For more information, contact Tannoy/TGI North America, 300 Gage Avenue, Kitchener, ON, Canada N2M 2C4. Tel: 519-745-1158. Circle EQ free lit. #126.**

## TANNOY MANUFACTURER'S SPECIFICATIONS

**Frequency Response:** 29 Hz to 110 Hz

**Maximum Peak Output:** 119 dB SPL

**Maximum Continuous Output:** 114 dB SPL

**Amplifier Power:** 180 watts continuous (at 4 ohms); >200 Watts peak

**Bandwidth:** 10 kHz

**THD+Noise:** 0.05%

**Signal-To-Noise Ratio:** 100 dB

**Power Consumption:** 30 watts at idle; 250 Watts at full power

**Input:** XLR and 1/4" phone jack combo or RCA

**Crossover Slopes:** 24 dB/octave (electro-acoustic) low-pass; 12 dB/octave (electronic) high-pass

**Dimensions:** 14" (36 cm) H x 25" (64 cm) W x 24" (61 cm) D

**Weight:** 110 lb. (50 kg)

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# UP CLOSE AND PERSONAL

## JBL 6208

JBL has not in recent years been a name widely associated with nearfield monitors. In addition, the concept of a powered JBL monitor was something even more remote. But there they were sitting in the studio, five powered JBL 6208's that arrived for me to use for a 5.1 surround sound mix (5.1 separates the signal into left front, center, right front, left rear, right rear, and separate subwoofer speaker channels).

The 6208 is a biamplified 2-way speaker system utilizing an 8-inch, long-throw woofer and a 1-inch titanium tweeter. Their crossover point is at

alternative. The JBLs did indeed make it easy for us to set up the rather complicated 5.1 surround mix thanks to their easy-to-interface, built-in amplifiers, which featured dual 1/4-inch and XLR inputs. However, first impressions upon power-up were that the 6208's sounded a bit "boxy"; that is, they seemed to have a lot more output in the lower midrange around 500-800 Hz than we were used to listening to. We got over this in about five minutes, however, and proceeded mixing for the better part of a week without ever having that sentiment arise again.

The mixing for Joe Houston's 41st album was done at Chick Corea's Mad Hatter Studios. We utilized ADATs as the signal source, sent through a wonderful vintage Neve 8078 onto both a Studer 1/2-inch (at 30 ips) and DAT. Joe's band consisted of drums, bass, guitar, piano/organ, Joe's tenor or alto sax, and vocals — plus the occasional harmonica solo. We also mixed several other songs by four other artists to get the feel of these monitors, some using extensive percussion, strings, loud, grungy guitars, lots of background vocals, and even an accordion. In short, we played just about every type of instrument through these speakers and they reproduced

them with flying colors. After our initial trepidation, we had very little trouble getting used to the 6208's, and just about forgot that they were there.

Now before you get to thinking that these speakers are the end-all, let me remind you that up until this point we were monitoring in 5.1 surround sound,

which, in my opinion, is the end-all for music mixing, so this isn't exactly a fair comparison to what you'd use in a normal stereo configuration. Surround gives you more depth, dimension, and clarity, and having five speakers (plus the soffit-mounted TAD's as a subwoofer) means there's always plenty of volume and low end if you need it, so this was not exactly a fair test. Then I discovered that I had to remix several songs in stereo (the surround mixes and stereo mixes are not compatible).

I had already done the stereo mixes of the latest album by Blues legend Joe Houston using a pair of Tannoy 10-inch Super Golds with custom Mastering Lab crossovers, and engineer Dennis Moody and I had been very happy with the results. It was with some reluctance that we switched to the JBLs, but since we needed five speakers and there were only two Tannoys, there was really no

get, so I insisted that the Tannoys be put back up for a reference. The Super Golds that we had so trusted before now sounded unbelievably wrong. Once again, it was a midrange thing, with the Tannoys having too much of a "honk" at about 2k and the 6208's being smooth as silk in that area. We just couldn't get used to the Super Golds again and ended up using the JBLs with great results. We mixed two songs for the upcoming Beto Levato CD. These tunes were pretty complicated to mix, as they had lots of guitars, Hammond, Rhodes, congas and assorted percussion, and a ton of background vocals.

We mastered at the new Oasis Mastering Facility in Studio City, CA. The original mixes done on the Super Golds required some mastering help on the bottom (at 30, 60, and 125 Hz) and the top (10, 14, and 18 kHz) and a dip at about 3 kHz (which accounted for the "honk"). The JBL mixes, on the other hand, had a bit too much at about 600 Hz and required an expected bit of help at 30 Hz, 60 Hz and 14 kHz.

I liked these speakers quite a lot — especially the fact that they are powered, which makes them extremely easy to set up for a variety of applications. JBL seems to have made a heartfelt commitment to get back into the studio and broadcast markets, and the 6208's are a great first step in that direction.

—Bobby Owsinski

**Price: \$499/each. For more information, contact JBL Professional, 8500 Balboa Blvd., Northridge, CA 91329. Tel: 818-894-8850. Circle EQ free lit. #127.**



## Bag End MM-8/ELF Monitor System

One of the continual dreams of project studio owners and engineers is to find a nearfield (closefield) monitor that has low-frequency response similar to that of a large soffit-mounted monitor. Unfortunately, monitors must follow the laws of physics, which means that



true low-frequency response requires an enclosure large enough to fit a small man (or woman) inside. In other words, if you want more bottom end, then the boxes effectively become too large to fit on top of the average console.

Enter the subwoofer: an additional cabinet (or two) with the required size to reproduce that missing bottom octave and, presently, the only way to get true low end from a moderately small enclosure. The trouble with many subwoofer systems, though, is that the added low frequencies often seem out of proportion — or disconnected — with the mids and highs, therefore making the combined sound seem artificial. The arrival of the Bag End MM-8/ELF reference monitor and subwoofer combination, however, might just change the way we think about subwoofers.

The complete system consists of two MM-8 reference monitors, two DL-10E subwoofers, and an ELF-1 Integrator. The MM-8 nearfield monitor is a coaxial 2-way in a vented 17 1/2-inch x 12-inch x 8-inch enclosure utilizing an 8-inch, low/mid-frequency driver and a 1-3/4-inch, aluminum compression, high-frequency unit crossing over at 2.9 kHz. The speaker has two unique switches on the front panel. One is a three-position switch labeled "Distant/Final - NFM (nearfield monitor)/Original - NFM/Final, Distant/Original," which is a high-frequency equalizer switch designed to compensate for both the placement of the speakers ("Distant" or "NFM") and the type of program ("Original" or "Final"). There is also a front-panel polarity switch. The system is fairly efficient with a sensitivity rating of 93 dB SPL @ 1 watt/1 meter.

The ELF system (Extended Low Frequency) consists of three pieces: two 13-inch x 22.5-inch x 13-inch D10E-S subwoofer cabinets (50 lbs.; each containing 10-inch drivers) and the heart and soul of the system — the ELF-1 Integrator, which is designed to perform electronic crossover duties and low-frequency extension. The ELF-1 is a 1U rack-mount box with front-panel status indicators (low- and high-protection threshold and signal present) and balanced, XLR rear input/output connectors. There are numerous gain and frequency contour switches located behind a removable security panel on the front panel.

According to Bag End, use of the Integrator greatly reduces any phase shifting and flattens and extends the response down to as low as 8 Hz. The

designers feel that by extending the frequency response down a full octave below what is considered to be the lowest musical note (a 16 Hz low C of a pipe organ), the sonic quality throughout the audible bass range is improved.

Speaking of designers, it should be noted that the ELF system was invented by Ron Wickersham and Ed Long, the godfathers of Time Alignment, nearfield monitors, and PZM microphones.

I used the Bag End system on one project consisting of some loud, guitar-laden rock and roll, as well as on a sophisticated dance remix that required extensive overdubs of new drum machine tracks, vocals, guitars, and real percussion. Two things were very apparent with this system immediately upon the first playback. First of all, this truly is a system. The ELFs give you a smooth low end that's noticeable but not at all out of proportion, with no holes or unevenness in the response. There was a surprising amount of low end coming out of subwoofers with only 10-inch transducers. The ELFs made the MM-8's sound like they were very large cabinets. As a matter of fact, the system compared very favorably to the soffit-mounted UREI 813's in the studio — Private Island Trax in Hollywood, CA. (Although I can't believe that it was reproducing 8 Hz, or even 20 for that matter.) The second, and much more surprising thing, was that the MM-8's were extremely responsive in the high end.

I've always been a big fan of coaxial speakers, and these speakers are another good example of why. Whenever I tweaked a high-frequency equalizer just a little bit, I could really hear the difference. Acoustic percussion, such as tambourines and shakers, really came alive. Acoustic guitar, thanks to the subwoofers, sounded full and warm.

I didn't hear much difference at all with the choice of front-panel EQ switch, and finally just settled on the "NFM/Original" position. The front-panel polarity switch could be of some use if you were constantly moving these babies around.

There are some items to consider



with this system. It's not especially portable since there's a lot of gear to carry around (two subs, the ELF-1 Integrator, and two MM-8 nearfields). Obviously, that's not an impediment if you're just looking for some speakers with some real bottom end for your project studio. You also need two sets of amplifiers, which, again, is not a problem in the project studio, but can possibly be a pain when going from studio to studio. Buying this system involves making a serious financial commitment: the MM-8 Reference Monitors list for \$1888; the ELF subwoofer system for \$582 each; and the ELF-1 crossover for \$2460 (the ELF-M, a less expensive crossover with fewer features, is also available for \$898).

The Bag End system's performance is best summed up by the comments of one of the artists when I asked how he liked the mixes. "They were great! Boy, those Bag Ends really kick ass." Of course, I like to think that I had something to do with the final sound, but in any event I'll take all the help that I can get. In this case, the Bag End MM-8/ELF system was just the ticket.

—Bobby Owsinski

**Price:** MM-8 Reference Monitors, \$1888; ELF subwoofer, \$582/each; ELF-1 crossover, \$2460; ELF-M (a less expensive crossover), \$898. For more information, contact Bag End Loudspeakers, P.O. Box 488, Barrington, IL 60011. Tel: 708-382-4550. Circle EQ free lit. #128.



## Quested HQ108

Roger Quested is one of the most respected studio designers working out of the U.K. He has built control rooms and monitoring systems for some of the planet's most famous studios. Quested's move to the manufacture of smaller stand-alone speakers came relatively recently.

Quested's first small monitor was the H108, and the HQ108 being looked at here shares lineage with that compact box. The story goes that a New York postproduction facility was looking to standardize its monitoring during a studio rebuild and tested the passive H108's, which they liked, but wanted more bass. Quested had designed the boxes to be as small as possible and set about answering the request by putting the same drivers into the altogether larger box used for the active Q108, and thus the HQ108 was born.

As part of the R&D process in the development of the HQ108, Quested experimented with putting concrete blocks inside the cabinet to reduce the [interior] volume, which sounded punchier as it got smaller. He found, though, he could achieve the same [sonic] results by putting the bits of concrete on the outside and decided that making the cabinet heavy was desirable. The box is made of 25mm MDF [medium-density fiberboard] and is a mighty hefty piece of furniture that you wouldn't want to drop on your foot, rounded edges or not. The chances are that the average project studio's means of mounting speakers are not going to be up to the job — an ad hoc over-meter monitor bridge arrangement will not cut it. The HQ108's need serious and substantial support if you're to do them justice, and you really wouldn't want them to slide off and flatten your console pots and switches.

These monitors are also not what most people would describe as a nearfield in size. You're looking at a box that measures some 13 x 13 x 16 inches — closer perhaps to our perceptions of a midfield, although in practice you could use them wherever you wanted — providing you supported them well enough.

The HQ108 uses the same 8-inch driver used in other Quested models coupled to a 28mm tweeter with a crossover point at a relatively low 1.2 kHz and supplemented by two bass ports. The cabinets can be biamped and are shielded to stop interference with other gear in the vicinity. For the purpose of this audition, I drove them with a Sony TAF540E amp, although it is safe to say that the bigger and better the amp the more unrestricted the performance. High-level users ought to be driving 200–300 watts of amplification, but you can get away with considerably less if you can be trusted to exercise restraint.

The HQ108's are extremely efficient and don't take much poke to get them shouting. In fact, they can be bloody loud and more than adequate for a medium-sized studio in a residential area. They have a particularly pleasant and powerful bottom end. Yes, it's bigger than an NS10, but the expanse of the bottom end is well beyond what you might realistically expect from a box of this size. To try this for yourself listen to The Who's remastered catalog of albums — guitar rock with a well-known bias towards bass guitar that is mixed high — and you'll be able to hear the extraordinary talents of bassman John Entwistle in all their glory. Compare the HQ108's to the performance on a common garden-variety nearfield and it's as if Entwistle's gained a string. The sound is not an artificially flattering or flappy bass; it just sits there under the rest of the program in a nice balance.

I auditioned a collection of CDs and did a bit of mixing on the HQ108's and found them predictable and informative. No nasty surprises; maybe a bit pronounced in the upper mids, but nothing to lose trust in. They're extremely easy to live with. A nice stereo image as opposed to a staggering one, and fairly wide and smooth dispersion. Best of all the HQ108's have none of the over animated top end that masquerades for clarity in so many modern nearfield speakers. Even so, they remain decidedly punchy and modern in character.

A good all-round speaker, muscular enough to toss the feathers yet

accurate enough to give guidance rather than just excitement. These monitors are certainly up there with all the usual suspects in this price league.

—Zenon Schoepe

**Price: \$2130/pair. For more information, contact the North American distributor: Audio Independence, Ltd., 2120 W. Greenview, #1, Middleton, WI 53562. Tel: 608-831-8700. Circle EQ free lit. #129.**

## Audix Nile V

The Audix Nile V is a two-way system utilizing a 7-inch Kevlar® woofer and the ever-popular 1-inch cloth dome tweeter crossing over at 2.2 kHz. Audix states the frequency response as 40 Hz to 20 kHz; sensitivity rating is 87 dB at 1 watt @ 1 meter; maximum power handling capacity is 250 watts. The dimensions are 15" H x 9 1/2" W x 11" D; weight is 24 lb. each.

The Nile V's look great with a beautifully finished, black, oiled-wood cabinet and gold 5-way binding posts. When I plugged them in I was treated to a well-defined, punchy bottom end and a high end that elicited adjectives such as "gorgeous," "silky," and "elegant."

Just as a sonic reality check, I asked engineer Richard Baron at Sonora Recorders in California for feedback; after a few days he replied, "The top end on these speakers is phenomenal. They have the most sweet, detailed highs and very precise, clean imaging. You can also hear stuff in the low end that NS-10's never thought of reproducing. The Niles sound very pretty."

So the Nile V's may be "hyped" like a Hi-Fi speaker. That is, they seem to accentuate the upper frequencies. But, is this a fault? After all, aren't nearfields supposed to be a common representation of what's found in the home?

However, Richard's most telling comment came next: "A client came in as I was checking the Nile V's out on a lush ballad we had just mixed. The sound had her riveted to her chair. Before she left she told me how much she wanted a pair for her home. I agree with her. I would love a pair for my home, too." We engineers and producers can be very picky and anal about what we work on, but what we (and our clients) listen to for



enjoyment often speaks volumes more.

Outer and inner beauty momentarily aside, there are a couple of things that you need to consider with these speakers. First, they are a bit tall at about 15 inches, which can possibly block both your sight lines to the studio and the sonic path to the main monitors. Richard noted that he had to set his studio chair up 6 inches higher to get on-axis with the tweeters. You can turn the speakers on their sides, but the imaging and the bass response changes considerably.

The other point (common on many nearfields) is that while the Niles sound great at low and moderately loud levels, they begin to "honk" a bit in the midrange at about 2 kHz or so when you really get on them. They can, though, really take a pounding without failing. We were powering them with a Phase Linear 700 at about 350 watts per channel at levels up around 100 dB or so when the sound began to change. I'd venture to say that in the vast majority of cases you'd never (and shouldn't) listen to any speakers for any extended periods of time at this level anyway. It's necessary during auditions, but not a good practice in the project room or home.

I mixed a Blues ballad and an uptempo Blues jam that featured bass, drums, guitars, organ, piano Blues harp, and vocals. Then I took my mixes over to Eddy Schreyer at Oasis Mastering (L.A.) to find what the sonic reality of the Nile system actually was. Sure enough, the monitors followed the classic response of a Hi-Fi speaker with lots of top and bottom end with the mids (1 to 5 kHz) scooped out. As a result, both my mixes were guitar and vocal heavy because I had put too much emphasis on the instruments with predominant midrange frequencies. (Unlike NS-10's, which have a bump in the midrange that usually causes your mixes to be light in the midrange.)

Despite this "different" midrange response, I really like the Niles...a lot. They're very easy to listen to and ended up reasonably accurate on the low and high end, since Eddy needed to add only a dB at 60, 80, 630, 800, and 14k Hz (approximately what had been added during past mixes with my standard monitors). I look forward to using the Nile V's a lot more. —*Bobby Owsinski*

**Price: \$1495/pair. For more information, contact Audix Corp., 9730 SW Hillman Court, #620, Wilsonville, OR. Sales Office: PO Box 248, Lake Forest, CA 92630. Tel: 800-966-8261. Circle EQ free lit. #130.**



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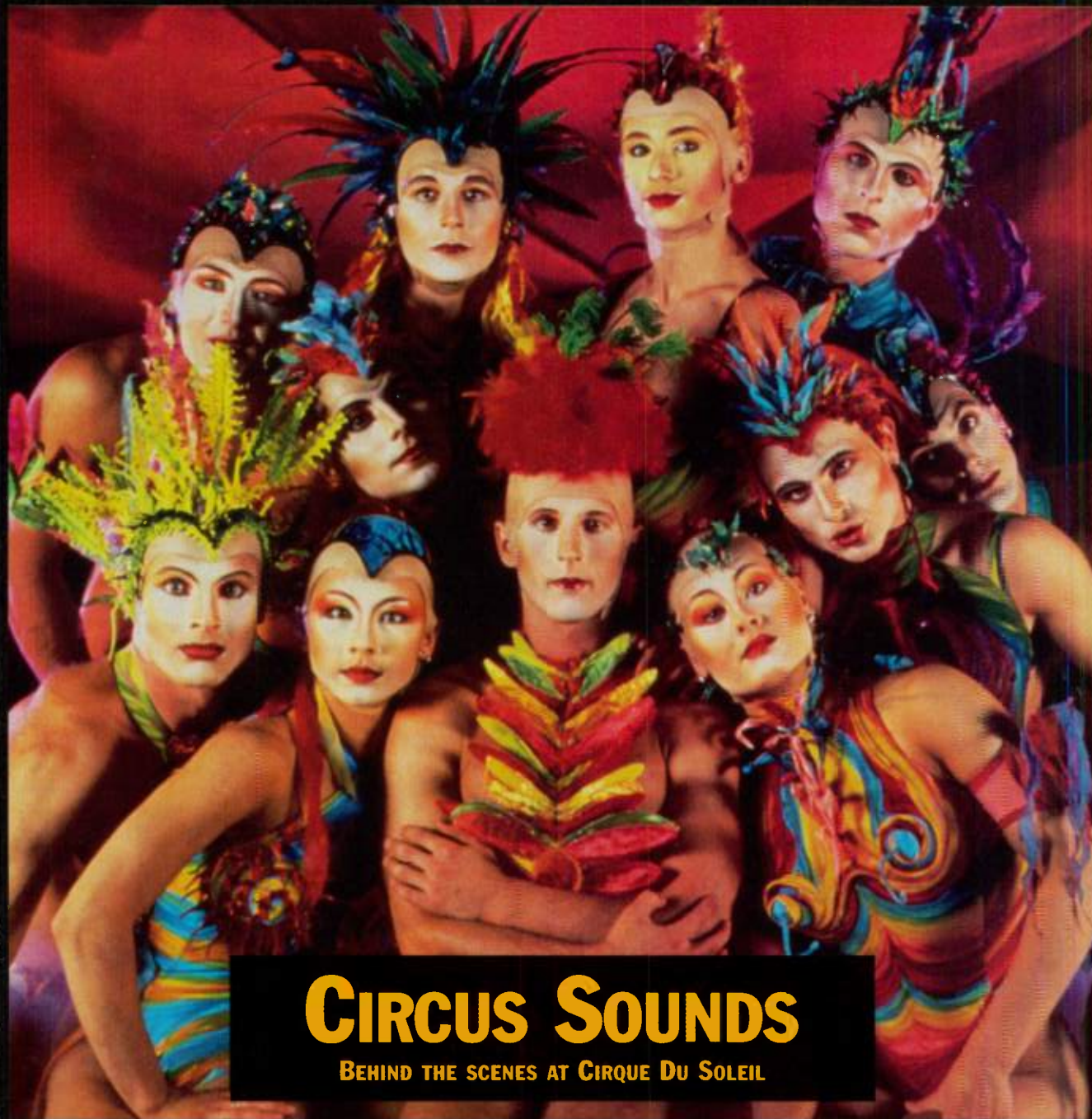
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# EQ

**LIVE**

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## CIRCUS SOUNDS

BEHIND THE SCENES AT CIRQUE DU SOLEIL



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**IF YOU'VE EVER THOUGHT OF RUNNING AWAY AND JOINING THE CIRCUS, READ THIS FIRST**

**BY DAVID LYND**

CIRQUE DU SOLEIL might best be described as contemporary theater combined with traditional circus acts minus the animals. The Cirque utilizes cutting-edge technology and unbelievable acrobatics to spellbind its audiences. The result is definitely intriguing and a great value for an evening of entertainment. There are several Cirque shows now playing around the world. One show is permanently set-up in Las Vegas, one is currently touring Europe, and another starts this spring in Tokyo, plus, there's a new North American tour that also begins this spring. Both North American and European tours travel with over 700 tons of equipment carted in over 30 trailers.

Maintaining the sound system for the Cirque Du Soleil has been one of my most challenging touring experiences to date. Until this job I had mostly found myself in nice, dry, climate-



**POLE PROVIDERS:** The Saltimbanco Pole Act is one of the unique sights at Cirque Du Soleil.

controlled venues. I started with Cirque as an engineer on a North American tour that subsequently went to Japan for seven months. The

show in Japan was set in one location in Tokyo, while the North American shows were a touring production.

## **ELEMENT-ARY**

In the world of the Cirque, all that separates the outside elements from the show equipment is a thin layer of Kevlar®, which is the material used to make the 50-meter traveling circus tent that serves as home for 12 months out of the year. A tent, of course, is not an ideal environment for a moisture-sensitive theatrical sound system. Precautions were taken to minimize the threat of rain and flooding by keeping equipment and connectors

off the ground. There were, however, problems with humidity due to the difficulty in air conditioning such a large sealed container (the tent). It meant the eventual replacement of many connectors over a two-year period.

Something as simple, and often taken for granted in concert-ready venues, as getting AC power properly established for the site was occasionally difficult. Staff electricians sometimes had a laborious time finding good earth grounding in some bizarre situations. We could be set up on anything from a parking lot to a beach to landfill. The last of which was the worst; we had



**THE BIG TOP:** Cirque's 50-meter Kevlar tent.

Photo by Al Seib



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| DP/2               | ALGORITHMS        | THMS             |                          |
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| Large Plate        | 3.6 sec DDL 2U    | Guitar Amp 3     | EQ-Chorus-DDL            |
| Small Plate        | 8 voice Chorus    | Guitar Amp 4     | EQ-Flanger-DDL           |
| Large Room         | Flanger           | Digital Tube Amp | EQ-Panner-DDL            |
| Small Room         | Phaser-DDL        | Dynamic Tube Amp | EQ-Tremolo-DDL           |
| Gated Reverb       | Rotating Speaker  | VCF-Distortion 1 | EQ-Vibrato-DDL           |
| Reverse Reverb 1   | Speaker Cabinet   | VCF-Distortion 2 | EQ-DDL with LFO          |
| Reverse Reverb 2   | Tunable Speaker 1 | FuzzBox          | Sine/Noise Generator     |
| NonLinear Reverb 1 | Tunable Speaker 2 | Guitar Tuner 2U  | ADSR Envelope Generator  |
| NonLinear Reverb 2 | Parametric EQ     | Pitch Shifter    | Distortion-Chorus-Reverb |
| NonLinear Reverb 3 | EQ-Gate           | Fast Pitch Shift | Distortion-Roto Reverb   |
| MultiTap Delay     | EQ-Compressor     | Pitch Shift-DDL  | Wah-Distortion Reverb    |
| Dual Delay         | Guitar Amp 1      | Pitch Shift 2U   | Compressor-Distortion    |
|                    |                   |                  | Flanger-Reverb           |

inputs, two outputs, and two processors the DP/2 is equally useful as two separate mono in-stereo out effects devices or as a true stereo device utilizing both processors.

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to drive copper rods 15 feet below the surface before we had decent grounding.

#### FRONT-OF-TENT

A typical Cirque FOH console has between 45 and 60 inputs and drives a computer-assisted surround system. Since we were relying only on generator power, we had one UPS (Uninterruptible Power Supply) unit supplying power to

FOH and another UPS for the band's equipment. This ensured us against power loss to computers and all electronic memory.

Because the Cirque owns its equipment and was not serviced by an outside sound company, any repairs or replacements had to take place wherever we happened to be on the tour. We really got a feel for

which manufacturers could provide immediate service.

Our monitor console once developed an internal grounding problem the day of the show, and so we had to rent a console from a local sound company while ours was being repaired. This sounds simple enough, but our requirements are pretty demanding. We split the console's 12 outputs to

six submixers onstage so that the musicians would have control over their own mix. It was a mad scramble between me, engineer Stefan Figel, and the musicians to get the monitors back online before the performance.

Radio [wireless] mics were a daily concern. Sometimes our site would be within a few hundred yards from a broadcast repeater tower. Although we did have spares standing by for the principal artists, most of the time our multiple-frequency Cetec/Vega system met the challenge. By the way, wireless receivers do have to be tuned up from time to time, as their frequencies can shift. We also all need to remember that while the connection from mic to mixer is "wireless," the connection from the mics to the belt packs (Countrymen Isomax headsets connected via Lemo plugs) is not.

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#### EQUIPMENT LIST

Cirque's Saltimbanco partial list of FOH equipment included a 56-input Yamaha PM4000 console. Outboard racks housed four reverbs (Yamaha SPX 900, SPX 90II, and REV 5 [2]); four compressors (dbx 160X); and four gates. Up to eight Yamaha D1030 system delay lines (for setting propagation delays), totaling 24 signal delays, and ten Meyer CP-10 system EQs were used. Also used were a Macintosh computer with Digidesign's G-sheet program for the effects program changes and surround system VCA levels. All reverbs and delays were MIDI capable.



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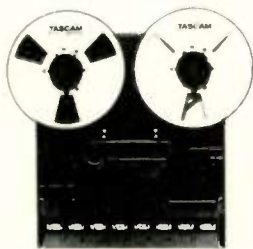
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tubing for strain relief, the mic connection to the plug often breaks, leaving us dead in the water. If you've ever tried field-soldering the miniature Lemo connector, you know what a treat that repair can be. It's not something you do on the fly. We subsequently requested that performers wear two mics and belpacks to ensure an uninterrupted signal.

Dealing with the Cirque's mains speaker systems, which have been designed to cover the audience split into zones, is an experience. Because of this design, the audience is never very far from a speaker array and their signal is delayed to the acoustic source. This is very different from the typical concert hang, which usually consists of left, right, and center cluster positions.

On some Cirque shows there can be as many as 20 mains clusters. The best way we have found to deal with propagation delays from such a system is to use the Meyer Sound SIM System II. It seems to us the most accurate way of configuring the delay times between speakers. In one situation, the extreme humidity in Japan required the system to be "SIM'd" three times.

The live sound field is broad and varied. It's important to be ready for anything. Don't cut yourself off from unusual opportunities. If anyone had ever told me that one day I'd be running off to join the circus, I would've told them they were nuts.

*Freelance sound designer David Lynd has worked as a professional live-sound engineer for over 14 years, having mixed a wide range of artists from James Brown to bagpipe funk band Rare Air.*



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# LOGICAL LOGISTICS AT THE HANG EM HIGH SALOON

**KEEP THINGS FROM GOING SOUTH DURING THE OPENING SHOW OF THE SOUTH BY SOUTH WEST SHOW**

**By BENNET SPIELVOGEL**



**A LITTLE RUSTY:** Rusty Davis, Little Texas's FOH engineer at the Yamaha PM3000C.

IF YOU'RE a live-sound mixer or a player who's given some thought to attending one of the many music conferences that periodically occur, here's some background on how preplanning and open communication prevented a logistical nightmare from happening at one particular club.

Here's the gig: You're chief production coordinator for the Austin, Texas South by South West (SXSW) music and media conference. [See sidebar.] Each evening, for the next four days, over 40 venues

stage management, falls on you and your staff. Most of the gig is reasonably straightforward: one club, between four and five bands per night, 40-minute sets, get-em-on, get-em-off, and use a single PA with monitors. But one show in particular has you a little spooked: opening night at the Hang Em High Saloon.

many performers and how much equipment will arrive, comes close to SXSW's opening night. The lineup consists of five acts, including a 12-piece mariachi band and two big-time national acts, three FOH boards, three monitor boards, different monitoring requirements for each setup (some with in-ear, others with traditional wedges), three drum sets, 40-minute sets with 20-minute change time between acts and a requirement for "guitar land." Plus, the Hang Em High was only one gig among all the others that night (and for the next three to follow) that had to run smoothly. What would you do? Where would you start?

This is the task that faced SXSW's chief production honcho Roy Taylor and production coordinator Leslie Uppinghouse. The biggest problems were where to put all the sound equipment and who would use what. Roy wanted, if possible, to avoid redundancy, especially with

things like monitor wedges, main speakers, and power amps. Two of the acts, Little Texas and Emilio Navaira, would bring their own FOH boards, monitor boards, and monitoring systems. Spectrum Sound from Houston had the contract to provide sound at the Hang Em High for all four nights. They'd be hauling their FOH and monitor boards, mics, power amps, mains and monitors.

About a week before the gig, Roy Taylor mapped out a basic plan and ran it by Spectrum, Little Texas, and Emilio Navaira. Spectrum handled mics, FOH, and monitors for the other three acts, which were Nydia Rojas, Jaime y Los Chamacos, and the Thompson Brothers. Little Texas and Emilio provide their own support (mics, FOH and monitoring), but tie their FOH into Spectrum's main speakers (Yorkville Elite MX2000's and SW1000's for the subs) using a rack of Carver power amps that Little Texas would bring. Little



**SECOND STRINGS:** The Little Texas backstage Guitar World.

(both indoor and outdoor) will showcase close to 700 acts. The technical nitty gritty, contracting and coordinating sound, lights and

#### **FIT WHAT IN WHERE?**

The Hang Em High Saloon holds 1260 people and often hosts big-league shows. But nothing, in terms of how



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## SOUTH BY SAY WHAT

For the last ten years Austin, TX has hosted what's become the Superbowl of music conventions, South By South West (SXSW). This four-day party is comprised of various activities. You can attend the tradeshow and visit with over 200 exhibitors, such as AzTech Interactive to discuss producing your band's next CD-ROM or get measured up for a road case from Blackhurst Audio Technology or speak to an ASCAP rep about the dark underbelly of music publishing. At the Artist Listening Kiosk you can preview the music of any of the showcasing acts and get directions to the clubs around town. Most of the venues are in the Sixth Street area of Austin and you can walk (or crawl) from one joint to the other.

Once you've had your fill of the tradeshow booths, plenty of scheduled panels and workshops continue throughout the day. There's a mentoring program where you can meet and quiz industry professionals one-on-one. You could attend Mark Rubin's "Naked Brunch: How to Keep Band Members From Tearing Each Other Into Small Pieces" or check out "Why Would Anyone Want to Be A Manager?" Discussions ranged from "Were the Grateful Dead Really Any Good?" to a collection of this nation's top music critics hashing out why Americans crave so much entertainment news.

For most folks, the music portion of the convention holds the most attraction and excitement. This year almost 700 hundred bands played in over 40 clubs, cranking out their sets each evening. Bands and songwriters submit tapes and the SXSW staff selects the lineup from thousands of entrants and then puts from four to five acts in a club per night. There are also many nonsanctioned SXSW music events that occur in the same time period. When combined with everything else, these events make for an exceptional entertainment value.

For information and mailing lists regarding the 1997 conference, you can call SXSW at 512-467-7979 or check out their web site at <http://sxsw.com/sxsw>. The 1996 preregistration (before October 16, 1995) was \$195 with walk up registration at \$395. For those not interested in attending the tradeshow or the seminars, a \$50 wrist band is your admission ticket into all the SXSW clubs (provided they aren't filled to capacity when you arrive). —*Bennet Spielvogel*

Texas also supplied Clair Bros. 12am monitor wedges. Spectrum's FOH Allen & Heath GL4 and Emilio's FOH Soundcraft Delta consoles would both sub into Little Texas's FOH Yamaha PM3000C.

Luckily there was enough room on stage for three drum kits. Nydia Rojas was backed by a primarily acoustic 12-piece mariachi band, so it wouldn't require much of a backline. The other acts didn't have major backline requirements in terms of amps. The challenge facing Roy was where to situate Little Texas's guitar land.

Ideally, once set up (during the afternoon load in), it would remain in place until Little Texas played their last encore. It needed to be close to the stage, but out of the way of everything else. What is guitar land? Little Texas carries 11 guitars and a mandolin, and

they have about 12 feet of racks full of processing, effects, and amps that all stay offstage. The only gear onstage (beside a Kurzweil keyboard and drum kit) are guitar (Mesa Boogie) and bass (SWR) speaker cabinets and some foot pedals.

Guitar tech Billy Hale makes adjustments to the racks and supplies guitars as needed. He needed room to setup the racks and space to walk back and forth so he can hand off and receive guitars on cue. Luckily, there was a four-foot space about 16 feet long behind the stage where Billy was able to set up; cramped but workable.

The three FOH consoles were set up in the rear of the club, one behind the other, along a side wall. Roy had scaffolding brought to accommodate the three stage-right monitor rigs. The monitor boards for Little Texas (Ramsa S840) and Emilio Navaira

(Crest Century) would be on the floor. Pool Winstanley, Spectrum's monitor engineer, would run his Yamaha 2408 from atop the scaffolding. J.D. Esquivel, Emilio's monitor man, set up inside the scaffolding and Tony Pollock was situated outside the scaffolding to J.D.'s left. This compact arrangement provided reasonably good sight lines for everyone.

Most of the load in was completed and line checks started by 11:00 AM. Little Texas soundchecked at noon, and Emilio started at about 2:00. Tony, Little Texas's monitor engineer, didn't encounter any trouble during setup. He used ten TC 1128 remote-controlled stereo graphic equalizers to customize individual monitor mixes quickly. Each one takes up a single rack space and holds 99 settings. The remote control has motorized sliders so you can rapidly see your

settings and make fast adjustments. Little Texas's drummer and singer both use Future Sonics In-Ear Monitors<sup>®</sup>, while the rest of the band uses the 12am wedges.

All the players in Emilio's band use Future Sonics In-Ear Monitors<sup>®</sup>. All, that is, except for Emilio, who prefers wedges. J.D. (Emilio's monitor engineer) prefers in-ear monitoring over wedges because he "can custom tailor a stereo mix for everyone and setup and tear down quickly. Plus, there's no weight factor (wedges, power amps, cables and racks) and the cost factor is less when you consider what good wedges, power amps, racks, and cables cost."

### THE BIG SHOW

As with any successful show, after it was all over, most of the audience probably had no idea of the logistical triumphs. Chalk up the success to effective communication skills and Roy's up-front preproduction (faxes, phone calls, geek mail) with the technical crews way before the first downbeat. Plus, he dealt with professionals: the folks in the SR business who consistently accomplish the impossible by showtime.

Spectrum, Little Texas, and Emilio, with the help of SXSW stage manager Gary Stokes, all cooperated to make the flow between acts seem like a normal changeover. For dancers and listeners, it was just another night at the Hang Em High filled with boozing and cruising. Oh yeah, and a ton of music.

*Bennet Spielvogel lives in Austin, TX and usually takes a vacation far from Austin during SXSW. This year Bennet didn't quite manage to get out of Dodge.*



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 **CROWN** *Power Base-3*

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## NEW GEAR FOR YOUR NEXT GIG



TASCAM M 08

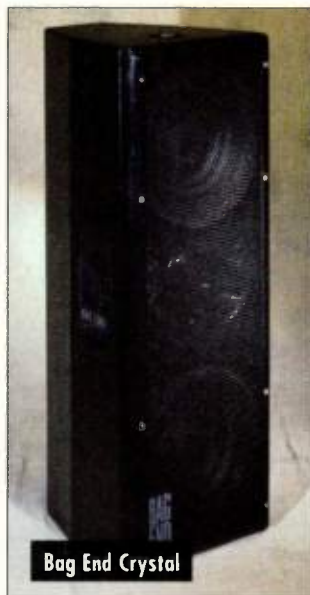
### EIGHT IS ENOUGH

TASCAM's M 08 Compact Utility Mixer is designed for both studio and live sound applications. It has four mono and four stereo inputs with XLR-balanced mic inputs and 48-volt phantom power. Each channel has: a two-band EQ, overload indicators, two aux sends, level and pan controls, and mute and PFL switches. Additionally, there are four effect returns, inputs to the aux and stereo busses, and a tape input. Two aux sends give users the ability to take the signal pre or post, while each of the four stereo channels has a gain control. Each of the four mono channels has an insert. Retail price is \$349. For more information, contact TASCAM, 7733 Telegraph Rd., Montebello, CA 90640. Tel: 213-726-0303. Circle EQ free lit. #131.

### CRYSTAL CLEAR

Bag End's latest speaker, the Crystal, is the second entry to the company's Time-Aligned

Gem Collection. The Crystal has been designed for large-scale, arrayable concert sound reinforcement applications and contains a pair of 12-inch high-output speakers. A high-compression driver with a three-inch copper voice coil drives a custom-



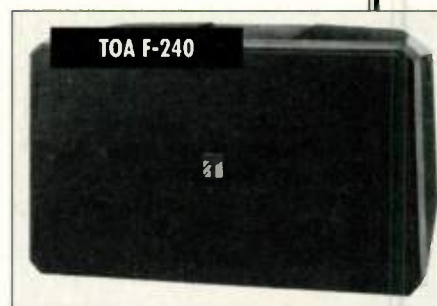
Bag End Crystal

designed oval waveguide. The two 12-inch speakers and the high-compression driver are housed in a wedge-shaped enclosure. System coverage angle of a single unit is 40° vertical by 50° horizontal at the -6 dB points. The Crystal includes built-in flying hard-

ware and built-in stand adapter. The wedge enclosure is constructed of 3/4-inch Finland birch plywood supported by internal bracing and finished in black textured catalyzed urethane. The grille is vinyl-coated steel in an aluminum, extruded frame and is connected to the cabinet with heavy-duty weatherseal. For more information, contact Bag End, P.O. Box 488, Barrington, IL 60011. Tel: 847-382-4550. Circle EQ free lit. #132.

### WAY COOL

Polypropylene enclosures house TOA's new F-240 speakers. The speakers employ a two-way bass reflex design with each F-240 component providing an optimal efficiency between 65 Hz and 20 kHz. A 6 1/4-inch low/mid transducer and a 1-inch dome tweeter equipped with a titanium diaphragm are at the heart of the F-240 speakers. There are four models available and each has a passive crossover network that divides signals at 4 kHz. Rated output is at 92 dB SPL. A rotary switch on the speakers' rear panel allows users to switch in between four different impedance settings. Other features include: overload protection circuitry (F-240G and F-240W only), a detachable rear cover that conceals and shields push-type input connectors, wall or ceiling mountable, and a grille-mounted logo that can be rotated for either horizontal or vertical positioning. For more information, con-



TOA F-240

tact TOA, 601 Gateway Blvd., Suite 300, South San Francisco, CA 94080. Tel: 415-588-2538. Circle EQ free lit. #133.

### TAKE THE STAGE

For applications where stage space is limited, Martin Audio has designed the WM0.5 stage monitor. Martin's monitor can also be used on a stand to provide high-level personal spot monitoring, while cabinet inserts allow it to be used in foreground applications. The WM0.5 is a passive two-way system featuring an 8-inch bass driver and a 1-inch ferrofluid-cooled compression driver on a 50° x 70° horn with the major axis of the horn mounted vertically instead of horizontally to increase the listening window in the vertical plane. For more information, contact Martin Audio, distributed by TGI North



Martin Audio WM0.5



America Inc., 300 Gage Ave., Unit 1, Kitchener, Ontario, Canada N2M 2C8. Tel: 519-745-2364. Circle EQ free lit. #134.

## SWEET SIXTEEN

Sixteen switchable UHF channels for up to eight channels of operation are standard fare with Sennheiser's new 1081-U/1083-U wireless systems. The units are packaged in a transport case with all the necessary accessories. The EM1031-U true diversity receiver is at the center of the two systems. With a frequency response of 40-20,000 Hz, it is equipped with Sennheiser's HiDyn Plus noise-reduction system. The EM1031-U also features automatic squelch

control and PLL synthesization. Several systems may be used simultaneously by combining two EM1031-U's in a 19-inch rack installation with the supplied rack-mount adapters. The 1081 system contains a dynamic supercardioid radiomicrophone. The BF1081-U handheld transmitter offers switchable sensitivity, an output power of 50 mW, and a frequency response of 80-18,000 Hz. The 1083 system contains the BF1083-U pocket transmitter, which connects to the system's mini clip-on lavalier mic, the MKE2-1053. Its frequency response is 80-20,000 Hz. For more information, contact Sennheiser, 6 Vista Drive, P.O. Box 987, Old Lyme, CT 06371. Tel: 860-434-9190. Circle EQ free lit. #135.



## THE MANY FACES OF E-V

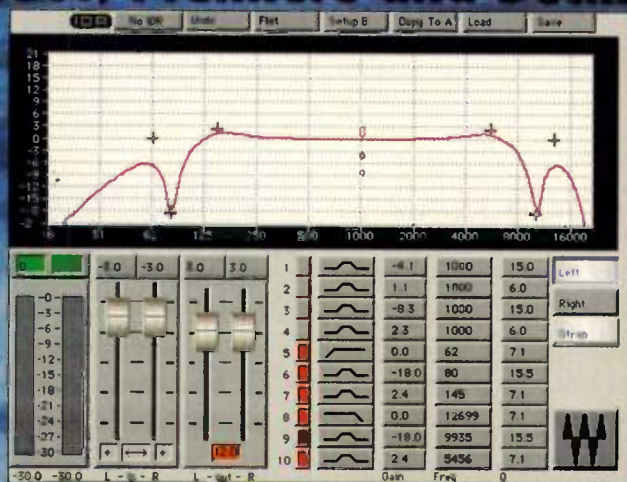
The CO2 is Electro-Voice's latest lavalier mic. The CO2 has a frequency response of 50-20,000 Hz and an omnidirectional polar pattern. Available in both black and white, the CO2 features Electro-Voice's Tincture surface, which may be painted with

acrylic lacquers, allowing custom colors for different situations. An 8-foot cable is provided, as is a phantom power electronics module. A TA4F connector or pigtails can be ordered for wireless configurations. For more information, contact Electro-Voice, a Mark IV Company, 600 Cecil St., Buchanan, MI 49107. Tel: 616-695-6831. Circle EQ free lit. #136.

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# CONNECTIONS TO DI FOR



Tube Works RT-4001

## THREE DI BOXES IN REVIEW

BY WADE MCGREGOR

ANYONE WHO HAS tried to plug an electric guitar directly into a mixer knows that this is not a musical combination. The high-output impedance of the guitar pickups (greater than 100,000 ohms) are loaded down by the low-impedance microphone input (less than 2000 ohms), causing a loss of treble and sometimes even distortion. If you made this connection through a long cable, there was probably additional noise, too. This was the reason the DI box was developed. DI, as most readers know, stands for direct injection or direct input or direct insertion, and means to take the sound from an electric instrument without using a microphone. Unfortunately, it is not just guitars that have this problem.

The output from many synthesizers, samplers, electric pianos, electronic drums, and so on is also unbalanced and often high-impedance. This is because the manufacturer's cost of adding a professional audio output con-

nection is higher and because such connections make these instruments easy to connect to common instrument amplifiers.

The DI box converts an instrument's unbalanced, high-impedance signal to a low-impedance balanced audio signal that is electrically similar to a microphone (150 ohms). This is achieved by using a transformer or active electronics to create a new output signal more suited to use with professional audio equipment. The

change in impedance is necessary to ensure that the sound of the instrument reaches the mixer unscathed. High-impedance signal lines can only run 15 to 30 feet before there is a noticeable loss of high-frequencies. Plus, they are also very susceptible to the electrical noise prevalent in the modern world that is just waiting to jump in and solo with the band.

The DI box also provides a connection directly from the input connector (except on a few models) to a loop connec-

tion. This loop connection is used to plug the instrument back into the musician's stage amp. Once this connection is made, the DI box becomes an invisible way of tapping into the instrument's sound without changing the stage setup of the musician. When connecting back to the stage amp, it is often necessary to disconnect the signal ground to the mixing console using a Ground-Lift switch on the DI box. This need is usually apparent when the instrument buzzes as soon as the connection to the mixer is made. If you are connecting an instrument through a DI box without any on-stage amp, you should ensure that the Ground-Lift switch is switched to ground. This will reduce the noise from the guitar cable and improve the electrical safety of the performer.

Now for the reviews:

### TUBE WORKS RT-4001

The sound quality of guitars and basses can be greatly influenced by the input the instruments connect to. Not only must the input accept these very high-impedance signals, but it must also capture the tonal quality that the player expects. Few guitars can plug straight into a mixing console without losing the bright, clear sound they achieve when plugged into a good guitar amp. You must choose an interface that can fool the guitar into thinking it is plugged into that old tweed amp. The Real Tube Direct box is intended to provide just that form of interface.

Tube Works builds a number of guitar-oriented products — from amps to effects boxes. The Real Tube Direct boxes are part of this line of tube uber-alles gear. Powered by a 30 V AC supply, which is a lump-in-the-line style and not the socket-wast-

## ROAD TESTS

**MANUFACTURER:** Tube Works, 8201 East Pacific Place, #606, Denver, CO 80231. Tel: 303-750-3801 or 800-326-0269.

**APPLICATIONS:** Translating the sound of guitars and keyboards into balanced signals with a little tube-sound added.

**SUMMARY:** A robust package capable of doing justice to the output from an old Strat or even a Marshall stack.

**STRENGTHS:** Choice of balanced or unbalanced outputs; level boost; good signal to noise.

**WEAKNESSES:** Balanced output doesn't work when unbalanced; tube qualities may be too subtle for some users.

**PRICE:** RT-4001 single-channel version, \$250; RT-4002 two-channel rack-mount version, \$500

EQ FREE LIT. #: 137



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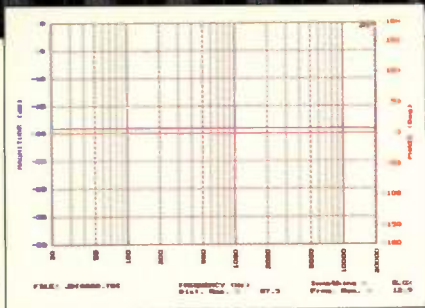
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**CIRCLE 69 ON FREE INFO CARD**





**FIGURE 1**

ing wall-wart format, this DI unit may add another cable to your stage rig, but at least you won't be looking for fresh batteries in the middle of your second set. The balanced output from the unit is direct from the cathode of the tube, which is running in a low-gain Class A mode. This output doesn't work when unbalanced (pin 3 grounded) and so an additional buffered unbalanced output is provided. Gain through the Real Tube Direct is typically -24 dB below the input level, but can be boosted by 12 dB via a rocker switch.

The brick-like case is very solid, and uses rolled-steel and good-quality rocker switches. Internal construction is not quite as reassuring; the tube is held in position with a dollop of silicon seal and the PC board was slightly bent in mating with the connectors. The RT-4002 is a two-channel version of the same circuitry and placed in a 1U rack-mount case with all the connections and switches (except power) on the rear of

the unit. This is especially well-suited to anyone gigging with an effects rack or stereo keyboard. The labeling of both units is anything but subtle, and the rack-mount version can be read from 20 rows back in the audience!

A switch provides for connection to instrument amplifiers at their loudspeaker outputs, and this will also modify the output response to simulate the high-frequency roll-off of typical instrument loudspeakers. The sound of the Real Tube Direct is clear and clean with very subtle additions to the harmonics of the instrument at higher levels when compared to a passive DI box. This is a good DI box for those who want a tube inline before anyone hears their instrument.

## JDI DIRECT BOX

If you want to connect two devices together with a minimum of fuss, then a passive circuit is ideal: no batteries; no additional noise; no problem. The DI box is intended to make life simple when it comes to connecting instruments to mixers for recording or sound reinforcement. There are a wide variety of devices built for this task, and as many of them impart a particular sound quality, they have become a matter of taste within the industry.

The two basic criteria are: Does it sound good and does it solve problems? If the DI can make the appropriate impedance changes (>100,000 ohms to >200 ohms), handle the output level of any instrument you encounter, and make that instrument sound as good as it can, then the first criterion is met. The second one may be more difficult. One day the keyboard is quiet and trouble free, but the next day it is buzzing no matter which way you throw the ground switch on the DI! A DI box that doesn't do this to you meets the second criterion.

The JDI JT-DBE Direct Box is built as solidly as any DI box I've seen and reflects a no-compromise approach throughout. Switches for the -15 dB pad and Pickup/Line are recessed yet easy to operate. The pad allows connection of line-level electronic instruments without overloading the

transformer or the mixer microphone input. The Pickup mode adds an RF filter into the output signal to reduce noise induced into instrument cables that are well above the audio spectrum (>70 kHz).

Conveniently, the 1/4-inch phone jack instrument connections and signal switching are on one end of the unit while the XLR output connector and ground-lift switch are on the other end. This makes the unit easy to place onstage with the side facing the performer available for their connection and leaving the connection to the mixer out of sight at the back. The steel case is made from square channel and the ends form the section that slides inside with all the switches and connectors attached. A very heavy coat of dark-green paint gives the unit a distinctive finish that includes clear labeling of all switches and connections. A foam pad is glued to the underside to reduce the chance of the unit slipping off the top of the amp even when the player is really rockin'.

The frequency and phase response of the JDI is excellent (see fig. 1) and the sound of the unit can only be described as completely transparent. This is an excellent passive DI box that will keep working even after the band's van drives over it.

## JENSEN ISO-MAX INTERFACE

Jensen Transformers has over many years built a reputation for high-quality audio and innovative application of transformer technology. The late Deane Jensen was regarded as one of the great geniuses of the audio industry. Still, the company continues to overcome the prejudices that have developed when people used the wrong transformer for the job. In fact, transformers need not limit the frequency response, phase response, or distortion of an audio device. Proof of this is presented in the form

**MANUFACTURER:** Cabletek Electronics Ltd., #114, 1585 Broadway, Port Coquitlam, BC, Canada V3C 2M7. Tel: 604-942-1001.

**APPLICATIONS:** Connection of any unbalanced audio signal to a microphone input of a mixer.

**SUMMARY:** A superb DI box with an excellent transformer in a practical and rugged case.

**STRENGTHS:** Very high-quality Jensen transformer; recessed switches and connectors; heavy-duty case.

**WEAKNESSES:** It's green; no provision for loudspeaker level input.

**PRICE:** \$199

**EQ FREE LIT. #:** 138



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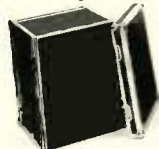
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Jensen Iso-Max

of the Iso-Max interface.

This is a wonderfully linear transformer-type direct box that can handle line-level audio, even at low frequencies, in a transparent fashion. The Iso-Max series of devices from Jensen covers a wide range of applications, from instruments onstage to project studio devices with unbalanced RCA-type connectors. I used the Model DB-2PX, which is designed for interfacing musical instruments to microphone inputs. Although this could be just another DI box, it's not. In addition to the fine transformers inside, the interface of the unit really sets it apart. On the rear of this unit is a gold-plated Phoenix-type connector (detachable screw clamp terminal strip) that allows connection to any bare wire. On the other side are 1/4-inch phone jacks for input and XLRs for outputs. Both the front and rear connections are active, and this offers the potential to use the Iso-Max in your project studio with all the connections neatly made to the terminal strip. When you need it for a gig, simply detach the terminal strip and take the DI box with you. No need to repatch when you return, just one simple connection.

Inside the Iso-Max are two Jensen JT-DB-EPC trans-

formers (one per channel) and a small circuit and switch panel acces-

sible through the bottom panel. The switch panel and circuit offer optional selection of grounding modes: ground lift; ground connected; ground RF connected through a resistor and capacitor. This provides noise-cancellation advantages for many situations and works in conjunction with the excellent common-mode rejection made possible by the transformer. This can reduce hum by up to 100 dB and mid-band noise by over 55 dB according to the manufacturer's tests. The transformer is also capable of handling very low frequencies at levels over +19 dBu at less than 1 percent THD falling to 0.1 percent at +15 dBu and typically only 0.04 percent at nominal levels.

Jensen has built an excellent interface for solving grounding and noise problems onstage or in the studio. The versatile connections allow for a wide range of applications and may even provide a solution for signals on unusual connectors (just cut them off and put the bare wire straight into the screw terminals). Anyone that doesn't need an extra 1/4-inch phone jack to connect to their instrument amp will find the Iso-Max a great sounding DI box with the bonus of having many other possibilities. **EQ**

**MANUFACTURER:** Jensen Transformers, 7135 Hayvenhurst Avenue, Van Nuys, CA 91406. Tel: 818-374-5857 or 213-876-0059.

**APPLICATIONS:** A two-channel interface between instruments or unbalanced audio equipment and balanced microphone inputs.

**SUMMARY:** A very versatile interface that can work as a 2-channel DI box or as a line-level interface inside an equipment rack.

**STRENGTHS:** Combination of detachable wire terminals and 1/4-inch phone jack/XLR connectors; high-quality transformers.

**WEAKNESSES:** Switches for grounding modes are tiny; no parallel connection of the input for on-stage instrument amp.

LIST PRICE: \$289.95

EQ FREE LT. #: 139



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CIRCLE 31 ON FREE INFO CARD



## Oram Series 8/16 Recording Console



**MANUFACTURER:** North American Distribution: TGI, 300 Gage Avenue, Suite 1, Kitchner, Ontario, Canada N2M 2C8. Tel: 519-745-1158.

**APPLICATIONS:** Multitrack recording and mixing console.

**SUMMARY:** An 8-bus console designed to fill the void between budget 8-bus recording consoles and the high-priced classics.

**STRENGTHS** Sounds great; sturdy modular construction; phase reverse and phantom on each channel; subwoofer output; variable low-cut filter; several size configurations available.

**WEAKNESSES:** No on-board oscillator; separate patching configurations required for tracking and mixing; jumpers instead of switches make quick changeovers difficult.

**PRICE:** \$9995, 16-Channel (model reviewed); \$13,995, 24-channel; \$17,995, 32-channel.

**EQ FREE LIT. #:** 140

THE ORAM BEQ (British EQ) Series 8 recording console traces its roots back to the classic Trident consoles. Trident and non-Trident fans should find many things to interest them about this board. First, it's a sturdy, beefy console. The 16 I/O version reviewed weighs well over 230 lb. Like the old Tridents, it contains easy-to-remove (via Nyloc fasteners) I/O modules and plenty of patch points. Sixteen, 24, and 32 frame sizes are available.

The BEQ Series 8 is physically laid out in an inline design (that is, it contains inline monitoring, its layout is symmetrical, and there's no "producer's desk"). However, the manufacturer makes a point of stating that the console incorporates a split design electronically. In essence, it's two mixers in one. If you configure the short faders as LR2, you get solo, pan, and two aux sends on this "second" mixer.

Each I/O module has trims for mic and line, an input select switch for mic or tape/line, phantom power, and a phase reverse switch. Below the phase reverse you get five aux sends on rotary controls, and to the right of the auxes is the EQ section. Oram's company custom-builds all the pots, and the pots do have a tight, sure feel. Below the aux and EQ section you'll find a high-cut switch, a pan pot, bus assigns, and a solo button. Each module also gets 8-segment LED metering (-20 to +8), a PFL switch, and a mute switch.

The next part of the module is devoted to monitoring. You get a 60mm fader, a "From Main" link button, a button that lets you put the monitor into the stereo bus LR-1 or onto a separate LR-2 bus, a solo, and two more auxes (6, 7) that only connect to the monitor. You can also solo the 60mm fader and pan it. Below the 60mm fader you'll find the 100mm main faders.

Even though everything is laid out in an easy-to-reach format, you'll have to adjust to the ergonomics. You may find yourself doing a lot of hopping around as you learn which controls do what.

### THE INS AND OUTS

Each module has a standard patching arrangement. You get an XLR mic input, a balanced TRS line input, a -10 RCA tape in (line in), a TRS insert point, a direct out (unbalanced 1/4-inch), and a balanced TRS mon (monitor in). I found the terminology confusing when I first went to return tape tracks. I set the console up for doing a guitar overdub and returned the tape tracks to the jacks marked TAPE IN.

I couldn't hear what had been previously recorded with the input module set for MIC. When feeding a microphone signal into the console and monitoring inline, you must use the MON IN jacks for returning your tape tracks to the console. During mixdown you unpatch the MON IN and patch into the unbalanced TAPE IN or balanced line in. There's no switch. You have one wiring configuration for tracking and









when that's done you repatch into the tape returns for mixdown.

I had no operator's manual, but John Oram did supply me with a comprehensive block diagram. I checked the block and, interestingly, no link exists between MON IN and TAPE/LINE IN. You'll need to set up a patchbay or make sure you have easy access to the rear of the console as you go back and

forth between tracking and mixing.

A wide variety of patching options exist on the master module. There are two sets of balanced bus outputs (XLR and TRS), TRS bus inserts, LR solo outputs, balanced control room outs on TRS, stereo (mix bus) outs on XLR and TRS, LR bus inputs, LR-2 monitor outs (for running a simultaneous alternate mix), subwoofer output (with built in crossover so all you

need to do is add power and a subwoofer to broaden the bottom end of your nearfields), mono out, aux 1-5 send, aux 1-5 return, aux 6 and aux 7 outs. The console also provides stacking bus inputs that permit you to plug in another mixer. One of the smarter features is the reverse talkback circuit that returns to the control room — thus enabling you to plug in a talkback mic without having to waste an input module.

The 8/16 gives you two separate tape returns, which is great, albeit on somewhat unconventional jacks. Each return is on a TRS. One TRS for machine 1 and another TRS for machine 2. There's no provision for returning a balanced tape machine. Both of the 2-track tape returns on my console were not operational so I wasn't able to listen to that circuit.

This section contains send and return provisions (with solo) for all seven auxes. Auxes 1-5 also have pan pots. You get complete control of the subs with 100mm faders, assign buttons, and pan. There's level controls for the mono, subwoofer, and overall control room volume. Two headphone jacks are included, along with short faders for the LR-2 level. There's no built-in oscillator, but you do get plenty of eight-segment LED metering for the subs, main LR bus, solo bus, and LR-2. Unfortunately, a malfunction with the talkback circuit made communication difficult. I had no way to talk back to the talent in the studio. Oram provides a talkback mic input, but it can not be assigned to aux 6 and aux 7, which distributed the cue mix. After checking, John Oram said a "trace problem exists." This problem has been corrected in new production models.

The heart and soul of any console lies in the mic preamps and the EQ. The Series 8 console uses the low-noise SSM2017 mic preamp and the (love 'em or hate 'em) ubiquitous TL072 and TL074. The SSM2017's in this board are surface-mount-technology based and the manufacturer stresses that their "highly packed density" provides different sonic characteristics from a standard (nonsurface mount) package. I don't claim to know all the ins and outs of surface mount versus standard in terms of audio differences, but I can say these preamps sounded excellent. They are pleasant, open, and very clear sounding.

The noise level of the mic pre achieves an [manufacturer's spec] EIN of -127.8 dBu. The bi-quad EQ circuit fea-

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tures bass and treble shelving circuits with a 15 dB boost or cut. The high and low shelves are permanently set at 12 kHz and 80 Hz. You do get a sweepable mid band  $\pm 15$  dB that covers 100 Hz to 10 kHz. I thought the greatest feature of the EQ was the variable low cut. You can sweep from 5 Hz (essentially bypassed) to 200 Hz with a fixed slope of  $-12$  dB/8 Va.

I liked the EQ and what it could do to fatten drums and add air to acoustic guitars. However, I missed not being able to defeat the EQ with a button. [All consoles currently shipping will offer an EQ defeat switch; a wise decision.]

One interesting button that's included is the high cut. Not many consoles include a high-frequency cut. John Oram explains that, "This cut control is structured to eliminate RFI through the module, a common fault in many designs, which, although providing HF cut with perfect input signals, do nothing for RF-borne products that get rectified in the early stages and once demodulated can not be removed." Some designers may question using a high-frequency cut as a way to battle radio interference, as it definitely dulled the sound and took much of the luster away when I engaged it.

Tracking with the console is very easy. Make sure your tape returns are patched into MON IN and not TAPE IN, select MIC with the input select button, set your trim, choose "from main" (next to the short fader) and decide if you're going to go direct out or bus out to tape.

As for monitoring, you've got short faders that can be panned for the control room mix, and aux 6 and aux 7 that can be a single mono headphone mix with effects or a single stereo headphone mix with no effects, or two different mono mixes with no effects — the choice is yours. If you require more monitoring versatility, don't monitor inline. Instead, return all your tape tracks to unused modules via the line/tape-in provision.

## CONCLUSION

This console, like most new designs, has its learning curve. It does, however, offer great sound. If you don't mind doing a little extra patching and can get by with the inline monitoring, this board is worth evaluating. I found that the board's EQ could perk up tracks and give a lot of punch to the low end.

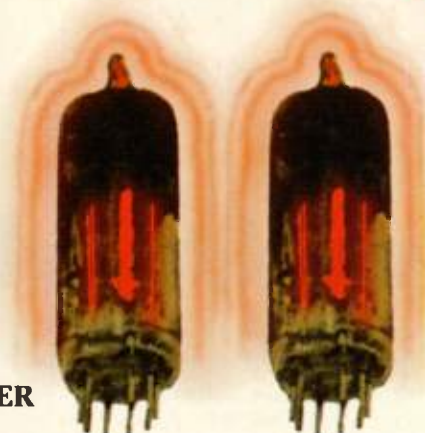
—Bennet Spielvogel



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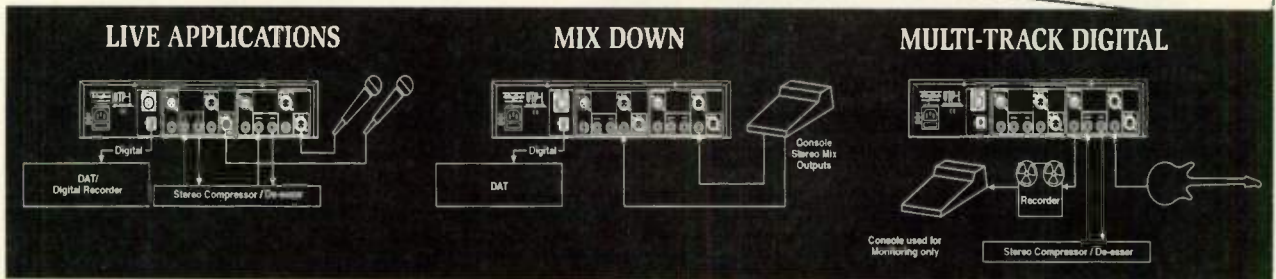
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# IN REVIEW

## QSound Qtools Plug-In

NOW AVAILABLE AS a Sound Forge-compatible plug-in (16- or 32-bit, version 3.0 or above), this software-only version of the QSound "3D" processing algorithm has two main functions: QXpander extends a stereo mix beyond the boundaries of conventional stereo, while QSYS can position a mono signal outside of the conventional stereo field. It's important with both not to alter the balance after the signal has been processed.

QXpander works on the differences between stereo signals (final mixes, submixes, synth outs, etc.) and affects mono (center channel) audio as little as possible. The more audio phase and delay "cues" that lie in the unprocessed stereo tracks, the better. (By the way, these tools use QSound's speaker algorithms, which have com-



**MANUFACTURER:** QSound Labs, Inc., 2748 37th Avenue N.E., Calgary, Alberta, Canada T1Y 5L3. Tel: 403-291-2492. WWW: <http://www.qsound.ca>.

**APPLICATION:** Process stereo mixes to increase the apparent size of the stereo field, or place mono instruments outside of the conventional stereo field.

**SUMMARY:** Brings affordable QSound to the masses.

**STRENGTHS:** Does what it claims; easy to use; relatively inexpensive; QXpander can really perk up some mixes; QSYS effect is truly novel.

**WEAKNESSES:** Requires careful tweaking to avoid weakening center channel signal; must be carefully checked for mono compatibility.

**PRICE:** \$195

**EQ FREE LIT. #:** 141

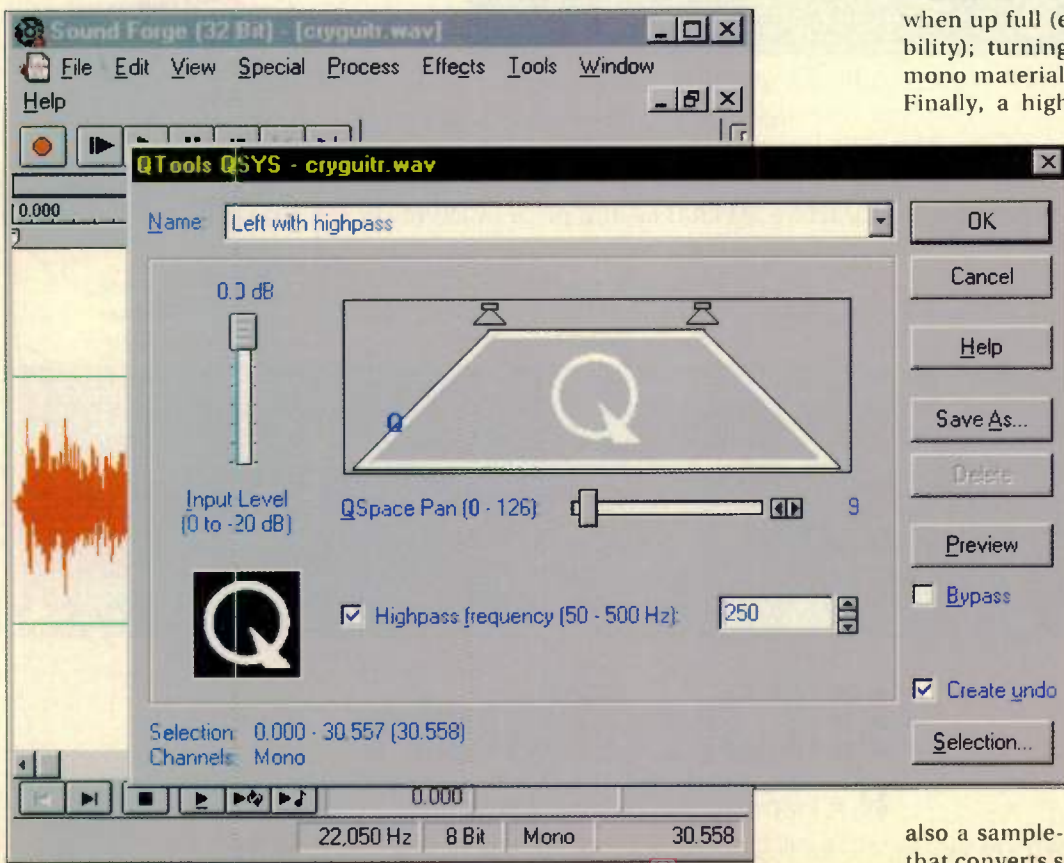
paratively little effect over headphones.)

The QXpander input control is crucial since the QSound process can

change gain enough to cause clipping. A warning informs you if this happens, and recommends an input control setting when you redo. The center control leaves mono material alone when up full (ensures mono compatibility); turning it down subjects the mono material to QSound processing. Finally, a high-pass filter attenuates some bass content — not from the overall signal, but from the signal to be "QSounded." This can also help with mono compatibility.

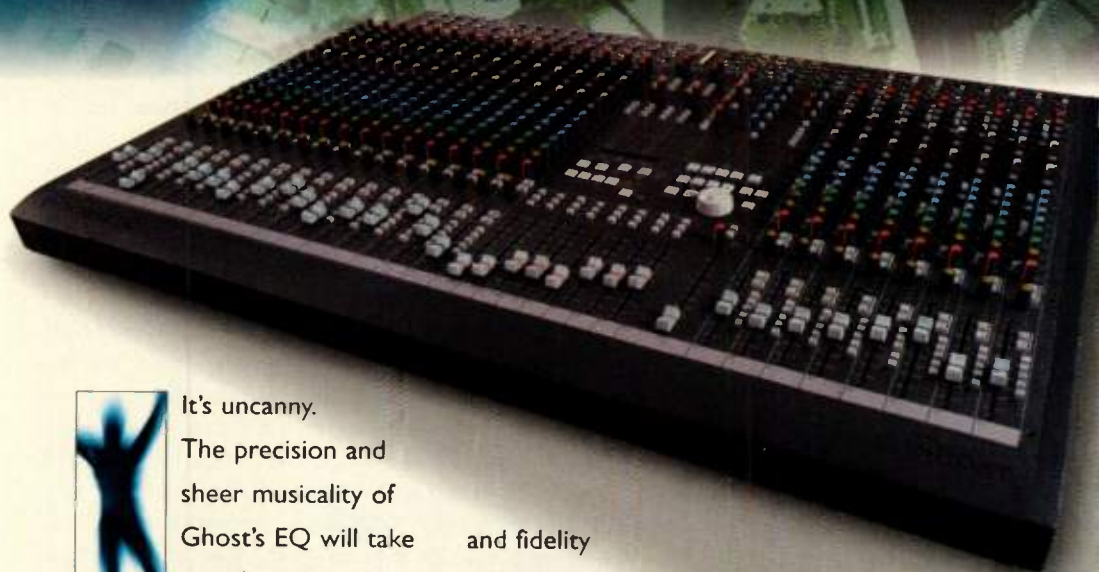
QSYS works with mono files only (otherwise, it is the same process used by the large studio QSystem), and adds a pan control to the input and high-pass filter parameters. The screen dump shows the QSYS screen. QSYS processes only entire files, whereas QXpander can work on parts of a file. There's

also a sample-rate converter included that converts sample rates to and from





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## QSYS MEETS REVERB

The QSYS tool creates the most dramatic QSound effects. For example, to create exceptional reverbs, extract a series of reverb-only tracks from the multi-track, separate them into mono audio files (a separate file for the left reverb and another file for the right reverb), load them into Sound Forge, and then use QSYS to pan each individual reverb channel.

Start by panning the first left channel reverb file to the least extreme left Q position (just beyond the left loudspeaker). Next, repeat this operation with the right channel. Now take a pair of reverb files with more predelay and slightly longer decay time and pan the individual channels to the mid-left/right Q position. Finally, take a third pair of reverb files with even more predelay and the longest decay time and pan the individual channels to the most extreme Q positions. The variations can be relatively subtle, such as 20, 40 and 70 ms for predelay and 1.1-, 1.3-, and 1.5-second decay times. Combine all the reverbs into a single stereo file and fly them back into your multitrack master. The final effect is that of the reverberation moving through the room around you rather than simply dying away behind the loudspeakers, as it typically does in stereo.

This trick also works well with multiple discrete echoes. If you use the QSYS tool to position the echoes from different instruments in discrete locations you can emulate the way sound bounces off the side walls in some venues. Unlike QExpander, QSYS does not alter the signal's tone, and allows you to position sounds without altering their other qualities. You can hear examples of both reverb and echo done with this process (in .WAV and AU format audio files) on an acoustics web page at <http://www.bkla.com> in the section on common acoustical problems.

—Wade McGregor

the supported options (8, 16, 11.025, 22.050, 24, 32, 44.1, and 48 kHz).

Like Sound Forge, QSound lets you save presets and name them (up to 63 characters!) — handy if you come up with "killer stereo drum spread" and don't want to have to find it again.

Does it do the job? The QXpander effect is really excellent on some material, but it's not a panacea. If processing an entire song is too much, consider processing some stereo submixes (e.g., keyboards, background vocals) on the master multitrack. The effect is killer with reverb (see sidebar), but this means recording the reverb so you can bounce it over to Sound Forge, process it, and bounce it back.

Sometimes after processing material, the center channel would seem to lack strength in comparison to the expanded stereo field. Proper high-pass filter settings will compensate, but this requires trial and error. A frequency setting around 250 Hz was good for subtle, but noticeable, widening of the image without sounding artificial. Moving the high pass up any further can give a "boxy" sound. Bottom line: when you tweak it right, a stereo mix really does seem to expand beyond the normal stereo, which opens up the mix and adds a bit more "space" for the instruments. Like other enhancement products, QSound is at

its best when improving something that's already good.

The QSYS effect is a blast. It is really uncanny to have sounds seem to come from places in the room where sounds have never come from before. QSYS is particularly effective for making ambient sounds larger than life — or at least larger than stereo.

Since a sound is worth a thousand words, you can download two examples of the QXpander effect (drums and program material), as well as one example of QSYS, from my AOL site (keyword SSS > EQ Online > Review Unit Demos). Check 'em out, it's pretty interesting to hear what this plug-in does.

The price is right and the effect is cool; you wouldn't want to use QSound on everything, but for some program material and certainly for sound effects, the results range from interesting to downright jaw-dropping.

—Craig Anderton

**System Requirements: QTools runs under Sound Forge 3.0, whose minimum system requirements are a 386SX processor, 4 MB RAM, Windows 3.1, VGA graphics, and 5 MB of free hard-disk space. (See the April '95 issue of for a review of Sonic Foundry's Sound Forge program.)**



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# IN REVIEW

## Ensoniq DP/2 Multieffects Processor



**MANUFACTURER:** Ensoniq Corporation, 155 Great Valley Parkway, Box 3035, Malvern, PA 19355-0735. Tel: 610-647-3930.

**APPLICATIONS:** Stereo or two independent channels of DSP processing for recording or live performance.

**SUMMARY:** Compact processor that doesn't compromise stereo processing even when used as an independent two-channel processor.

**STRENGTHS:** Great guitar processing; wide range of reverbs and delays; useful dynamic processing; powerful remote control capabilities.

**WEAKNESSES:** Small display for so many parameters; complexity may intimidate new user.

**PRICE:** \$795

**EQ FREE LIT. #:** 142

control capabilities (see below), there is the advantage of stacking these processes in very effective ways. Many presets include a noise gate, which dramatically benefits the guitar amp/loudspeaker emulation. There are a lot of killer guitar sounds in the box and they all include a range of styles and control that should suit most applications. There is even a very easy-to-use guitar tuner preset. The front panel 1/4-inch phone jack can replace the need for a DI box in the control room and give you a fully processed guitar directly into the mix.



THE ENSONIQ NAME has never been associated with guitars. However, guitarists should take note of Ensoniq's new DP/2. This powerful signal processor has a wide range of presets dedicated to guitar processing — covering the territory from subtle Crystal Guitars to teeth-gritting Shred. There are also presets for vocals, keyboards, horns, and drums, in addition to a few for overall mix enhancement. The DP/2 is a versatile multieffects processor that is at home in the guitar rig or project studio.

The DP/2 houses 65 algorithms that are the basis of its over 600 presets. The focus of these algorithms is the guitar player and project studio engineer/owner. In addition to the reverbs and delays you would expect in a good multieffects device, there are a wide range of filters, compressors, gates, and expanders that actually have more capability than many of

their analog equivalents.

In addition to the range of remote

The user can store up to 300 presets, 100 of which can include com-

### MANUFACTURER'S SPECIFICATIONS

**A/D-D/A Conversion:** 16-bit linear

**Input Level:** -18.5 dBV to +19.5 dBu

**Maximum Output Level:** +17.3 dBu into >10 kohms; +14.5 dBu into 600 ohms

**Input Impedance:** 21.4 kohms, rear inputs; 910 kohms, front 1/4-inch phone jack input

**Output Impedance:** 220 kohms

**Frequency Response:** 2 Hz-16 kHz

**Dynamic Range:** 96 dB

**Signal-to-Noise Ratio:** -90 dB "A" weighted

**THD+Noise:** >.0032% "A" weighted

**Crosstalk:** Better than -80 dB at 1 kHz

**IM Distortion (SMPTE):** 0.05%

**65 Algorithms**

**600 Presets (300 ROM, 300 RAM)**

**128k words (256 Kbytes) of delay memory**

**Maximum Delay Time Per Unit:** 1.8 sec

**Maximum Single Delay Time (No Regeneration):** 3.6 seconds

**Dimensions:** 19" (48.26 cm) wide x 1 3/4" (4.29 cm) high x 9 3/4" (23.60 cm) deep

**Weight:** 6.3 lbs. (2.9 kilograms)



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plete routing configurations (parallel or serial; stereo in/mono in). There are presets to create noise or tones for setting up your gear, filters for removing vocals (à la karaoke), a vocoder, and even the wildest ring-modulator

sounds ever. This is a fun box!

The front panel makes the internal signal path clear at a glance and provides signal present and peak indication. All of the front-panel toggle

*continued on page 121*

## ENSONIQ DP/4+ UPDATE

The DP/4+ (\$1795) has taken the powerful architecture of the original DP/4 processor (reviewed here in the August 1992 issue) and improved the interfaces for both connection to pro-audio gear and the user. The DP/4+ is a four DSP (40 MIPS for techies) processors that can be used in any combination for processing from one to four audio inputs and providing one to four stereo outputs. Users can select whether each processor provides an independent output (for applications such as channel inserts) or two stereo outputs or mixed to one mono or stereo output. This provides incredible flexibility when using the DP/4+ in different situations.

A major complaint about the original DP/4 was the confusion that users had regarding which configuration the unit was currently in. With so many possibilities, it was easy to lose track. Now the front panel of the DP/4+ has a series of configuration diagrams with LED indicators that display the current configuration in a manner that is clear to even the first-time user. The input level displays are also improved; now three LEDs will vary in intensity to display levels from -30 dB to clipping. For those times when you have accidentally selected the wrong preset (the overdrive guitar presets cause mics to feedback very quickly), a single button will instantly mute all of the outputs. This button, like most on the DP/4+, includes a bright LED right in the middle — making it clear which buttons are active at a glance. The Mute button does not kill the headphone output, allowing the user to set up the unit offline without adjusting the mixer. Selecting units for editing or preset selection turns that switch yellow and pressing the switch twice will put that unit in bypass, adding a red indication to the switch.

The DP/4+ provides 400 factory presets with 200 available for overwriting your own variations. There are a number of new presets and seven new algorithms, such as two "tube amp" simulations, a guitar tuner, and a vocal remover (more for karaoke than your monitor mix...).

All the input and output connections have been changed to provide direct interfacing to balanced +4 dBu or -10 dBV signal levels (switchable) and all the outputs are now "ground compensated" three-conductor at typical line-level impedances instead of the unbalanced 1-Meg-ohm impedance of the original DP/4. The front panel makes use of a Neutrik combo-connector to provide easy connection of guitars (1/4-inch phone jack and 910-kohm impedance) or microphones (XLR connector and 1-kohm impedance), making the DP/4+ the easiest processor to patch into even when permanently installed and connected at the rear panel. A front-panel switch selects the front connection, disabling the rear connection on input #1.

Listening to users has paid off for Ensoniq. The DP/4+ addresses all the major concerns I had with the original DP/4, while adding some great enhancements.

—Wade McGregor



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**MANUFACTURER:** Beatboy Drum Sequences, HCR 1 Box 1A 193, Lackawaxen, PA 18435. Tel: 717-685-1338, E-mail: BeatboyTec@aol.com.

**APPLICATION:** Improve MIDI-generated rhythm parts by using drum sequences played by pro-level drummers.

**SUMMARY** 20 song-length drum parts, with fills. Each of four disks has a different style, but they all work very well in the context for which they are intended.

**STRENGTHS:** Excellent pro-level, unquantized drumming with human "feel"; useful documentation.

**WEAKNESSES:** None.

**PRICE:** \$70/each

**EQ FREE LIT. #: 143**

THE CONCEPT IS simple: hire some well-respected drummers, have them play 20 song-length drum performances into MIDI drum pads, and record the results as Standard MIDI Files set up to trigger a General MIDI- (or Yamaha XG-) compatible drum kit. The files are high on realism (because there's no quantization) and excellent dynamics. And, of course, since they're MIDI sequences, they're completely editable — nuke parts you don't like, or find something like a fabulous tom fill and paste it wherever you want.

Loading the files (provided on 3.5-inch Mac or PC disk) was no problem; just import, tune into General MIDI, and go. All files have a countoff followed by a track containing the song-length performance; several have additional fills and ancillary percussion parts on other tracks. As each disk is packaged in a standard jewel box, there's room for a CD booklet-sized manual, which provides a great deal of helpful info.

There are four disks in the series. Nigel Olsson, Elton John's drummer for 20 years, is behind

the Pop disk. The 20 tunes are a mixture of rock, ballads, and blues. The ballads seemed most effective, because this is where the human timing really matters. The rock tunes are not overly exciting, but well-executed. My favorite: Spectacle, where he rips into a Phil Spector kind of part, complete with castanet and tambourine tracks. Otherwise, this is a straight-ahead pop drum.

Rod Morgenstein, best known for his work with the Dixie Dregs, Winger,

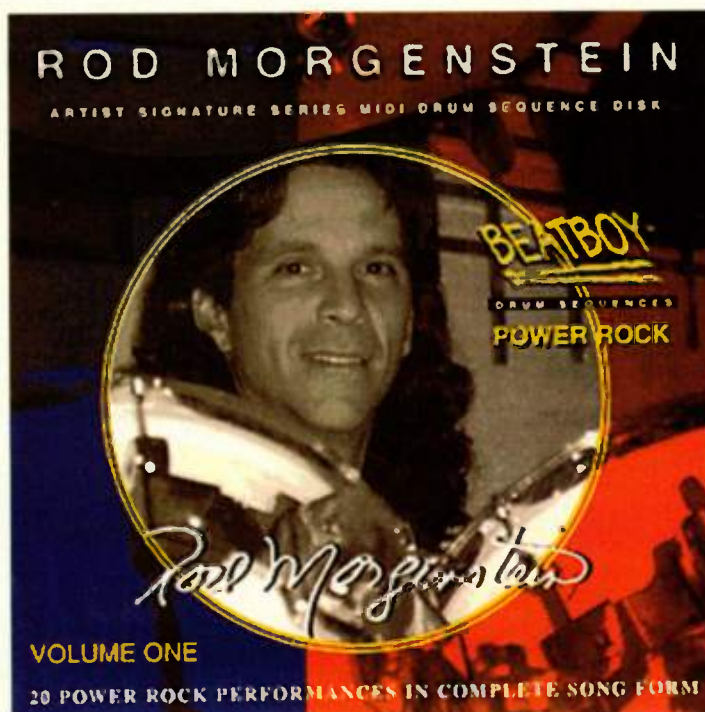
and Steve Morse band, weighs in with two disks: Progressive Rock and Power Rock. Power Rock is fabulous; not only are the riffs and fills inspirational, it's fun just listening to the sequences (check out "Thrash," the drum solo in "Voodoo," or rev up "Ledrush" to about 140 BPM from the original 116 for techno-zep). The Olsson parts leave lots of space for you; with this disk, it helps to give the drummer some space. But hey, why not? He's great.

Progressive Rock is a gem for the rhythmically challenged — great stuff in 7/4, 5/4, 6/8, and other "minority" grooves. But there's also an outstanding fast shuffle, a slow ballad with zillions of eminently pastable fills, and a gorgeous Afro-Cuban piece. These are MIDI drums for the adventurous.

Finally, there's the Country disk by Eddie Bayers, who has 150 gold and platinum albums to his credit. In addition to the expected country parts, I really enjoyed the Cajun-style groove and the three train-beat rhythms. One of the most impressive aspects of the Bayers disk is his control. The accents and "feel factor" timings are right on the money.

Some may feel these disks are not cheap, but then again, neither are the drummers who play on them, and I certainly couldn't have Rod Morgenstein at my beck and call for \$70. So you can have a better idea of what these disks are all about, I've posted some audio examples on my AOL site (path: keyword SSS > EQ Online > Review Unit Demos).

If you need drum parts that are superior to the preprogrammed ones in drum machines, these disks will add a musicality to your music you'd be hard-pressed to add yourself, unless you're a drummer on the level of these guys. —Craig Anderton





## ENSONIQ DP/2

continued from page 118

switches include status LEDs inside the switch. The front-panel headphone output is extremely handy for quickly auditioning your settings, but since the level is adjusted by the output level control, it affects the mix (if you forget to reset it). The DP/2 uses an inline power supply unit that does not waste any space at your power bar and connects to the unit with a 6-pin DIN plug.

The audio interface for the DP/2 offers a range of input and output level control sufficient to interface with gear operating at -10 dBV or +4 dBm. The inputs and outputs are the ground-compensated (quasi-balanced), three-conductor phone jacks. The noise floor and bandwidth of the unit do not change radically between algorithms, and the audio lives up to my expectations for a 16-bit processor. This is an easy unit to interface to your studio or stage rig.

The two-channel DP/2 is roughly half the size of the DP/4 and includes even more presets accessible to the front-panel control. The DP/2 contains two of the same digital signal processors as the original four-channel/four-DSP DP/4 (reviewed in the August 1992 issue of *EQ*), but with further development of the algorithms. There is a total of 18 new algorithms, some of which have been combined to offer much of the same level of processing in a 2-DSP box as that of the new DP/4+. Clearly Ensoniq has gone beyond simply scaling down the DP/4+ and have created a comprehensive two-channel processor with extensive processing capability. Unlike many processors offering multiple algorithms, the DP/2 allows the user to place algorithms in any order and offers a simple means of patching the processing in parallel or series configurations.

Ensoniq offers comprehensive remote control for the DP/2 that includes two dual footswitches, a control pedal, and MIDI. Any parameter within the unit can be mapped to any of these controls, thus offering the user exceptional control over the unit's operation in whatever format is appropriate. If you need to regularly set the threshold of a compressor algorithm, simply assign it to a foot pedal and you can track the performer without even using your hands. The optional pedals can be very handy for busy

mixes or live performances.

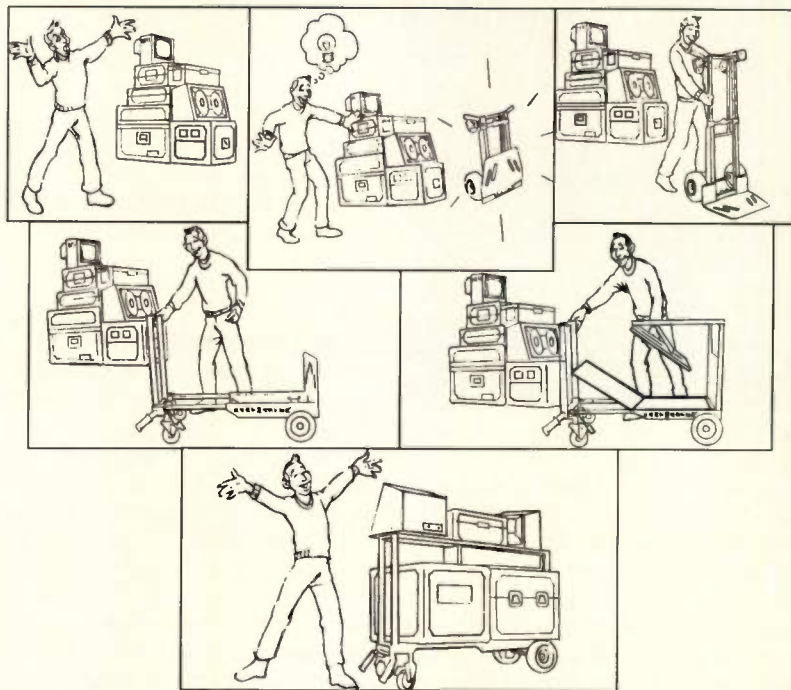
Using MIDI Sys Ex messages, all of the programming done with the front panel can be handled by a computer. Through the use of computer-based MIDI patch-editing programs such as Mark of the Unicorn's Unisyn and Sound Quest's Midi Quest (whose DP/2 template was still in development as this review goes to press), all the algorithm parameters are visible on the screen at once and can be adjusted or auditioned as though you had a giant front panel on the DP/2. Without this access, the two-line, 32-character display can be time consuming to adjust parameters in detail.

Thankfully, the edit button returns the user to the last parameter adjusted, reducing the amount of knob twisting required to make repeated adjustments. Preset or parameter numbers are displayed on a separate big 2-digit LED display.

The DP/2 is a powerful effects processor that builds on the success and strengths of the original DP/4 while reducing the cost and complexity. It is the algorithms that make these devices worth the money, and Ensoniq has done fine work in creating useful tools, especially for the project studio and performing musician.

—Wade McGregor

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# Nine Nearfield Nuggets

Buying monitors is only the first step to solving your listening problems

BY EDDIE CILETTI



The concept may have originated from an engineer's need to emulate the consumer listening environment, but nearfield monitors (NFM) actually solve many other problems. Some NFMs achieve greater accuracy — within their usable frequency range — than systems built for extended range and/or higher sound pressure levels (SPLs). Woofers and tweeters that can respond to delicate transients and deliver high SPLs don't come cheap. That's why manufacturers are constantly experimenting with low-mass materials that can maintain rigidity with loud, complex waveforms. The winner is the system that sounds great but has an affordable price.

Though you may dream of owning — or at least having access to — a full-range audio monitoring system (FRMs), taking full advantage of same requires a robust, well-designed space. FRMs, in the wrong environment, will find every rattle and uncomplimentary reflection in your control room. By contrast, the diminished size of NFMs results in less room stimulation and more direct sound to your ear.

In some project rooms, NFMs have pretty much replaced traditional control-room monitors. But just because they tend to be more forgiving doesn't mean that their placement, care, and feeding is noncritical. If you have problems with a current system or are shopping for something new, get the most bang for your buck by checking out these tips and suggestions.

## 1. SPEAKERS LIE!

No matter how "flat" a system claims to be, the specs are based on measurements made in a scientific environment — the anechoic chamber — a place with no reflections of any kind. It is a given that monitors will interact with their environment. So always listen "through" the monitors, assume they are "wrong" until proven otherwise, and never be cocky about EQing with wild abandon. If your mixes are spectrally unbalanced, don't first blame the speakers, but do consider the following...

## 2. REFERENCE YOUR MONITORS

Before checking into a mental institution, listen to a handful of your favorite CDs *on the system to which your console is connected*. Bring the CD player up on a pair of faders, turn off all echo returns and drive the stereo bus with a typical "mix level." Bring up your mixes (from a DAT or 2-track) on another pair of faders so that the levels match those of the CD. Some mix-related problems can be resolved just by becoming a better listener. Don't be afraid to reference while mixing. It's a much cheaper alternative to hiring a witch doctor with a spectrum analyzer and/or buying and experimenting with a "room equalizer."

## 3. POSITIONING TIPS

More bass can be realized by symmetrically locating the monitoring system within boundaries such as walls, floor, and ceiling. Of course, recording consoles also fall under this category for low frequencies but can cause reflective problems at high frequencies. Since NFMs are essentially bookshelf speakers, the "wall" can be a critical player. If, in your project control room, the speakers are not against a wall but can be, try using

that "boundary" to your benefit.

To optimize low frequencies, loop a kick-drum sample and listen to its character change while walking away from the primary listening position. There will be an area where the fundamental resonance seems natural and round and other areas where the drum seems thin. Experiment with both the "pitch" and/or the sample if there is no obvious difference. If you find a better "sweet spot," reposition the console so that it places the engineer in that optimum listening position.

To optimize high frequencies (a.k.a. the stereo image), use program material and alternate from stereo to mono. The "phantom" image between speakers should be clearly centered and not "outside" the speakers. (If so, check the cabling for proper polarity.) Tweeters can have a wide dispersion area, so look for and minimize any potential reflections. Power amplifier level settings, control room monitor pot tracking, and cabling can play key roles in this area. Experiment with the distance between the speakers as well.

## 4. SYMMETRY & HARMONIC BALANCE

Oops! Too often, the recording console dictates the layout of the primary listening environment. Long consoles that end up on the long wall (of a rectangular space) will, more often than not, result in a room that lacks real bottom. Unless the opposite wall is a major bass trap, sonic reflections will cancel low frequencies — especially at the center point between the walls.

Try to center the audio monitors on the short wall, equidistant from each long wall. Off-centered monitors will have unequal bass response; the monitor closest to a side wall will likely have more bottom than its mate. Monitors placed on the short wall have more physical space to develop the full wavelength of low frequencies. Since sonic energy is reduced over distance, the further the back wall, the less deconstructive energy is reflected back to the primary listening position.

The formula in fig. 1 is used to calculate the wavelength of sound through air at room temperature. Fig. 2 lists the wavelengths produced by



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## WORKSHOP MAINTENANCE

the open strings on an electric bass. As you can see, a low "E" requires more than just elbow room to fully develop.

In the studio, as well as onstage, bass players are often guilty of cranking the low-end in order to achieve a greater "feel" factor. This is not easy when in close proximity to the cabinet, while the audience gets a pelvic massage and the engineer struggles to get a balance. A similar phenomenon occurs in many studio listening environments. The back wall and corners are typically warmer and appear to have extended low-frequency response. If this energy is missing at the engineer's position, compensating with EQ will yield low-end build-up at the rear wall that can cause gastrointestinal disturbances.

Two-way speakers should be positioned so that the tweeter and woofer are vertically aligned to increase the width of the image's sweet spot. Horizontal placement will aggravate the phase interaction between woofer and tweeter as your head shifts in that plane.

### 5. INTERIOR DECORATING

The area forward of the listener's position should be fairly acoustically dead to maximize the direct signal and minimize high-frequency reflections that can blur the stereo image. This can be done with carpet, curtains, and acoustically sculptured foam. (Be sure to use the fire-retardant variety.) While these items can be placed on or against a wall, they can be made more effective at mid to low frequencies when mounted off-the-wall and/or on a frame so that an air space is created.

The area behind the listener can be

more acoustically live, but the *pings* and *boings* of parallel surfaces should be broken up by various bits of strategically placed "furniture." A bookshelf filled with books and/or tapes, for example, makes a great diffuser/nonreflective surface. A sofa or couch (what's the difference?) also breaks up reflections while heavy curtains and closets (the latter filled with coats and enclosed by louvered doors) can help to absorb bass.

A hard floor is easier terrain for roll-around chairs than carpet, therefore ceilings should be made nonreflective via "pyramids" and nonparallel surfaces, etc. Wherever carpet must be used, choose natural fibers to minimize static electricity.

### 6. HOW BIG IS IT?

Woofer size is important if you like the sound and feel of bass. Many nearfield monitors use 6-inch woofers that are not adequate for the lowest octave of music. (The fundamental of a bass guitar's E string is 41.25 Hz. Many nearfields are weak below 80 Hz.) Subwoofers are a very effective solution both to hear bottom and to minimize stress on monitors with small woofers. They should not, however, be used as a bandage. Get the most from what you have before augmenting. My personal NFM preference is for 8-inch woofers.

### 7. SHOCK ABSORBERS: CHEMICAL

So far I've mentioned many variations of acoustic "damping" materials. If zingy tweeters are rattling your brain, look for a system with a ferrofluid-

*continued on page 128*

### To calculate:

$$\text{Wavelength (feet)} = \frac{\text{The velocity of sound in air (1130 feet per second)}}{\text{The frequency in Hertz}}$$

FIGURE 1: Calculating the wavelength of a frequency in air.

| Bass Note | Frequency (In Hertz) | Wavelength (In Feet) |
|-----------|----------------------|----------------------|
| E         | 41.25                | 27.39                |
| A         | 55.00                | 20.54                |
| D         | 74.25                | 15.21                |
| G         | 99.00                | 11.41                |
| Width     | 141.25               | 8.00                 |
| Length    | 94.16                | 12.00                |

FIGURE 2: The wavelength of "open" bass strings and the frequencies that can develop within an 8-foot-by-12-foot room.



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# ALESIS



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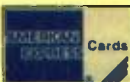
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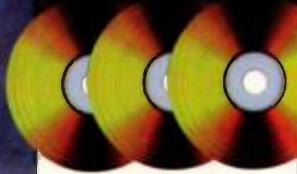
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| 500 to 999      | .90               | 1,000                           | 775       | 375       | 350     |
| 1,000 to 1,999  | .80               | 900                             | 625       | 200       | 100     |
| 2,000 to 4,999  | .72               | 725                             | 250       | no charge |         |
| 5,000 to 25,000 | .65               | no charge                       | no charge |           |         |

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|         | 300     | 500     | 1,000   | 2,000   | 5,000   |
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| 1-Panel | \$1,627 | \$1,748 | \$1,903 | \$2,893 | \$5,943 |
| 4-Panel | \$1,957 | \$2,078 | \$2,233 | \$3,353 | \$6,643 |
| 6-Panel | \$2,387 | \$2,508 | \$2,663 | \$3,873 | \$7,093 |

Includes graphics layout, typesetting, graphics proofs, film and printing for booklet, tray card and 2-color CD label (1-color for 999 or less), replication and packaging in shrink-wrapped jewel case - from your sketch, photos and premastered CD-R.

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|              | 500   | 1,000   | 2,000   | 3,000   | 5,000   |
|--------------|-------|---------|---------|---------|---------|
| to 12 Min.   | \$720 | \$1,004 | \$1,588 | \$2,090 | \$2,974 |
| 13 - 29 Min. | \$750 | \$1,071 | \$1,714 | \$2,267 | \$3,247 |
| 30 - 49 Min. | \$791 | \$1,148 | \$1,865 | \$2,478 | \$3,575 |

Full-Color O-Card Cassette Single - CHROME!

|            |       |       |         |         |         |
|------------|-------|-------|---------|---------|---------|
| to 12 Min. | \$715 | \$935 | \$1,394 | \$1,918 | \$2,600 |
| to 29 Min. | \$740 | \$979 | \$1,476 | \$2,033 | \$2,778 |

Includes graphics layout, typesetting, graphics proofs, film, graphics printing, shell printing, test cassette, and shrink-wrapping - from your sketch, photos and master.

## VINYL RECORD PACKAGES

|                         | 300   | 500     | 1,000   | 2,000   |
|-------------------------|-------|---------|---------|---------|
| 12" Single (to 14 Min.) | \$795 | \$1,015 | \$1,285 | \$2,195 |
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# MAINTENANCE

continued from page 124

damped tweeter. Ferrofluid acts like a shock absorber to the "spring" suspension of tweeters and midrange drivers. It hydraulically restricts excess reaction to stimuli. As side benefits, it also conducts magnetically and thermally to improve efficiency and heat transfer (between the voice coil and the magnet), respectively. Ferrofluid can, in some cases, be added after-the-fact. (A future article will be devoted to this subject.)

## 8. SHOCK ABSORBERS: ELECTRONIC

Power amplifiers — and the cables that connect them — can affect sonic performance, albeit to a lesser degree than any of the aforementioned items. If you are trying to maintain "punch," use the shortest and thickest cables on both sides of the amp. Yes, a power cable can make a difference. Use the same length of speaker cable for both speakers regardless of amp location. Or, if the amp is oversized compared to the speakers, try using excessive lengths of garden-variety lamp cable (or a resistor in series) to warm them up. Resistors intended for biasing transistors are available in 3-to-10-

watt sizes. Typical values range from 1/10-ohm to 1/2-ohm.

All monitor systems with two or more drivers utilize a crossover network to split the frequency spectrum into bands as required by woofers, tweeters, and midrange drivers. The most common is the passive network that is inserted between the amp and speakers. But, if you want disciplined, minimally colored speakers, the electronic version of ferrofluid requires that there be no obstacles between the amp and each driver. An active-crossover network requires a separate power amp for each frequency band, hence the terms bi-amp, tri-amp, and so on.

## 9. SPEED LIMIT STRICTLY ENFORCED

Fuses should be part of your highway patrol squad to keep speed demons from exceeding the sonic speed limit. Fuses may, in some cases, affect sonic quality, but not so much as damaging transients or excessive levels. Just as guitar, bass, and piano strings go flat (and never sharp) so too can a speaker's resonance shift down in frequency after stressful battles with your as-yet-unpolished mixes. If you blow a single component, always replace left and right drivers (in matched sets, when possible) at the same time.

Fuse values will vary with speaker type and program material. Start with 1/2-amp fast-blo (not slo-blo) and work your way up to (but do not exceed) two amps unless the speakers can handle the power. Radio Shack and cars-that-go-boom shops have a pretty good selection of fuses and their holders.

## SUMMARY

Before the CD, transferring an audio master to vinyl or cassette presented obstacles to dynamic range, high-frequency transients, and low-frequency phase anomalies. These limitations — when conquered by signal processors such as compressor/limiters and de-essers — made life easier on both speaker components and ears alike. Digital audio minimizes the difference between what is heard in the studio and what can be realized at home. I think "postmodern" recording techniques require an even better understanding of signal processing because what was once solely the domain of the mastering engineer is now in all of our hands.

Your monitors, whether nearfield or otherwise, require care, feeding, and a healthy respect if they are to continue being valuable tools. Not only do speakers lie, but equalizers are their co-conspirators. Don't blame your tools, but do know their limitations.



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## TASCAM 102 mkII / 103 Stereo Mixdown Cassette Decks



Best values for musicians, studio operators and production houses. The 102 mkII and the 103 consistently produce only the highest quality tape recorded output.

- Their Features:**
- 60dB signal-to-noise ratio combines with wide frequency response for high-fidelity sound reproduction using any type of cassette tape
  - Industry-standard Dolby B/C noise reduction and Dolby HX Pro sound technology extends high frequency performance up to 6dB and minimizes distortion
  - Advanced bias-sensing electronics automatically chooses optimal recording settings for the type of tape you load in—Normal, Metal or CrO2
  - Record/Mute autopacer automatically inserts 4 seconds of silence between songs or broadcast segments
  - Multi-function display clearly indicates transport mode, tape counter, position, tape and level indicator
  - Multi-counter with both tape counter and run-time modes
  - Independent L and R stereo level controls and master record level control
- Tascam 103 Advanced Features:**
- 3-head system allows you to record on a tape and monitor it at the same time, without rewinding
  - MPX filter button eliminates pilot and sub carrier broadcast tones that can interfere with Dolby noise reduction

## 202 mkIII Dual Auto Reverse Cassette Deck



The 202 mkIII provides high-fidelity sound reproduction and a wide frequency response, as well as a host of features that help you dub, edit, record or playback onto/from one or two cassettes easily and efficiently.

- Normal speed and high-speed dubbing
- Autopacer automatically inserts 4 seconds of silence between songs or broadcast segments for pro quality tapes
- Incorporates Dolby HX Pro sound technology to extend high frequency performance and minimize distortion on Normal, Metal and CrO2 tape
- Allows you to quickly and easily create a professional-sounding composite tape from several sources. Functions like Intro Check, Computerized Program Search, Blank Scan and One Program quickly find the beginning of tracks you want
- Twin turn-head cassette decks in a durable rack-mount housing and playback for total flexibility
- **Play** manual on deck 1 while deck 2 records on one or both sides
- **Record** simultaneously on both decks from an external master
- **Play** back both sides of one or both decks in a continuous loop, up to five times
- **Auto Reverse** automatically reverses tape direction during playback and record
- **Repeat** rewinds tape and allows infinite looping during playback
- **Timer** switch for unattended record/playback (timer required)

## New! 302 Double Auto Reverse Cassette Deck

All the features of the 202 mkIII, the new 302 adds even more recording and playback flexibility. That's because the 302 is actually two fully independent cassette decks. Both decks have their own set of interface connectors, transport control keys and noise reducing functions.

- Auto-reverse capability on both decks
- Individual simultaneous record capability—both decks
- Independent RCA unbalanced in/out for each deck
- Cascade and Control I/O let you link up to 10 additional machines for multiple dubbing or long playing record and playback applications

## CD-601 Professional CD Player



Frame-accurate cueing precision, extremely high-fidelity and a small form factor make the CD-601 ideal for post-production applications where sound effects and music are "thrown-in" from compact discs. The CD-601 integrates with most post-production equipment including mixers, video editors and computer studio controllers.

- Balanced XLR and unbalanced RCA outputs
- Precision cueing control and Auto cue
- Linear motor-driven pick-ups eliminate dead air
- Optional RC-601 remote control adds additional features and conveniences
- Optional BU-2 RAM for instant start and seamless loops up to three minutes

## marantz® PMD-101/201/221/222/430 Portable Professional Cassette Recorders

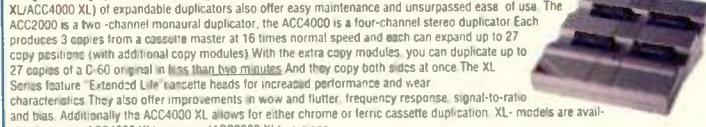
The world standard for field recording, the PMD line is also the value leader. They all feature RCA line input/outputs, 1/4-inch headphone jack, built-in speaker, pause control, audible cue and review, tape counter, full auto shut-off and low battery indicator.



| General               | PMD-101  | PMD-201      | PMD-221      | PMD-222      | PMD-430         |
|-----------------------|----------|--------------|--------------|--------------|-----------------|
| Stereo/Mono           | Mono 2   | Mono 2       | Mono 3       | Mono 3       | Stereo 3        |
| Inputs/Outputs        |          |              |              |              |                 |
| Mic Input             | 1/4-inch | Miniplug     | Miniplug     | Miniplug     | 1/4-inch        |
| Condenser Mic         | Built-In | Built-In     | Built-In     | Built-In     | —               |
| Remote Jack           | —        | Yes          | Yes          | Yes          | —               |
| Modular Tel. Jack     | —        | Yes          | Yes          | Yes          | —               |
| External Speaker Jack | —        | Yes          | Yes          | Yes          | —               |
| Record Controls       |          |              |              |              |                 |
| VU Meters             | —        | 1            | 1            | 1            | 2 (Illuminated) |
| 2-Speed Recording     | Yes      | Yes          | Yes          | Yes          | —               |
| Dolby B NR            | —        | —            | —            | —            | Yes             |
| dbx NR                | —        | —            | —            | —            | Yes             |
| Mic Attenuation       | —        | 0-10dB -20dB | 0-10dB -20dB | 0-10dB -20dB | 0-15dB -30dB    |
| Ambient Noise Cont.   | —        | Yes          | Yes          | Yes          | —               |
| MPX Filter            | —        | —            | —            | —            | Yes             |
| Manual Level Control  | —        | Yes          | Yes          | Yes          | —               |
| Limiter               | —        | Yes          | Yes          | Yes          | —               |
| ALC                   | Yes      | Yes          | Yes          | Yes          | —               |
| Peak Indicator        | —        | —            | Yes          | Yes          | —               |
| Playback Controls     |          |              |              |              |                 |
| Pitch Control         | ±20%     | ±20%         | ±20%         | ±20%         | ±6%             |
| Bias Fine Adj.        | —        | —            | —            | —            | Yes             |
| Tone Control          | Yes      | Yes          | Yes          | Yes          | —               |
| Half-Speed Playback   | Yes      | Yes          | Yes          | Yes          | —               |
| Memory Rewind         | —        | —            | Yes          | Yes          | Yes             |

## Telex ACC2000/4000 Series Cassette Duplicators

Designed for high performance and high production, Telex's ACC Series (ACC2000/ACC4000) and (ACC2000 XL/ACC4000 XL) of expandable duplicators also offer easy maintenance and unsurpassed ease of use. The ACC2000 is a two-channel monaural duplicator, the ACC4000 is a four-channel stereo duplicator. Each produces 3 copies from a cassette master at 16 times normal speed and each can expand up to 27 copy positions (with additional copy modules). With the extra copy modules, you can duplicate up to 27 copies of a C-60 original in less than 15 minutes. And they copy both sides at once! The XL Series feature "Extended Life" cassette heads for increased performance and wear characteristics. They also offer improvements in wow and flutter, frequency response, signal-to-noise and bias. Additionally the ACC4000 XL allows for either chrome or ferric cassette duplication. XL models are available in stereo (ACC4000 XL) or mono (ACC2000 XL) versions.



- Fingerip Operation**
- Individual rotary audio level controls allow for an increase or decrease of audio levels as the master translates to the copies.
  - Each cassette position has a quick and accurate monitoring of audio fluctuations.
  - Side A or B select button let you set up for duplication of either 1 side or both sides of a cassette at once.
  - Stop all tapes instantly, at any point during the copy or rewind cycle.
  - Short tape indicators alert you if a tape stops before the original does, identifying incomplete copies caused by jam or error.
  - Automatic or manual selection of rewind and copy operation.
  - Rewind tapes to the beginning or end automatically (AUTO mode) or manually.
  - In AUTO mode the copy button activates the entire rewind/copy/rewind sequence. In manual it starts copying immediately.
- Easy Maintenance:**
- Slanted work surface and unique "heads-up" cassette platform allow less oxide build up on the heads and makes cassette loading and unloading much easier.
  - Each cassette position has a three point tape guidance system that eliminates skew problems. Plus, when a tape is inserted, each cassette position is activated to prevent unnecessary wear and tear on the tape head mechanism.
  - Audio and bias, along with head adjustments, are made easily from the top of the unit and a switch on the back engages the head and pinch roller for convenient cleaning.

- ACC2000 Mono Master Module:**
- 1/2 track, two-channel monaural duplicator produces 3 copies from a cassette master at 30ips (16X normal speed).
  - Expands up to 27 copy positions by adding ACC2000 copy modules (four positions each).
  - Erase heads in the copy positions automatically erase existing audio as new material is being recorded.
  - Track select/short tap indicators auto/manual operation.
  - Includes removable power cord and protective dust cover.
- ACC2000 XL Mono Master Module:**
- Same features as ACC2000, plus—Extended Life cassette heads.
- ACC4000 Stereo Master Module:**
- 1/4 track, four-channel stereo duplicator. Same features as ACC2000 Mono Master Module.
- ACC4000 XL Stereo Master Module:**
- All features as ACC4000, plus—Extended Life cassette heads. Can be configured for chrome or ferric cassette duplication.
- ACC2000 Mono Copy Module:**
- 1/2 track, two-channel monaural copy module.
  - Each module has four copy positions with erase heads and controls for side select.
  - LED displays indicate end-of-tape status for each pocket.
  - Includes ribbon cables for connection to ACC2000 master and other copy modules.
  - Includes removable power cord and protective dust cover.
- ACC2000 XL Mono Copy Module:**
- Same features as ACC2000 Copy Module, plus—Extended Life cassette heads. Connects to ACC2000 XL Master Module.
- ACC4000 Stereo Copy Module:**
- 1/4 track four-channel copy module. Has all the features of the ACC2000 Copy Module.
- ACC4000 XL Stereo Copy Module:**
- Same as the ACC4000 Copy Module, plus—Extended Life heads. Configurable for chrome or ferric cassette duplication.

## Copypette EH Series Duplicators

The popular Copypette series produces high quality, low cost cassettes in large quantities at nearly 16 times normal speed. This means you can reproduce both sides of a C-60 tape in less than two minutes. Available in two versions, the Copypettes are capable of duplicating either one cassette or three at a time. In addition each are available in both mono and stereo models. They couldn't be easier to use. You simply insert the cassettes, press the START switch and they do the rest. They rewind all tapes to the beginning, copy, then rewind to the beginning again before stopping. The whole process can be stopped at any time by pressing the CYCLE button. Side Select feature allows you to set them up to copy one side of a tape or both sides at once.

- Stereo Copypette 1\*2\*1**
- Weighing only 8 lbs. (3.6 kg), this unit has a durable, impact resistant housing and includes a removable power cord, carrying handle and protective cover. It also has an optical, non-reflective end-of-tape sensing system that provides gentle tape handling. A mono version is also available.
- Stereo Copypette 1\*2\*3**
- This duplicator copies both sides of three cassettes at once, yet it's as small as the 1\*2\*1. It weighs only 12 pounds (5.4 kg) and includes a hard cover to protect the unit while not in use. It uses all DC Servo motors for the ultimate in reliability. A mono



## TASCAM 112 mkII Stereo Cassette Deck



The classic "no frills" production workhorse, the 112 mk II is a 2-head, cost effective deck for musicians and production studios. Extremely rugged and reliable, the 112 mk II is ideal for production mastering and mixdown. It also features a parallel port for external control and an optional balanced connector kit means it is flexible enough to integrate into any production studio.

- Utilizes Dolby B or C noise reduction with Dolby HX Pro
- Automatically selects proper bias type, so you get optimal recording & playback response with Normal, Metal or CrO2 tape
- Gear independent input dials let you dial in stereo VU calibration with one dial. You can also adjust for channel specific calibration
- Offers two AutoLocator buttons and a MEMO IN control. These controls allow you to select two points on any tape for one button forward/reverse to wherever the action is. Additionally RTZ (return to zero) quickly spots the tape back to 0000 on the tape counter
- Rear-mounted RCA input/output jacks for easy connection to high-quality sources
- Optional LA-112 connector provides additional balanced or unbalanced XLR inputs and outputs. Installation is simple and requires no special tools
- 25-pin D sub connector (parallel port) on the back, links the deck to the optional RC-134 remote control unit or for fader start from any mixer that use the same protocol

## 112R mkII Bi-Directional Stereo Cassette Deck

The 112R mkII is a sonically uncompromising, auto reversing and continuous play cassette deck. It offers the finest independent head auto-reverse design at this price level, plus it has extra dubbing and editing features that make it ideal for long program recording.

- All the features of the 112 mk II plus—**
- Three-head transport with separate high-performance record and playback heads. Manufactured from resilient Cobalt Amorphous materials, the independently-operating heads combine with precision FG servo direct-drive castpan motors to provide the highest standards of reproduction quality and performance
  - Frequency response is 25 Hz to kHz with less than 1% total harmonic distortion
  - Equipped with Hysteresis Tension Servo Control (HTSC) the 112R involuntarily eliminates wow and flutter. HTSC is an advanced servo control system that maintains consistent back tension on the tape all through the reel, combating inconsistencies brought on by extreme temperatures and humidity.
  - Super Acculign Rotating Head System allows recording or playback tape direction to be changed with one button. A single-screw azimuth adjustment makes it easy to maintain the head alignment after many hours of continuous use.
  - For unattended record/playback of material that is longer than one side of a tape, there are two features that spare you from constantly attending to the deck.
    - Auto Reverse mode plays or records in both directions before stopping, switching sides on the fly
    - Continuous Reverse mode allows you to loop the tape during, layback up to 5 times, or record in both directions, without pausing to flip the tape and re-engage the record mechanism. Both features are accessible from the front panel, with one-button selection.

## 122R mkIII 3-Head Stereo Cassette Deck



The standard for production and broadcast facilities, the 122 mkIII features smooth tauffless tape handling mechanisms, a three head transport with high-performance Cobalt Amorphous record/playback heads and precision servo direct-drive castpan motors.

- All the features of the 112R mk II (no reverse of course) plus—**
- XLR balanced and unbalanced RCA inputs and outputs are selectable with the flip of a back-panel switch. There are 1/4-inch inputs on the front panel for simple and direct plug-in of line-level gear
  - MPX filter button eliminates pilot and sub carrier broadcast tones that can interfere with Dolby noise reduction
  - Bias and level fine tuning for each channel. These tuners can be used in conjunction with the one-touch 400 Hz or 10 kHz oscillator adjustment signals to get proper VU calibration before or during each recording session
  - Record/mute autopacer automatically inserts 4 sec. of silence between songs or broadcast segments for pro quality tapes

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## BEHRINGER

### MDX 1200 Autocom

- Attack and release times, with Intelligent Program Detection, prevents common adjustment errors.
- Newly-developed, powerful noise gate.
- Switchable soft knee/hard knee characteristics for varied sound pressure levels.
- Bright, illuminated LEDs show gain reduction.

### MDX 2100 Composer

- Integrated auto/manual compressor, expander & peak limiter
- Compresses "musically" in dynamic range without any audible "pumping" or "breathing".
- Attack & release times are controlled automatically or manually
- Interactive Gain Control (IGC) combines a clipper and peak limiter for distortion-free limitation on signal peaks
- Servo-balanced inputs and outputs are switchable between +4dB and -10dB

## ALESIS

### 3630 Compressor

The 3630 provides two full-featured professional compressor/limiters in one rack space. Ideal for any application from studio recording and mixing to live sound reinforcement and broadcast.

- Dual mono or linkable true stereo operation.
- Choose between RMS and peak compression styles as well as hard knee /soft knee characteristics.
- Dual 12-segment LEDs display gain reduction and input/output levels.
- Each channel's built-in noise gate has an adjustable threshold and close rate to ensure clean, transparent performance.
- Variable attack and release times and a sidechain function for "ducking" in broadcast applications.

## t.c.electronic

### Wizard M2000 Studio Effects Processor

The M2000 features a "Dual Engine" architecture that permits multiple effects and six different routing modes. There are 250 factory programs including reverb, pitch delay, delay, chorus, flang, phase, ambience, EQ, de-essing, compression, limiting, expansion, gating and stereo enhancement. The M2000 also features 20-bit analog conversion/AES/EBU and S/PDIF digital inputs/outputs. "Wizard" help menus, 16-bit dithering tools, Tap and MIDI tempo modes and single page parameter editing. The array of enhanced pitch shift (up to 8 voices), chorus, and delay effects are characterized by their precision and versatility. Everything from the fine and subtle to the wide and spectacular is handled with equal superiority. The algorithms in the dynamics section (compressor, limiter, expander, gate and de-esser) are unique as stand-alone effects, but are particularly useful in combination with other effects. Those might be de-esser/room, gated hall or compressed pitch. The possibilities are endless. Tempo Tap function lets you match effects to the beat. Tempo can be adjusted in beats-per-minute and sub-divided any way you like—even in triplets. The tempo can also be read from MIDI. Preset "Gating" (morphing) function ensures seamless transition between effects. Very useful in live and mixing situations.

## Symetrix

### 601

### Digital Voice Processor



- Accepts mic or line level analog signals, converts them to 18 bit-digital and then performs 24-bit digital domain signal processing.
- Processing includes fully parametric/shelving EQ, notch/dynamic filtering de-essing, delay, chorus, gating, expansion, compression, AGC and DC removal.
- Combination of 128 factory presets and 128 non-volatile user programs.

- Has XLR-balanced mic and line inputs, XLR-balanced stereo output. Digital XLR-balanced and S/PDIF (RCA) inputs and outputs. MIDI input/output supports connection to virtually any type of MIDI control device for programming or controlling the 601 in real time.
- Ideal for a variety of recording, broadcast, live sound, and post production applications.

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## Fostex

### XR-5/XR-7 Multitrackers

#### XR-5 Features:

- High-speed (3-3/4 ips) four-track (2-tracks simultaneously) recorder with built-in Dolby noise reduction (can be turned off)
- Pitch controller varies the tape speed within a range of  $\pm 12\%$
- Punch in/out function makes corrections and phrase insertions when necessary, can be done easily with optional footswitch.
- Four inputs accommodate two microphones in channels one and two. Has convenient insert points for connecting a compressor/limiter and other devices for the mic channels.
- Each channel is equipped with two-point high/low shelving equalizers to help shape the sound, and an AUX send function for processing ambient system effects.
- Trim function lets you switch High/Mid/Low input levels for channels one and two.
- Alternate Mix mode lets you independently select the signal from the input jack or the tape playback. Prefader effect send, inline monitor & other functions are also possible using this mode.
- Post foldback (monitor) send function routes the foldback signal to the AUX send. When the foldback is activated you can actually mixdown at the same time you add reverb to a tape

- MID/TAPE multi-mix mode supports MIDI synchronization. Together with the Alternate Mix mode the XR-5 can simultaneously mix all MIDI sound source output with tape playback sound and effect output while monitoring!



#### The XR-7 has all the features of the XR-5 plus—

- 6 inputs, plus the ability to record four tracks simultaneously
- Dolby C noise reduction plus dual speed recording
- During recording, Channels 5 and 6 are the primary inputs for microphones and acoustic instruments. They have trim controls and mid-sweep EQ. During mixdown, these channels act as the main stereo L/R bus.
- Auto rehearsal mode lets you concentrate on the music instead of the machine.

## TASCAM

### PORTA 03 mkII Ministudio

The easiest way to get into multitrack recording, the PORTA 03 is an extremely economical 4-track recorder that lets you overdub as well as mixdown to standard cassettes.

- 4-track recorder with integrated two channel mixer
- Two 1/4-inch MIC/LINE inputs with trim control
- Extended dynamic range with Dolby B noise reduction
- 3-digit tape counter keeps track where you are on the tape
- Master level control for the entire mix, and the level sent to LINE OUT for stereo mixdown
- Track selector indicates which of the 4 tracks you're recording to

- SAFE selection keeps you from inadvertently recording over tracks you've recorded
- Headphone jack for comfortable monitoring
- RCA output jacks for mixdown to cassette



### PORTA 07 Ministudio

The PORTA 07 packs high-end features into a compact and economical package. Achieves great sound with high speed tape transport, high-low EQ and DBX noise reduction.

- 4-track recorder with integrated four channel mixer
- Two 1/4-inch LINE inputs and two 1/4-inch MIC/LINE inputs with trim control.
- Separate high and low EQ for each track provides 10dB of boost or cut.
- dbx noise reduction for improved signal-to-noise ratio
- Punch-in/out manually or with optional RC-30 footswitch.
- Effects send with stereo return can be applied in varying amounts to all four channels

- "Bounce or "ping pong" a submix of multiple mono or stereo tracks onto a single empty track, leaving the original submix tracks free to overdub new material onto. You can even add a "five" track to the submix while you're bouncing down, to squeeze in yet another track.



### 424 mkII Portastudio

The 424 is premium Portastudio that takes multitrack recording to the next level. Features superior audio quality, balanced XLR inputs, enhanced equalization and a big-studio style AUX section.

- All the features of the PORTA 07 plus—
- 4-track recorder with 8-input mixer (4 mono MIC/LINE inputs with 1/4-inch and balanced XLR jacks and 2 stereo inputs with 1/4" jacks.)
- Separate 3-band EQ section for each of the four mono channels with 10dB of boost or cut and sweepable midrange
- Auto Punch in/out with rehearsal, plus a Repeat switch lets you set up a tape loop that goes over the same area of a tape while you practice your punch-in/out and overdub moves—without committing a single note to tape
- Two independent dedicated AUX sends let you use more effects or use one as tape cue during tracking

- Dual-speeds, logic-controlled tape transport system improves tape handling and sound quality. Select 3-3/4 inch per second HIGH speed for the best possible recording quality or NORMAL 1-7/8 ips speed.
- Monitor output makes it easy to connect an external monitor amplifier without repatching—at mixdown.
- Tape DIRECT OUTS are provided for integration with external mixers.



**MIDI Musicians Take Note!**—If you've got MIDI keyboards, drum machines and sound modules in your set up, you can exploit the power of virtual tracking! With either the PORTA 07 or 424/464/488 Portastudio. You can use a MIDI synchronizer like the Tascam MTS-30 MIDI-Tape Synchronizer to record (strip) a code onto track 4 (track 8 with the 488). Just select SYNC mode on the DBX switch and record the tone to tape. After stripping the tape with FSK or Song Position Pointer information, all your MIDI instruments will faithfully follow the tape during playback and recording, even if you slow or speed the tape using the PITCH controls. The big benefit is that your MIDI tracks (called virtual tracks) don't actually have to be recorded until final mixdown, giving you lots more unused tracks to record on.

### 464 Portastudio

The functionality of a pro recording studio in a small, lightweight package, the 464 Portastudio is a full-featured eight input, four-track cassette recorder complete with a 12x2 internal mixer and dual buss design that lets you create separate recording and cue mixes.

- All the features of the 424 mk II plus—
- 4-track recorder with 12-input mixer (4 mono MIC/LINE with 1/4-inch and balanced XLR jacks, 4 stereo 1/4" jack pairs.
- Channels 1-4 offer High and Low shelving EQs and a sweepable Mid EQ. Tracks 5-6 and 7-8 have shelving EQ only, while 9-10, 11-12 are best used with input that has its own internal EQ.

### 488 mkII Portastudio

When 4 tracks are just not enough, then you need the perfect creative tool—the 488 mkII Portastudio. The most cost-effective 8-track recorder on the market, the 488 not only offers additional capacity but versatile capability and intuitive operation for easy capturing & manipulation of your ideas. Whether recording acoustic or electronic instruments or vocals, the 488 offers maximum creative freedom to produce your best work. With all the functionality of a professional studio, the 488 may be the ultimate demo recording machine.

#### All the features of the 464 mk II plus—

- Includes phantom power for use with high-quality condenser microphones.
- Built-in mixer features low-noise circuitry, with 12 inputs and 2 group busses. There is a separate input for your stereo master recorder.
- Each of the 8 main input channels includes individual 3-band equalizers. You get Hi and Low shelving EQs, plus a semi-parametric sweepable midrange EQ.
- Unique multi-mix mode with the capability of handling up to 20 inputs at mixdown.
- The only 8-track cassette that offers a servo controlled tape transport complete with electronic braking. Equipped with a high-performance Hysteresis Tension Servo Controlled (HTSC) tape transport, the 488 delivers better sound than the first 8-track reel-to-reel machines.
- HTSC maintains precise and consistent tape tension from the beginning until the end of the tape. It actually dynamically adjusts the back tension on the tape as it moves from one end to the other, allowing precise locating capability.



## ALESIS

### Monitor One

#### Near Field Studio Reference Monitor

Designed by engineers with decades of experience, the award winning Monitor One provides the last critical link in the recording studio's signal chain, giving you an accurate reproduction of what is being recorded.

- Delivers excellent image and transient reproduction, powerful bass, and smooth, extended high frequency detail.
- Exclusive SuperPort speaker venting technology eliminates the "choking" effect of port turbulence for solid high-power bass transients and extended low frequency response
- Ferrofluid cooled 1" silk-dome driver eliminates the harshness and ear fatigue associated with metal or plastic tweeters, making it easy to mix on for extended periods.
- Monitor One's powerful bass incorporates a proprietary 6.5" low frequency driver with a mineral-filled polypropylene cone and a 1.5" voice coil wound on a high-temperature Kapton former.
- They come in a mirror-image left/right pair covered with a non-slip rubber textured laminate for stable mounting

### Monitor Two

#### Mid Field Studio Reference Monitor

With much of today's popular music demanding more bass! louder volumes than a small near field monitor can possibly produce—the Monitor Two delivers—at a price no higher than many of these smaller speakers.

- Utilizes a 10" three way speaker design with a unique asymmetrical crossover to maintain the same accurate tonal balance and imaging of the Monitor One—but with a much larger sound field
- 10" low frequency driver incorporates Alesis' SuperPort speaker technology to provide powerful, extended bass.
- 5" mid frequency driver offers exceptional mid frequency detail
- 1" silk dome high frequency driver delivers a broad but natural frequency response from 40Hz to 18kHz
- Covered in a non-slip rubber finish, the Monitor Two comes in a mirror imaged pair for mixing accuracy.



## TANNOY

### PBM Series II Reference Monitors

The PBM II Series is the industry standard for reference monitors. They feature advanced technologies such as variable thickness, injection molded cones with nitrite rubber surrounds and the highest quality components including polypropylene capacitors and carefully selected inductors. With a Tannoy monitor system you are assured of absolute fidelity to the source, true dynamic capability and most important, real world accuracy.



#### PBM 5 II

- Custom 5" injection-molded bass driver with a nitrile rubber surround for extended linearity and accurate low frequency reproduction. They are better damped for reduced distortion and exhibit more naturally open and detailed midrange.
- Woofer blends seamlessly with the 1" polyimide soft dome ferro-fluid cooled tweeter providing extended bandwidth for extremely precise sonically-balanced monitoring.
- Designed for nearfield use, the PBM 5 II cabinets are produced from high density media for minimal resonance and features an anti-diffraction radiused front baffle design.

#### PBM 6.5 II

- Portable and extremely powerful, the PBM 6.5 II is the ideal monitor for almost any project production environment.
- 6.5" lowfrequency driver and 3/4" tweeter are fed by a completely redesigned hardwired hand selected crossover providing uncompromised detail, precise spectral resolution and flat response.
- Fully radiused and ported cabinet design reduces resonance and diffraction while providing deep linear extended bass.

#### PBM 8 II

- High tech 1" soft dome tweeter with unmatched pattern control and enormous dynamic capability. 8" driver is capable of powerful bass extension under extreme SPL demands.
- Hard wired crossover features true bi-ware capability and utilizes the finest high power polypropylene capacitors and components available.
- Full cross-braced matrix medite structure virtually eliminates cabinet resonance as a factor.
- Ensures precise low frequency tuning by incorporating a large diameter port featuring laminar air flow at higher port velocities.





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## CARVER

### CA-400/CA-900 Stereo Power Amplifiers

Designed from the ground up for fixed installation applications, the CA-400 and CA-900 are manufactured under the most stringent quality control procedures and are backed up with a full five year warranty covering all parts and labor.

- 3-position barrier strip screw terminal inputs can be used with balanced or unbalanced lines
  - Independent CH 1 & CH 2 level controls with 11 detented positions.
  - Dual mono mode for operating both channels with a single mono input.
  - Bridged mono mode for combining the power of both channels into a single higher powered channel
  - Internally configurable for parallel mono mode, for single channel low impedance operation.
  - Internal jumpers to bypass Left and Right Level Controls.
  - Internal connection points for add-on accessories like the optional Balanced Transformer Kit.
  - Independent CH 1 and CH 2 speaker relays will instantaneously disconnect if fault conditions such as over temperature, short circuit or D.C. offset is detected.
  - Power Ready, Signal Present and Clip/Protect Indicators
- CA-400 features:** 130W per channel into 8 ohms, 200W per channel into 4 ohms
- CA-900 features:** 325W per channel into 8 ohms, 450W per channel into 4 ohms

## Stewart

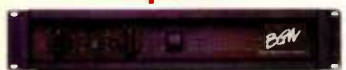
### Power Amplifiers PA-1000 PA-1400 PA-1800



- High frequency switch mode power supply fully charges 120,000 times per second (1000 times faster than most power supplies) requiring far less capacitance for filtering and storage.
  - High speed recharging also reduces power supply "sagging" that afflicts other designs.
  - Incredibly efficient, 5 PA-1000 or PA-1400's (4 PA-1800's) can be run on one standard 20 amp circuit. No need for staggered turn-on configurations or other preventive measures when using multiple amp set-ups.
  - They produce smooth and uncolored sound, while offering very full detailed low end response and tons of horsepower.
  - Each amp carries a full 5 year warranty on parts and labor
- PA-1000** weighs 9 lbs. is 15" deep and occupies one standard rack space. Delivers 1000 watts into 4Ω when bridged to mono.
- PA-1400** weighs 16 lbs. is 15" deep and takes 2 standard rack spaces. Delivers 1400 watts into 4Ω when bridged to mono.
- PA-1800** weighs 17 lbs. is 17" deep and takes two rack spaces. Delivers 1800 watts into 4Ω when bridged to mono.

## BSW

### Performance Series Amplifiers



#### Performance Series 1 300 Watt Power Amplifier

- Measuring only 3.5 inches high and weighing 26 pounds, the Series 1 delivers more than 150 watts per channel.
- Welded steel chassis is unbelievably strong while a custom heat sink extension provides exceptional thermal capacity.
- An internal fan provides quiet background noise levels for critical monitoring applications and when pushed hard the cooling system insures continuous cool operation even in the most demanding situations.
- Active balanced inputs with both XLR and 1/4" phone jacks.
- Supplied with quality 5-way binding posts for highly reliable speaker connections.
- Front panel handles are reversible for either rack mount installation or easy handling.
- LEDs are provided for signal presence and clip indication; the detented gain controls have large knobs for easy front panel adjustments.

#### Performance Series 2 600-Watt Power Amplifier

- Same as above except the Series 2 weighs 32 pounds and delivers more than 300 watts per channel

#### Performance Series 4 1200-Watt Power Amplifier

- Same as above except the Series 4 weighs 53 pounds and delivers more than 600 watts per channel.
- Has a switch selectable clipping eliminator that prevents damage to the speakers.

## SAMSON MIXPAD 9

### Ultra-Compact 9-Channel Audio Mixer

A remarkably compact 9-channel mixer, the MIXPAD 9 offers professional audio performance and a wide range of user-intensive features. It boasts low noise and distortion specifications, includes wide-range gain trim controls for both mic and line inputs and provides exceptionally low group delay over the full frequency bandwidth for a more transparent, open sound. It also has a very high slew rate—usually found only on larger, more expensive mixing consoles—allowing it to react very quickly to transients and maintain a crisp, articulate sound. It offers phantom power (48V) for use with condenser microphones and an in-line power supply eliminates magnetically-induced hum.



- 3 mic/line inputs and 3 stereo channels (Total 9 inputs)
- 2 auxiliary sends for effects and two Stereo returns
- Independent 2-band shelved EQ, pan control for mono channels and balance control for stereo channels

- Adjustable mic input trims allow use with a wide variety of mics.
- Phantom powered XLR mic input connectors
- Peak LEDs for left and right main outputs
- Extremely durable, extruded aluminum chassis

## MACKIE

### MICRO SERIES 1202-VLZ 12-Channel Ultra-Compact Mic/Line Mixer

Usually the performance and durability of smaller mixers drops in direct proportion to their price. Fortunately, Mackie's fanatical approach to pro sound engineering has resulted in the Micro Series 1202-VLZ, an affordable small mixer with studio specifications and rugged construction. It delivers no-compromise, non-stop, 24-hour-a-day professional utility in permanent PA applications, TV and radio stations, broadcast studios and editing suites—where nothing must ever go wrong.

- Working S/N ratio of 90dB, distortion below 0.025% across the entire audio spectrum and +28 dB balanced line drivers.
- 4 mono channels with discrete, balanced balanced mic/line inputs and 4 stereo channels (12 inputs total)
- Line inputs and outputs work with any line level, from instrument level, to semi-pro -10dB, to professional +4dB.

- Switchable phantom-powered (48V) inputs for condenser mics
- Every input channel has a gain control, pan pot, low EQ at 60 Hz, high EQ at 12.5 kHz and two aux sends with 20dB gain
- Master section includes two stereo returns, headphone level control and metering
- Sealed rotary pots resist and other contaminants



### NEW! MS1402-VLZ 14 x 2 Compact Mic/Line Mixer

Mackie's fanatical engineers have done it again. Balanced inputs and outputs, 3-band EQ, AFL/PFL and deluxe tape monitor/Control Room feature. Nice long 60mm faders, six studio-quality mic preamps and extra Alt 3-4 stereo bus—in less than 1.3 square feet of space.

- Studio grade mic preamps (chs. 1-6) with high headroom, low noise and phantom power. Also incorporate low cut filters to cut mic handling thumps, pops and wind noise. Lets you safely use low shelving EQ on vocals.
- Trim controls (ch. 1-6) with ultra wide range (+10 to -10dB) handle everything from hot digital multitrack leads to whispering lead singers and older, low output keyboards.
- Pan control with constant loudness and high L/R attenuation so you can pan hard left or right without bleed-through.
- Two aux sends per channel with 15dB extra gain above Unity.

- 60mm log-taper faders are accurate along their whole length of travel and employ a new long-wearing contact material for longer fader life & upper resistance to dust, smoke etc.
- Control room/pump matrix adds incredible tape monitoring and live sound versatility.
- Mute switch routes channel output to extra ALT 3-4 stereo bus. Use it for feeding multitrack recorder channels, creating a sub-group via control room/phones matrix, monitoring a signal before bringing it into the main mix or creating a "mix minus"
- Solid steel chassis instead of aluminum or plastic.



The new MS-1202, 1402 and 1604 all include VLZ (Very Low Impedance) circuitry at critical signal path points. Developed for Mackie's acclaimed 8-Bus console series, VLZ effectively reduces thermal noise and minimizes crosstalk by raising current and decreasing resistance.

### NEW! CR-1604 VLZ 16-Channel Mic-Line Mixer

The hands-down choice for major touring groups, studio session players, as well as broadcast and sound contracting. The new CR-1604 VLZ features everything you would expect from a larger console, and then some! 24 usable line inputs with special headroom/ultra-low noise Unityplus circuitry, seven AUX sends, 3-band EQ, constant power pan controls, 10-segment LED output metering and discrete front end/phantom-powered mic inputs.

- Lowest noise and highest headroom (90 dB working S/N and 108 dB dynamic range). Many drummers consider it the only mixer capable of handling the attack and transients of acoustic and electronic drums.
- Genuine studio-grade phantom powered, balanced input mic preamps on channels 1-6. All CR-1604 VLZ (and optional XLR10 for ten more) discrete input mic preamp stages incorporate four conjugate-pair, large-emitter geometry transistors. So, whether recording nature sound effects or heavy metal, mixing flutes or kick drums, you get the quietest, cleanest results possible.

- True 4-bus design with channel assigns to 1-2, 3-4 or main L-R.
- 3-band EQ with mid-frequency sweep and low cut switch.
- AFL/PFL solo and mute switches with overload and signal present indicators.
- Rear panel features include insert points and 1/4-inch XLR connectors on every channel, as well as RCA tape inputs/outputs.
- New, standard size channel trim pots are found at the top of each channel.
- Rotary input/output "pod" allowing three different positions for set-up.



## TASCAM

### M2600 mkII Series 16/24/32-Channel 8-Bus Mixers

#### LOW NOISE CIRCUITRY

- Combining completely redesigned low noise circuitry with Absolute Sound Transparency™ the M-2600 delivers high-quality, extremely clean sound. No matter how many times your signal goes through the M-2600, it won't be colored or altered. The signal remains as close to the original as possible. The only coloring you hear is what you add with creative EQ and your outboard signal processing gear.
- Double reinforced grounding system eliminates any hum.
- World-class power supply provides higher voltage output for better headroom and higher S/N ratio.

#### PREMIUM QUALITY MIC PRE-AMPS

- The M-2600's mic pre-amps yield an extremely low noise floor, enormous headroom and an extremely flat frequency response. It also increases gain control to an amazing 51dB. Plus, you get phantom power on each channel.
- Accepts balanced or unbalanced 1/4" inputs, and low-impedance XLR jacks. Better still, the TRIM controls operate over a 51dB input range. For the hottest incoming signals, all it takes is a press of the -20 dB PAD button atop each channel strip to bring any signal down to manageable levels. Plug in anything—keyboards, guitars, basses, active or passive microphones, samplers and more.

#### THE BEST AUX SECTION IN THE BUSINESS

Versatile AUX section has 8 sends total. 2 in stereo. Send signal in stereo or mono, pre- or post-later. Available all at once. Return signal through any of 6 stereo paths.



#### FLEXIBLE EQ SECTION

Bi-directional split EQ means you can use either or both EQ sections in the Monitor or Channel path... or defeat the effect altogether with one bypass button. Other comparably priced mixers will lock the shelving mix into the Monitor path only, limiting your EQ application.

#### ADVANCED SIGNAL ROUTING OPTIONS

Direct channel input switching. Assign 30% of eight buses, direct to tape or disk, or to the master stereo bus. Because the group and direct-out jacks are one and the same, you can set either without repatching.

#### ERGONOMIC DESIGN

The M-2600 has a big studio feel. All buttons are tight & spring loaded, lock into place and accommodate even the biggest fingers. The faders and knobs have a tight, smooth "expensive" feel and are easy to see, reach and manipulate. Center detents assure zero positions for EQ and PAN knobs. Smooth long throw 100mm faders glide nicely yet allow you to position them securely without fear of accidentally slipping to another position.

## Panasonic SV-3800/SV-4100 Professional DAT Recorders



Designed for professional applications, the SV-3800/SV-4100 have highly accurate and reliable transport systems with search speeds up to 400X normal, and 20-bit D/A converters to satisfy the highest professional expectations both in terms of sound and functionality.

#### SV-3800 Features:

- Recording via analog inputs offers sampling rates of 44.1 or 48kHz. When recording through digital inputs, it automatically clocks to incoming frequencies of 32/44.1 or 48kHz.
- XLR-balanced digital inputs/outputs plus consumer format coaxial and optical inputs/outputs. XLR-balanced analog stereo inputs/outputs. Output level is selectable between +4dB and -10dB. The input level is +4dB.
- Built-in shuttle wheel has two variable speed ranges: 3 to 15x in Play mode and 1/2 to 3x normal speed in Pause mode.
- High speed transport enables searching up to 250x normal speed. Search up to 400x normal speed is possible once the tape has been scanned in Play, FF or REV mode. This ensures access to any point on a two-hour DAT in under 30 seconds.
- Ramped record mute and unmuter with three seconds fade-in and five seconds fade-out provides automatic level changes at the start and end of a recording.
- Comprehensive display includes program numbers, absolute time, program time, remaining time and Table of Contents.

#### SV-4100 Has all the features of the SV-3800 Plus—

- Offers enhanced performance required for professional production, broadcast and live-sound systems. Features such as instant start, external sync capability and enhanced system diagnostics make the SV-4100 the DAT quality standard.

## Fostex D-5 Digital Master Recorder

With professional features and a consumer price tag, the D-5 satisfies a lot of requirements. It records or plays back four hours of music, includes optical and digital input/output, and TOC functions that are as easy to use as a CD player. It's also equipped with basic pro features such as editing function, GPI and XLR connectors and 300X speed locate and search functions.

- Playback/records audio with 32/44.1/48 kHz sampling in SP (standard play) mode. Equipped with LP (long play) mode. It can play/record at 32 kHz up to 4 hrs. on a 120 minute cassette.
- Analog interface includes switchable (+4dB/-10dB) balanced and unbalanced XLR inputs and outputs.
- AES/EBU digital interface (XLR) for professional use and optical (S/PDIF) input/output for consumer/semi-pro connections.
- 5-pin GPI input connector allows Play, Stop & S-ID search to be implemented through commands from an external source.
- Records CD-0 code sync ID, enabling precise music start up. When performing digital signal transfer from CD through its optical input, the D5 precisely records S-IDs according to the track number and index information of the CD-0 code. So even if there is a break in the middle of a song or there isn't a non-recorded section between two songs, you can locate to the S-ID location (eg. beginning of song) precisely.

## D-10 Digital Master Recorder



- Switchable 44.1 and 48kHz sampling frequencies
- Analog interface includes switchable XLR-balanced (+4dB) and unbalanced RCA (-10dB) inputs and outputs.
- Equipped with and XLR-balanced AES/EBU digital interface and optical (S/PDIF) input/output conforming to IEC consumer
- Built-in 8MB RAM (4 MB x 2) offers instant start as well as scrubbing at 1m/second accuracy
- Advanced jog/shuttle for precision cueing and monitoring
- Auto Cue provides automatic location to the exact start of audio modulation during ID search and tape loading
- Universal GPI input/output enables easy and fast assemble editing, based on A-time between a pair of D-10s.
- Switchable 2-position reference level: -12dB/-20dB.
- Start and Skip IDs as well as up to 799 P-NOs can be recorded and played back.
- 10-digit key-pad lets you store and recall 100 cue points
- Continuous or peak reading level meters can display available headroom with an accuracy of 0.1dB.
- Reads and displays A-time or Pro R-time, also provides PCM monitoring.
- Optional 8333 interface card adds timecode and RS-422 (X 2) functionality to the D-10
- Reads an external timecode and records on the sub-code area
- Reproduces and outputs the timecode from sub-code area
- Switchable RS-422 and ESbus protocols. Using the ESbus, up to 16 D-10s can be daisy chained.

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## TASCAM

### DA-P1 Portable DAT Recorder

- Rotary two head design and two direct drive motors for the best transport in its class.
- XLR-balanced mic/line inputs (with phantom power) accept signal levels from -60dB to +4dB.
- Analog line inputs & outputs (unbalanced) pl. S/PDIF (RCA) digital inputs and outputs enable direct digital transfers.
- Uses next generation A/D & D/A converters for amazing quality.
- Supports 32/44/1/48kHz sample rates & SCMS-Free recording.
- Included in its design is a MIC limiter and 20dB pad to achieve the best possible sound without outside disturbances.
- TRS jack & level control to monitor sound with any headphones.
- Built tough, the DA-P1 is housed in a solid, well-constructed hard case. It includes a shoulder belt, AC adapter & V battery.



## SONY

### TCD-D8

### DAT Walkman Player/Recorder

- Long Play (LP) mode allows 4 hours of record/playback of 12-bit audio on a single DAT cassette.
- Equipped with digital coaxial and optical input connectors. Also has analog Mic and Line inputs.
- High-speed Automatic Music Sensor search function finds & plays tracks, skips forward or back up to 99 tracks, all at 100x normal speed.
- Digital Volume Limiter System increases listening comfort & sound quality by automatically adjusting for sudden level changes.
- Two-speed cue-review lets you hear sound while player is in fast-wind modes. Up to 3x or 25x normal speed.
- LCD display with backlit windows clearly shows recording level, track number, operating status and 4-segment battery indicator, even in low ambient light conditions.
- Optional RM-D3K System Adapter Kit for complete digital interface. It has input/output connectors for both the optical cable & the coaxial cable. Also includes a wireless remote control.



### TCD-D10 PRO II

### Portable DAT Recorder

- Has balanced XLR input, switchable mic (-60dB) or line (+4dB).
- A 12-pin digital connector provides interfacing with AES/EBU digital signals of 32/44/1/48.0 kHz sampling rates.
- Comprehensive self-diagnostics function constantly monitors the rotation of the head drum, capstan and reels. The tape transport mode and load/unload time are continuously checked as well.
- Up to 39 start IDs can be recorded in the subcode area. When the record button is pressed, the start ID is recorded automatically for 9 seconds. During recording, it can also be added manually to any position of the tape. Search for start IDs is 100X normal speed.
- 20-segment digital peak level meters include overload indicators. Closely tracks input signal for accurate level indications.
- During playback, the date and time of recording is displayed.
- Has a record-level limiter with a last attack time of 300ms. Mic attenuator prevents distortion by suppressing signal level 20 dB.
- Immediate playback is possible through a built-in 5-tracker.
- Supplied wired remote controller also accepts a mic holder. Two mic stand screw adapters are also supplied.
- Supplied NP-22H rechargeable battery provides 1.5 hours of operation. Optional NPA-D10 battery adapter enables 1 hour on AA batt. Supplied APC-88 AC adapter operates on 100-240V 50/60 Hz.



## Roland

## DM-800

### Digital Audio Workstation

The DM-800 is a compact, stand-alone multi-track disk recorder that provides an amazing array of features at an unbelievably low price. Whether for music production, post production or broadcast, the DM-800 will make your work simpler, faster, more productive and more profitable. A full function workstation, the DM-800 performs all digital mixing operations from audio recording, to editing, to track-bouncing, to final mixdown. It fully supports SMPTE and MIDI time codes and also features a built-in Sample Rate Resolver to synchronously lock to any time code.



- POWERFUL EDITING**
  - Time compression, pitch compression
  - Completely non-destructive cutting, erasing, copying
  - Very fast looping for music or ambiance editing
  - Scrub preview and preview to, from and thru
  - Six levels of waveform zoom
  - Optional RS-422 interface (D10-8000) for 9-pin control from video editor
- TRIGGER FEATURES:**
  - Trigger mode to play any combination of 8 tracks for vocal fly ins or sound effects placements
  - Advanced trigger mode for live operation with preset or dial up cue of phrases to be played one after another
- RECORDING OPTIONS**
  - Records to standard SCSI hard drives
  - Up to 24 hours recording time possible
  - Uses Magneto Optical or Syquest drives for fast project changeovers
  - Optional internal 2.5" Drives for portable operation
- PROJECT CATALOGING**
  - Up to 150 projects on line at once
  - Easy cataloging of sound effects and projects
  - Easy transfer of sounds from one project to another
  - File compatible with DM-80
- HIGH QUALITY SOUND**
  - Sampling rates of 48/44.1/32 kHz
  - 18-Bit A/D and D/A with 128 and 8 times oversampling
  - 24-bit internal processing
- FLEXIBLE I/O STRUCTURE**
  - Full digital patch bay
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  - Four balanced analog inputs with gain controls and four balanced analog outputs with option for 4 more
- FULL AUTOMATION**
  - Dynamic and snapshot automation of level, pan, 2-band EQ, including frequency select, boost and cut
  - Microscope editing of automation data
  - Phase level editing of level, crossfade and fade in/out
- ACCURATE SYNCHRONIZATION**
  - Frame accurate sync to any time code
  - Locks to LTC
  - Generates and reads all types of SMPTE, including 24.25, 29.97 (Drop/non-drop) and 30 frames per second
  - Incoming SMPTE reshaped to output jack
- VIDEO OUT**
  - Composite, S-video, digital RGB output
  - All track overview with infinite level of project zoom
  - Views of phrase and waveform editing
  - Very accurate level meters
  - Track status and time location

## Digital Multi-Track Recorders

## TASCAM



The first thing you notice about the eight channel DA-88 is the size of the cassette - it's a small Hi-8mm video cassette. You'll also notice the recording time - up to 120 minutes. These are just 2 of the advantages of the DA-88's innovative use of 8mm technology.

- The ATF system ensures that there will be no tracking errors or loss of synchronization. The DA-88 doesn't even have a (3) need a tracking adjustment. All eight tracks of audio are perfectly synchronized. What's more, this system guarantees perfect tracking and synchronization between all audio tracks on all cascaded decks - whether you have one deck or sixteen (up to 128 tracks)!
- Incoming audio is digitized by the on-board 16-bit D/A at either 44.1 or 48kHz. The frequency response is flat from 20Hz to 20kHz while the dynamic range exceeds 92dB.
- Executes seamless Punch-ins and Punch-outs. This feature offers programmable digital crossfades, as well as the ability to insert new material accurately into tight spots. You can even delay individual tracks, whether you want to generate special effects or compensate for poor timing.

## FOSTEX RD-8



Based on the S-VHS format, the RD-8 is designed for the home project or professional recording studio. Features include up to 40 minutes of recording time on a single tape, noiseless punch-in/out, selectable sampling frequencies of 44.1 and 48kHz and pitch and track delay controls. Systems are expandable from 8 to 128 tracks and there are a wide variety of options available.

- Full transport control is available via the RS-422 port, providing full control right from your video bay. The RD-8 records at either 44.1 or 48kHz and will perform Pull-Up and Pull-Down functions for film/video transfers. The Track Clip feature helps maintain perfect sound-to-picture sync and the 8-Channel Optical Digital Interface keeps you in the digital domain.
- The S-VHS transport in the RD-8 was selected because of its proven reliability, rugged construction and superb tape handling capabilities. 8 tracks on S-VHS tape allow much wider track width than is possible on other digital tape formats.
- With its LCD and 10-digit display panel, the RD-8 is remarkably easy to control. You can readily access 100 locate points, and cross-fade time is fully controllable in machine to machine editing. Table of Contents data can be recorded on tape.
- Since the RD-8 is fully ADAT compliant, your machine can play tapes made on other compatible machines, and can be controlled by other manufacturers ADAT Controllers. Your tape will also be playable on any other ADAT deck.

## SONY

### PCM-800



Based on the success of Sony's multi-channel DASH-format recorders, the PCM-800 is an affordable and expandable 8-track digital system that employs Hi8 tape technology.

- Combines flawless sound quality, outstanding reliability and professional audio interfacing with AES/EBU digital I/O and XLR analog I/O connections.
- Combines all basic audio functions such as precise auto punch in/out digital cross fade technology, external synchronization with SMPTE/EBU time code and selectable sampling frequencies of 44.1 and 48kHz.
- Also features a shuttle dial for precise tape control, variable speed playback of 6% in 0.1% increments and a flat frequency response from 20Hz to 20kHz.
- Up to 16 PCM-800's can be operated in perfect sync with optional RCC-S1 sync cables, providing up to 128 channels of digital audio recording and reproduction.
- Optional DABK-801 Sync Board provides SMPTE/EBU time code generation and chase synchronization. It can be locked to the incoming time code with subframe accurate offset, which is ideal for audio-follow-video applications.
- The DABK-801 also provides complete video synchronization to external video reference signals.
- Optional RM-D800 provides comprehensive remote control over all functions of the PCM-800. The RM-D800 can control up to six units for up to 48 channels of digital audio.

## ALESIS adat xt

### 8-Track Digital Audio Recorder

An incredibly affordable tool, the new ADAT-XT sets the standard in modular digital multitrack recording. With new features & enhanced capabilities, the ADAT-XT operates up to four times faster than the original ADAT, offers an intelligent software-controlled tape transport and provides onboard digital editing and flexible autolocation.



- Stunning Audio:**
  - Incorporates ultra-high fidelity 18-bit, 128 X oversampling A/D converters which provide better-than-CD audio quality.
  - For outputs, the D/A converters provide 20-bit, 8x oversampling performance for a flatter frequency spectrum, improved phase response and much less low-amplitude distortion.
  - Frequency response is 20 Hz to 20kHz @ 0.5dB, S/N ratio is greater than 92dB, crosstalk between channels is better than -90dB @ 1kHz.
- Flexible Inputs and Outputs:**
  - Servo-balanced 56-pin ELCO connector operates at +4dB for interfacing with consoles with +4 dB balanced/unbalanced inputs/outputs.
  - Also includes unbalanced -10dB inputs/outputs (phono connectors).
  - Has an electronic patch bay built-in so it can be used with stereo and 4-bus consoles.
  - Multiple Optical Digital I/O can carry up to eight tracks at once completely in the digital domain. The digital I/O combined with the ADAT Synchronization Interface make it completely compatible with any ADAT-format recorder or other devices that use Alesis' proprietary digital protocol.
- Digital Editor:**
  - Make flawless copy/paste digital edits between machines or even within a single unit. A new Track Copy feature allows you to make a digital clone of any track (or group of tracks) and copy it to any other track (or group) on the same recorder. This allows you to assemble composite tracks for digital editing.
  - Use two or more ADAT-XTs and the Tape Offset feature lets you copy and paste not only from track to track, but from location to location. Tape Offset assembles the elements of a project with a minimum of repetitive over cubbing. It changes the relative tape position of a slice XT to its master, so you can "fly" audio to different locations on each tape.
  - Track Delay feature allows you to delay the time reference of a track by up to 170ms. With Track Delay, you can easily change the groove of a time. Track Delay is individually adjustable on each channel and is excellent for fixing slight timing errors in recorded tracks (player lags behind or rushes the beat). In recordings with multiple microphones, you can time-align each track, precisely compensating for the spacing between mics with accuracy to 0.0001 seconds.

- Intelligent Transport:**
  - Rewinds and fast-forwards up to 4X faster than the original ADAT.
  - Advanced transport software continuously monitors autolocation performance and the head constantly reads ADAT's built-in sample-accurate time code—even in fast wind modes.
  - Newly developed Dynamic Braking software allows the transport to quickly wind to locate points while taking every precaution to treat the tape gently.
- Onboard Autolocator with Auto Record:**
  - Onboard 10-point autolocate system provides quick access to multiple tape locations. Four specialized locate points make your recording sessions quicker and easier.
  - Auto Play automatically enters Play the moment any autolocate point is reached. Auto Return automatically rewinds at the end of a loop.
  - Auto Record function lets you automate punch-in/punch-out times that are accurate to 1/100th of a second.
  - Rehearse Mode allows you to enter or exit record modes without actually laying tracks to tape.
  - To record on the fly, you can even use the individual Record Enable buttons to punch in and out of tracks.
  - Includes remote control with transport and locate functions, offers a footswitch jack for hands-free punch-in.
- Optional Accessories:**
  - BRC Master Remote Control lets you command up to 128 tracks from a single location, with 460 nameable locate points, SMPTE & MIDI synchronization & extensive digital editing power.
  - AI-1 Digital Interface offers sample rate and digital format conversion between the ADAT-XT's Optical Digital Interface and AES/EBU and S/PDIF formats.
  - AI-2 Synchronization Interface allows synchronization to video and film. The AI-2 offers compatibility with video recorders and editing systems (including TimeLine's Lynx-2 system) and can issue MIDI Time Code and translate MIDI Machine Control commands to the ADAT-XT.

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- 48v phantom power, built-in limiter & internal front speaker.
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- Supplied Nickel Metal Hydride rechargeable battery powers the PDR1000 for two hours. The battery has no "memory effect" and is charged in two hours with the supplied AC adapter/charger.
- PDR1000TC Additional Features:**
- In addition to all the features of the PDR1000 recorder, the PDR1000TC is equipped to record, generate and reference to time code in all existing international standards.
- All standard SMPTE/EBU time codes are supported, including 24, 25, 29.97 (drop frame and non-drop frame) and 30 fps.
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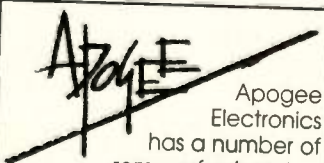
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Be sure to also take advantage of the inexpensive promotion and distribution opportunities available on the **World Wide Web**. You can set up your own Web "homepage," or you may want to consider joining the Oasis-sponsored **Musicians on the Internet** program, which promotes your CD online & distributes it via the CDnow! superstore.

### 2. Work with a Qualified, Independent Graphic Artist

If you want your product to compete with the major labels, you have to look as good as they do. **One-stop "chop-shop" duplicators who offer one-size-fits-all graphics aren't going to cut it.**

This is your project: you need to sit down and work with your own graphic artist-- **face-to-face**. Resources for finding good graphic artists in your local area include local ad agencies, fellow musicians, or a free referral from the Oasis graphic artist database. (You can e-mail or call Oasis & we'll locate a good graphic artist for you in or near your hometown.)

### 3. Work with a Reputable Duplication Company

Oasis has several worthy competitors, but not all duplicators are reputable. Things to check:

- Financial stability of the company. (Caution: **there has been a recent rash of duplicator bankruptcies.** Make sure your duplicator won't collapse while it has your masters!)
- Is the price too LOW? If a deal seems too good to be true, it probably is.
- Consider the quality of the company's clientele--does it work with professionals--names you recognize? Ask for references.
- Consider how knowledgeable & helpful the company's staff is on the phone: do they know the music business? Are they interested in your project's potential?

If you are in need of CD & cassette duplication, Oasis offers its assistance:

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for a more thorough discussion of the topics we've touched on here.

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# NAB and the Audio Business

It's not just a video show  
anymore more

BY MARTIN POLON



The National Association of Broadcasters (NAB) trade meeting and "Multimedia World" recently took place in Las Vegas, NV, drawing nearly 90,000 individuals from all over the United States and the world. There was a time not so long ago when the audio section of the NAB appeared to be eclipsing the annual AES audio show in terms of the sheer number of audio exhibits, but, as stand-alone audio has become a major component of the "food chain" for video production, postproduction, and multimedia/computer applications, the audio industry spread out everywhere on the NAB floor, with the so-called traditional "audio ghetto" shrinking in size and importance.

Curiously, the advances made in small-and-effective audio hardware for the personal and project (P&P) studio seem to be driving many of the applications of broadcast audio today. Just as P&P studio equipment has changed the face of sound-reinforcement installations, touring systems, and multimedia, the broadcast technology market has finally acknowledged the existence of the well-designed mass market P&P studio and MIDI as well as MI (musical instrument) audio products.

The products are (by broadcast standards) relatively inexpensive,

robust, well-designed, effective, and small in physical stature (again by broadcast standards). Add easy availability both in terms of being standard inventory retail items rather than special, order virtually "hand-made" products and easy access to parts, service, and technical support from large multinational electronics companies, their representatives, and pro dealers. All of this becomes extremely attractive to both the radio and TV broadcaster, as well as to the broadcast equipment turnkey repackager.

The following product areas are the zones of studio audio emphasis that seemed to be the strongest audio hits of the NAB.

**1. Internet and "Real Audio":** Imagine this: Each and every recording studio facility (and every other media venture as well) being able to offer a home page on the Internet with various successful projects available for audio listening via a simple clicking on a "radio button." It'd be a great way of promoting the studio or any band that has recorded there. If you invest in a new piece of gear, you can show prospective customers a sample of what they can expect from it. The possibilities are endless.

Utilizing the current and future projected capability of Internet sonic listening "down-streaming" software such as Real Audio and other similar competitive software, the Internet audio surfers can hear via their computer whatever sounds are posted. Although the apparent acoustic quality of such software today is that of AM radio and short-term improvements promise only monaural FM radio audio quality, that still allows the studio's projects to be well showcased. The enthusiasm shown by Internet users at being able to listen in real time as opposed to lengthy downloads approaching one hour or more has validated the concept of such programs as Real Audio.

**2. Audio Servers:** A concept that is beginning to be embraced by "leading edge," mainstream, large-scale recording studios is the storage of projects on RAID hard drives to be distributed to individual nonlinear recording

and postproduction rooms in a given facility or shared worldwide with another facility via ISDN lines/T1-T2 lines. The concept has been pioneered by television stations, who are using the RAID servers to store news actualities and commercial spots.

As the server technology continues to drop in price, multiroom studio facilities that have segued to nonlinear editing on hard disk will utilize server technology to both optimize project transfer and protect the project's integrity. It is quite possible that the technology will evolve as it is for video news editing, where the master resides in the security of the centralized multi-level RAID drives and all editing/post-production takes place with lower level copies that are then conformed back to the original master.

**3. Other concepts** that earned strong notice at the huge broadcast/multimedia show included digital audio editing workstations, MIDI mixing and recording, and MIDI DSP boxes. The strong emphasis at the show was of a broad range of well-designed audio and video recording and editing software for both the Windows and Macintosh platforms. This clearly marks the point where compatible mainstream computing platforms can provide cost-effective DAW (digital audio workstation) functionality. Also interesting to note was the fact that after a vicious winter and an only lukewarm spring, it seemed to most, if not all, of the showgoers that Apple Computer was on the mend, and that the hold on the audio/video/multimedia production niche by the Cupertino, CA computer maker was still viable.

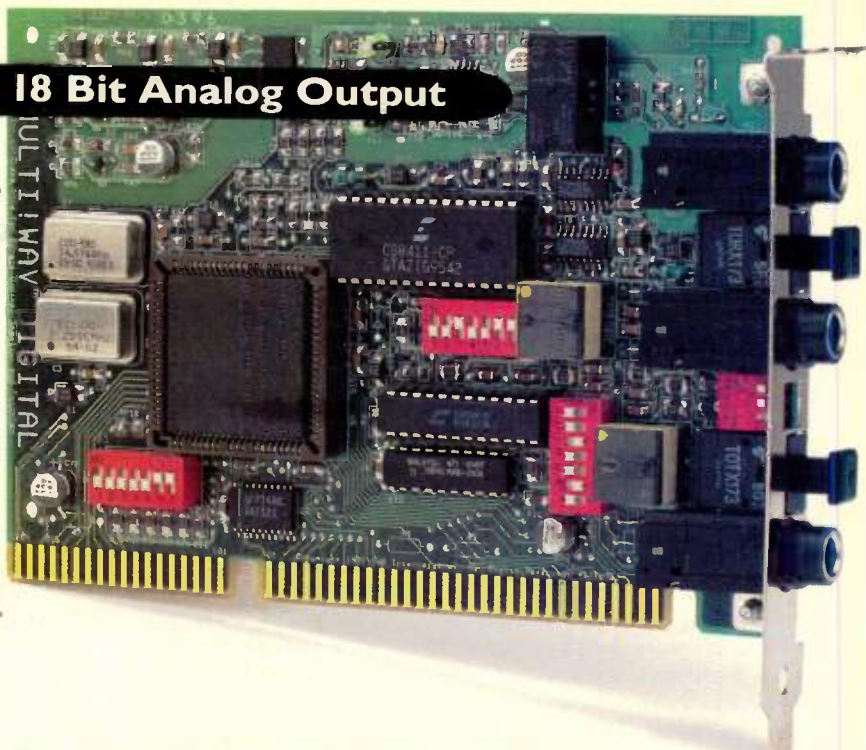
The bottom line of the NAB is that the Las Vegas-based event has, by default, assumed the mantle of primacy over the entrepreneurial audio and video production arena as well as providing a focused show case for PC- and Mac-based multimedia. As audio continues to be absorbed into the mainstream visual and graphics-related media of this decade, the reality of NAB attendance may be more and more important to those who own and operate project studios. **EC**



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CIRCLE 96 ON FREE INFO CARD



## ACROSS THE BOARD

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a 16-channel system with 32 tracks of audio. He performed all of the editing on the multitrack data and then mixed to two tracks using the Pro Tools mixing desk with automation and plenty of TDM plug-ins. He even did some overdubs directly into Pro Tools. Not one minute has been spent in a real studio.

In the past, it has been hard to work on one system at home and then move your audio to another system for final mastering. Audio file interchange has been a problem. The future holds hope for us, though. Avid (Digidesign's parent company) spearheaded the OMF (Oddios My Friend?) standard for audio file transfer. I have used it to transfer multitrack data with regions between Pro Tools and Deck II. AIFF files can be exported by Sound Designer II and imported to Sonic Solutions. There are a multitude of shareware utilities that will convert data from WAV files (the most common PC audio format) to various Macintosh formats.

Don't forget to keep checking my web site (<http://www.digital-atom->

ics.com). It's up to 23,000 hits since February. I am going to try to send live photos from the Steely Dan tour this summer — if I'm not too busy mastering project studio albums.

Well, it's time to jump on my horse and ride into the sunset. The only problem is that I am sitting on a beach in the west coast of Florida with nothing between me and the horizon but water. If my horse can swim, I'll see you next month.

## THE RETURN OF YES

continued from page 50

night performance of the band was amazing, so we flew the harp in using Sonic. In general we used Sonic Solutions to fix technical problems. There were a couple of instances when a note or a tone was a little weird or might have feedback on it. In that case I would go to another night, literally grab a note and paste it in.

The feedback problems were the biggest issues for Sonic Solutions. Otherwise, what you will hear on the CD is the essence of the performance. One very cool benefit of using a hard-disk recorder is that there is no rewind time — and on a 20-minute piece like

"The Revealing Science..." it makes the session move faster.

At the beginning of April we moved out of the bank and into the "Church," where we continue to mix and edit. It's been really interesting for me to work with Tom because I never had the opportunity to watch somebody do this before — this is really my first time in the deep end at this level. It was amazing to see what Tom can do while he mixes. I thought that mixing was a fader thing, but now I am convinced that it has almost nothing to do with the faders. Tom almost never EQs a sound in solo unless there is a problem in a technical sense, like maybe to set a notch filter. For most of the in-progress mixes, we have had an Alesis QuadraVerb and an ART CS2 stereo compressor across the mix bus and that's it! We finally got some more CS2's in here so now we have 20 channels of compression. We also have a bunch of ART effects, including the DR-X 2100 SE, the Effects Network, and the eight-channel Pro Gate, as well as the Roland SRV-330 reverb. By the time we are done we will probably have a sizable rack full of gear. It's a simple setup but it sounds great.

Kevin Dickey can be reached at [KDickey@digivault.com](mailto:KDickey@digivault.com).

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