

EQ



**THE PROJECT
RECORDING
& SOUND
MAGAZINE**

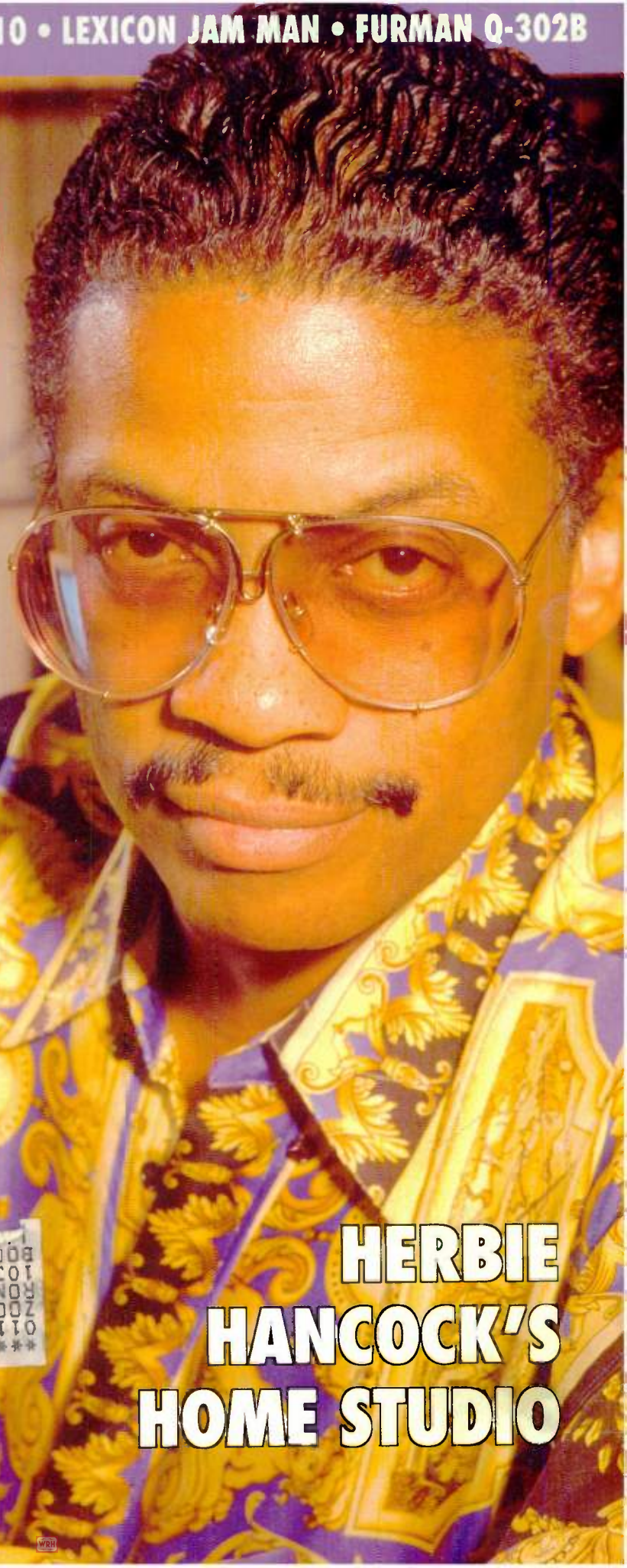
FEBRUARY 1994

SURROUND SOUND RECORDING REPORT

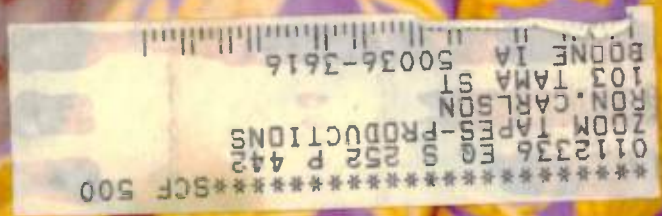
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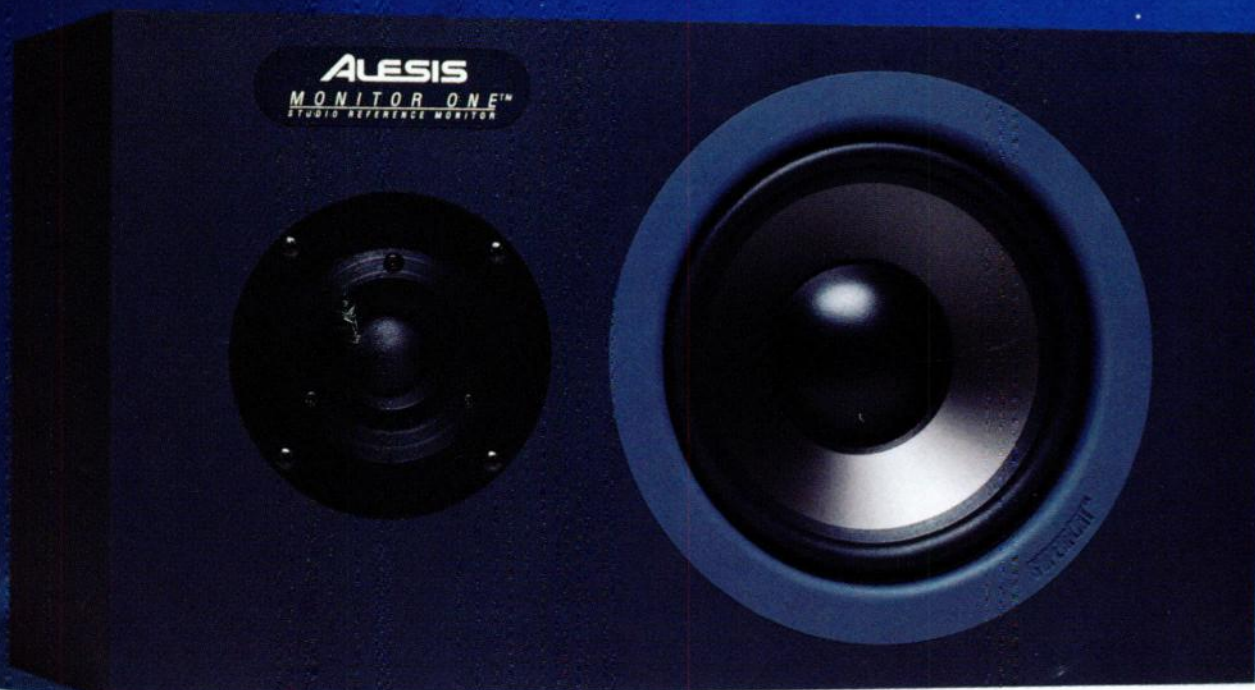
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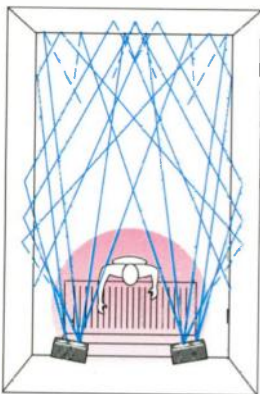


The Truth From

The truth...you can't expect to find it everywhere you look, or *listen*. But when mixing music, hearing the truth from your monitors will make the difference between success and failure. You'll get the truth from the **Alesis Monitor One™ Studio Reference Monitor**.

Room For Improvement

Fact: most real-world mixing rooms have severe acoustical defects. Typical home and project studios have parallel walls, floors and ceilings that reflect sound in every direction. These reflections can mislead you, making it impossible to create a mix that translates to other playback systems. Trying to solve the problem with acoustical treatments can cost megabucks and still might not work. But in the near field, where direct sound energy overpowers reflections, reverberant sound waves have little impact, as shown in the illustration. The Monitor One takes full advantage of this fact and is built from the ground up specifically for near field reference monitoring.



Does your living room double as your mixing suite? The pink area in the illustration shows where direct sound energy overpowers reflected waves in a typical mixing room. The Monitor One helps eliminate such complex acoustic problems by focusing direct sound energy toward the mixing position, instead of the love seat.

Working close to the sound solves the room problem but creates other problems, such as high frequency stridency and listener fatigue (typical of metal-dome and composite tweeter designs). Our proprietary soft-dome pure silk tweeter design not only solves these problems, but delivers pure, natural, incredibly accurate frequency response, even in the critical area near the crossover point (carefully chosen at 2500 Hz).

The Truth From Top To Bottom

The Monitor One gives you all the truth you want in the mids and highs, but what about the low end? You probably know that the inability to reproduce low frequencies is the most common problem with small monitors. Most of these speakers have a small vent whose effect at low frequencies is nullified by random turbulence, or they're sealed, which limits the amount of air the driver can move. Such speakers give disappointing results in their lowest octave.

The Monitor One overcomes wimpy, inaccurate bass response with our exclusive SuperPort™ speaker venting technology.

The ingenious design formula of the SuperPort eliminates the choking effect of small diameter ports, typical in other speakers, enabling the Monitor One to deliver incomparable low frequency transient response in spite of its size.



Alesis SuperPort™ technology gives you the one thing that other small monitors can't: incredibly accurate bass transient response. No, the SuperPort doesn't have a blue light, but it makes the picture look cool.

The result? A fully integrated speaker system that has no competition in its class. You'll get mixes that sound punchier and translate better no matter what speakers are used for playback. Whether you mix for fun or for profit, you want people to hear what *you* hear in your mixes. The Monitor One's top-to-bottom design philosophy is a true breakthrough for the serious recording engineer.



Left To Right

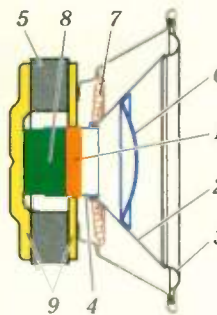
Power To The People

High power handling is usually reserved for the big boys. While most near field monitors average around 60 watt capability, the Monitor One handles 120 watts of continuous program and 200 watt peaks...over twice the power. Also, its 4 ohm load impedance allows most reference amplifiers (like the Alesis RA-100™) to deliver more power to the Monitor One than they can to 8 ohm speakers. That means the Monitor One provides higher output, more power handling capability, and sounds cleaner at high sound pressure levels.

If you like to mix loud, you can.

The Engine

Our proprietary 6.5" low frequency driver has a special mineral-filled polypropylene cone for stability and a 1.5" voice coil wound on a high-temperature Kapton former, ensuring your woofer's longevity. Our highly durable 1" diameter high frequency driver is ferrofluid cooled (costly, but it's the best way to cool a tweeter), to prevent heat expansion of the voice coil which inevitably leads to loss of amplitude and high



A cross section of the Monitor One's proprietary Alesis-designed 6.5" low frequency driver.

1. 1.5" voice coil
2. Mineral-filled polypropylene cone.
3. Damped linear rubber surround.
4. Kapton former.
5. Ceramic magnet.
6. Dust cap.
7. Spider.
8. Pole piece.
9. Front and back plates.

frequency response. Combined, these two specially formulated drivers deliver an incredibly accurate, unhyped frequency response from 45 Hz to 18 kHz, ± 3 dB. The five-way binding posts provide solid connection, both electronic and mechanical. We even coated the Monitor One with a non-slip rubber textured laminate so when your studio starts rockin', the speakers stay put. Plus, it's fun to touch.



The Monitor One's five-way binding posts accept even extra-large monster wire, banana plugs and spade lugs. Hookup is fast, easy and reliable.

The New Alesis Monitor One™

You don't design good speakers by trying hard. It takes years and years of experience and special talents that only a few possess. Our acoustic engineers are the best in the business. With over forty years of combined experience, they've been responsible for some of the biggest breakthroughs in loudspeaker and system design. The Monitor One could be their crowning achievement. They're the only speakers we recommend to sit on top of the Alesis Dream Studio™.

See your Authorized Alesis Dealer and pick up a pair of Monitor Ones. Left to right, top to bottom, they're the only speakers you want in your field.

The Monitor One is the speaker for the Alesis Dream Studio™. Need more information about the Alesis Monitoring System? Call 1-800-5-ALESIS. See your Authorized Alesis Dealer. Monitor One, SuperPort, RA-100 and the Alesis Dream Studio are trademarks of Alesis Corporation. Alesis is a registered trademark of Alesis Corporation.

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PROJECT RECORDING
& SOUND TECHNIQUES
VOLUME 5, ISSUE 2
FEBRUARY 1994



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Cover: Herbie Hancock by Ed Colver



It's nice to know an AKG studio standard isn't over anyone's head anymore.

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Bean, from D'Cuckoo, whose new "Umoja" CD is on RGB Records.

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LETTERS TO EQ

UNDER A MICRO-SCOPE

The giant photograph of the RCA 44-BX on page 24 of the October issue gave me a major nostalgic attack, and I was pleased to read that my favorite old classic is being used by a master of contemporary recording for major artists. I was the "last microphone engineer" at RCA, but I missed doing any professional work on the 44, as it was discontinued a couple of years before I joined the company in 1958. I worked on the 77-DX, BK-5A and B, and designed the BK-11A and 12A.

Please forgive these picky comments, but your excellent photo invites close inspection. Around 1960, I built three 44-BX mikes from factory scrap parts. I still have two of them, having sold one recently to Ron Streicher. He is putting it to use, whereas mine just sit around the lab. That mic was pictured in *Sound & Communications*, September 1986, p. 19. Note that the organdy cloth in the screen is whiter than Swedien's because it was stored in the dark for 26 years. The case on my mic is scratch-free, and the shock mount was spaced about a quarter-inch below the fork, indicating that the mic was still floating on the rubber mount. Swedien's either has collapsed rubber pieces, or a nut is missing between mount and mic.

In 1960, I found that the magnets on the last run of 44's, if well saturated, yielded 2 dB higher sensitivity than the long-published value of -55 dBm. I used my own fixture and a huge GE half-cycle AC magnetizer. I assume that any 44 with MI number 4027-L can be "supercharged" in this way.

I caution those wishing to obtain the best performance from old RCA ribbon mics that the ribbon tuning is critical. If it is too high, there will be wiggles in low- and midrange response. If too low, it can scrape on the gap surfaces. The only way to determine proper tuning is to measure it electrically with a low constant current, as shown in the above-mentioned issue of *S&C*, p. 24, and also in *Audio*, April 1977. The fundamental resonance of the 44 is increased by transformer loading, so I measure the second resonant peak and calculate the fundamental by dividing by 3. A well-aged 44-BX will have a 15 to 20 Hz fundamental, so the overtone will be 45 to 60 Hz. I have made very limited tests on mics repaired by contemporary

shops, and have not yet found one tuned to original factory numbers.

Jon R. Sank
Cross Country Consultants
Haddonfield, NJ

MIXED EMOTIONS

Since discovering your magazine a while back, I have been a faithful and largely satisfied reader. While I realize it is but one of your chores to try to satisfy the multiple demands of many different readers, I have to tell you I was thoroughly disgusted by the exchange between *EQ* and Ms. Monnar in the October issue Letters column.

As is par for the course in this volatile atmosphere of the Ninties "politically correct" ('scuse me while I spit) paranoia, Ms. Monnar's kneejerk, rampage was completely "unenlightened." I agree that her concerns should have been addressed. However, since she didn't even have the common decency to state her concerns in her letter, it seems highly prejudicial in my mind for you to take the uncommon step of calling her to further solicit her advice. Additionally, I see absolutely no basis for her assertion that she has "experienced more sexism in your magazine than in any other magazine of its type."

At the risk of testing your "honesty," I would like to register a little complaint of my own — you will give equal time (not "special time") to the more conservative element among your readership, won't you? On page 90 of this selfsame issue you have an article on live sound for the Lollapalooza tour. While, as I do most of your articles, I found it interesting reading, I was very offended by the accompanying photo showing the Lollapalooza stage. The people who attended Lollapalooza paid to see and hear what took place there. I, on the other hand, did not! It is laughable for you to pat yourselves on the back for conforming to Ms. Monnar's definition of "acceptable or expected behav-

WRITE TO US

EQ wants to dialogue with you. Write to: Letters to the Editor, EQ, 939 Port Washington Blvd., Port Washington, NY 11050. Letters must be signed, and may be edited for clarity and space.

A photograph of the Alesis QuadraSynth keyboard synthesizer. The instrument is dark-colored with a white and black keyboard. Above the keyboard, there is a control panel with a small orange display screen showing "ALESIS QUADRASYNTH". To the left of the keyboard, there are several knobs and buttons. The overall lighting is dramatic, with a blue and purple glow in the background.

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ALESIS
STUDIO ELECTRONICS

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ior" (funny, that's a term my parents used to use), only to then turn around and force what you deem acceptable on other unwilling members of your readership. Then, to add to this injury, this photo, in all its vulgar glory, was repeated on the cover page (p. 81) of the Band in a Van section. Surely folks, this wasn't the only picture taken at Lollapalooza!

On a positive note, I really enjoy the format of your magazine. Having a background primarily in live audio, I especially like your live-sound section, although I would like to see it expanded (what was I saying about multiple demands?). By way of input, I would like to see a detailed article, with accompanying close-up photos, on system rigging and flying techniques. [It's been done — check out Feb. and April '93. — Ed.] Additionally, I would like to see some sort of article, or series of articles, documenting budget home or project studios. Lastly, I would like to see articles covering the specific use of dynamics processors. Funny, despite how long the

compressor has been with us, its real world functionality is still probably less familiar to many of us than that of the average digital signal processor.

Well, thank you for your time. I hope you will consider my suggestions (all of them). I look forward to your coming issues. Gotta go. I have more liberals to oppress.

Mark Allen
Wheat Ridge, CO

TOO PERFECT

I just finished listening to Donald Fagen's *Kamakiriad* and, boy, am I angry, and also a bit sad. So much technology and time wasted.

Actually, that's the problem in a nutshell — too much emphasis on technology and making things "perfect" and not enough emphasis on the songwriting. With only scattered exceptions, the new Fagen songs seem more like looped percussion grooves with lyrics. The instrumentation, harmonies and arrangements are boring. No amount of gloss can

make up for mediocre songwriting and I'm afraid that's what Fagen and company have forgotten.

Since the Dan's last recording and Fagen's *Nightfly*, rock and pop have progressed and diversified in ways that make the jazz/rock fusion sound of *Kamakiriad* sound stale and uninspired. Compare this disc, if you will, with *Ten Summoners Tales* by Sting, or *Harbor Lights* by Bruce Hornsby — both jazz tinged pop recordings and both, for my money, more interesting, emotional, and fresh sounding than anything on *Kamakiriad*. Oh well, can't wait for the new "Dan" album.

Bruce H. Zimmerman
Sound Productions
Hartford, CT

CORRECTION

In our "AES at a Glance" chart, published in the December issue, we listed the wrong price for the Langevin EQP1-A equalizer. The correct price is \$1275.

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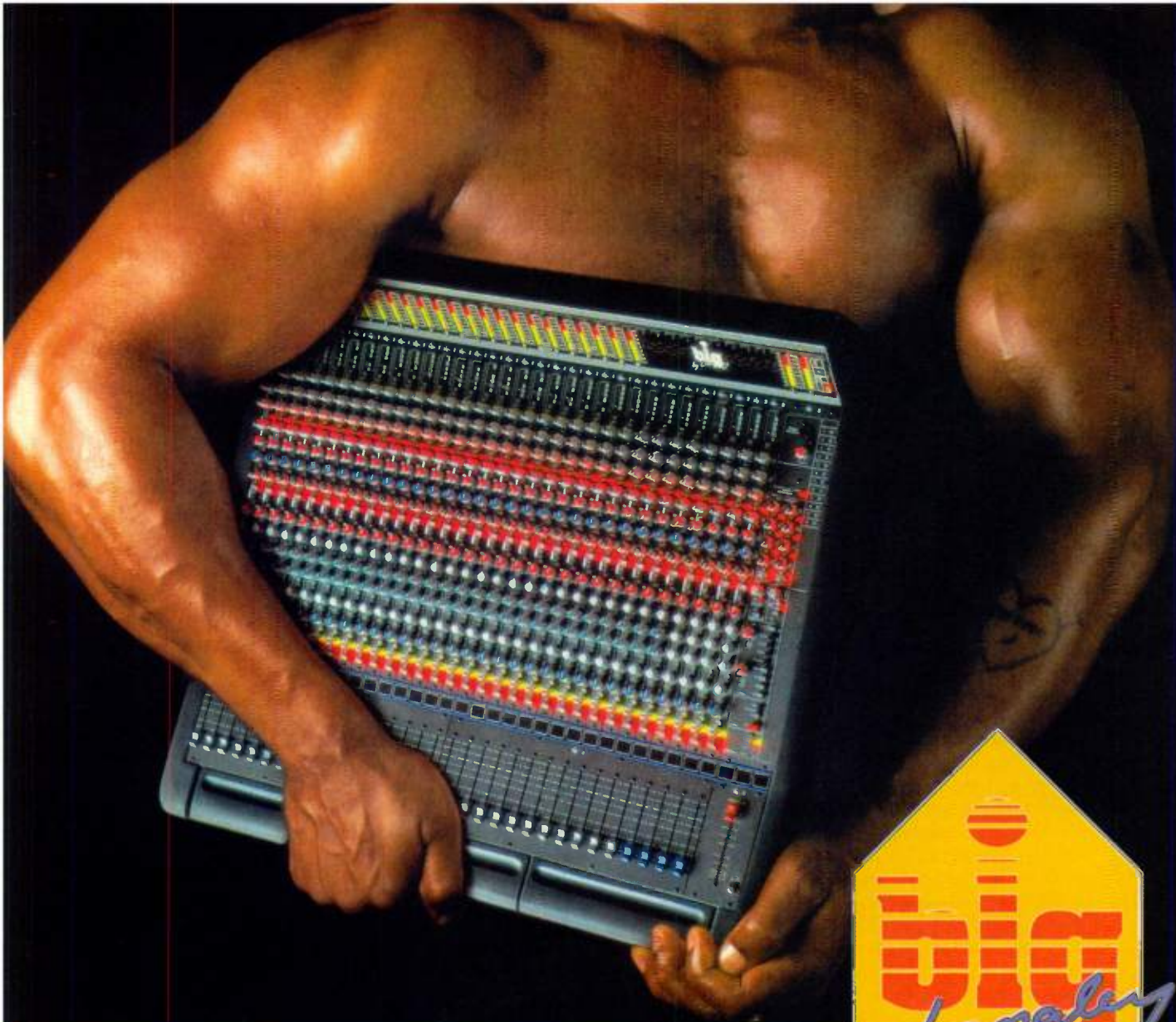
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EQ&A

SWITCHING STORY

Q What is the proper method of wiring balanced and unbalanced equipment to a Switchcraft 144 point TT patchbay? Also, how do the key inputs and outputs of gates and compressors get wired to the patchbay?

Jorge Chinique
Lakewood, NJ

A To answer the first question, we will begin with unbalanced termination to a TT jack (refer to fig. 1). As unbalanced terminations use two conductors, there are two terminations to be made to the jack. The signal conductor (center conductor in a coaxial cable) is connected to the tip (T) terminal, and the signal return or ground conductor (shield conductor in a coaxial cable) is connected to the sleeve (S) terminal. Because the ring (R) terminal is not used, it can be wired directly to the sleeve terminal for a second ground contact to the plug body. This termination scheme assumes that the jack will carry a signal from an unbalanced output to an unbalanced input; conversion between balanced and unbalanced signals is a separate consideration and depends on the equipment used in the application.

Balanced lines use all three terminations to the TT jack (refer to fig. 2). The tip and ring terminals connect the signal leads, and the ground is connected to the sleeve terminal. In a two-conductor cable with a shield, the two conductors carry the signal and the shield carries the ground. For example, pin 1 from a Switchcraft A3F or A3M connector would be tied to the sleeve terminal, pin 2 to the tip terminal, and pin 3 to the ring terminal.

The answer to the second question is somewhat more complex, since a variety of connection schemes are used by the various manufacturers of gates, compressors, and expanders. The input and output of the main audio signal (the audio signal to be affected by the equipment) should be wired in accordance with the balanced

and unbalanced termination methods described above, depending upon whether balanced or unbalanced connections are used on the equipment in the application.

The term "key input" is typically associated with gates. This is often an unbalanced input-only connection and would be wired to the panel as such. The term "sidechain input/output," or "sidechain insert," is typically associated with compressors and expanders that provide external access to the internal detector (sidechain) circuit. When separate connectors or jacks are used for input and output, they can be wired directly to the jackfield as appropriate.

A slight complication arises when a three-conductor jack is used as a "sidechain insert," where the ring terminal carries the signal send, the tip terminal carries the signal return, and the sleeve terminal carries the ground. This configuration can be loosely termed a "dual unbalanced termination," where the send and return signals share a common ground. Two separate unbalanced terminations would be made to the patch panel, with the ground termi-

nation split as shown in fig. 3.

There is one very important point to note regarding normalling. On equipment where a sidechain loop bypass switch is not used, use of the sidechain jack(s) will typically break (bypass) the internal connection of the main audio input signal to the sidechain circuitry; bypass is accomplished through internal shunt contacts (consult the equipment owner's manual). Half-normalling of the sidechain as it appears at the patch panel will loop the sidechain signal send to the sidechain signal return when no patch cord is present. Therefore, the patch panel is made transparent when the sidechain loop is not in use (see fig. 3). Needless to say, there is no standard method for the layout and normalling of the terminations on a patch panel; optimum panel layout depends on the application of the equipment in the studio. For more information, patch panel layout examples can be found in various sound studio reference manuals and trade magazine articles.

Tim S. O'Meara
Director of Engineering
Switchcraft

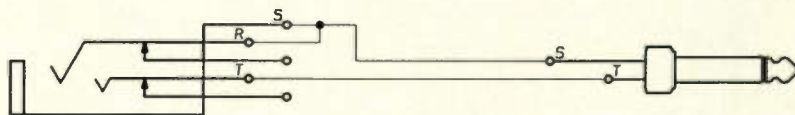


FIGURE 1
UNBALANCED TERMINATION

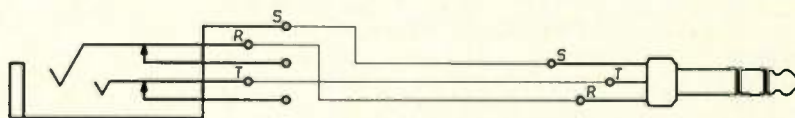


FIGURE 2
BALANCED TERMINATION

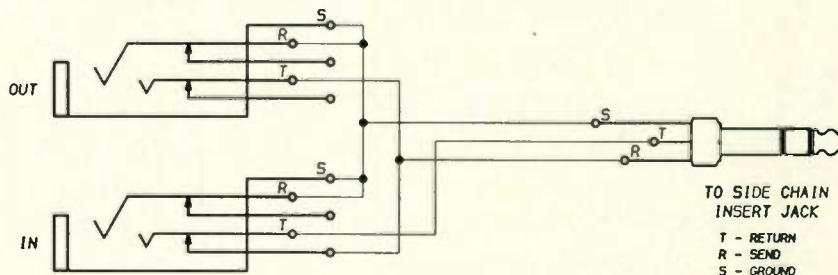


FIGURE 3
SEND/RETURN TERMINATION

SONY

PLAY OUTSIDE THE LINES.



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INNOVATION AT WORK.

MMC: SEE YOU REAL SOON

Q I'm starting to hear more and more about MIDI Machine Control (MMC). As I'm about to invest in a Fostex RD-8 digital 8-track, I'd like to have a better understanding of MMC to determine whether or not this is a feature I can benefit from. Can you help?

Scott Brady
Dallas, TX

A Accomplished via a set of universal system commands, MMC should make our work environments more efficient than ever.

Newer mixing consoles are incorporating MMC, thus providing studio engineers with the ability to issue recorder transport commands directly from the desk. But the real value of MMC becomes most apparent in the integration of a MIDI sequencer and

recorder. Recent versions of the most popular MIDI sequencing programs are now incorporating MMC. Let's take a look at what typically takes place in this type of setting.

In a recorder/sequencer sync environment that is using MMC, when a Play command is issued at the computer, a MIDI message is sent instructing the recorder to enter Play. When the sequencer locates to a given measure, it also instructs the recorder to FF or REW. During this process, the sequencer is constantly requesting position information from the recorder so that as the correct location approaches, the sequencer can issue a Play command. When the recorder enters Play, the sequencer (which has been patiently waiting) once again locks on to the recorder and the two continue merrily on their way. This is referred to as Deferred Play and is essentially a "locate and play" command.

In similar fashion, the sequencer can issue a Stop command at the song end. When the sequencer resets to measure 1 and a Play command is issued, the recorder rewinds and enters Play with the MIDI system once again locked to the recorder. By entering what I shall refer to as Left and Right locator positions, the recorder can be instructed to cycle or loop between these points. Additionally, recorder tracks can be enabled and punch in and out can be accomplished.

Through all these various operations, the computer is functioning as the command center for both the recorder and the MIDI system. It is important to note, however, that the recorder is still the master timing device. You should also understand that software developers are likely to incorporate MMC at various levels of implementation. Final advice: don't assume anything, and look before you leap!

Roger Maycock
Senior Product Specialist
Fostex

This is where your questions get answered. Send your query with your name and address to:
EQ Editorial Offices,
939 Port Washington Blvd.,
Port Washington, NY 11050
Fax: 516-767-1745

Small Wonder

ASHLY has established a solid reputation for building top quality amplifiers that sound great and hold up under even the most rigorous operating conditions. Our rugged, single rack space SRA-120 professional stereo power amplifier continues in this tradition, delivering a solid 60 watts per channel into 4 ohms stereo, 45 watts per channel into 8 ohms stereo, or 120 watts total into 8 ohms mono-bridged, with low distortion and excellent overload behavior. Turn-on delay and instantaneous turn-off circuitry eliminate any transients to the speaker. Rear panel input connections may be made via 1/4" balanced phone jacks or barrier strips with ground lift provision. The compact SRA-120 is suitable for applications such as small control room monitor systems, headphone distribution amps, or driving the high end of a bi-amplification setup. All ASHLY products are fully covered under the Company's exclusive Five Year Worry-Free Warranty program.



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World Class Studio Sampling, Drum and Rhythm Sessions

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EQ

PRODUCT VIEWS

DIGITAL DYNAMO

Yamaha introduced the DMP9 Digital Mixing Processor at NAMM. Available in 8- and 16-channel configurations, the DMP9 is a programmable digital mixer with a dynamic range greater than 92 dB. The latest Yamaha digital signal processing technology provides 16-bit A/D and 18-bit D/A conversion, and digital inputs and outputs allow for 20- and 24-bit interfacing. The DMP9 features digital effects via two built-in digital multieffects processors that provide reverbs, delays, and modulation. The device is easy to operate, with a 16-character, 4-line LCD screen and a data entry wheel, providing easy access to all functions. Input channels are set using rotary controls and LEDs. The DMP50 has 50 scene memories for storing EQ and snapshots. All mix parameters such as EQ, faders, channel on/off, etc., can be stored and then instantly recalled, either manually or via MIDI program change messages. Input channels can be used as mono inputs, stereo pairs, or a combination of both. Inputs 1 and 2 also have XLR mic inputs. For more information, contact: Yamaha, P.O. Box 6600, Buena Park, CA 90622-6600 Tel: 714-522-9011. Circle EQ free lit. #101.

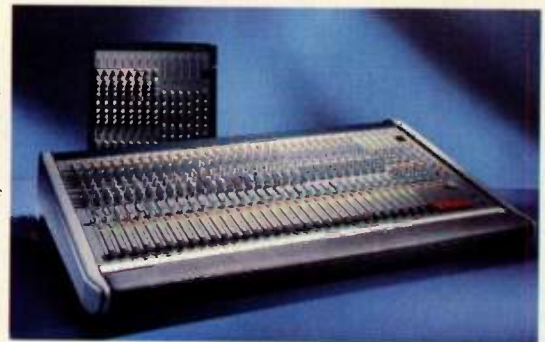


NEW CLASSIC

The VT-1 Vacuum Tube mic preamp from D.W. Fearn recreates the warm sound of classic tube amps of the 1960s, but employs modern components and computer-optimized circuitry unavailable in the vacuum-tube era. Utilizing the same vacuum tubes used in its ancestors, the VT-1 also benefits from advances in components, such as polypropylene coupling capacitors, superior transformer designs from Jensen and computer-aided circuit designs. The classic-style, amplifier-isolated-analog ballistic VU meter may be easily recalibrated for other reference levels. The VT-1 features a minimal number of connectors and switches in the audio path and switches are high-reliability ceramic insulated rotary types. The unit is built on a heavy-gauge aluminum chassis, utilizing point-to-point wiring for all audio circuitry. The hand-crafted device sells for \$2000. For complete details, contact: D.W. Fearn, P.O. Box 57, Pocopson, PA 19366. Tel: 215-793-2526. Circle EQ free lit. #103.

DOUBLE VISION

D&R introduced two new versions of the Vision console at NAMM. They are the Vision M series and Vision SR series. The M series is an 8-bus console configured especially for studios using both modular digital multitracks and numerous synth/sampler virtual tracks. It features the new Dual Input Multitask Module (DMM). The DMM features a true dual input path module with two faders, two fully sweepable hi-def EQs, two independent sets of aux sends (four discrete aux sends switchable to eight), and two sets of mutes and solos on each input module. The Vision SR series is an 8-bus console designed for live-sound applications. For more complete details, contact: D&R USA, Rt. 3 Box 184-A, Montgomery, TX 77356. Tel: 409-588-3411. Circle EQ free lit. #104.



ROM TO GROW

Glyph has introduced the GCD-200R rack-mount series of dual-speed CD-ROM drives. The series is compatible with most sound samplers and it comes complete with everything necessary for use with an Apple Macintosh. It's also compatible with PC computer systems via an optional interface card from Glyph. The GCD-200R now features Direct Sample™. This Glyph exclusive is designed to provide pure digital sampling from any Redbook audio CD directly into a Macintosh or PC compatible computer via the SCSI port. These samples can then be saved in various audio file formats, manipulated in third party waveform editing software, and downloaded to samplers. For more information, contact: Glyph Technologies, 605 West State Street, Ithaca, NY 14850. Tel: 607-275-0345. Circle EQ free lit. #102.



PEAK PERFORMER

Summit Audio is offering a modular vacuum-tube signal processing line. The line consists of a mic preamp, overdrive preamp, direct box, equalizer, compressor, and "Brick Wall" limiter. An additional model is a DSP-based stereo peak and average meter featured with various scales. For more information, contact: Summit Audio, P.O. Box 1678, Los Gatos, CA 95031. Tel:408-395-2448. Circle EQ free lit. #105.

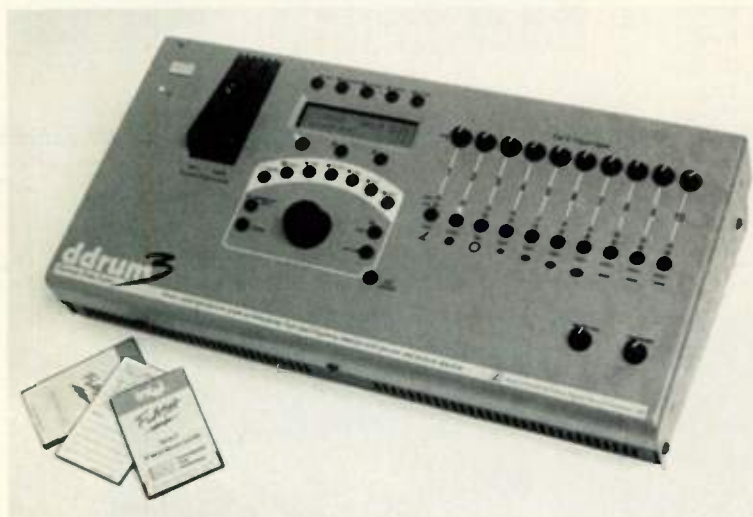
WARM PUNCH

Anthony DeMaria Labs' ADL 1000 is a two-channel, vacuum-tube compressor/limiter with no ICs or transistors in the chain. The unit features four vacuum tubes for a warm, fat, clear signal. The ADL 1000 uses an opto attenuator for very smooth compression. The unit is balanced, but also operates with unbalanced systems. Frequency response is 15 Hz - 30 kHz. Other design features include custom audio transformers in and out, large VU meter with a switch for viewing output or gain, full stereo linking capabilities and a heavy-duty chassis. Each unit is completely hand-built. For more information, contact: Anthony DeMaria Labs, 95 DuBois Road, New Paltz, NY 12561. Tel:914-256-0032. Circle EQ free lit. #106.



MAUI WAUI

Turtle Beach Systems have begun shipping the new Maui wavetable synthesizer upgrade card. It's been designed so that owners of lower-quality cards can add the benefits of wavetable synthesis and sampling capabilities to their existing solutions. Maui's General MIDI 16-bit sampled instruments are stored in 2 MB of ROM onboard the card. SampleStore, a user-definable sample player is included so that users can create their own samples using any existing Wave files as a starting point. Thus, virtually anything recorded using an existing sound card can be played back via a MIDI sequencer. Maui ships with 256k of sample RAM, which is upgradeable to 8 MB of storage RAM. It's MPU-401 compatible, so its installation into a DOS environment is relatively simple. List price is \$199. For more information, contact: Turtle Beach Systems, P.O. Box 5074, York, PA 17405. Tel: 717-767-0200. Circle EQ free lit. #107.



DRUM BOOGIE

drum's newest introduction to the world of drumming is the ddrum3 system. Along with the company's 1000 levels of dynamics, array of sounds, and studio-worthy performance level, ddrum3 enables drummers to load in their own sounds through MIDI, DAT, SCSI, and CD-ROM. In addition, the ddrum3 Brain also has an input for a hi-hat pedal and features an improved padset. There's even a rimless pad for hand drummers. ddrum3 is a 16-bit linear sampler with 44.1 kHz sampling frequency. The Brain contains hundreds of different percussion sounds. The user can edit different sounds and resample them together (in the digital domain) to create new samples. ddrum comes with 4 MB internal ROM memory, expandable up to 388 MB. For further information, contact: ddrum, Inc., 300 Long Beach Blvd., Stratford, CT 06497. Tel:800-882-0098. Circle EQ free lit. #108.



EQ PRODUCT VIEWS



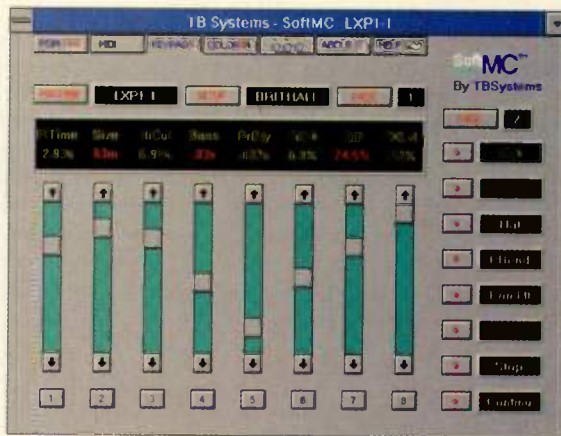
QUINT- ESSENTIAL

Neumann has introduced the TLM 170 R, a large diaphragm condenser mic with five polar patterns selectable by either a rotary switch

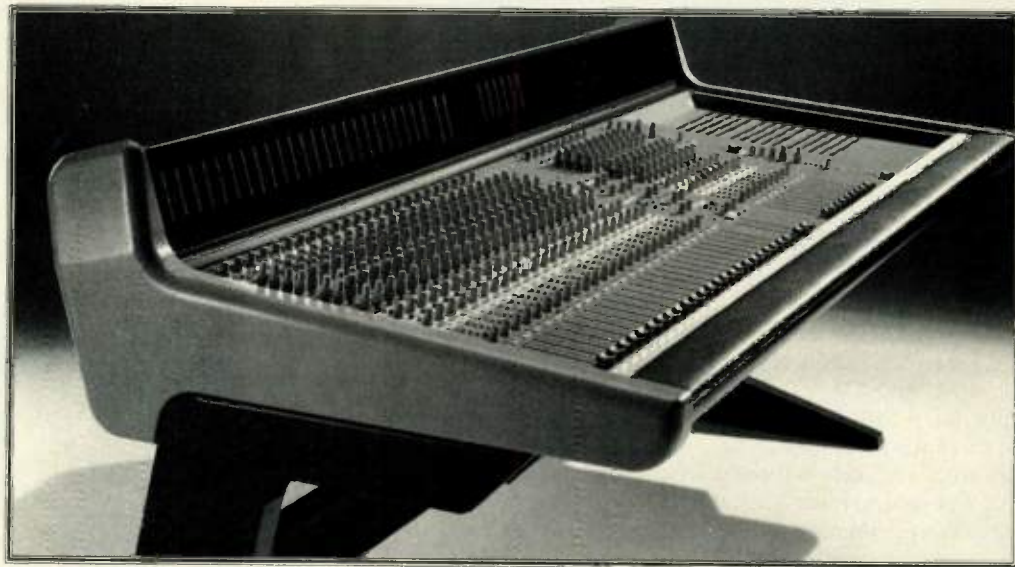
on the rear side of the mic, or remotely by the N 48 R-2 dual-phantom-power supply/controller. Remote control of microphone polar patterns had previously been achieved through the use of special, multiconductor cables and connectors. For more information, contact: Neumann (USA), 6 Vista Drive, P.O. Box 987, Old Lyme, CT 06371. Tel: 203-434-5220. Circle EQ free lit. #109.

TAKE CONTROL

TB Systems' SoftMC is an easy-to-use programmable MIDI controller for Windows. SoftMC allows control of multiple MIDI devices at discrete levels in a complex MIDI-system environment. It controls virtually any MIDI device available along with built-in support for Lexicon's LXP-1 multieffects processor. SoftMC v.1.0 is TB Systems' first release from the company's ongoing efforts in the area of MIDI system control software. For further info, contact: TB Systems, 2205 Boston Rd. Bldg 0-144, Wilbraham, MA 01095. Tel: 413-596-8380. Circle EQ free lit. #110.



IF SILENCE IS GOLDEN, THIS CO



The D&R Orion. From its Hi-Def™ EQs to its fully modular design, from its custom-welded RFI-killing steel frame to its incredibly flexible floating subgroups, the handcrafted Orion is every bit a D&R.



STUDIO SWITCHBLADE

Sound Sculpture calls its Switchblade 16 an effect system integrator rather than a switching system. It features 16 ins and outs in a true-matrix audio array. It provides you with simultaneous mixing and distribution of audio from any input to any output, plus you can chain effects in any order, mix effects in parallel, create networks of chained and mixed effects in any configuration, independently program gain on each audio path in calibrated or continuous increments, and balance levels between effects for tonal balancing or for stereo- or quad-image positioning. For complete information, contact: Sound Sculpture, 5741 Arapahoe Road, Suite 2A, Boulder, CO 80303. Tel: 303-442-1954. Circle EQ free lit. #111.

FLEX YOUR MUSCLE

The newest addition to Rane's Flex Series of modular signal processors is the FSC 22 stereo compressor. Housed in the compact HR format for vertical or two-across 19-inch rack mounting, the FSC 22 features separate threshold and ratio controls for each channel, as well as switchable attack/release time and dual-function metering that displays either gain reduction or channel output. The FSC 22 is designed to perform as a low-noise, low-distortion studio-grade unit, utilizing Analog Devices' SSM2018 VCAs and provides both 1/4-inch TRS and three-pin input and output connectors. Suggested retail is \$399. For complete details, contact:



Rane, 10802 47th Avenue West, Mukilteo, WA 98275-5098. Tel: 206-355-6000. Circle EQ free lit. #113.

MOVES AND GROOVES

The Hollywood Edge joined forces with underground interactive producers Chris Lang and Eric Cunningham to create new CD sound products. *L.A. Riot 1* features scratches, transforming, backspin loops, drop-ins, rare groove breaks, and tuner slam. *L.A. Riot 2 Hip Hop & Rap Attack* is designed for dope rap and hip hop music construction. *L.A. Riot 2* gives users hundreds of custom beats featuring gangsta, old school, acid jazz, and hardcore Oakland styles. For complete details, contact: The Hollywood Edge, 7060 Hollywood Blvd., Suite 1120, Hollywood, CA 90028. Tel: 213-466-6723. Circle EQ free lit. #112.



CONSOLE SHOULD COST 7486% MORE

Next time you audition a console, from anyone at any price, ask to hear a test for which we're well-known. It goes like this: We select 'mic' across the board, and assign every channel to the mix bus. We crank up the studio monitor amp, all the way. We push up all the channel and master faders, all the way. We turn the console's monitor level up. All the way. Next, we invite each customer to place his or her ear right next to one of the monitor's tweeters.

Gingerly, they listen, to not much at all.

Then, we bring the monitor pot down from what would be a speaker-destroying level to a merely deafening level. Before ears are plugged and music blasts forth, we invite one last, close listen, to confirm the remarkable: Even with everything assigned and cranked up, a D&R console remains effectively — and astonishingly — silent.

Of course, a D&R is much more than the quietest analog

board you can buy. So we equip each handcrafted D&R with dozens of unique, high-sonic-performance features. And we back each board with our renowned factory-direct technical support.

How much is all of this worth? Well, if silence is golden, then every D&R is worth its weight in gold.

In which case, until we raise its price about 75 times, the D&R console pictured at left is one truly impressive investment opportunity.



D&R ELECTRONICA B.V.

Rijnkade 151, 1382 CS Weesp, The Netherlands

tel (-) 31 2040-18014 • fax (-) 31 2040-16087

D&R WEST: (818) 291-5855 • D&R NASHVILLE: (615) 461-4802

D&R SOUTHWEST: (409) 756-3737 • D&R USA: (409) 588-3411

D&R handcrafts consoles for recording, live sound, theatre, post-production and broadcast, for world-class to project facilities. "Weight in gold" comparisons based upon 11/93 market prices.



A Digital Recording Studio Inside Your ASR-10

The ENSONIQ ASR-10 is the *only* musical instrument that combines the equivalent of a sampler, digital tape recorder, signal processor, and MIDI sequencer—for a fraction of the cost!

The new ASR-10 Version 2.0 lets you add two tracks of audio recording to your sequenced

tracks—direct to RAM or to your SCSI hard drive. Locate to any bar and punch-in to overdub new performances just like tape. Audition your results, keeping only the best take. Use onboard state-of-the-art effects processing to create a polished final mix.

All of this in one easy-to-use, integrated instrument!

Here's how easy it is to produce professional quality demos:

- Sequence up to eight tracks of sampled instruments.
- Record lead and background vocal tracks through onboard EQ and delay.
- Bounce down the vocals (through a plate reverb) to make room for a sizzling guitar solo.
- Mix your composition through a final EQ/reverb blend.
- Play out through the optional digital I/O to a DAT recorder *and you're finished!*



There's a studio inside this rackmount ASR-10, with SCSI standard.

RECORD LIVE AUDIO DIRECT TO HARD DRIVE OR RAM!



And remember—the ASR-10 is also a sophisticated stereo sampler with a world-class library of sounds and expressive performance features. Buy a sampler and take home a complete digital studio.

Call 1-800-553-5151 for more information.

Already own an ASR-10? A Version 2.0 disk upgrade is available free to all ASR-10 owners (requires ROM version 1.5).

CIRCLE 70 ON FREE INFO CARD

I'd like more information on the ASR-10 with Version 2.0.

I own an ASR-10 serial # _____

Please send me my free Version 2.0 upgrade disk.

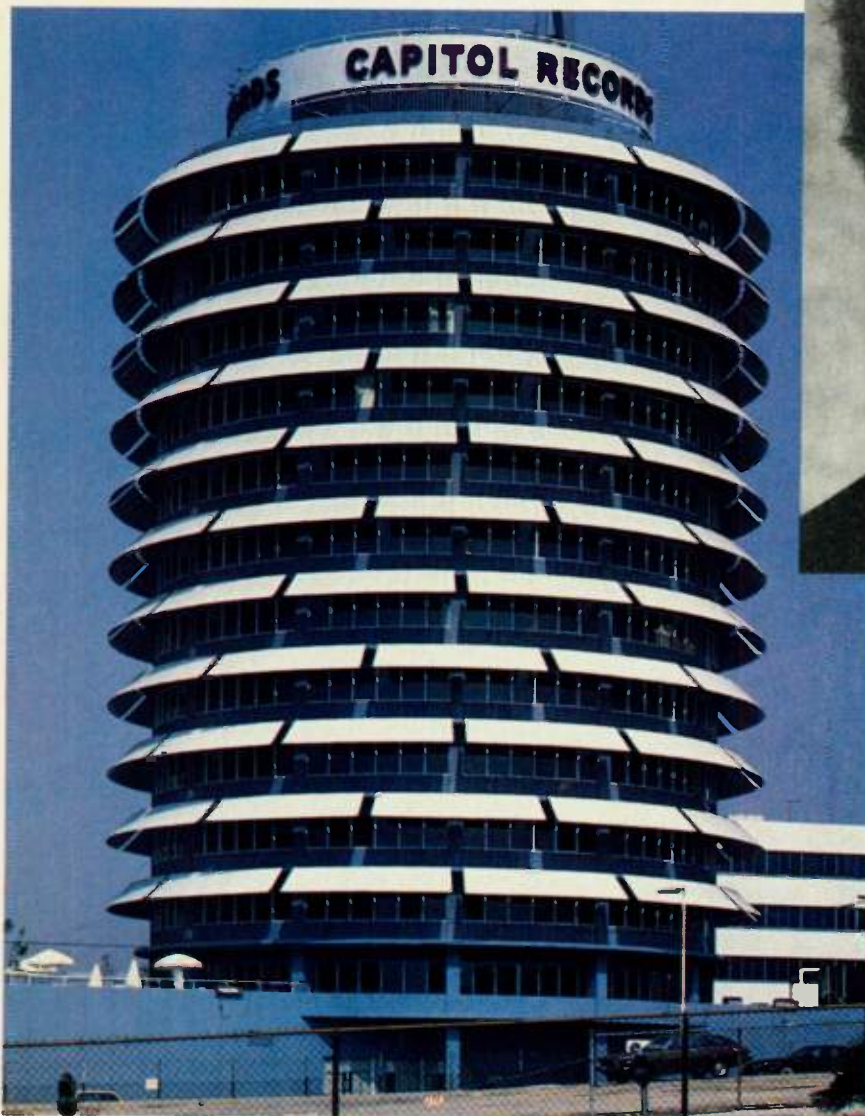
Name _____

Address _____

City _____ State _____ Zip _____

Phone (_____) _____

Mail to: ENSONIQ Corp., Department Q-40, 155 Great Valley Parkway,
P.O. Box 3035, Malvern, PA 19355-0735



CAPITOL GAINS: Michael Frondelli hopes to build project studio co-ops near the famed tower.

A CAPITOL IDEA

Michael Frondelli

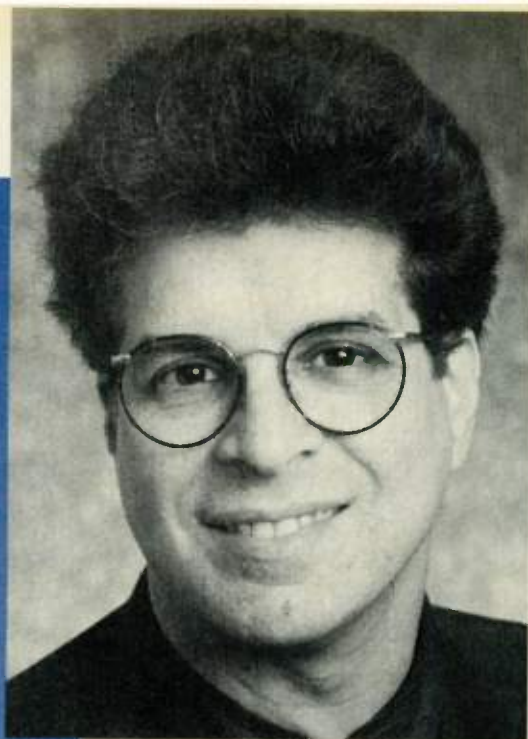
"If it's a hip place to be and has the right vibe, we know that artists will enjoy coming here to work in the studios."

As the music industry battles its way through today's beleaguered economy, major record labels are looking for ways to cut costs, especially at the pre-production stage of album recording. Since 1956, Capitol Records has been one of the few labels with an in-house world-class recording facility, accommodating the lauded likes of Frank

Sinatra, Gene Vincent, Judy Garland, and, more recently, Bonnie Raitt and Crowded House.

But as the new era of music recording dawns in the face of CD-I and multimedia, and with alternative music all the rage, Capitol's honchos Gary Gersh (president) and Charles Koppelman (CEO EMI Records Group North America), have given the task of adding to these famed recording studios a new preproduction facility to Michael Frondelli, creative director of Capitol Studios in Los Angeles. As Frondelli aptly states: "The classic arrangers like Nelson Riddle and Neal Hefti pretty much had it all down on the charts, and even with 70 musicians, they'd make the changes right there, live in the studio."

Frondelli says that in addition to



upgrading the already existing two recording studios and mixing room to a state-of-the-art status, Capitol would greatly benefit from the use of several new combination writing/rehearsal/demo studios both for MIDI and live recording. "We're in the process of looking at property near the Capitol Tower for these new rooms."

Frondelli's vast experience as an engineer and producer more than qualifies him for the job, as he knows first hand the needs of every player involved in making a record, from the musicians to the producer. With over 20 years under his belt, nine of those with Electric Lady, Frondelli has engineered for Oingo Boingo, Hall and Oates, Billy Idol, and the movie soundtrack *Hail Hail Rock n' Roll* with Keith Richards. As Capitol's ambitious project gets underway, he gives us his insights.

"Everybody in this business today is very budget minded — there's a lot of value in doing your homework. What it comes down to is that artists get ten years to write their first album and three months to write their second. It's the age-old situation — you can be on the road promoting your first album and it's two years before anything happens. After that, you have no choice but to come up with some more hits.

"The concept here for Gary and Charles is to integrate the studios in such a way where our artists can be creative and to provide these artists with a drawing board to work out their ideas, melodies, and concepts. Today you can work with an ADAT format, take the usable tracks, upgrade them to a multi-

continued on page 107

The Most Widely Used Studio Headphones.



As a recording professional, you need to listen to the music—not the headphones. You want the audience to feel the emotion and excitement that you feel. That's why so many musicians and recording engineers rely on the K240M.

It's no wonder that the 1990 and 1991 *Billboard* surveys of U.S. studios found that AKG headphones are the "#1 Most Widely Used Studio Headphones."



Made in Vienna, the K240M is a product of Austria's musical

heritage. Our engineers have

designed their pure love of music into the best headphones in the pro market. Trust the AKG K240M to help you make great music. We've been a part of putting hits on the charts 52 weeks a year for decades.



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CIRCLE 17 ON FREE INFO CARD

Pure.



With over 20,000 ADATs already in use all over the world, Alesis has made more digital multitrack tape recorders



TEC AWARD WINNER
Voted Recording Product of the Year and Best Recording Device/Storage Technology.

And with good reason. Alesis was founded on digital technology, so we know what it

takes to make the best-selling digital multitrack. The Alesis ADAT® Digital Audio Recorder's sound quality, sample accurate synchronization capability (ADAT Synchronization Interface), fiber-optic digital interface (ADAT MultiChannel Optical Digital Interface), and wide range of peripherals available now, give ADAT owners the creative flexibility they need.



Alesis AI-1™ ADAT to AES/EBU and S/PDIF Digital Interface with sample rate converter lets you transfer audio digitally to or from the ADAT system and external units such as DATs, CDs, and other digital recording formats.



The Alesis AI-2™ Multi-Purpose Audio/Video Synchronization Interface by TimeLine (the leader in synchronization products) connects ADAT to the world of video, film and multi-media production using SMPTE, 9 pin and TimeLine Lynx control protocols.

Focus on Compatibility™

Its revolutionary impact on the recording industry has made ADAT the de facto standard in digital multitrack. The enormous number of ADAT users worldwide, the fact that Fostex has licensed the ADAT format for their own digital recorder, and the growing list of leading companies focusing on industry compatibility by becoming members of The ADAT Group™, all mean that when you choose ADAT, you're compatible with a vast array of music and audio equipment, now and in the future. And, you're supported by a network of professionally trained Authorized ADAT Service Centers worldwide.



The ADAT Format – made for multitrack

ADAT records eight tracks of 16-bit linear, 48 kHz sample rate audio, with no data compression "tricks" or channel sharing. We chose Super VHS® (S-VHS®) tape as a foundation, then designed ADAT's data structure and heads specifically for the rough-and-tumble, back-and-forth, punch-in-and-out environment of multitrack recording. To make sure that recording one track wouldn't disturb any other track, we divided each helical scan into

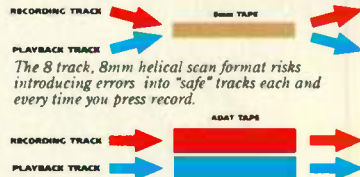


An 8 track, 8mm recorder's helical scan: there are only four audio data blocks, forcing each track to share a block with another.



An ADAT's helical scan: ADAT tracks are safely separated into 8 discrete data blocks. (Both vertical dimensions enlarged for clarity)

eight separate data blocks. Some digital recorders combine data from two different channels into the same data block on tape, which means that each time you record a track, another track must be read into a buffer and actually re-recorded even though it is in "safe" mode.



The ADAT format records each track discretely, as all professional multitrack recorders should.

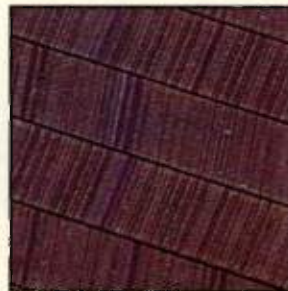
Bigger is Safer

Microscopic contaminants in the studio aren't just probable, they're statistically inevitable. If the format can't overcome them, they'll cause mistracking, noise, distortion, even total muting of the audio. Formats smaller than S-VHS are more vulnerable to contaminants, dropout, and misalignment, especially when exchanging tapes between machines. One 8mm digital format attempts to squeeze the same amount of sound into one-tenth the tape area that ADAT does. ADAT's S-VHS tape offers more total surface area to meet the demands of digital recording, and its wider 100 micron tracks are five times less vulnerable to being derailed by dust. Because even though technology makes it possible to make formats smaller and smaller, dust stays the same size.



Comparison of tape areas for 1 second of audio: ADAT (1,211 mm²) and the 8 track, 8mm helical scan format (133 mm²).

Actual microscopic comparison of the ADAT tape format and the 8 track, 8mm helical scan format (enlarged approximately 100 times).



ADAT's wide 100-micron tracks offer an extra margin of safety for digital audio.



The 8mm's 20-micron tracks squeeze more data into the same area, with little room for error.

than any other company. More than Sony. More than Mitsubishi. More than Yamaha, Akai, and Tascam combined.

More than just a tape recorder— The ADAT System

ADAT, when combined with the BRC™ Master Remote Control, is a complete digital recording and digital editing system with features that no other recorder, analog or digital, can match. The BRC is a full-function autolocator and MIDI/SMPTE time code chase-lock synchronizer. Plus, it controls digital copying between ADATs, like a disk-based recorder, but much simpler to use.

The ADAT MultiChannel Optical Digital Interface digitally transmits up to eight ADAT channels at once over a single fiber optic cable to any track on any ADAT in the system without repatching, all in the digital domain. Now you can "fly in" that perfect vocal part to multiple locations in seconds, with absolutely no generation loss. And our new QuadraSynth™ keyboard has an ADAT digital interface so you can record it without ever leaving the digital domain.



The BRC Master Remote Control, shown with optional RMB™ Remote Meter Bridge, supercharges your ADAT System by adding SMPTE and MIDI synchronization, storable autolocation points, copy and paste digital editing and more.

ADAT/BRC digitally stores important session notes

Instead of scribbling notes on cumbersome studio track sheets, the BRC lets you store 400 autolocation points, 20 Song start points, punch in and out points, MIDI tempo maps, SMPTE offsets, and more in the two-minute data header of the ADAT tape. The BRC's alphanumeric display lets you name each cue point and song. It even has a handy built-in list of 16 standard cue point names you can edit.



Unlike analog autolocators, the BRC can recall 400 points, storable on each ADAT tape for later recall, so you can keep your mind on the project instead of having to remember minutes, seconds and frames.

The ADAT Worldwide Network

Thousands of ADAT Worldwide Network™ multitrack recording group members are reaping the benefits of choosing The ADAT System. As WWN members, they are able to collaborate and exchange ADAT tapes with other talented musicians, producers, composers and engineers throughout the world. Alesis is proud that so many creative people worldwide are using this American-made product, making ADAT the most popular digital multitrack tape recorder in history. The recording professionals below don't endorse ADAT, they use it every day. Their credentials speak for themselves. Visit your Authorized ADAT dealer and see what the new standard in digital multitrack recording can do for you.



- Dave Rouze**
Technical engineer for Larry Carlton, currently using ADAT to record all Larry's live concerts. 2 ADATs and a BRC.
- Jay Graydon**
Two time Grammy® Award winning (twelve nominations) producer, engineer, writer, and guitarist. 4 ADATs and a BRC.
- Owen Bradley**
Country Music Hall of Famer. Producer of many legendary country music artists. 9 ADATs and a BRC.
- Francis Buckley**
One of the top dance and pop engineers in Hollywood. 4 ADATs and a BRC.
- Web Staunton**
Grammy-nominated chief engineer and studio owner. 3 ADATs and a BRC.
- Mick Guzauski**
L.A.'s leading platinum mixdown engineer. 4 ADATs and a BRC.
- Andy Hilton**
Owner and Chairman of the largest pro-audio equipment-for-hire company in the U.K. and Europe. Plenty of ADATs.
- Ray Benson**
One of country music's hottest producer/arranger/writers. 3 ADATs and a BRC.
- Tom Size**
Has engineered and mixed a wide range of music from rock to legendary jazz. 3 ADATs and a BRC.
- Russell Brower**
Two Emmys (eight nominations). Sound designer and producer for film, television and major theme parks. 2 ADATs and a BRC.
- Tim Wilson**
Consultant and system designer for leading recording artists and songwriters. Has installed more ADATs than he remembers.

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CIRCLE 01 ON FREE INFO CARD

Make Room For Daddy-O

STUDIO NAME: Studiodad

LOCATION: Brooklyn, NY

KEY PEOPLE: Daddy-O (owner/producer/artist); Richie "Crash" Herrera (engineer)

PRODUCTION CREDITS: Stetsasonic; Third World; Queen Latifah; Jeffery Osborne; Tyler Collins; Eek-A-Mouse; TCF Crew; Jabulani; and others.

CONSOLE: Tascam 3500 with extended channels, 72-input patchbay

RECORDERS: MCI 24-track; Tascam 112 professional cassette recorder [3]; Technics HX-Pro Dual Cassette; Panasonic SV-3500 and SV-3700 DATs; Casio D-7 portable DAT

SIGNAL PROCESSORS: Alesis Midiverb II [2]; Aphex Expander/Gate [2] and Expresor; Audio Logic Quad Noise Gate; BBE Sonic Maximizer [2]; dbx 163X compressor [2] and 563X silencer; Digttech Digital Delay System 3.6; DigiTech Harmony Machine; Roland DEP 5; Symetrix parametric EQ; Yamaha R-100 reverb processor; Yamaha SPX900.

MONITORS: KRK 13000; AR Red Box II; Yamaha NS-10M; Auratones

AMPLIFIERS: Bryston; Hafler 2000

AUTOMATION: CAD/Megamix Automation Sys.; Macintosh SE-30 Superdrive

SEQUENCERS: Akai MPC 60II; Alesis HR-16 and HR-16B

SAMPLERS: Akai S900; Casio VZ20-M

KEYBOARDS: Roland D-10, Juno 106 and 60; Casio VZ-10M; Kawai K-3M

DRUM MACHINES: Roland 202, 606, 808, 909

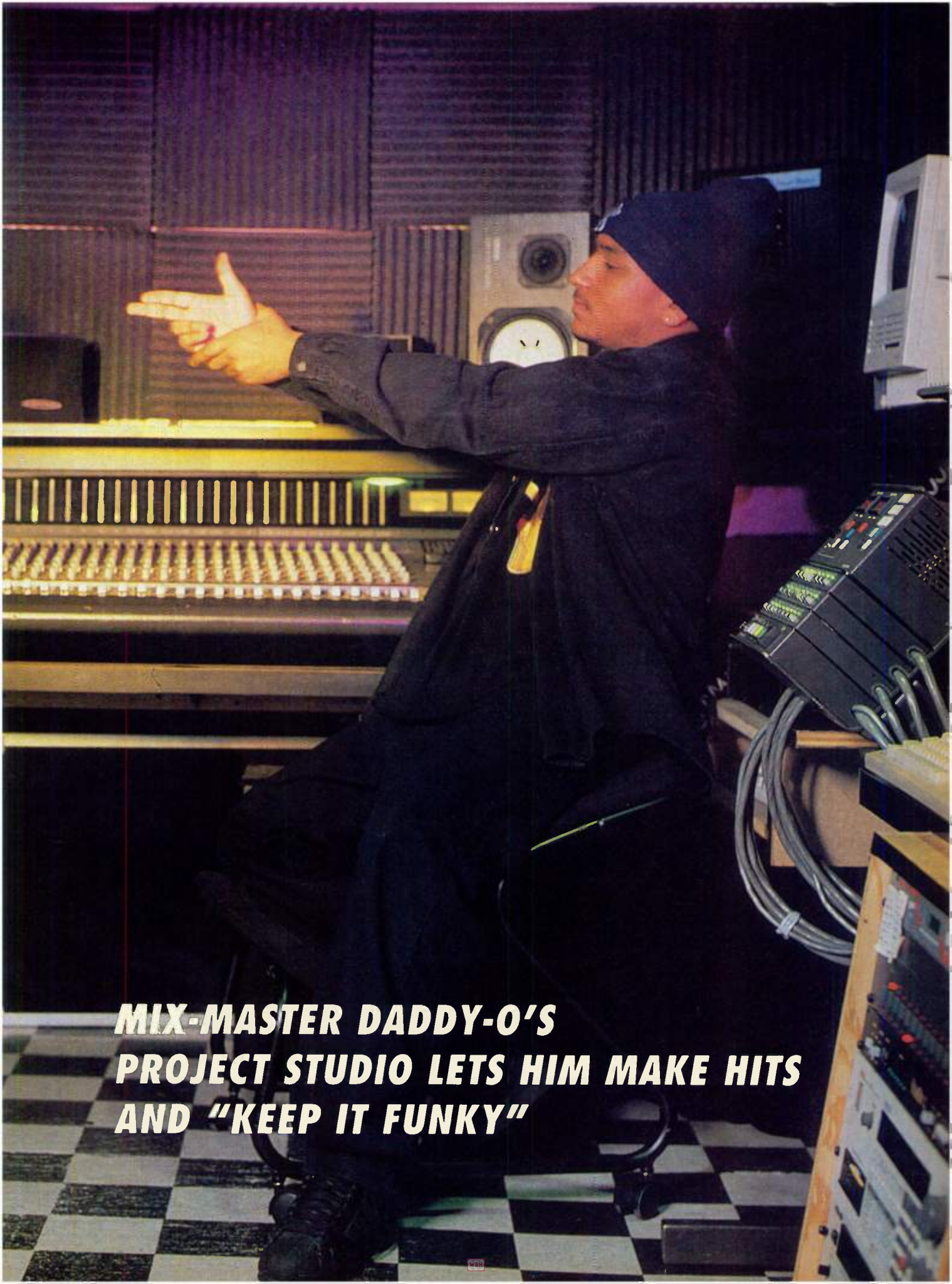
MICS: AKG C414 and 535; CAD Equitek II; Shure SM57

PRODUCTION NOTES: Says Daddy-O: Although I spent most of the money in it on wiring, I still have it patched like a fully blown 4-track. Everything is within hand's reach, with heavy concentration on monitors. Our motto at my studio is that if it doesn't feel right, all the technology in the world can't save the song. On the other hand, a song that does feel right can benefit from the right technology.

STUDIO NOTES: Daddy-O continues: My engineer, Richie, is really close to the street and creates new engineering techniques daily. The bottom line for us is to maximize sonic potential with superb talent, and to keep it clean and definitely funky.



Photo by Julian Jaime



**MIX-MASTER DADDY-O'S
PROJECT STUDIO LETS HIM MAKE HITS
AND "KEEP IT FUNKY"**

The Serious

THE TASCAM DA-88 THE DIGITAL MULTITRACK DECK FOR SERIOUS PRODUCTION

It's true. The first machine designed specifically for low cost digital multitrack production is now available. And it comes to you from the world multitrack leader, TASCAM. It's simply the most advanced, well thought out and heavy duty digital 8-track deck you can buy. The best part is, it's incredibly affordable.

The DA-88 is built for production. The integrity of TASCAM's design is evident in every facet of the deck. From its look and feel — to its exceptional sound, unsurpassed features and expansion capability.

GOES FASTER, LASTS LONGER AND TAKES A BEATING

While we admit that it's an elegant looking machine, it's tough to see its finest asset. The tape transport. Designed and manufactured by TASCAM specifically for the DA-88, it's fast, accurate and solid. And that's what counts in production — in personal studios, project studios or in those demanding high-end facilities.

You'll notice it uses superior Hi 8mm tape, giving you a full 108 minutes of record time. What's more,

the transport is lightning fast and yet so quiet you'll barely hear it blaze through a tape.

We didn't stop there. Because production environments are notorious for constant, if not abusive, shuttling, punching, 24-hour operation — you get the idea — the transport was designed and built to take a beating.

TASCAM DA-88

POWER

VARI SPEED

DIGITAL IN

REMOTE

DISPLAY

ALL INPUT

AUTO INPUT

INSERT

RESEL

AUTO IN/OUT

CLEAR

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Even more impressive is the transport's responsiveness. Take a look at the front panel. Notice the shuttle wheel? Turn it just a bit and the tape moves at one fourth the normal play speed. Turn it all the way and it flies at 8 times faster. Do it all night if you want. It's quick, smooth and it's precise. Need to get to a location quickly? Accurately? Shuttle a bit and you're there. The location is easily viewed on the DA-88's 8-digit absolute time display — in hours, minutes, seconds and frames. With the optional SY-88 sync card it displays timecode and offset, too.

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Unlike other digital multitrack decks, the DA-88 works logically and is simple to operate. Like your analog deck. All functions are familiar and easily operated from the front of the deck.



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s Machine



Take punching-in and out, for example. You have three easy ways to do it. You can punch-in and out of single tracks on the fly. Just hit the track button at the punch-in point. Hit it again to punch-out. You can use the optional foot switch, if you like.

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There's more. Add the optional SY-88 synchronizer card to just one of your DA-88s and you've got full SMPTE/EBU chase synchronization. The best part is, you can record time-code without sacrificing one of your audio tracks. You also get video sync input, an RS-422 port to allow control of the DA-88 from a video editor, and MIDI ports for MIDI machine control.

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LISTEN TO THE REST

Of course, the sound quality is stunning. With a flat frequency response from 20Hz to 20kHz and dynamic range greater than 92dB, it delivers the performance you expect in digital recording.

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CIRCLE 55 ON FREE INFO CARD

Sequencing For Humans



Adding that human touch to those electronically generated drum beats

BY CRAIG ANDERTON

Timing is everything, and that's especially true with music. Yet mathematically perfect timing is most certainly not everything, otherwise drum machines would have replaced drummers a long time ago. Good drummers enhance music by playing with the time — subtly speeding up or slowing down to change a tune's "feel," and leading or lagging specific beats to push a tune or make it lay back a bit more in the groove.

Often, these time changes ahead of or behind the beat are very small; even a few milliseconds (ms) can make a difference. This is surprising, since sound itself moves at about 1 foot per second, so a 6 ms change theoretically affects a track about as much as moving an amp 2 yards further behind the drummer. Yet when you conduct timing shift experiments, it becomes obvious that even very small timing differences can change a tune's groove when you hear these changes in com-

parison with a relatively steady beat.

Musicians and engineers often forget about the importance of timing changes and quantize everything, which is the quickest way to suck the life out of a piece of music. Fortunately, we can use other aspects of sequencers (and more recent drum machines) to put the feel back into sequenced music.

AN HONEST FEEL

Many sequencers provide timing randomization options to help give a more human-sounding track. Randomization is great if you want to simulate the effect of a drummer who's had too many beers. If you want a truly groovacious rhythm part, shift timings the way a drummer would. Human drummers add variations in a mostly non-random way — often subconsciously, so these changes tap directly into the source of the drummer's "feel."

Drummers often hit some drums slightly ahead of, or behind, the beat to give certain effects. For example, jazz drummers tend to hit a ride cymbal's bell a bit ahead of the beat to "push" a song. Rock drummers frequently hit the snare behind the beat (listen to any Led Zeppelin album) to give a "big" sound. Of course, the sound isn't really bigger; but our brain interprets slight delays as indicating a big space, since we know that in a big space sound travels a while through the air before it reaches us.

A sequencer or drum machine's track shift (or track offset) function, which can move a track back and forth in increments of single clock pulses, is your first line of defense against mechanical grooves. Keep the kick drum on the beat as a reference and use track shifting to change the timing of the snare, toms, and percussion by a few milliseconds. Here are some other track timing tricks:

- For techno, dance, and acid jazz tunes, try moving any double-time percussion parts (shaker, tambourine, and so on) a little bit ahead of the beat to give a "faster" feel.
- Sometimes it pays to shift individual notes rather than an entire track. With tom fills, delay each subsequent

note of the fill a bit more (e.g., the first note of the fill is on the beat, the second note approximately 2 ms after the beat, the third note 4–5 ms after the beat, the fourth note 6–8 ms after the beat, and so on, until the last note ends up about 20 ms behind the beat). This can make a tom fill sound gigantic.

- If two percussion sounds often hit on the same beat in a rhythm pattern, try sliding one part ahead or behind the beat by a small amount (a few ms) to keep the parts from interfering with each other.

- If some drums fight with melodic parts (i.e., the kick drum and bass mosh together), slightly advance the part you want to emphasize in the mix. It will grab the ear's attention just before the beat, thereby bringing more attention to itself.

- Track shifting does not apply only to drum parts. Suppose there are two fairly staccato harmony lines in a tune. If you advance one by 5 ms and delay the other by 5 ms, the two parts will become more separate and distinct instead of sounding like one combined part. If the parts are panned oppositely in the stereo field, the field will appear even wider.

- Hitting a crash cymbal a bit ahead of the beat makes it really stand out. Moving it behind the beat meshes it more with the track.

QUANTIZATION: TOOL OF SATAN?

Remember: machines don't kill music, people do — and quantization is one of the main weapons. Although quantization has its place, it's a very artificial process because no drummer plays with crystal-controlled precision.

Fortunately, sequencers usually let you quantize by a certain percentage (usually called "quantize strength" or "intensity"). In other words, 100 percent quantization moves a note exactly to the nearest beat, but 50 percent quantization moves it halfway closer to the beat. I quantize the kick to 100 percent and all other drum tracks to somewhere between 50 percent and 80 percent. The result is a track that sounds rhythmically correct, but retains most of a performance's "feel."

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Drawings for a FREE Trip to L.A. and Aphex Bucks

But the idea of showing off our heritage was still on our minds. So, we will draw from the names of people who get a T-Shirt*. One lucky winner will come to L.A. with a companion as VIP guests of Aphex. Then we get to brag about how great the Aural Exciter is ... how our patented process has often been imitated, but never duplicated.

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To get your free T-shirt you must purchase an Aural Exciter (your choice of Aphex Models) by March 31, 1994 and send in the warranty card. Other details are in the tiny print. Hint: you don't have to buy an Aural Exciter to be eligible to win the L.A. trip or *Aphex Bucks*. All you need to do is write to us or see your Aphex dealer for details. Join the Celebration and visit your Aphex dealer today!

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* Drawing open to all residents of the United States. To enter, simply send a post card to Aphex at the address above with your name, address and telephone number. You must write "100,000 Aural Exciters" on the card. For complete rules, send a stamped self-address envelope to the address above. Aural Exciter and Big Bottom are trademarks of Aphex Systems and are covered by U.S. and foreign patents issued or pending.

CIRCLE 07 ON FREE INFO CARD

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TEMPO TWEAKS

People generally set the tempo in a sequencer to the desired beat, then just let it sit there. That's not the way real music works. In a fascinating study, Ray Williams and Ernest Cholakias (of DNA Groove Templates) compared the tempo tracks of two classical pianists playing "Moonlight Sonata," and plotted out the tempo changes. The results were anything but a constant tempo — the changes looked like a relief map of the alps.

Real drummers insert subtle tempo changes over several measures or just in selected parts of individual measures to build anticipation and change mood. Fortunately, most sequencers let you change the tempo track throughout a song; once you start working with this technique, you'll find it an essential part of the production process. Here are some examples of track shifting:

- To boost a song's energy level, increase tempo slightly (by 1 or 2 beats

per minute), the timing equivalent of modulating pitch upward by a semitone; both increase excitement. Decreasing tempo has the reverse effect.

- Change tempo a bit earlier than the first beat of the measure you want to change. This creates a smoother lead-in than having the tempo change coincide with a measure change.

- For really dramatic effects, ritard the tempo over the course of a measure (e.g., one BPM or less lower on each beat), then return to the original tempo. Having a drum roll during the ritard creates a particularly effective transition.

Along with timing, here are a few suggestions on better drum parts through better timbres:

- To simulate the fact that two consecutive drum hits never have exactly the same timbre, assign the same drum sound to two different notes. For example, with an Alesis D4, copy the snare sound to a different MIDI note, then detune the alternate sound by a very small amount. There will be a subtle, but noticeable, timbral difference between the two snare sounds. Shift every other note or so of your snare part to trigger the second snare, and you'll have a much livelier part.

- With sampled drum sounds, route some velocity modulation to pitch so that high-velocity hits are slightly higher pitched. This gives the feeling of the drum skin being stretched tighter. Set the pitch modulation amount so that the change is not really audible except when compared to the nonbent sound.

- Velocity also works well when routed to filter cutoff so that harder hits give a brighter sound.

- Set a drum sample's start point several milliseconds after the start of the sound and use velocity to push the start point closer to the sample's beginning. Hard hits will give a louder, more forceful attack; the effect can be much more convincing than velocity switching between different samples (although this has its uses too).

Before signing off, I'd like to thank Michael Stewart (Digidesign) and Marius Perron (Jeanius Electronics) for sharing their insights about timing with me; several parts of this article owe a lot to their research. The more you get into the complex interplay between timing and sound, the more interesting it gets.



A D V E N T U R E S

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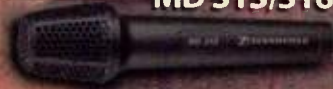
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Tubes is the ST-1 Shock Therapy microphone suspension system. The amount of shock rejection is adjustable or "tunable" simply by spreading the two inner clamps farther apart, which increases the tension of the industrial elastic holding the inner microphone clamps...The new Proteus family of digital sample playback modules was unveiled by **E-mu Systems** at NAMM. The Proteus FX is a low-cost unit, retailing at \$749, and the UltraProteus is a feature-rich unit with a 16 MB sound complement and is to list for \$179....Maximum shock rejection is 18 dB and a removable pop filter is included for the \$100 retail price...**Eye & I Productions** has introduced two new additions to the growing Voice Crystal line of sample CDs. *The Steve Reid Definitive Percussion Sampler* is a collection of exotic percussion instruments from around the world. *The Digital Kitchen's Definitive Grooves CD* is designed for Hip Hop and Funk productions.

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CIRCLE 58 ON FREE INFO CARD

Engineer's Guide to Studio Jargon

A helpful glossary that helps you overcome the studio tower of babble

BY BRUCE BARTLETT
WITH JENNY BARTLETT

When producers say they want you to "fatten" the sound of a sax, what do they mean? What are musicians talking about when they say a guitar sounds too "edgy"? How can you fix it?

Engineers need to know how to talk the talk. They must be able to translate a vague description of sound quality into perfect EQ settings or mic techniques. This glossary is an attempt to do just that. It defines many subjective audio terms.

When producers or musicians describe the sound they want, they might use terms that are visual: bright, transparent, focused, dark. Other times they refer to bodily sensations: warm, chesty, full-bodied, thin. Or they might compare the tone quality to sounds you already have heard: nasal, honky, boxy, tubby. Sometimes they refer to materials that have a characteristic sound: blanketed, glassy, tinny, steely. By playing with a graphic equalizer, you can train yourself to hear many of these effects.

You'll relate certain frequency bands with their colorations.

You may disagree with some of these definitions, but that's okay. These definitions are not standard, just suggested. They are what we think most people mean, based on conversations with producers and musicians over many years.



Airy: Spacious. Open. The instruments sound as though they are surrounded by a large reflective space full of air. Good reproduction of high-frequency reflections. (A stuffed closet does not sound airy because it absorbs highs.) Having a high-frequency response that extends to 15 or 20 kHz. True stereo pickup, as opposed to panned mono tracks.

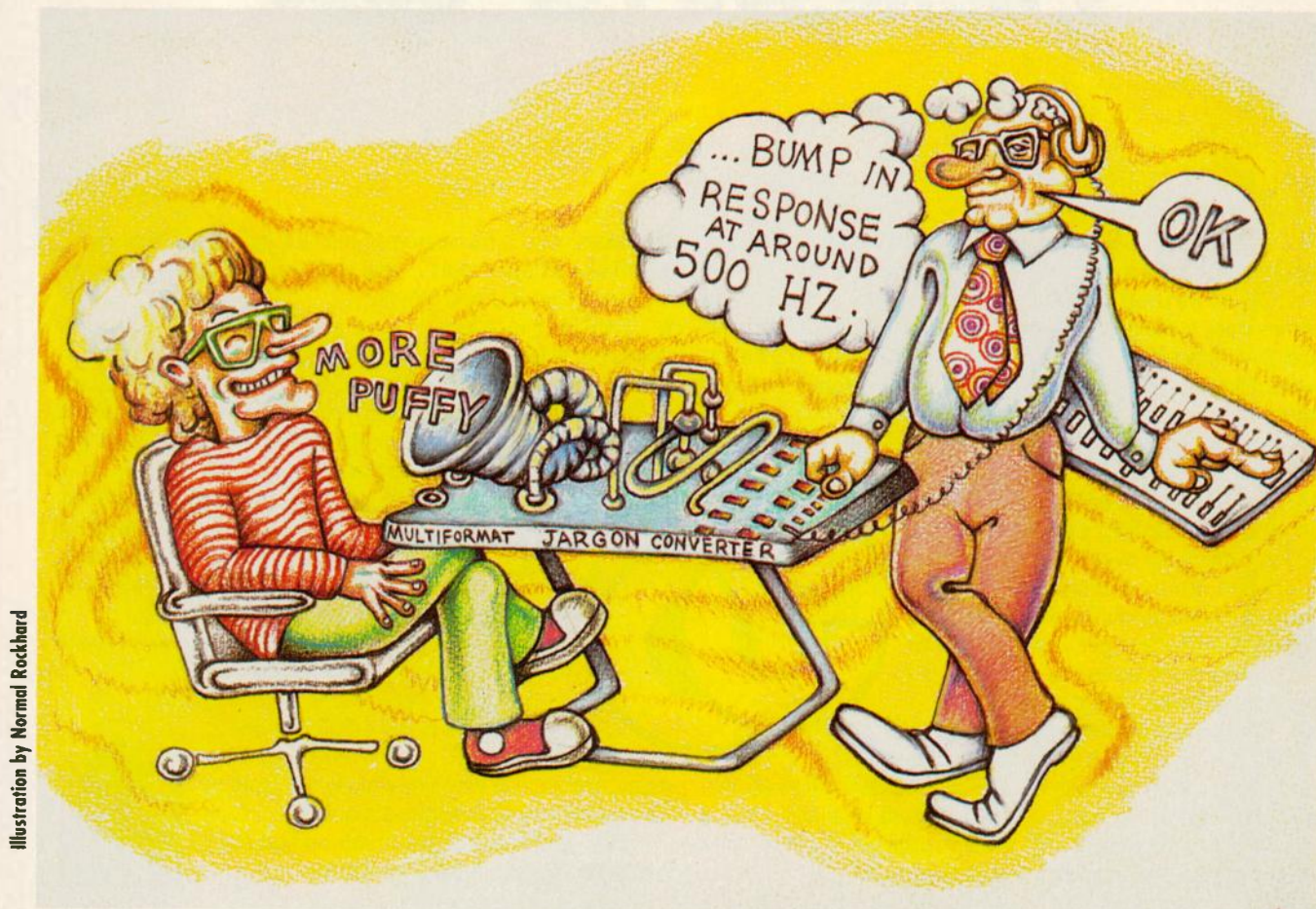


Illustration by Normal Rockhard

Cut through producer-babble with EQ's handy Multifomat Jargon Converter.

B

Ballsy: Emphasized low frequencies below about 200 Hz. Good low-mids in guitar.

Bassy: See Ballsy.

Blanketed: Weak highs, as if you had put a blanket over the speakers.

Bloated: Excessive midbass around 250 Hz. Poorly dampened low frequencies, low-frequency resonances. See Tubby.

Bloom: Adequate low frequencies. Spacious. Good reproduction of dynamics and reverberation.

Blurred: Poor transient response. Vague stereo imaging, not focused.

Boomy: Excessive bass around 125 Hz. Poorly dampened low frequencies or low-frequency resonances.

Bottom: Low frequencies, say, 125 Hz and below.

Boxy: Having resonances as if the music were enclosed in a box. Sometimes an emphasis around 250 Hz to 500 Hz.

Breathy: Audible breath sounds in woodwinds and reeds, such as flute or sax. Good response in the upper-mids or highs.

Bright: High-frequency emphasis. Harmonics are strong relative to fundamentals.

Brittle: High-frequency peaks or weak fundamentals. Opposite of round or mellow. See Thin. Objects that are physically thin and brittle emphasize highs over lows when you crack them.

C

Chesty: The vocalist sounds like his or her chest is too big. A bump in the low-frequency response around 125 to 250 Hz.

Clear: See Transparent.

Click: In a kick drum, the attack of the beater on the head. See Snap.

Clinical: Too clean or analytical. Emphasized high-frequency response, sharp transient response. Not warm.

Colored: Having timbres that are not true to life. Nonflat response, peaks, or dips.

Compressed: Dynamics are restricted.

Constricted: Poor reproduction of dynamics. Dynamic compression.

Distortion at high levels. Also see Pinched.

Crack: In a snare drum, the sharp attack of the stick on the head enhanced by a boost around 5 to 10 kHz. The drummer can hit rim shots instead of hitting the head.

Crisp: Extended high-frequency response. Like a crispy potato chip or crisp bacon frying. Often referring to cymbals.

D

Dark: Opposite of bright. Weak high frequencies.

Delicate: High frequencies extending to 15 or 20 kHz without peaks. A sweet, airy, open sound with strings or acoustic guitar.

Depth: A sense of distance (near to far) of different instruments. Instruments that sound far away have more reverb than instruments that sound close.

Detailed: Easy to hear tiny details in the music; articulate. Adequate high-frequency response, sharp transient response.

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Distant: Quiet or reverberant.
Dry: No reverb or other effects. Not spacious. Overdamped transient response.
Dull: See Dark.

E
Edgy: Too many high frequencies. Trebly. Harmonics are too strong relative to the fundamentals. When you view the waveform on an oscilloscope it even looks edgy or jagged due to excessive high frequencies. Distorted, having unwanted harmonics that add an edge or raspiness to the sound.
Etched: Clear but verging on edgy. Emphasis around 10 kHz or higher.

F
Fat: See Full and Warm. Spatially diffuse — you pan a sound to one channel, delay the sound, and pan the delayed sound to the other channel; slightly distorted with analog tape distortion or tube distortion.
Focused: Referring to the image of a musical instrument that is easy to localize or pinpoint, with a small spatial spread.
Forward: Sounding close to the listener, projected. Emphasis around 2 kHz to 5 kHz.
Full: Strong fundamentals relative to harmonics. Good low-frequency response, not necessarily extended, but with adequate level around 100 to 300 Hz. Male voices are full around 125 Hz; female voices and violins are full around 250 Hz; sax is full around 250 to 400 Hz. Opposite of thin.

G
Gentle: Opposite of edgy. The harmonics — highs and upper mids — are not exaggerated, or may even be weak.
Glare, Glassy: A little less extreme than edgy. A little too bright or trebly.
Grainy: The music sounds as though

it's segmented into little grains rather than flowing in one continuous piece. Not liquid or fluid. Suffering from harmonic or I.M. distortion. Some early A/D converters sounded grainy, as do current ones of inferior design. "Powdery" is finer than "grainy!"
Growl: In the sound of a bass guitar, a peak around 600 Hz.
Grungy: Lots of harmonic or I.M. distortion.

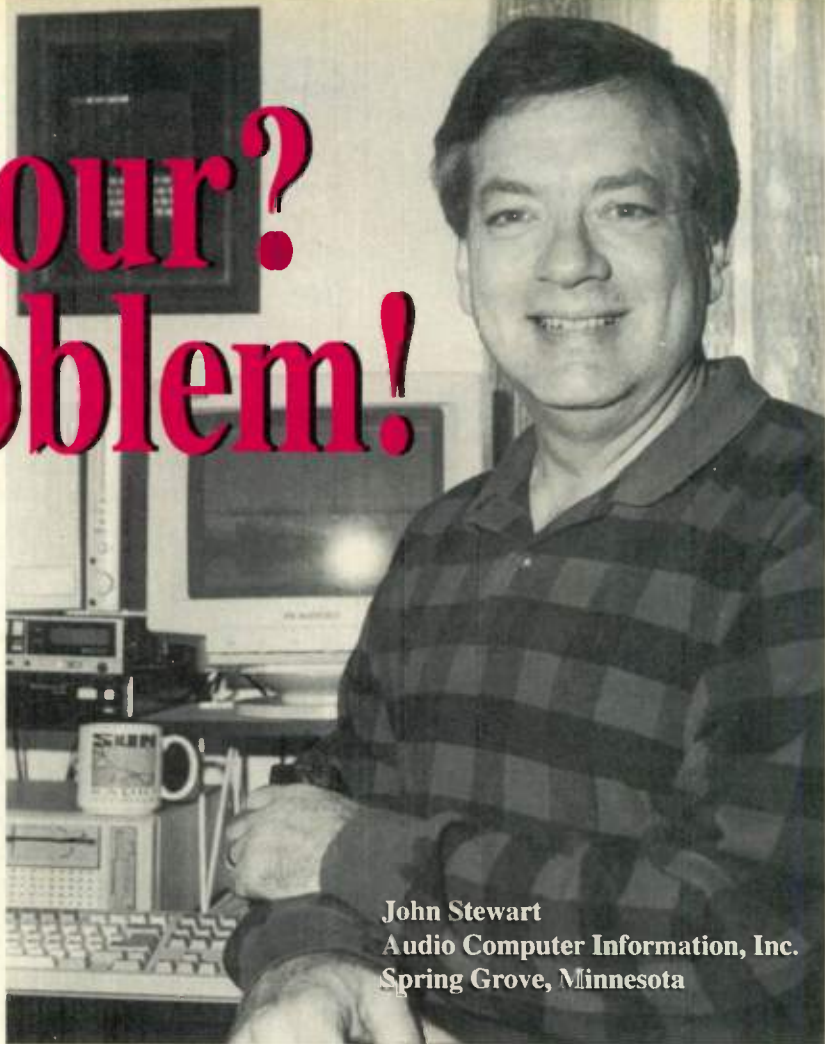
H
Hard: Too much upper midrange, usually around 3 kHz; good transient response, as if the sound is hitting you hard.
Harsh: Too much upper midrange. Peaks in the frequency response between 2 kHz and 6 kHz; excessive phase shift in a digital recorder's low-pass filter.
Heavy: See Weighty.
Highs: High frequencies.
Hollow: Too much reverberation, or a midfrequency dip. Too much room ambience. Also see Honky.
Honky: The music sounds the way your voice sounds when you cup your hands around your mouth. A bump in the response around 500 to 700 Hz.

L-M
Lows: Bass, low frequencies.
Mellow: Reduced high frequencies, not edgy.
Muddy: Not clear. Weak harmonics, smeared time response, I.M. distortion, too many instruments overlapping each other's frequency ranges.
Muffled: The music sounds as if it is covered with a blanket. Weak highs or weak upper mids.

N
Nasal: Vocalists sound as though they are singing with their noses closed. The vocalist's mic is too close to the mouth. Strings or guitars can

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sound nasal, too. Nasalness is a bump in the response around 600 Hz. See Honky.

P
Papery: Referring to a kick drum, an emphasis around 300 to 800 Hz.

Phasey: The instrument sounds out of phase (opposite polarity between stereo channels). It has a diffuse, directionless quality and makes your ears feel funny; the sound has a lot of phase cancellations or comb filtering, like a flanger. This can happen when a sound source is picked up with a mic near a surface, or when a source is picked up by more than one mic.

Pinched: Narrowband. Midrange or upper-midrange peak in the frequency response.

Piercing: Strident, hard on the ears, screechy. Having sharp, narrow peaks in the response around 3 kHz to 10 kHz.

Powerful: See Thunderous, Weighty.

Presence: A sense that the instrument is present in the listening room. Synonyms are Edge, Punch, Detail, Closeness, and Clarity. Adequate or emphasized response around 5 kHz for most instruments, or around 2 to 5 kHz for kick drum and bass.

Puffy: A bump in the response around 500 Hz.

Punchy: Good reproduction of dynamics. Good transient response with strong impact. Sometimes a bump around 5 kHz or 200 Hz.

R
Raspy: Harsh, like a rasp. Peaks in the response around 6 kHz, which make vocals sound too sibilant or piercing.

Rich: See Full. Also, having euphonic distortion made of even-order harmonics.

Round: High-frequency rolloff or dip. Not edgy.

S
Sharp: See Strident and Tight.
Sibilant: "Essy." Exaggerated "s" and "sh" sounds in singing, caused by a rise in the response around 6 to 10 kHz.

Sizzly: See Sibilant. Also, too many highs on cymbals.

Smearred: Lacking detail. Poor transient response, too much leakage between mics. Poorly focused images.

Smooth: Easy on the ears, not harsh. Flat frequency response, especially in the midrange. Lack of peaks and dips in the response.

Snap: In a kick drum, the click or attack of the beater on the head. It can be emphasized by boosting around 2 to 6 kHz and by using a wooden beater. In a snare drum, the attack of the stick on the head, usually around 5 kHz.

Soft: Poor transient response. The transients hit you softly, smearred in time. Also see Mellow and Gentle.

Spacious: Conveying a sense of space, ambience, or room around the instruments. Stereo reverb. Early reflections.

Squashed: See Compressed.

Steely: Emphasized upper mids around 3 to 6 kHz. Peaky, nonflat high-frequency response. See Glassy, Harsh, Edgy.

Strident: See Harsh and Edgy.

Sweet: Not strident or piercing. Delicate. Flat high-frequency response, low distortion. Lack of peaks in the response. Highs are extended to 15 or 20 kHz, but they are not bumped up. Often used when referring to cymbals, percussion, strings, and sibilant sounds.

T
Thin: Fundamentals are weak relative to harmonics. Note that the fundamental frequencies of many instruments are not very low. For example,



violin fundamentals are around 200 to 1000 Hz. So if the 300 Hz area is weak, the violins may sound thin — even if your monitor speaker's response goes down to 40 Hz.

Thumpy: You hear low-pitched thumps when the instrument is played. Usually referring to a guitar with too many lows around 60 to 80 Hz. Often caused by miking an acoustic guitar too close to the sound hole or by a noisy piano pedal mechanism.

Thunderous: The deep bass sounds like thunder. Extended low-frequency response below about 50 Hz.

Tight: Good low-frequency transient response and detail. Often used referring to a well-damped kick drum that has a blanket inside pressing against the beater head; absence of leakage between microphones.

Tinny, Telephonelike: Narrow-band, weak lows, peaky mids. The music sounds as if it's coming through a telephone or tin can.

Transparent: Easy to hear into the music, detailed, clear, not muddy. Wide flat-frequency response, sharp time response, very low distortion and noise.

Trashy: See Tinny.

Tubby: See Bloated. Having low-frequency resonances as if you're singing in a bathtub.



Veiled: The music sounds as if you had put a silk veil over the speakers. Slight noise or distortion, or slightly weak high frequencies. Not transparent.



Warm: Good bass, adequate low frequencies, adequate fundamentals relative to harmonics. Not thin. Also, excessive bass or midbass. Also, pleasantly spacious with adequate reverberation at low frequencies. Also see Rich, Round. Some people refer to warm highs, which means sweet highs.

Weighty: Good low-frequency response below about 50 Hz. Suggesting an object of great weight or power, like a diesel locomotive.

Wooly: The music sounds as though you had put a wool blanket over the speakers. Weak high frequencies. For drums, a wooly sound is an emphasis around 250 to 600 Hz. **EQ**

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Three Views Of A Room

Studio design. Everybody needs it, but there is no one way to go about doing it. To help illustrate how the pros get the job done, *EQ* asked some of today's busiest studio designers to present a recent example of a room that they have done and also to provide a few words on how they overcame any complicating conditions that made the job a bit more than they bargained for.

Window Dressing

Creative Trust's (project) Studio at Mole End provides a wilderness recording retreat for its owners

BY RUSS BERGER

When the members of Creative Trust, the management firm for artists Michael Card and Stephen Curtis Chapman, first considered building their own project studio, they agreed that it should create an atmosphere

of "comfortable creativity."

The partners wanted a state-of-the-art facility, but in a relaxed setting. Creative Trust selected a site situated on a hill in the secluded woods of Franklin, Tennessee. The site included an existing masonry structure that had previously been used as a garage and storeroom. The split-level building followed the slope of the hill on which it was built, resulting in a 2-foot elevation change between the two portions of its foundation. The layout of the new studio utilized this feature to separate the control room and studio spaces.

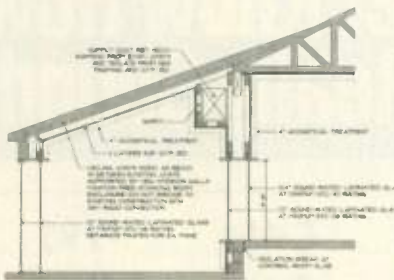
The facility's design also took advantage of the building's existing exterior windows to provide a view of the pastoral setting from each of the technical rooms. The recording studio features full height, sound-rated windows on either side, so that operators and musicians can look out to the decked patio, and beyond to the valley below.

Within the studio, these windows create a more open, spacious feeling between the studio and control room. With this layout, engineers, producers, and musicians can communicate better. You have to be very careful,

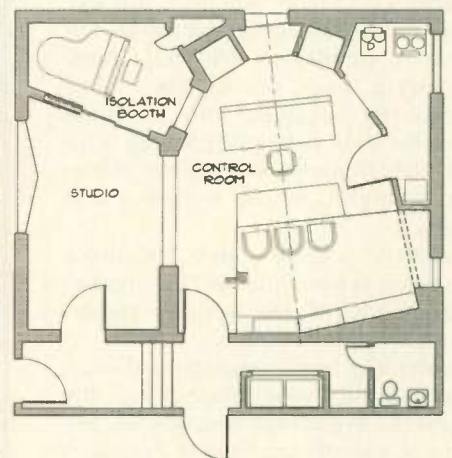
however, in coordinating the placement of the windows and the room's geometry to keep from having acoustical problems in the monitoring environment.

The facility's audio control room features a Neve V3-48 audio console with Flying Fader automation. The monitor wall was designed to adapt to a variety of loudspeakers and also houses two video monitors. The video status monitor is supported by a motorized lift within the front wall enclosure. When the lift is lowered, an exterior window is revealed, affording another view of the wooded area surrounding the facility. A dedicated equipment room is next to the control room and houses an Otari MTR-90 multitrack machine and associated outboard gear.

In order to maintain appropriate sound isolation between the different spaces, we created a "room within a room," with the interior walls isolated from the exterior building shell and supporting their own isolation-ceiling structure. Special attention was paid to maintaining the necessary sound isolation through modifications to the building's structural slab,



The Studio at Mole End features numerous windows to overlook its scenic locale.





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to prevent vibrations from being transferred between rooms via the common foundation.

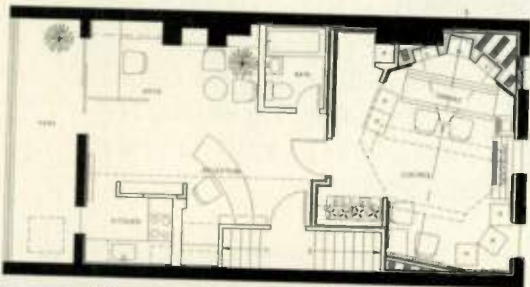
Working within the constraints of an existing building and a tight budget are challenges we frequently face. Anyone can throw money at a problem and probably eventually get things to work. The trick is to develop realistic project goals, keep them in sharp focus, find cost-effective solutions to problems, and make wise compromises.

Macrose Place

New York City's Macrose Music is one very centered composing/mixing-style project studio

BY JOHN STORYK

Macrose Music is the project studio for Fred Thaler, one of New York City's prominent composers of music for the advertising industry. Located on one floor of Fred's Chelsea townhouse in Manhattan, it represents the quintessential tape-based MIDI-style composing, recording and postproduction studio.



Fred's array of synthesizers actually includes about six different keyboard devices that he has acquired over the years, each representing a slightly different way of working. An important design consideration for composing/mixing-style project studios is that the composing keyboard is centered in the room. For Macrose, the composing area was positioned in a more creative environment, overlooking the scenic New York City streetscape.

Although not common for Fred's production requirements, there is a small vocal "alcove" to the left of center that provides a dryer area for a vocal microphone. Headphones are required for live mic recording sessions. A separate iso booth was considered, but would have taken too much space.

On the equipment side, midfield monitoring is provided by Genelecs, the analog 24-track tape machines are Otari, and the mixing console is a DDA DMR12. The room and equipment have been positioned to accommodate the configuration, the windows, and the nonstudio requirements in such a way that all the equipment has been placed while still maintaining an acoustically accurate front room listening environment for midfield monitoring. I believe this is a traditional and very effective approach for medium-sized project studios. It provides great

flexibility in laying out the rest of the room.

A complete trough system has been installed about the perimeter of the room for low-voltage wire management. Although this is a private studio, clients are often present and appearance is important. The multi-track tape machine alcove provides excellent machine noise attenuation and places the machines out of the way of most of the room activity. A floating floor/ceiling system based on kinetics roll-out flooring and multi-layered gypsum board construction was used to achieve an NC value of 25 for the room.

The remainder of the floor is dedicated to business support as well as HVAC, storage, and so on.

Special K

Size was definitely an issue for Bill and Ed Kinslow's New York City project studio

BY FRANCIS DANIEL

Studio K was probably the lowest budget project we have ever done — and also the most original. A project studio here in New York City for musicians Bill and Ed Kinslow, where everything costs 50 to 100 percent more than elsewhere, it was built for under \$15,000. It also incorporates a unique acoustical design approach that we have been developing for several years and have trademarked — The Modal Mixer.

When the Kinslow's came to us, they already had a space selected and a clear program of what they wanted in the space. Our job was to help them get there quickly and cheaply while still meeting those pesky building codes and their own performance criteria. We all knew the rooms had to be pretty small to incorporate all the functions for tracking, mixing, and editing.

But there is a fundamental problem with *all* small rooms — smaller than a concert hall, anyway. Whatever their shape, they have an intrinsically uneven low-frequency response — those much discussed, lit-



Macrose Music's many synthesizers had to be taken into account during the design process.



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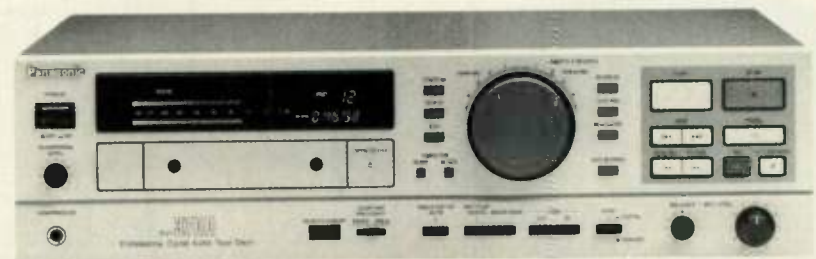
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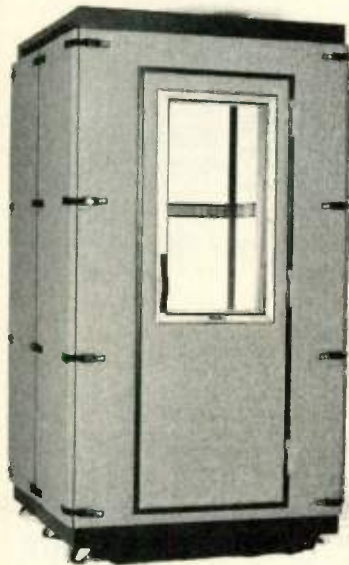
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tle understood room modes or standing waves. The only way to get a room with no modes is to make it anechoic, that is, without echoes or reflections. In a word: dead. No reflections and no way for modes to build up.

However, no one wants to work in a completely dead room. Loudspeakers don't take to a completely dead environment easily either — witness what happens to your favorite monitor if you take it outdoors, which, except for the ground, is the ultimate anechoic space.

So we are stuck with room modes and have to tame them. The best answer to the problem that we have seen so far is to make all the modes work off all the walls. This modal structure (all oblique modes for you technically inclined readers) works to reduce the extremes of the peaks and valleys, and reduce the need for bass trapping. And that is what the Modal

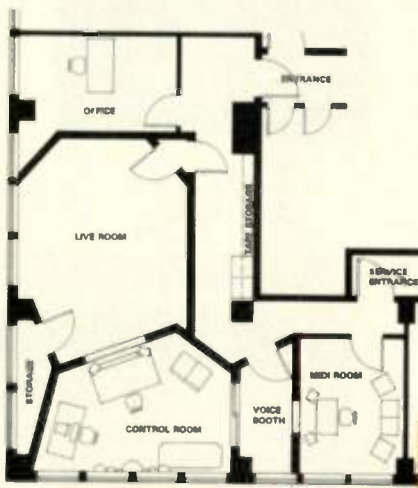
Mixer does without having to tilt every surface in the place.

The secret is the double-sloped wall and its angles in relation to the room shape. You can get an idea of how it looks from the photo and the plans, but there are a few tricks to making it work right — maybe that will be in a future article. The measurements we have taken show an exceptionally smooth low-frequency structure, and our ears confirm it.

Because of the small budget and, as always, limited space, we made the single wall between the live room and the control room the double slope for both rooms and killed two acoustic birds with a single construction. The tradeoff is that the control room is not symmetrical, something we usually want. But we felt that since all monitoring was going to be done on nearfields, this was an acceptable compromise.

The Modal Mixer, however, does not solve everything. So in the ceiling we designed a curved thin plywood membrane. This treatment provides some bass absorption at the same time it diffuses mid and high frequencies.

The rooms have worked very well for their owners. And we were pleased that we were able to create a first, and a working one at that. As Lord Rayleigh, the founder of modern physical acoustics put it close to a century ago, "The ear is the final judge, and from its verdict there is no appeal." **EQ**



The Modal Mixer helped to solve some design problems at Studio K.



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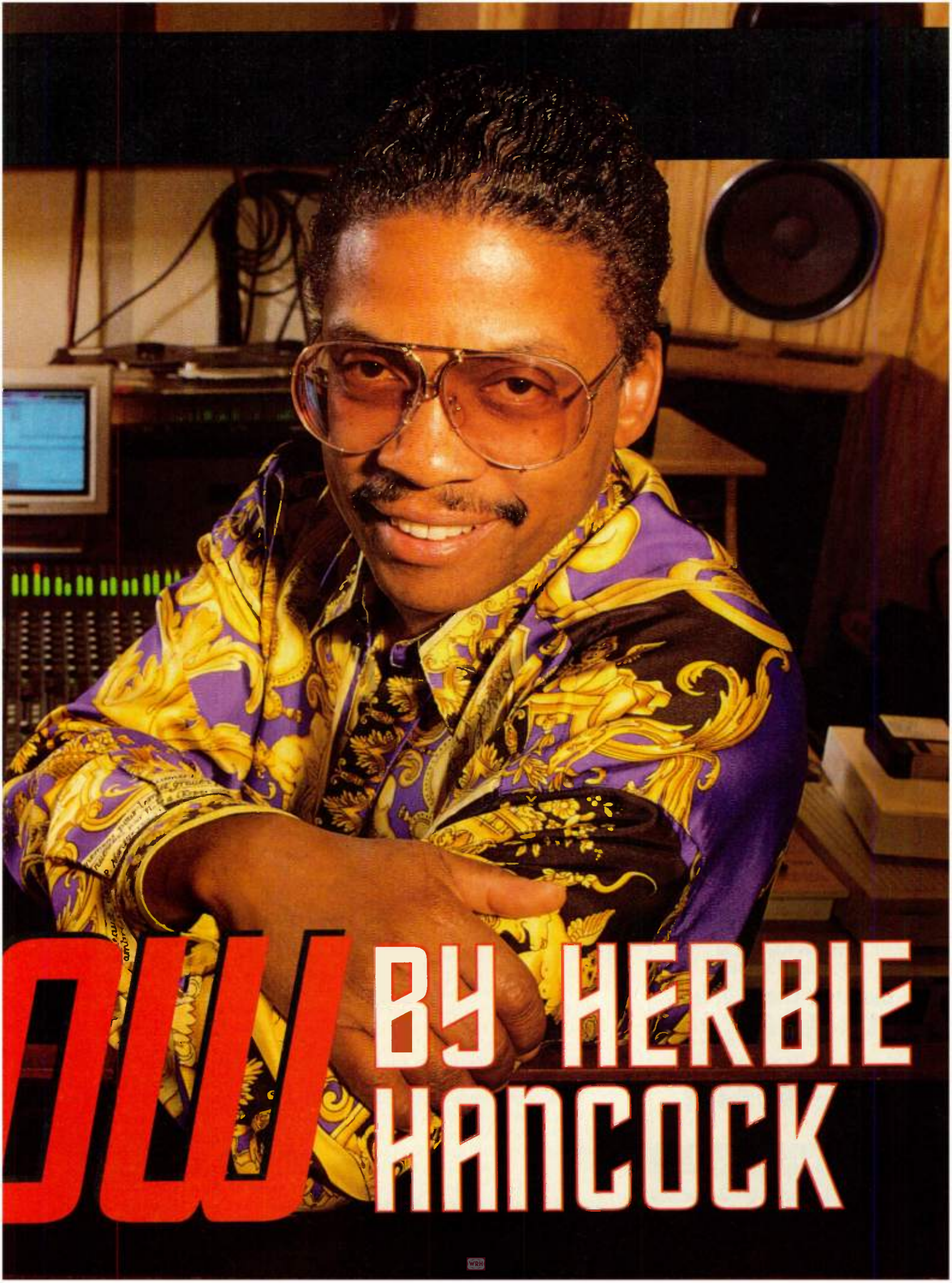
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CIRCLE 31 ON FREE INFO CARD

A few years after I left Miles Davis, I put together my first project studio, Garage Sale Sound. This was sometime in the early 70s and the studio was nothing fancy: just a minimal mixing board and some crude pieces of equipment that I set up in my garage. It was important for me to have a space nearby so that if I got an idea (and they can be gotten at the weirdest times) I wouldn't have to rush off to another location; I could lay down tracks right there in my garage.

In the early years, I was using the facility solely to put ideas down on tape. Had I not set up my own home studio, a lot of valuable ideas would have gotten lost. Soon I added a mixing console, the Soundcraft 2400, which gave me the ability to mix my musical ideas and complete preproduction for albums such as *Thrust*, *Treasure Chest*, and the soundtrack for *Death Wish*.

I bought my first digital keyboard in the late '70s—the E-mu Model 4060. It served as a master controller for my analog synthesizers, meaning I could trigger the notes of external synthesizers directly from the 4060. I don't recall there being, at that time, any other keyboards that enabled you to perform this function.

E-mu had incorporated a built-in sequencer in the 4060, which I fully loaded with RAM memory. Like most built-in sequencers, it was designed to record and play back short ideas, but I wanted to use it in the same way that we use external sequencers today. This was the pre-MIDI age, but I didn't want to record just short ideas; I wanted to record whole songs.

The sequencer was accessed from a telephone keypad mounted on the unit. So when recording, I divided a song into sections and used the keypad to store those sections in different locations. The instrument, however, wasn't designed for seamless sequen-

tial playback of those stored areas, so we attempted to come up with a solution to this problem.

My technical engineer, Bryan Bell, worked closely with E-mu engineers Scott Wedge and Dave Rossum to modify the keyboard for seamless playback. Subsequently, this led to our developing a digital patchbay accessory for the 4060 keyboard. It cost me thousands of dollars to manufacture, but I strongly felt that the end would justify the means. Then MIDI came into the picture, and obsoleted the device we had just finished building.

Another device that was born of necessity was our "master clock." Bryan Bell wanted to utilize the LINN drum machine as a master device, using the 4060 keyboard as a slave. The dilemma lay in every manufacturer saying that the keyboard had to be the master; there was no universal timing source. So we hired John Vieira to build a 4-channel clock-dividing network with tape synch capability, while Roger Linn provided us with some tape-chip syncs that he was using. Bryan Bell, meanwhile, made a two-rack-space box that interfaced with our SMPTE reader and the old tape sync that the LINN drum machine used. These efforts resulted in a device that could drive any sequencer; we could now have four different devices following our home-made master clock.

After we had this device set up,

Dan Garfield visited our studio to show us his own synchronizing device, Dr. Click. To his surprise, we had already invented our own version of this product. But while his device had two channels of clock dividing, we had a 4-channel unit that also read SMPTE. With our master clock, we could use mixers and sequencers to chase tape, a function that nobody else was able to do in 1981. Dan Garfield actually went on to do very well with Dr. Click. For us, however, creating new technology was never a matter of marketing, but of necessity.

Many years ago, I dreamed of being able to control all the synthesizers in my studio from one source, and then save all the information to a computer. Today my dreams have come true. We're using four Apple Macintoshes and two IBM PCs in the studio for music applications.

I consider myself a Macintosh person at heart. In fact, my first computer, which I bought in 1979, was an Apple II Plus with 48k of RAM. Bryan Bell created a multipage software program for the Mac called Cosmic Keyboards, and it provided pages for lyrics, record information, written music, and a sequencer. He began writing and learning BASIC at the same time, but the program was amazingly sophisticated for its time.

Even though I have two IBMs (which came with the Euphonix and the Waveframe), Macintosh is the foundation for the studio. A Mac IIfx contains all my sequencers — Opcode's Studio Vision, Steinberg's Cubase Audio, Passport's MasterTracks Pro, and Mark of the Unicorn's Digital Performer. I usually use Studio-Vision, but having these various other sequencers allows me to accommodate the different tastes and preferences of others who work on my projects.

Our most recent acquisition is the Euphonix CSII mixing console. The primary reason for purchasing it was to enable me to do final mixes in my studio, and I need-



Photos by Ed Colver

HERBIE'S HOMESTEAD

STUDIO NAME: Garage Sale Sound

ENGINEERS: Will Alexander (head engineer), Darryl Smith, Darryl "Bob Dog" Robertson, Will "Roc" Griffin, Bill Summers

CONSOLE: Euphonix CSII 48 fader w/full automation; WaveFrame AudioFrame 1000 32 Ch. w/SDIF/PD IN/OUTS; Yamaha DMP-7D w/AD8X

RECORDERS: Sony PCM3348 48-track; Akai Adam DR1200 24-track; Ampex MM1200 2-inch 24-track

SYNCHRONIZER: Timeline Microlynx

CASSETTES AND DATS: Sony dual cassette; Sony DTS 1000, FTS 500 DAT

MONITORS: Mains — UREI 604E coaxial horn/15-inch woofer; TAD 1603 15-inch woofers; Bag End D18E dual 18-inch subwoofers; Bag End Elf processor; Mastering Labs Passive Equalizers; Minis — Yamaha NS10s; Aux — Meyers HD-1 nearfield; Studio — UREI 809

OUTBOARD EQUIPMENT: Lexicon 480L and PCM70; Ensoniq DP-4; Korg A-1; Eventide H3000E Harmonizer; Zoom 9002; Rane MIDI EQ, Dynamic controllers; Drawmer gates; UREI LA-4

MICS: Shure SM57, SM58, PZM; AKG C414, C451; Sennheiser 421, 441; Beyer; Nakamichi; Sony

KEYBOARDS: Korg T-1, 01W-FD; Roland MK-80; Ensoniq TS-10; Yamaha DX-7 II w/EI; Rhodes Chroma w/Chroma Expander

SAMPLERS: Ensoniq ASR-10 16 Mb; Kurzweil K-2000R 16 MB, Akai S-1000 32 MB; WaveFrame AudioFrame 1000 32 MB; NED Synclavier 9600 32 MB; DigiDesign SampleCell II 32 MB; DigiDesign Sound Accelerator II

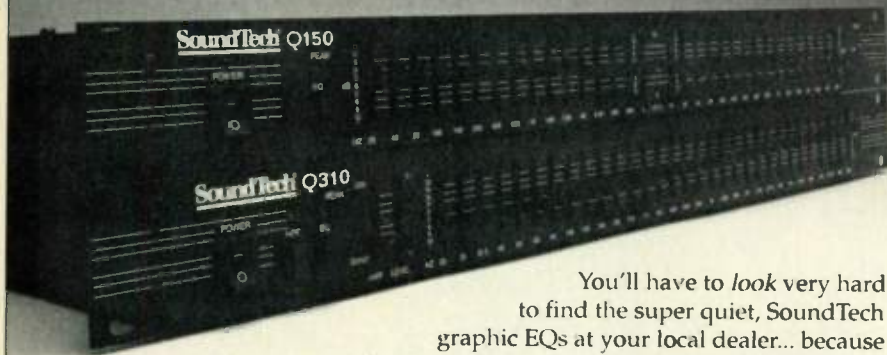
DRUM MACHINES: LINN 9000; Akai MPC 60

COMPUTERS: Apple Macintosh IIfx, Mac Quadra 900, Mac Quadra 840A/V, Mac SE/30 and Mac IIsi; IBM 386/33 MHz (Audioframe); IBM PC 486/33 MHz (Euphonix CS II)

MIDI INTERFACE: Lone wolf MidiTap (5); Opcode Studio 3, Studio 5

SOFTWARE: Opcode Studio Vision 1.5; Vision 2.0 Beta, Cue, Max, Trackchart, OMS; MOTU Digital Performer, Performer 4.2; Steinberg Cubase Audio; Passport Master Tracks Pro, Encore, Alchemy; CODA Finale 3.1; DigiDesign SoundTools II, DINR

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"I try to incorporate my vision into the product..."

ed an automated mixing console because we are working with so many tracks. Moreover, this console has all the features I need to work on my music — Snapshot Recall, MixView screens, and, of course, Dynamic Mix Automation. Automation was a necessity because some of the songs we recorded contain up to 62 tracks. Without automation, it would have become almost impossible to mix a song with that many tracks in it.

Before acquiring the Euphonix CSII, I compared it with my previous mixing console, a Neve 8068. I did a comparison test by trying to A/B the EQ of the 8068 (the 8068 is famous for its EQ) against that of the Euphonix. The EQ of the Euphonix compared favorably with that of the 8068. Plus, the CSII has the features of a larger board despite its compact size.

These days, I'm using the Korg T-1 as a controller. Other models I have include Proteus's 1, 2, and 3, a Korg Wavestation, a Korg O1RW, a Kurzweil 2000 rack model, the Roland JD990 (with an incredible orchestral expansion board option that we added), a Waveframe, and a Synclavier. The Synclavier sounds fine, but its architecture makes it a bit slow, so I tend to use the Waveframe more.

Digidesign's SampleCell is great for sampling. The Sound Designer II board allows us to have four tracks of hard-disk recording. Among our signal processing devices, Ensoniq's new DP/4 enables us to have signal processing going from one unit to four different devices independently.

Even to this day, after a new device comes out its features will inspire me to conceive of uses that go way beyond the original vision of the manufacturer. I try to incorporate my vision into the product by customizing and modifying it for my needs. I can see other possibilities for a product, possibilities that the manufacturer may not have even considered when the product was originally introduced. Essentially, I'm a closet techie in a musician's body.

EQ

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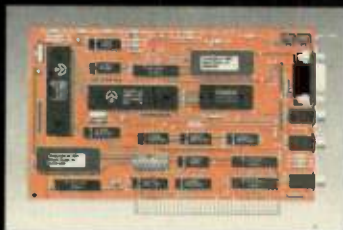


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CIRCLE 39 ON FREE INFO CARD

EUPHONIX EUPHORIA

There's a dilemma any techie faces when it comes time to choose new technology for his or her growing home facility: Where do I go from here? In Herbie Hancock's case, the answer is clear cut. "If I have a choice of going with the tried-and-true," he says, "or jumping on a new piece of technology right away, I'd rather jump on the new technology and take my chances. I feel comfortable on the cutting edge." This brave philosophy may explain why Hancock chose the Euphonix CSII digitally controlled analog mixing console for his project studio, Garage Sale Sound.

In order to determine if the Euphonix board was right for him, Hancock had to devise a comparison test between the CSII and his previous board, the Neve 8068. What he discovered was enlightening.

"The Euphonix features a larger board without taking up as much room," says Hancock. "Plus, because of the digital technology, each strip on the CSII has six inputs, whereas an analog board has only one." After adding together the stereo faders and various inputs, Hancock states that the Euphonix machine makes room for 144 inputs altogether (6 inputs per strip x 24 strips).

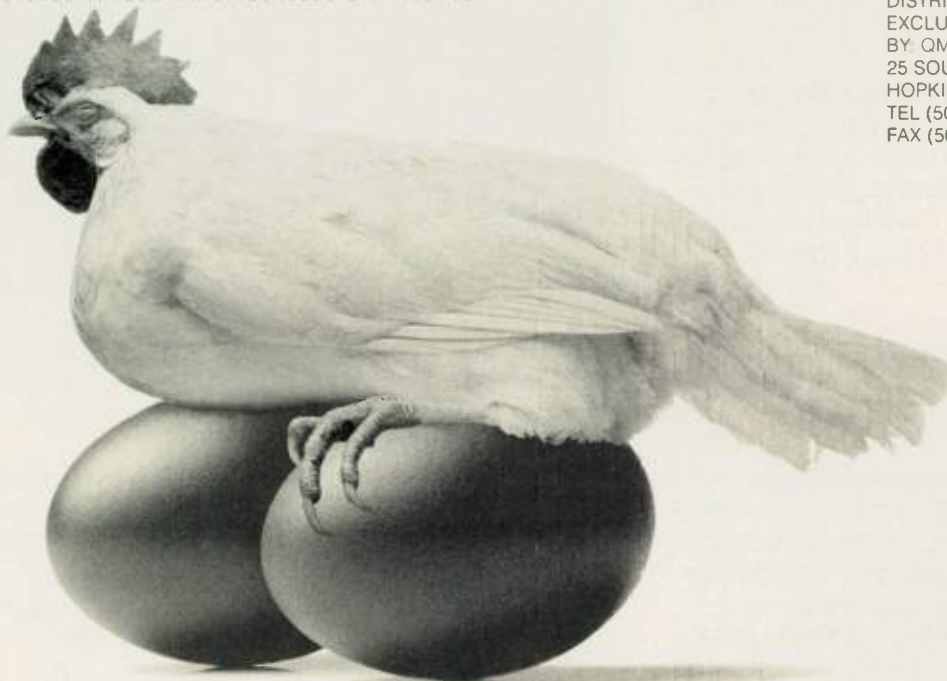
The CSII's Dynamic Mix Automation was also a major selling point for Hancock. Through automation, the CSII can record all control changes with reference to timecode, including faders, mutes, EQ, aux sends, preamps, routing, and effects inserts. In addition, Hancock cites the MixView software, run by the CSII's Support Computer, as a major asset in recording and mixing down a variety of projects. The software shows precise EQ curves, console setup, track sheets, and other information through eye-catching high-resolution graphics.

Another feature, Snapshot Recall, allows up to 50 complete console setups to be stored and recalled through onboard RAM. Explains Hancock, "Even if you're working on several things at once, you can still perform various functions for each project. Furthermore, the settings you had for a particular tune can be recalled at the touch of a button."

Hancock adds, "Updates are always being made, and the Euphonix CSII will be able to adapt to my needs." —Jon Varman



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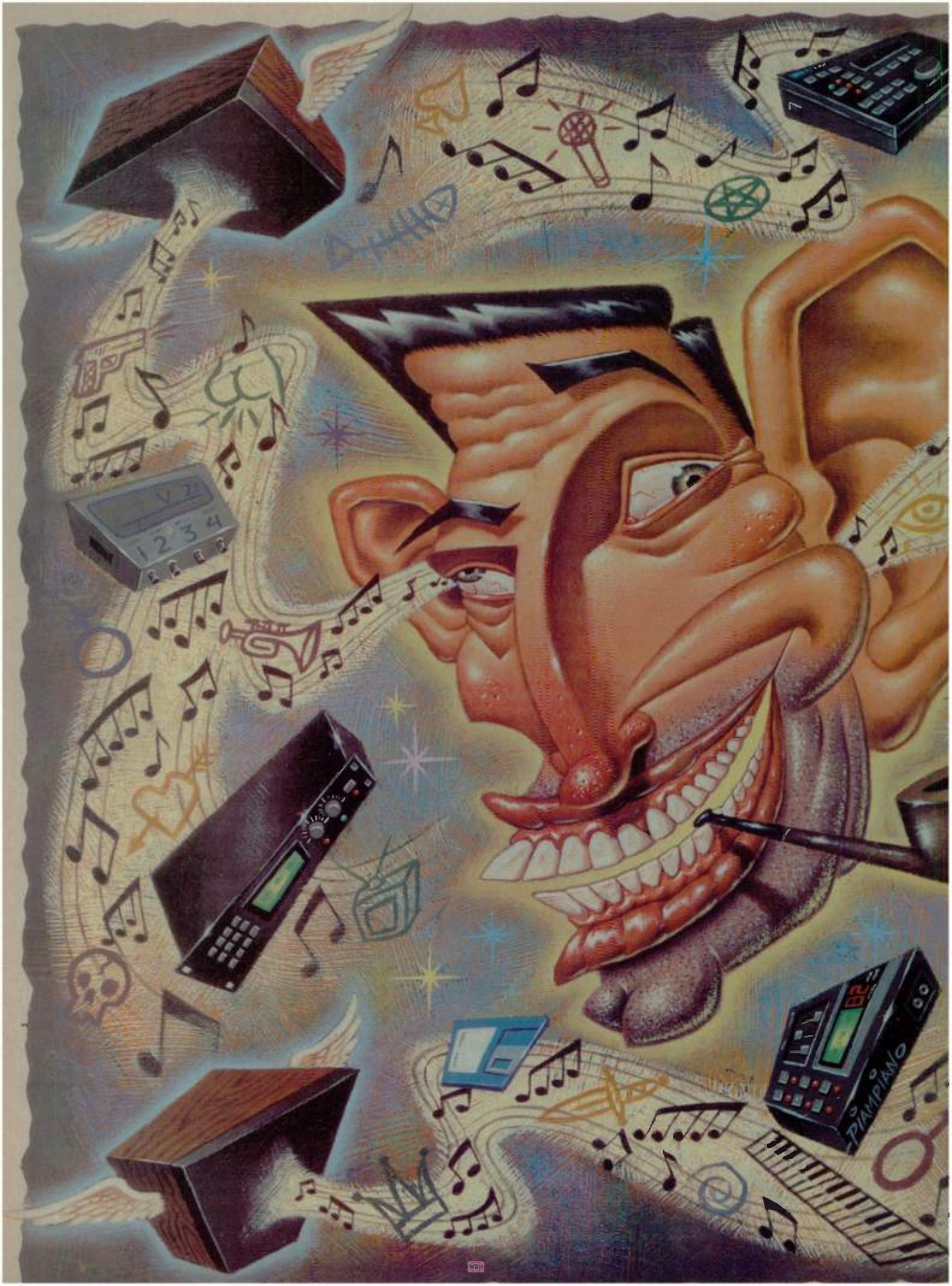
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CIRCLE 61 ON FREE INFO CARD



SURROUND SOUND SPECIAL REPORT

STUDIOS GO BEYOND STEREO

An up-to-date look at great new 3D audio gear (no funky glasses necessary). Everything you need to enter the next dimension of sound.

BY JOHN LA GROU

For decades, audio engineers have been fascinated with the idea of three-dimensional sound reproduction. Dating back to Walt Disney's original *Fantasia* presentations and even earlier, engineers have devised methods to wrap sound around a listener. In more recent memory, attempts at quadraphonic sound and related technologies have come and gone. Today, cinematic sound has propelled a new generation of multispeaker 360-degree formats.

Three-dimensional sound from a two-dimensional (stereo) source is achieved by electrically imitating the brain's discrimination of small differences in arrival time between left and right ears. Also imitated are the effects of head, shoulder, torso, and pinnae on our brain's ability to localize sound. This modeling is given various names, including Head Related Transfer Function (HRTF), and is accomplished by averaging the results of numerous human studies of sound localization.

So far, nobody has achieved true 3D sound with a pair of speakers. In recent years, however, the apparent sonic stage has become much wider and deeper than the physical location of two speakers. If you haven't listened to some of the latest developments in 3D audio, you're in for a treat.

CRYSTAL CLEAR

Many technologies we take for granted today were birthed in military and aerospace laboratories. Maintaining

this tradition, Crystal River Engineering finds its roots in spatial audio research for NASA and the U.S. Air Force. A pioneer in applied 3D audio, Crystal River's Convolotron 3D system is the most convincing display of 3D audio this engineer has ever heard. But there's a catch. The listener must wear headphones — speakers are not used.

Nevertheless, for many applications, headphone-based systems will become increasingly important in professional and applied audio. Such applications include virtual reality systems, entertainment and emerging media, acoustic modeling, interactive engineering, and so forth.

Crystal River's Acoustetron 3D Audio Workstation operates on the same principle as a computer graphics ray-tracing engine. Instead of light rays, the computer renders acoustic reflection paths. How powerful must a computer be to render real-time acoustic waves in a reverberant environment, you ask? Crystal River's Acoustetron system is capable of over 2.5 GIPS per chassis. That's 2,500,000,000 (2.5 x 10⁹) instructions per second. And even at this blazing speed, it's insufficient for all real-time calculations of every sound wave and reflection vector in a complex reverberant field.

Included in Crystal River's system are atmospheric absorption algorithms, Doppler shift parameters, several surface material models, multiple programmable reflection paths, and independent gain and directional



SURROUND SOUND SPECIAL REPORT



Roland RSS uses binaural and transaural processes for 3D sound.

controls for up to four discrete sound sources in real-time reflective space.

I first experienced Crystal River's space machine at the Siggraph Computer Graphics show. After strapping into chair, goggles, and headphones, I was instantly transported into a realm far away from Siggraph. Indeed, within moments, I completely forgot about the trade show, the booth, and even the contraption I was strapped into. I'm totally serious.

As I "literally" flew around in 3D space, multiple musical sources emanating from different locations in the virtual room maintained their apparent positions as I changed my direction. Though sounds emanating directly overhead were slightly less realistic, this is by far the best simulated 3D playback I've ever heard.

ROLAND RIGHT ALONG

I was introduced to Roland's prototype RSS in a little room at the 1990 AES show in Los Angeles. This was my first experience of effective spatial sound from a pair of stereo speakers. Today, Roland offers a complete line of 3D audio products, including the RSS-80 48 processor, ADA-8024 A/D/A converters, and SSC-8004 controller, priced at \$21,500 for the entire package. All processing is 24-bit, and four discrete channels are standard.

Roland's Sound Space system employs two processing functions to emulate 3D sound. The first process is

binaural, adding height and azimuth cues to the input signal. The second function is transaural, compensating for crosstalk between left and right sources and localizing the image at the listener's ears rather than at the loudspeaker. Movements are adjustable in three-degree increments in any combination of left, right, up, down, front, and back.

Ron St.Germaine, engineer and producer for Living Colour, has been using the RSS system extensively. "On the *Stain* record," says Ron, "the RSS is all over the tracks.

We spatially floated sound bites everywhere we could, industrial noise would explode from the center of the image to far left and right, and even discrete reverb tails would be placed into wide and deep RSS fields. Throughout the song 'Postman,' the lead vocal (or actually the lead whisper) was

continuously swept through space. This gave the effect of subconscious thoughts running through a person's head."

CIRCLE OF SOUND

The Circle Sound System from RSP Technologies is a cost-effective surround sound system that is designed for recording in surround and for playback of any audio format. It is a four-speaker system that operates by detecting the ambient information in the input signal and using this information to place sounds at specific locations around the listener.

The complete system is comprised of three components: the Circle Sound Encoder, the Circle Sound Decoder, and the Circle Sound Controller. The Encoder contains four inputs with left, center, right, and surround information being fed from a mixer and uses a matrix process that effectively reduces four channels down to two channels for standard medium storage for transmission. This unity gain encoder offers XLR or 1/4-inch I/O with up to +24 dBm input level.

The Circle Sound Decoder is the key element in the system. It detects

continued on page 108



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AT4051



AT4033



AT4031



Chris Lord-Alge

Producer/Engineer

"The day I received the 4033 I ended up using it to record background vocals on Stevie Nicks' new project. Unlike large capsule microphones the 4033's upper end doesn't get "peaky"...it is very flat at 3 to 8kHz.

Both the 4031 and 4051 have a beautiful low end...something you don't usually get with a small diaphragm mike. And the 4031 works great when you don't have a lot of room to get in tight on a high hat or piano...it really sounds smooth and airy."

Tom Lord-Alge

*Producer/Engineer,
2-time Grammy Winner*

"What really knocked me out with the 033 was that, with a slight adjustment of the singers, everyone sounded as though they were on axis. With variable pattern mikes, I always feel that I am compromising sound quality when it's out of the cardioid pattern.

The microphones sound very modern. It is like they have a contemporary curve if you will...for the music that is coming out these days, it seems to be a sound we are all looking for."



Tom Lord-Alge (seated), Chris Lord-Alge (standing)

Find out for yourself how important the Audio-Technica 40-Series microphones can be in your studio. Write, phone, or fax today for more information and the name of your nearest Audio-Technica 40-Series dealer.

Some recent Chris Lord-Alge projects:

- Damn Yankees • Lindsey Buckingham • Stevie Nicks
- Poison • Slaughter • Tina Turner • Joe Cocker • Jude Cole • Rod Stewart • 21 Guns

Some recent Tom Lord-Alge projects:

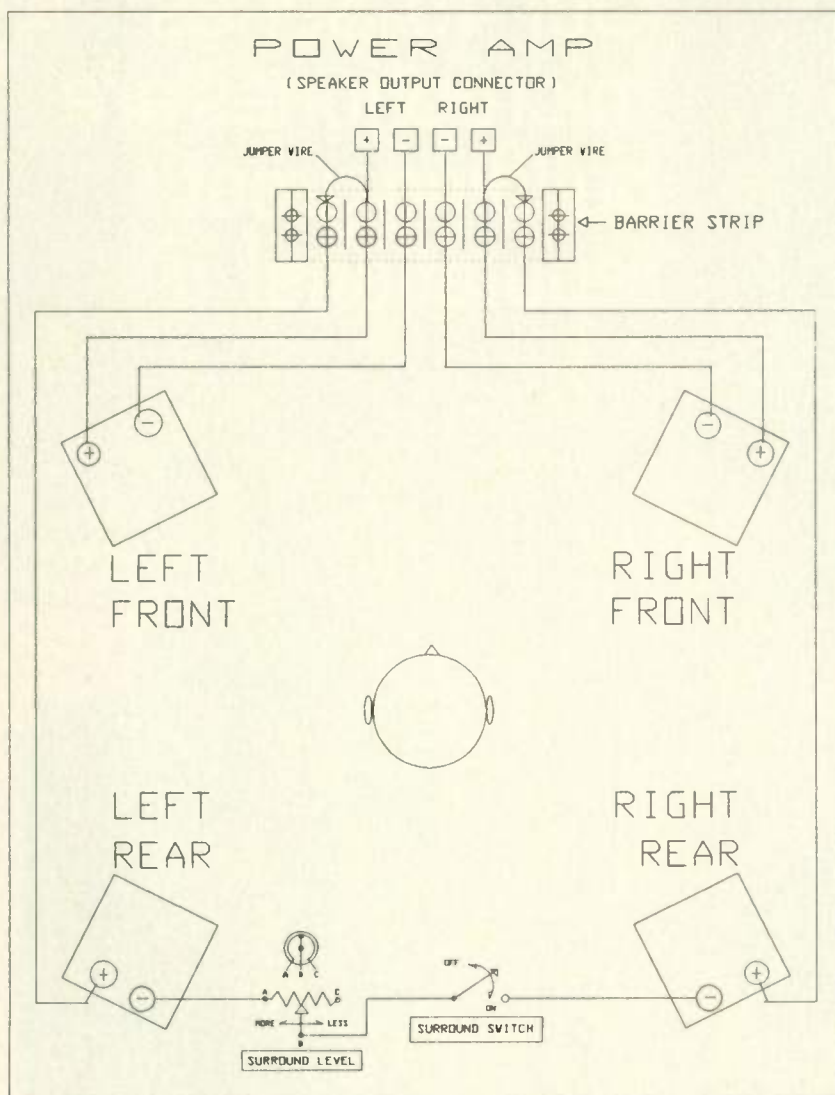
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Surround sound is an unrealized option that can help music mixers and interested listeners literally get inside a mix. Rather than considering it strictly an audio gimmick for picture, how about thinking of it as a new toy that will breathe some life into your old toys?

The sonic version of MSG, surround enhances the taste buds of your ears. Yes, there are a few concepts to learn and booby traps to avoid, and certainly an audiophile could argue that better gear is of primary concern; but what about the fun factor? If you'd like to get a taste of surround, but are not sure about taking the plunge, grab an extra pair of speakers and read on.

DEPTH CHARGE

Since the introduction of stereo, the ability to move a sound source between the speakers has intrigued mixers and listeners alike. Panning sounds left or right is one of the most basic effects. To enhance the stereo image even further, mix engineers and gear manufacturers have continually experimented with ways to give the illusion of sound coming from beyond the monitors. Doing so, unfortunately, creates a signal that doesn't always sum to mono.

Most stereo reverb programs, for example, sum to mono reasonably well; however, manipulating phase, specifically to localize sounds outside of the stereo window, requires more care. The important stuff (kick, snare, bass, lead vocal, and so on) shouldn't go away when summed. (That's why they are placed in the center.) The designated mixer must be sensitive to effects that are not mono-compatible by frequently checking the mix, in mono, as effects are added.

The solution to providing front-to-rear depth would be four discrete channels of audio. But believe me, I'm not trying to add yet another format to a consumer market that would rather see media prices go down. No matter what your feelings toward DCC and MiniDisc are, we should all agree that our first goal is to get additional resolution and bandwidth from our current digital system. Compact disc and cassette, plus 8mm, VHS, and laserdisc are enough for now. Don't ya think?

Still, it is possible to extract ambi-ent and depth information from a stereo mix. A little electronic sleight of hand, an additional pair of speakers (placed behind the monitoring posi-

STOP! YOU'RE SURROUNDED!

Movie theaters have the right idea. Here's your guide to an in-studio surround sound system.

BY EDDIE CILETTI

tion) and you've got surround. The technology has existed since the dawn of stereo. Increasing the sonic depth-of-field in this manner, you may find, is an alternative to cramming more effects down your mix bus.

OK, here's a quick ear test. Put a few of the aforementioned "up the middle" items into your mix with no effects. This creates a phantom center image. Why? Because both speakers are getting identical signals in phase, that is, of the same polarity. Since some mixers do not have a phase reverse switch, to demonstrate my point, reverse the cable polarity on one of your speakers. Now the image should appear to be "outside" of both monitors, right? (Hey, did anyone just discover that their speakers were wired out of phase? Make sure they're connected properly.)

THE BACKGROUND

We all know that mono is the summed signal total of "left plus right." Conversely, "left minus right" yields the difference information between channels. This is the essence of surround. Take this difference information, put it in the rear speakers, and something magical happens.

You can have a bare bones surround system in minutes if you follow the wiring diagram shown in fig. 1. As you can see, no additional amplifiers are needed for this experiment. All that's required is an additional pair of speakers, preferably the same type, or at least of similar efficiency, as the front pair. (You'll know right away whether they work together. If you get almost nothing out of the rear speakers, swap them with the front speakers.)

Nothing changes about the way the front speakers are wired. The positive (+) outputs of the power amplifier are connected to the positive (+) inputs of the front speakers. The negative (-) terminals of the front speakers are returned to the negative (-) terminals of the power amplifier. Connect the rear speakers exactly the same way, except that the negative (-) return wires connect to each other, not to the amplifier. A wire nut can be purchased from the hardware store to cover the bare wires.

If you find it difficult connecting two wires to one terminal, try using a dual-row, six-position barrier strip (Radio Shack part #274-659). Connect one set of wires from the amplifier to

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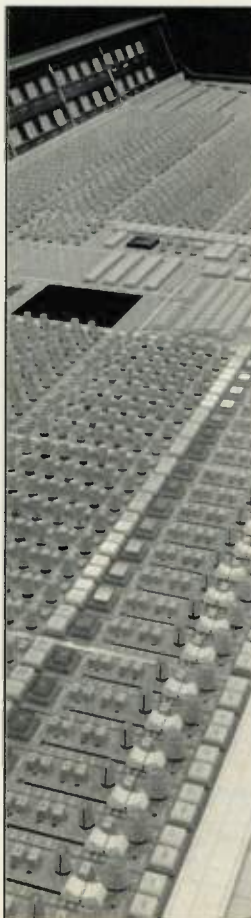
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SURROUND SOUND SPECIAL REPORT

the barrier strip, then connect the speaker wires to the barrier strip. This method also facilitates connecting a level pot and in/out switch. If a conventional integrated amplifier is being used, connect the rear speakers to the alternate speaker outputs so that they can be switched in or out.

The drawback to this "passive" system is that there is no control of the level between front and rear speakers. Of course a separate amplifier can be used, but that requires additional electronics. If the rear speakers are too loud, try inserting a wire-wound potentiometer (25-ohm, 2-watt, minimum; Radio Shack part #271-265) in series with the rear speakers at the junction of the negative (-) returns to reduce their level.

I had originally put a surround system together to hear the few quad-encoded records I had left over from the '70s. (See the Disc sidebar.) There were several quad formats, incidentally. Four discrete channels could be encoded on vinyl (CD-4). Open reel and a modified 8-track tape cartridge were naturals, too. All of these

formats required either special decoding equipment or additional amplifiers. There were also two other variations of encoded quad: SQ (Columbia) and QS (Sansui). These were fundamentally the same, and it is here that surround and quad are linked. SQ and QS played like standard stereo discs and tapes.

Any signal designated for the rear channel must be returned on two channels with one channel out-of-phase. There is no discrete left-rear or right-rear information, although the Dolby, Lexicon, and the RSP decoders all have clever ways of directing the rear channel signals based on information received from the front. (See the Gear sidebar.)

CREATING A STEREO MIX

Here's the deal. Let's say you have a snare drum panned to the center. The front speakers respond in unison, reproducing the snare drum as a phantom center image. Nothing comes from the rear because there is no "difference" between left and right signals. Add reverb (returned in stereo) and

QUAD DISC FAVORITES

The Beach Boys *Surf's Up* LP (Brother/Reprise RS 6453) has liner notes explaining that the recording was produced so that it may be enjoyed in either stereo or quad, using the Dynaco and E-V-Stereo-4 systems.

A trip to the *Twilight Zone* of comedy awaits those who can find The Firesign Theater's *I Think We're All Bozo's On This Bus* (Columbia QAL30737) and *Not Insane Or Anything You Want To* (Columbia C31585). These are two very twisted discs. The latter is not specified as being quad encoded, but everything is so wildly panned and phase-manipulated that your ears get as twisted as their sense of humor!

I also have a 33-1/3 Juke box EP (7-inch) by Simon & Garfunkel with songs featured from their *Bridge Over Troubled Waters* LP (Columbia ZSQ 159845). —Eddie Ciletti

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that effect fills all four speakers. Cool!

Now, kill the reverb for a moment and pan the snare to the right. The sound will seem to come from the whole right side, front and rear. Notice that three speakers are now on. Right front and right rear are in phase with each other, while left rear and right rear are out of phase. The reverse happens when a sound source is panned to the left.

You will notice right away that anything not panned dead center becomes very obvious. You'll either love this or hate it. There are two options at this point: lower the level, or pan toward center until a blend is achieved. Mark the fader levels and remember to listen in stereo and mono. Note the differences.

Those that read my articles and reviews should know by now that I'm into unusual disciplines. Mixing in surround is one of them. There are a lot of people who joke about going back to mono. "Things were so much easier then!" A lot of engineers keep an oscilloscope tied to the stereo mix bus to keep an eye on out-of-phase information. Mixing with surround speakers is like having an aural phase meter.

You may find the rear information distracting at first. Compare a number of mixes you feel are well balanced. If the rear level still seems out of proportion, try turning those speakers down. Your current mix may need a little tweaking after this adjustment. Keep in mind that if you want the mix to be equally "wet" (with reverb, for example) when played through just two speakers, that particular reverb should

be returned in mono. If you don't mind losing a little reverb when switching from surround to stereo, you can indulge yourself when monitoring in surround. This concept applies to all effects and panning.

A well-balanced surround mix may seem a bit less exciting when monitored in stereo, but I believe you will find the stereo mix punchy, with the important elements prominently featured. If your past mixes were lacking this quality, then surround could be your discipline, too!

GETTING TO THE REAR SPEAKERS

Oooh, let me count the ways. The first option is to get a surround encoder. (See Gear sidebar for details.) Since you haven't had a "taste" yet, let's see what's lying around that can be used as a rear-channel generator (RCG). What is needed is a device that can generate two signals: one in phase and one out of phase. This is how you "force" sound to the rear. Following are three ways to construct an RCG.

I use an old Korg delay unit, model SDD-1000, which has "+ mix" and "- mix" outputs. It's the perfect out-of-phase generator. Return both channels to the mix, hard left and hard right. An effects send to the Korg is the "rear" send. Using the shortest delay and modulating it slowly is very sweet. The sound fills the rear speakers with a swirling effect that is legal!

Another trick is to mult an effects send and bring it up on two faders (panned hard left and hard right), placing only one of the channels out of phase. A third out-of-phase genera-

tor can be made from any device that has an active (transformerless) balanced output. For example, the Aphex 124 is a -10 to +4 level matching and signal balancing box that's perfect for this application. Wire a female XLR with two unbalanced cables. Connect both shields to pin 1, one hot lead to pin 2, and the other hot lead to pin 3. The other end of these two leads can be brought up on either a pair of faders or a stereo effects return.

Once you get any of these RCGs to work, sound directed to them via an effects send will seem to be coming from the rear. It is actually also coming from the front, but your ears are tricked because the rear information is louder. It's totally mathematical and completely incompatible with mono. (There is always some compromise.) Build your mixes carefully, balancing your stereo mix with the surround speakers on. Rear-only information must be something you can afford to lose, but, if added toward the end of a mix, a combination of stereo panning and rear information will make things collapse better. An image-widening device, such as the BASE box, Q Sound, or the Roland RSS system will definitely throw a lot of information to the rear.

This article should at least shed some light on mono compatibility. I am very curious to see if anyone else finds surround mixing as helpful and as much fun. All of my systems have surround, and it's only an occasional recording that is too wide. Two-mic, XY, and MS recordings are a special treat because you are literally surrounded. **EQ**

HERE'S THE GEAR

Many integrated audio/video preamps and TV sets have surround decoders built in. The concept of surround sound is not new, but Dolby Labs is responsible for organizing and standardizing its use. Decoders by Dolby (model SDU4) or other manufacturers are marked with "Dolby Surround" or "Dolby Surround Pro Logic" logos, which respectively note passive and active systems. Lexicon has three Digital Home Theater Processors, models CP-1, CP-2, and CP-3. Each features not only Dolby-compatible surround, but also variations called Music Surround and Movie Surround. These units offer a wide variety of signal processing options; the CP-3 features THX, for example. All include a selection of reverb programs that emulate concert hall ambience.

In addition to recovering the surround information, both decoding systems add a 15 to 30 millisecond delay to the surround channel. (The bandwidth of this channel is reduced and circuitry is designed to improve surround separation and reduce noise.) Dolby Pro Logic decoders include additional enhancement of directional characteristics. (Remember that since it is not a discrete 4-channel system, surround does not actually have separate left-rear and right-rear information.) A center channel is optional. Its purpose is to improve localization with respect to the picture.

RSP Technologies offers three single-rack-space units: an encoder, a decoder, and a joystick panner. This system is not licensed by Dolby, but is a viable, cost-effective alternative. The quad panner is an especially cool toy! [Look for a review in the near future.—Ed.]

—Eddie Ciletti

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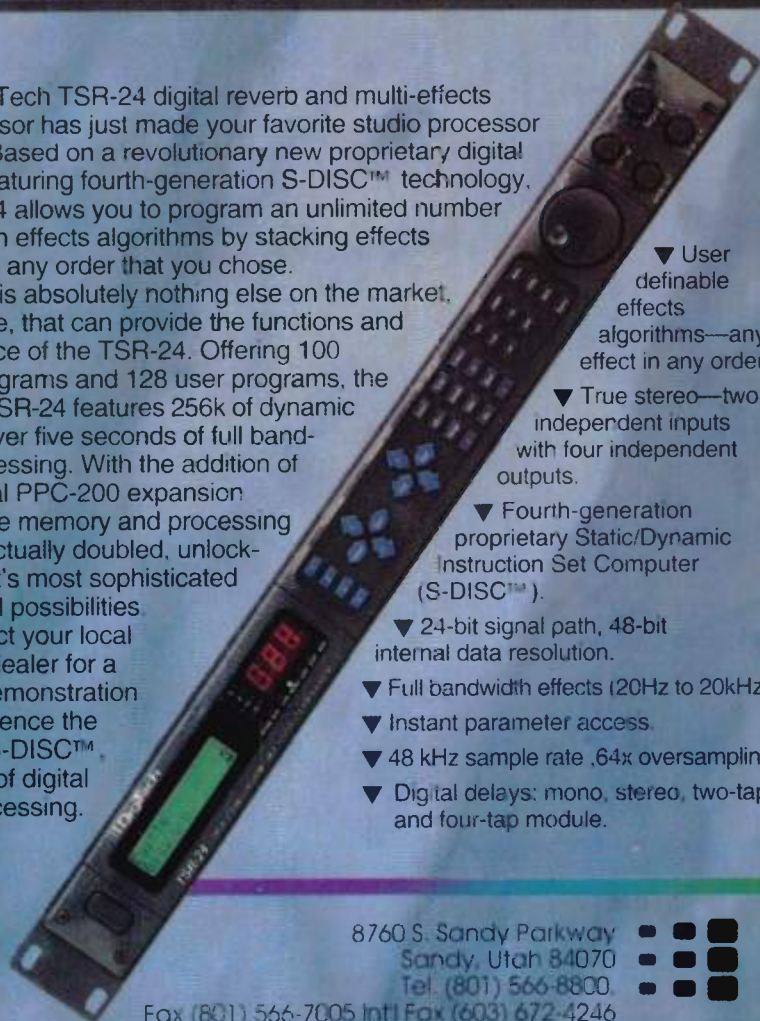
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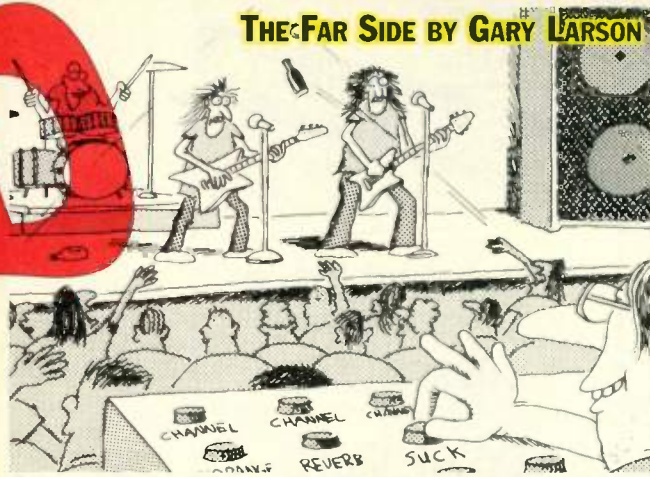
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LIVE SOUND FOR THE GIGGING MUSICIAN

SOUND FACTORY AUTOMATION

■WHEN THE owners of New York City's Sound Factory took over its space nestled on a commercial street on the west side of Manhattan five years ago, the 18,000 square-foot former warehouse was an empty shell with muddy floors and one dank bathroom. Instead of filling the club with flashy furnishings and elaborate frills to attract clubgoers, they made a conscious commitment to creating the best sound system in the Big Apple. Taking a cue from the legendary Paradise Garage, they geared their nightspot for a clientele whose sole interest was dancing to the best club music pumped over a high-quality system.

Unquestionably, they've attained their goal: Sound Factory is nationally renowned as having one of the clearest and most powerful audio systems. Although the club only opens one night a week, its carefully designed system has become the industry standard due to its power and clarity.

"We decided to build what we thought would be a unique system," explains coowner/engineer Steven Dash. "The Paradise Garage had been closed for three or four years prior to when we decided to open, and nobody in the city decided to follow in their footsteps, which really surprised us."

After gutting the space, Dash and partner Phil Smith (there're two others) carefully planned the audio and worked feverishly to install equipment until the club opened its doors several months later. While Sound Factory was an instant hit among underground denizens, it did take quite a bit of experimentation to create a perfect environment. "A lot of the modifications we made took time to figure out because we had to go over them with the manufacturer to make sure that we didn't damage the equipment. Though we looked at the schematics, we still had to call the manufacturers, and they



NEW YORK CITY'S SOUND FACTORY SETS THE STANDARD TO WHICH ALL OTHER CLUBS HOPE TO MEASURE UP

BY DARREN RESSLER

were all very helpful. As opposed to having the music hit from opposite sides of the dance floor or from one huge suspended cabinet, Sound Factory's coverage wisely emanates from all four corners for max-

SOUND FACTORY EQUIPMENT LIST

- AMPLIFIERS:** BGW GTB [5] and GTA [3]; Crown Mac 2400 [2], Mac 1200 and PSA-2 [2]; UREI 6250 [2]; QSC 1500
- OUTBOARD GEAR:** Rane GE-30 equalizer [4], AD-22 delay, AC-23 crossovers [2], and AC-22 crossover; White 2300 equalizer [2]; Yamaha Q2031A equalizer
- MONITORS:** JBL, EAW, and TAD
- DJ BOOTH SETUP:** Technics SL1200 [3] and 1500 reel-to-reel; Stanton 681 SE cartridges [3]; UREI 1620 mixer (modified); PDS custom crossfader for mixer, custom electronic DJ-Operated crossover [2], custom DJ-operated 5-band equalizer, and custom monitoring system; Carver cassette deck

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imum sonic pleasure. The sound, which is extremely intelligible, is entirely concentrated on the 60 x 60 dance floor, and there is a dB drop as you walk off. Says Dash, "We have four speaker stacks in each corner, and on the side of the floor, blowing in, are two hanging side-fill custom-made boxes. There are no other speakers anywhere else. They're set back and pointed toward the floor, and are designed to fill in the corners."

Delay lines ensure that the audio hits precisely, and Dash time-aligns the drivers using Fluke, Ivie, AudioControl, and Tektronix testing devices. The goal is to try to make sure that all the audio hits the floor at the same point in time.

So what are some of the

secrets behind Factory's sound? "Sorry," Dash laughs, "I can't give that away, but I will tell you that [the secret] is in our modifications and in our electronic crossover, which is DJ-operated. There are a lot of things we do that we just don't give away, as they took us a lot of time to figure out. Don't get me wrong, we made a lot of mistakes and had to correct them before we opened. It took a while to get it together. But because of that, we've learned tricks having to do with phasing equipment, alignment, modifications to all of the different manufactured amplifiers we use, and crossover networks."

According to Dash, a
continued on page 111

FACTORY WORKER

Sound Factory might have one of the best sound systems going, but all of its custom-made equipment and painstaking attention to audio design wouldn't be worth a lick if it weren't for the mixing talents of the club's colorful in-house jock, Junior Vasquez. Pumping fierce underground house, Vasquez doesn't just let a song play; instead he works his equipment to put a spell on his faithful crowd.

Influenced by legendary jocks such as Shep Pettibone and the Paradise Garage's Larry Levan, Vasquez never plans his sets and constantly tears through tracks to keep the mix interesting.

Soundwise, his main concern is to avoid overdriving the system to the point where it will distort and hurt the dancers' ears. In addition to his seamless mixes, part of Vasquez's brilliance lies in his working the Factory's custom crossovers and its three-way and five-way EQs. "It's like second nature to me at this point because all records aren't mastered the same," says Vasquez, who's also an accomplished remixer/producer having worked with Prince, Madonna, Cyndi Lauper, and others. "I have to constantly EQ and make minor adjustments after I mix a record."

Other weapons in his arsenal include utilizing pans and obtaining delay effects with tape decks. And if the joint is really on fire, look out for his ear-shattering siren or a bizarre sound effect, which might go off while he's playing one of the test tracks recorded at his home studio.

With other jocks of equal stature constantly flying abroad to do guest spots, Vasquez sees no need to hit the road. "I get enough right here on Saturdays," he says bluntly. "Unlike other DJs, I have a great home to play in every week. I don't like to travel and I don't like carrying records around. The whole environment here is perfect for me — all of my records are at hand and I'm not creatively restricted. It's a great situation."

— Darren Ressler



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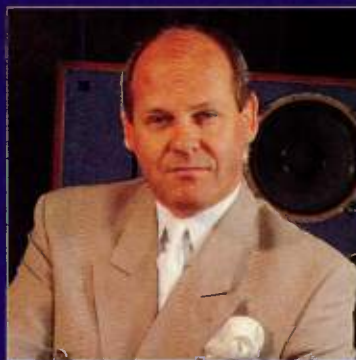
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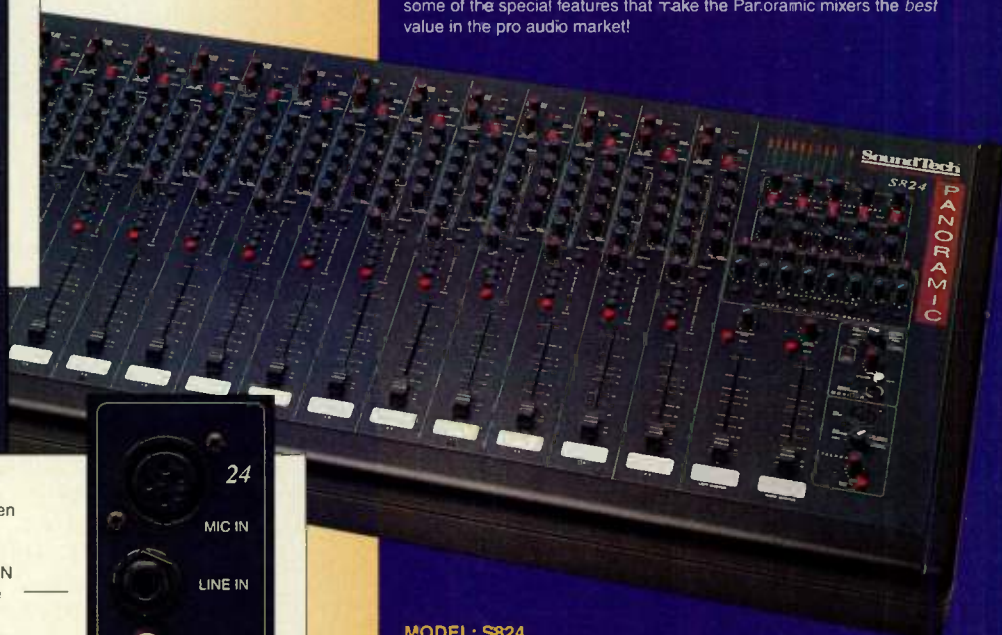
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CATCH A WAVE

Yamaha showcased the WaveForce Series of sound-reinforcement loudspeakers at NAMM. These speakers have been designed for professional applications that require high-level, low distortion audio. There are five WaveForce models, covering program, stage monitor, and subwoofer applications. The drivers and wave guides were designed to function as integral systems. The WaveForce wave guide has a spherical horn that eliminates the discontinuities, reflections, and narrowing sometimes associated with conventional horns. The compression drivers are made from a thin-film titanium, precisely drawn to a very deep radius. The WaveForce speakers offer high-power, long linear-excursion woofers with flat-wound copper voice coils on Kapton coil forms, with two Neutrik Speakon connectors on each cabinet. For further information, contact: Yamaha Professional Audio Products, P.O. Box 6600, Buena Park, CA 90622-6600. Tel: 714-522-9011. Circle EQ free lit. #114.



Yamaha WaveForce

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Bag End D10M

with two E-10, cast-frame, high-performance loudspeakers, designed to provide a bright, yet warm sound. New features incorporated in its design include: a new cone design that handles more power and reduces cone fatigue, standardization of connectors — a flush-mounted plate contains two 1/4-inch connectors and one double banana connector, and a new vinyl-coated steel grille. Created with Bag End's semi-open back design, the D10M cabinet is internally divided with two subchambers. It has a power handling capability of 300 watts continuous sine wave, with 600 watts music program capacity and 1200 watts peak. For

the whole story on the D10M loudspeaker, contact: Bag End, P.O. Box 488, Barrington, IL 60011. Tel: 708-382-4550. Circle EQ free lit. #115.

XLENT BASS MODULE

The new Hartke 4.5XL extended range bass module incorporates four 10-inch Hartke aluminum cone drivers and a 5-inch high-frequency driver in a special design. They also feature a special Kapton voice coil with lower resonance and a deeper tone. The speaker array is combined with a deeper and larger tuned ported cabinet design. The 4.5XL bass module has a power handling capacity of 275 watts at 8 ohms and provides an additional 6 dB in the low end along with a high end that has been extended to



Hartke 4.5XL

12 kHz. The suggested list price is \$1199. For more information on the Hartke 4.5XL, contact: Hartke Systems, Samson Technologies, P.O. Box 9068, Hicksville, NY 11802-9068. Tel: 516-932-3810. Circle EQ free lit. #116.



Carver GA-250

HAVE IT YOUR WAY

The GA-250 guitar power amp from Carver accommodates players who prefer a "tube-like" sound, those who prefer a clean, solid-state sound, and those who require both. Designed primarily for use with musical instruments, the GA-250 offers user control of key circuit parameters that determine characteristic sounds. Each stereo channel of the GA-250 has a rotary pot and two switches for control of tonal response and output stage characteristics. The knob varies the output damping factor of the amp.

When turned full to the left, the GA-250's output provides a solid-state sound. As the knob is rotated clockwise the amount of damping decreases, allowing the speaker to interact with the output stage, thus providing a sound characteristic of many tube-

amplifier designs. There is a tube clipping switch on each channel and a presence switch boosts frequencies around 2 kHz. For more information, contact: Carver, P.O. Box 1237, Lynnwood, WA 98046. Tel: 206-775-1202. Circle EQ free lit. #117.



Bullfrog Trapezoidal Loudspeakers

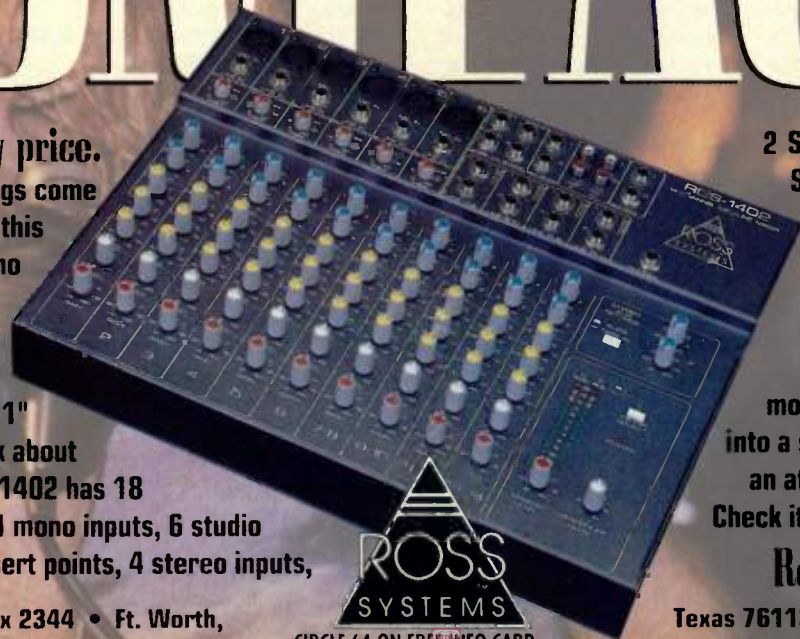
No BULL FROG

Bullfrog has introduced a new line of cost-effective trapezoidal speaker systems. Seven loudspeakers and two monitors round out the line. Well-suited for on-stage monitoring or sound-reinforcement applications, the trapezoidal design simplifies installations in confined spaces and allows for arced arrays. Designed with a T-nut construction to eliminate component break-out, the cabinets are well insulated to neutralize internal standing waves. There is also additional waffle bracing on the inner ceiling and floor of the enclosures. For more information, contact: Bullfrog, Diamond Cut, 1503 Prairie Ave., South Bend, IN 46613 Tel: 219-233-4151. Circle EQ free lit. #118. ☺

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Big features, tiny price.

They say that good things come in small packages, and this space-saving mixer is no exception! The Ross RCS1402 packs a full array of features into this sleek 7 lb., 14" x 11" x 2.2" chassis. And talk about features! The new RCS1402 has 18 total inputs, 6 balanced mono inputs, 6 studio grade Mic inputs, 6 Insert points, 4 stereo inputs,



2 Stereo Aux Returns, 2 Aux Sends, rack mount option, 3 band EQ, Headphone output, Tape in/out, two 12 segment LED metering, internal power supply, and much, much more! All of this is designed into a stylish, compact unit with an attractively compact price! Check it out at a dealer near you!

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CIRCLE 64 ON FREE INFO CARD

LOSING THE AMPLIFIER BLUES



BEATING THE HUMS, BUZZES, SNAPS, AND POPS THAT PLAGUE YOUR ROAD-WEARY RIG
BY WENDY MACKENZIE

■AMPLIFIERS are an often-overlooked part of the live-sound system. As soon as something goes wrong with one, however, everyone wishes he or she knew just a little bit more, because amplifiers are actually the heart of the system. Technicians tell horror stories of hearing a pop, then a low hum, and then no signal. When they examined the speakers, they discovered the cones all the way out, all the way in, or even burned up. An amp transistor had failed, and DC voltage had shot through the system. Working around the problem was tricky because of the extensive damage.

New amplifier models have various types of warning and protection built in to make these horror stories a thing of the past. But that's not to say that an amp won't break down, because it will fail on the road and probably at the worst possible moment. Since amps carry the standard "No user parts inside" warning, the only thing you can do is replace the amp with a spare and get the amp to the nearest authorized service center. You will never again underestimate an amp once you've experienced the grief of having one die during a show.

Obviously, the best way to avoid problems is to buy the highest quality amp you can afford from a reputable company that has good warranty and service support. It's also worthwhile to learn a bit about the specs and features so that you get the right amp for your needs. There are numerous protection circuits and features to consider. One is thermal protection, which detects amp overheating and then either switches the amp off or reduces the output to compensate. Make sure you know which features come with the amp you are buying, because an amp switching off in the middle of a gig is *not* a pleasant surprise. DC and output stage protection eliminate the possibility of

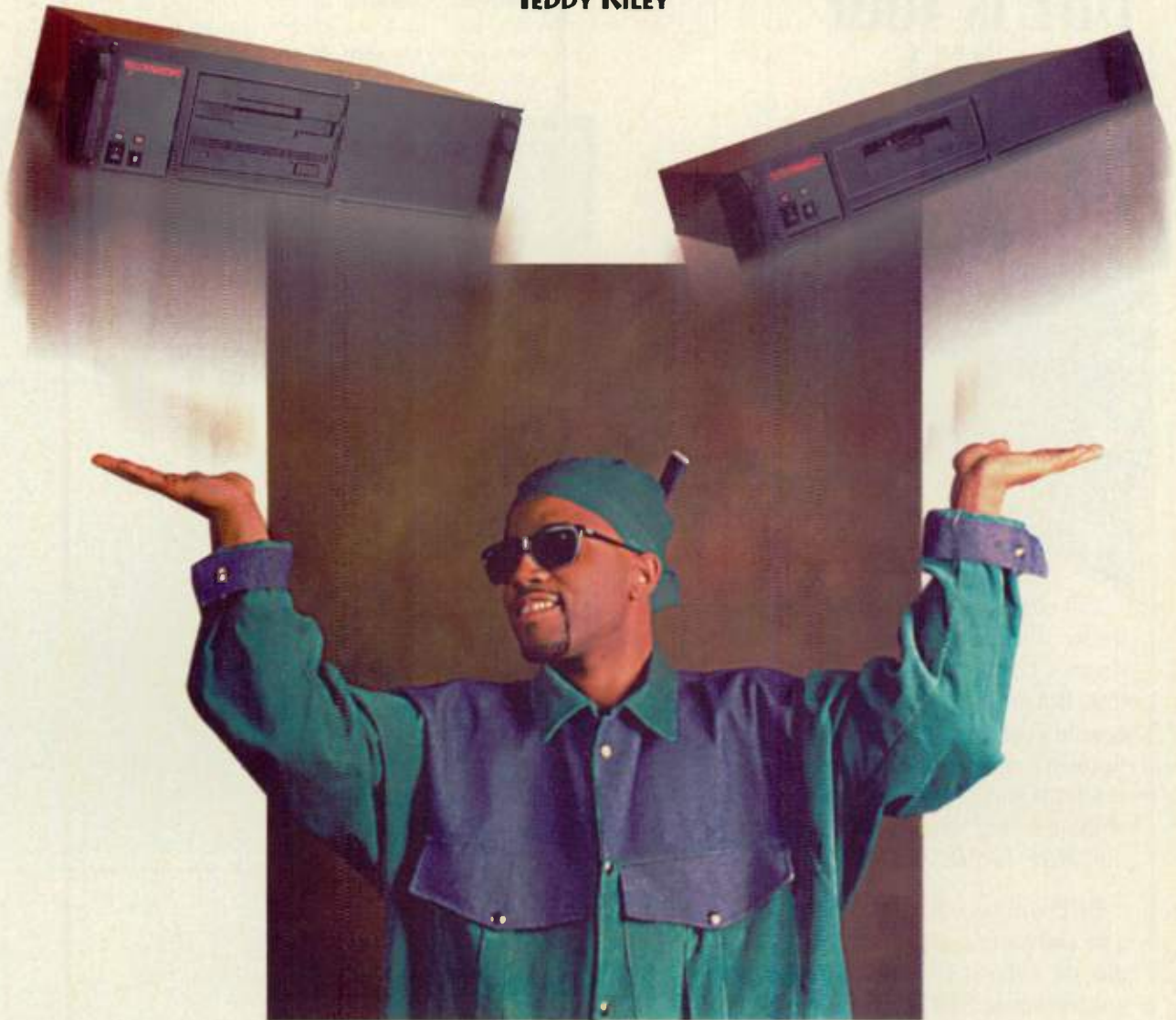
blowing the speakers if an output transformer fails. Balanced inputs and a lift switch help reduce hums from ground loops.

LESS IS MORE

An important consideration when buying amps is the power required for the speakers. Contrary to what you might think, more power is less likely to damage the speakers because the square-wave effect of an [under-powered] overdriven, clipping amp will stress the speaker more than clean watts will. For example, a 200-watt speaker might last longer with a 300-watt amp than with a 150-watt amp. Some amps have selectable mono modes as well as stereo. Bridged mono increases the amplifier

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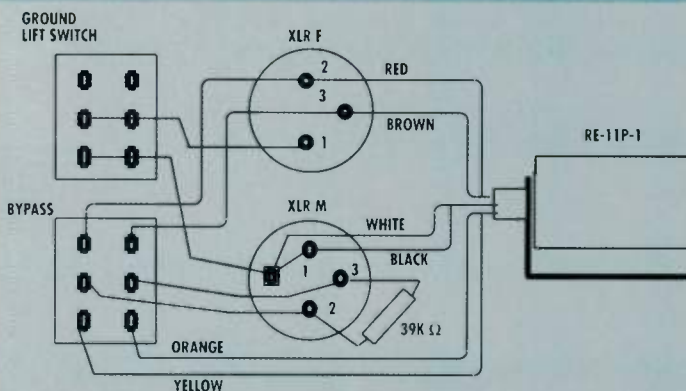
CIRCLE 12 ON FREE INFO CARD



power available to loudspeakers, but also increase the minimum speaker impedance.

If the speaker impedance is lower than the amp rating (both are expressed in ohms), the amp could overheat. Running stereo can be the safest bet because each side of the amp is independent, and many techs think the amp

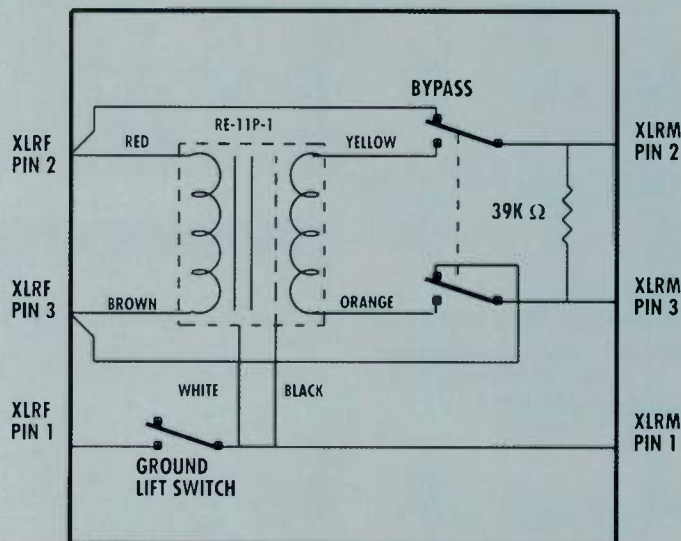
sounds best that way. Be aware that output wiring is different for each mode. Speaking of wiring, make sure the speaker cable is the correct gauge for the power and the distance to the speakers; power loss in the cable should be less than 0.5 dB, e.g., a 4-ohm loudspeaker should be connected with less than 75 feet of 12 gauge wire (1.59



THE MAGIC BLACK BOX

Let's face it: Hum is public enemy number one in the studio and in the live environment. Nobody likes it and nobody wants it around.

I was once given two magic black boxes that would eliminate almost every hum I came across. When in place between the mixer and the amps or crossovers, this box uses a transformer to isolate one part of the system from the other, and can also break the ground loop. This diagram shows how to build one of these small wonders. And although it may not be the ideal box for you, it has worked well for me.



ohms per 1000 feet). Heavy-duty connectors will also help.

A lot of the problems attributed to amps are actually system problems. Many hum and noise problems are caused by faulty connections or cabling to the amps. Always check connections first by wiggling the connectors and pushing them in. If you hear any static-type noises or the signal becomes intermittent, then there is something wrong with the connection. Try replacing the cable with one that you know is okay. This will often solve the problem.

KEEP 'EM COOL

With proper care and maintenance, most amps will give you very few problems. Amps almost always require ventilation to keep them cool. Racked, they usually



Treat your amp (like the Hafler shown here) right and they'll do the same for you.

need external fans to cool the heat sink area. If your amps have internal fans, you need to keep those fans clean by removing them and blowing them off, or by washing them in mild soap and water, and drying them, and then replacing them. Any buildup of dirt can

affect the performance and cooling of the amp. Of course, if you're playing outside or loading in the rain, be careful not to expose the amps to moisture.

For trouble-free amps on the road, go out with the best that you can afford.

Carefully check out the amps you buy for quality, service, protection, weight, and durability. Bring extra cables, ground lift adaptors, magic boxes, and an emergency amp, and your band in a van will have the tools to keep the show on the road.

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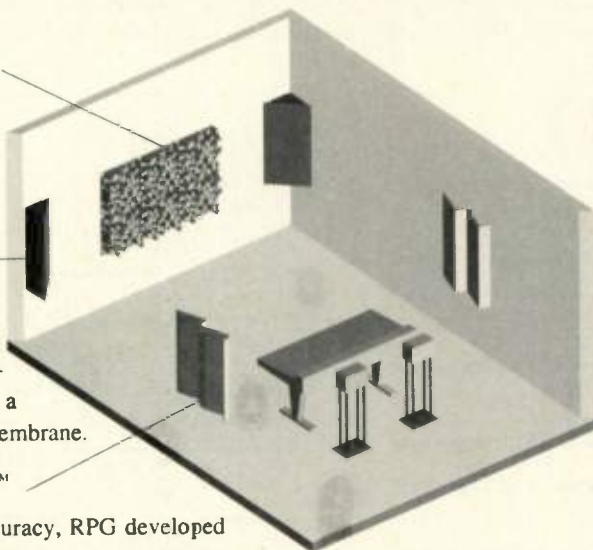
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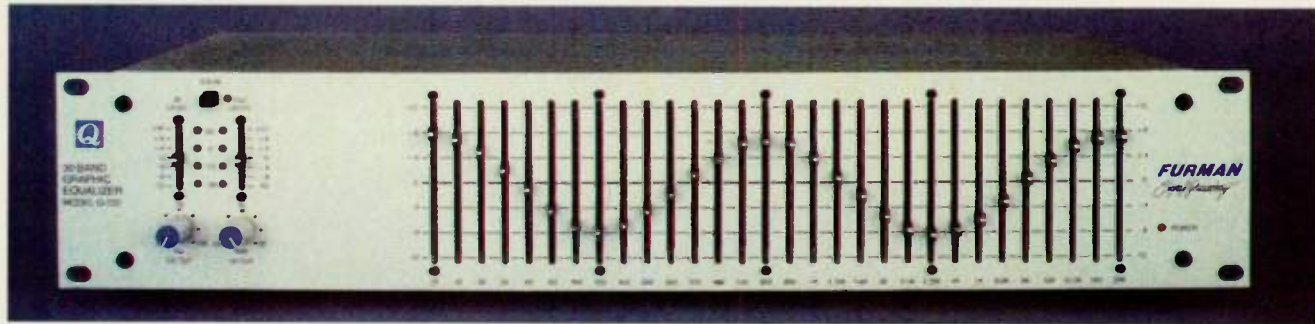


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FURMAN Q-302B GRAPHIC EQ



■THE VERY FIRST product produced by Furman Sound, in 1974, was a parametric equalizer. Today, despite having a full range of signal processors, Furman Sound is probably best known for its power conditioning products. The power conditioners have become a staple of the touring sound industry because of their convenient features and their ability to alleviate some of the worst problems that unreliable power can create. The new Q-Series of graphic equalizers from Furman shows that although AC power is important, it is signal processing that got this company started. I tested two of the six models in the Q-Series: the Q-302B and Q-602B (see sidebar). The other models in the Q-series

are the Q-151 and Q-301, dual 15-band and single 30-band short-throw units, respectively; the Q-152, a dual 15-band long-throw unit; and the Q-541, a 4-channel, 5-band stereo unit.

Furman has designed these clean and quiet equalizers using active circuitry to emulate traditional filter components. This design allows the units to remain stable over a wide range of operating temperatures with the 1/3-octave bands maintaining their tight (± 2 percent) band-center tuning. I found that inserting the unit in the signal chain to compensate for slight irregularities in loudspeaker response (in this case, 0 to -4 dB) resulted in a definite improvement in the subjective quality of the reproduced sound. The ± 12 dB

range of control was sufficient to enable making radical modifications in the tone of instruments, but left enough headroom to avoid clipping — even with large boosts in specific bands. The resonance of filter bands seemed to be well damped and did not color the sound excessively.

The constant-Q design of the Furman Q-Series equalizers maintains the individual filter bandwidth (1/3-octave) regardless of the slider position (see fig. 1). This offers filters that combine in a very predictable manner to create a wide variety of EQ curves. Keep in mind, however, that combining adjacent bands can create boosts or cuts of up to 20 dB (with less than 1 dB of ripple), so caution should be exercised when

making radical curves to avoid sending the equalizer, and the equipment following it, into clipping (see fig. 2). The response created by graphic equalizers follows the general pattern of their front panel settings. With some radical settings, however, this will not always directly reflect the unit's legend in dB (see fig. 3), but will give the user a good indication of the response changes created.

VOICE OFF

The Q-302 equalizer is easy to use in the most common application of sound-reinforcement equalization: "voicing the system." Most experienced sound-reinforcement engineers have a good idea of the 1/3-octave bands that affect specific qualities of voices and

ROAD TEST

MANUFACTURER: Furman Sound, Inc., 30 Rich Street, Greenbrae, CA 94904. Tel: 415-927-1225

APPLICATIONS: 1/3-octave equalization as a console insert in recording and for loudspeaker equalization and feedback control in sound reinforcement.

SUMMARY: A well-designed 1/3-octave equalizer with precise 60 mm sliders and comprehensive features.

STRENGTHS: Well-engineered controls, accurate legend, and easy to interface.

WEAKNESSES: Case construction and owner's manual could be slightly improved.

PRICE: Q-302: \$469; Q-302B: \$503; Q-602: \$699; Q-602B: \$767
EQ FREE LIT #: 119

BY WADE MCGREGOR

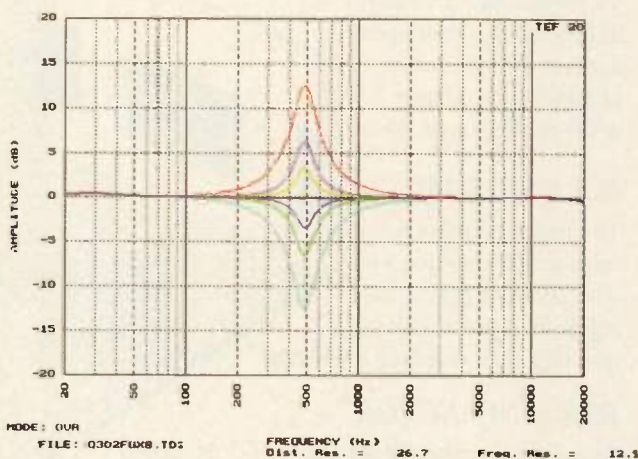


Figure 1. Constant-Q Filter Bandwidth 500 Hz band: boost and cut by 3, 6 and 12 dB.

Owning a Real Neumann Just Got a Lot Easier

You've put a lot of money into your studio... expensive consoles, recorders, processing, etc. But your recordings just don't measure up to your expectations. Chances are, the problem is with the most important (and most often overlooked) part of your signal chain... the microphones.

Virtually every major recording produced during the last 50 years has utilized Neumann microphones on vocals and critical tracks. And with good reason. Neumann microphones sound better. The warmth. The texture. The velvety smooth richness that cannot be duplicated. It's called the "Neumann Sound."

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CIRCLE 41 ON FREE INFO CARD



First Aid For Loudspeakers, Part 2

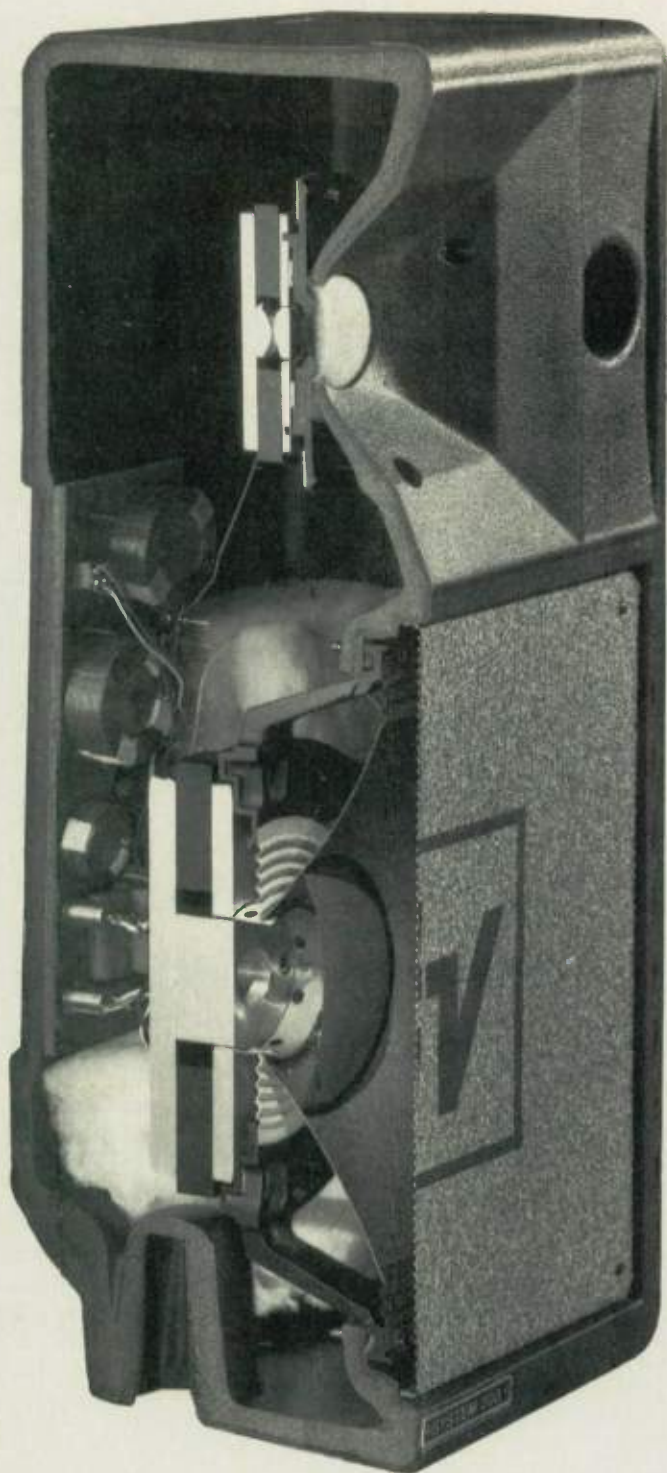


Photo courtesy of Electro-Voice

More information on getting the most out your favorite overused and underappreciated loudspeakers

BY CALIX LEWIS RENEAU

There are reasons why so many different speakers are on the market — and it's not just because the manufacturers want to make a lot of money. Different applications demand different speakers, and using the wrong speaker for the wrong job is an easy way to spend the day at the reconing shop.

The studio environment is a good example. It's amazing how often musicians will spend thousands of dollars and countless hours choosing their other gear, but cut corners picking the one part of the system that lets them know exactly what they're putting to tape. PA speakers are the worst choice. Live music speakers rarely, if ever, have a frequency response curve suitable for recording monitoring. And, unless you've invested megabucks in your entertainment center, your home stereo is not much better. Speakers designed specifically for studio monitoring should be your only choice.

FREEDOM OF CHOICE

If for the studio you should choose speakers that can still deliver an acceptably flat sound using a minimum number of drivers. Three-way speakers are fine, but if at all possible, choose two-way speakers: passive crossover networks introduce time shifts and other audible coloration into your music, and a three-way system doubles the number of passive crossovers. Also watch the specs.

Serious Automation



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The new CS2000 digital control studio system from Euphonix leads the industry in computer aided mix management. With the powerful Version 2.0 software the CS2000 incorporates features that take it beyond any other system on the market.

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The new template software allows the engineer to pre-set the level of automation for every control on the console. Those familiar with conventional systems can simply start by automating lower faders and mutes, moving on to upper fader, pan, aux send, and input gain automation when the session demands it.

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CIRCLE 10 ON FREE INFO CARD

WORKSHOP SPEAKERS

Every manufacturer seems to use different formulas in developing its specs, but there are some basics.

Here's a secret, folks: every loudspeaker can reproduce any frequency from 20 Hz to 20 kHz. A horn might be inaudible at 1 watt at 50 Hz (and I don't recommend it), but if you look at the diaphragm, it's moving. Fifty Hz in a tweeter isn't musically useful because it won't produce sound at any usable volume. That's why a speaker spec sheet should include a variation in decibels (usually no more than ± 3 dB). Some speakers will print a dB vs. frequency-curve chart to display this graphically.

There's a wealth of information on studio monitors that is available to help you choose. Be informed. Using the wrong monitors will invariably produce the wrong sound in the end. If you're using nearfield monitors (and, 90 percent of the time, you should be) correct placement is critical. Nearfield monitors should be just that — near, to eliminate as much room coloration as possible. The speakers should be placed at head level on two points of an equilateral triangle a meter from your head. The monitors should be placed on solid platforms with no rattles or rumbles. Many engineers recommend removing the grilles to let the speakers "breathe" and to avoid blocking some high frequency information. Also, keep in mind that putting a speaker against a wall or in a corner will dramatically change the sound it produces.

SIZE DOES MATTER

If you're using larger speakers, give yourself more room. With larger monitors, room acoustics become even more critical. Again, try to place both monitors equidistant from your "sweet spot" at head level, only this time place them farther away. The larger the speaker, the more room is needed to achieve optimum sound. Ideally, the room length along the axis of the listener and the speakers should be half the wavelength of the lowest frequency you'll be expecting your monitors to accurately produce. At the very least expect to need a 50 Hz standing wave, which would mean you need at least 10 feet of breathing room from the face of your speakers.

ROOM FOR THOUGHT

Whether you use nearfield monitors or a larger system, the sound of the room is still critical to getting a good monitor, so keep the studio simple and clean. There should be absolutely nothing between you and your speakers, and precious little nearby to influence the sound.

While the trend has been away from the totally "dead" room, the acoustic influence your studio environment has should be completely within your control. Don't sit with your back to a wall: the wall will give you early reverb reflections that don't exist in your mix. Don't store equipment and boxes and whatever else on the studio floor: it will eat up and muddy your bass, especially with larger monitors.

Some studios use a real-time analyzer, associated noise generator and graphic equalizer to isolate and solve problems. This adds an equalizer to the chain, which colors the sound. You don't want anything between the tape monitor and the speakers that will change the sound, because your goal is an accurate representation of what you're recording. Whenever possible, use acoustical solutions to solve acoustical problems.

GOING LIVE

When you gig, leave the studio monitors at home. Studio and home speakers are not designed for live playing. They generally don't have the audio dispersion patterns, power handling capabilities, or the sheer volume needed to be effective in most live settings. Besides, good studio monitors are designed to make all the flaws in your music painfully obvious. PA speakers should just make you sound good.

Should you use separate speakers and bi- or triamp, or get speakers with all of the drivers in one cabinet? There are advantages to both, but a good guideline is "how big is the gig?" For smaller clubs, parties, dances, and so on, single-cabinet systems offer a lot in the way of portability and ease of use. Also, one stereo amplifier can handle your whole speaker setup. In larger venues, component systems make more sense, especially as more speakers become needed to create the desired sound-pressure levels in the



NOISES OFF

house. My feeling is that by the time you're playing gigs large enough to require something more than a single-cabinet system, you're better off renting your PA speakers.

Stage monitors are different beasts from either studio or main speakers. In spite of what most musicians feel, a stage monitor should only put out as much information as is necessary. There are many different ways of monitoring, from slants in front for the vocalist, to stand-mounted "hot spots" and keyboard monitors. I lean toward keeping the stage as quiet as the musicians can stand it and further toward keeping the monitor mix leaning more to the midrange frequencies; the mids pretty much give the sound its definition and intelligibility. Proper stage monitoring is a subject worthy of an article by itself. Suffice it to say you've got to start with the proper speakers in any given situation.

That's it for now. Stay tuned. In our next (and final) installment, we'll talk power. **EQ**

Q During a soundcheck, we had all the stereo sends from a Yamaha SY99 and VL-1 dialed in on the main PA system (we were running a stereo system). When we brought up the stage monitor for the keyboardist, all he could hear was reverb — no dry sound at all in the monitors. We checked all the effects sends and returns — in fact, we shut off all the effects devices, but that didn't change the problem. So we asked the keyboard player to turn off the synthesizer's internal reverb. When he did, the reverb went away in the monitors and the main speakers, but there was still no synth in the monitor speaker. What's going on?

Linda Douglas
Erie, PA

A Don't start tearing apart your equipment just yet. This is the kind of problem that could drive you nuts trying to find its source. Fortunately, we've encountered this before, and chances are very good there's nothing wrong with either the PA or the keyboards.

The stereo send from your synthesizer actually is a mono signal made stereo by the instrument's internal digital signal processing. The problem is most likely an improperly wired (out-of-polarity) cable on one of the channels of the stereo pair. When this signal was sent into the main speaker system, the dry, mono portion came through along with the reverb. When the same signal was summed to mono to be sent to a single stage monitor, the dry portion of the left and right signals canceled each other out. All that was left was the difference between the left and right channels — the reverb. Engaging the "polarity" switch on one of the console inputs (if your console is so equipped) or replacing the improperly wired cable (you do have a cable tester, don't you?) should solve the problem.

Gerald Tschetter
Division Marketing Manager — AG
Yamaha

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6 AUX SENDS with Solo and Solo LED.

6 STEREO AUX RETURNS. All have 20dB gain, Solo and can be used in stereo & mono. 1 & 2 are pannable & bussable.

MIX-B/MONITOR section can be used as an independent stereo out for PA monitor mix, 2-track recording, video/broadcast feed or assigned to L/R mix.

TWO SEPARATE HEADPHONE SECTIONS can be used totally independently of each other. Each features source selection between Control Room & any combination of AUX 3/4, AUX 5/6, Mix-B or External source. Solo allows control room to hear what musicians are hearing in their headphones.

TALKBACK assigns to all submasters, main mix, AUX 1, AUX 2 or Phones 1&2.

SOLO level adjust and ultra-rude LED.

MONITOR section with separate Control Room & Studio levels. Source selection between L/R mix, Mix-B, Tape & External. Can be switched to Mono.

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EXPANSION CONSOLES let you add channels in banks of 24 to either the 24-B or 32-B. Expanders have their own internal mix amps so the main board only "sees" one extra channel per expansion console.

Built-in talkback MIC.

Trick **BUS SOLO** switches send odd-numbered buses to the left speaker and even-numbered buses to the right speaker — unless you've pressed the respective MONO L&R button. When a bus has been mono-ed, SOLO sends the bus to both speakers.

L MIX/R MIX & MONO L&R buttons assign buses to main L/R stereo bus.

All channels have Mackie's renowned discrete, wide-bandwidth **MIC PREAMP** circuit for ultrahigh headroom & low noise. All mic inputs have RFI choking, ferrite beads and +48V phantom power (switchable in banks of 8 channels).

+4dBV balanced **TAPE RETURNS**, switchable to -10dBV unbalanced in banks of 8 returns.

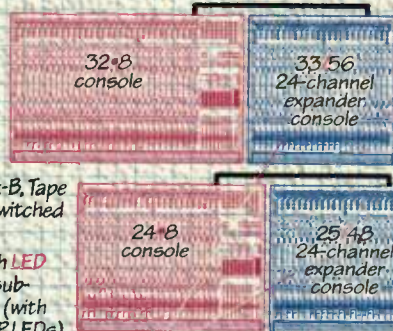
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Three **TAPE OUTPUT** jacks per bus (total of 24). +4dBV balanced, switchable in banks of 8 to -10dBV unbalanced.

Optional tilt-up **METER BRIDGES** are globally switchable to see tape return preamps or channel output and include VU meters for main L/R output. **MB24** meter bridge for 24-B console is \$799*. **MB32** for 32-B is \$899*. Our soon-to-be-released **MB16** 16x8x2 console's meter bridge will retail for \$699*.

Rugged, non-flexing **STEEL CHASSIS.**

4-BAND EQ with "Expensive British Console Sound." Includes **TRUE PARAMETRIC HI-MID**, swept **LO MID**, shelving **HI & LO** plus 18dB/oct **HI PASS** (lo cut) filter at 75Hz. Users are raving about the sound quality.



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YE OLDE ENGLISH **SOUNDE** Greg started out by asking "What is it that makes the finest British mixing boards perform the way they do?" For example, "classic," older English consoles have much wider-band midrange EQ than lower-priced consoles — it really has an effect on overall sound quality. So we incorporated the same capabilities on our new consoles. This also enabled us to add the flexibility of a variable bandwidth control for true parametric HI-MID EQ. It wasn't easy to engineer in the expensive circuitry necessary and still keep our consoles affordable, but we did it.

You'll like the increase in both sound quality and versatility.

We paid the same kind of attention to fader quality. Instead of less-accurate D-taper faders, we commissioned a totally new custom 100mm fader with the logarithmic taper found in mega-expensive consoles.

EVEN THE FEATURES HAVE FEATURES. Naturally each channel has in-line monitoring with split EQ. But our MIX-B Monitor section also has a SOURCE switch to tape off the channel (pre-fader) to create independent mixes for taping, broadcast feeds or headphone mixes. Dual independent headphone sections offer the ability to switch between Control Room and any combination of AUX 3/4, AUX 5/6, MIX-B or External sources. Tape inputs and outputs feature internal

*Suggested Retail Price. Your actual price may vary.

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HE WORKED. HE SLAVED. He created the 8-bus console HE always wanted to own. In fact Greg kept adding features until he threatened to whack him upside the head with a rare salmon. Now the first notices are in from 8-Bus owners: simultaneous raves from recording studios, PA companies and videopost houses. Quotes like "It's so quiet I had to check to see if it was on" and "Blows away my old board that cost \$20,000." In other words, Greg really DID succeed at creating the first affordable high-headroom, low noise, feature-laden 8-bus consoles. Unfortunately, we can't build them fast enough to meet demand. Unlike our competitors, Mackie can't just order up consoles by the container-load. Instead, we build each 24-8 and 32-8 at our factory in Woodinville, Washington. Even though we're working day and night (and shipping more and more each week), there's still a waiting list at Mackie dealers. Even Greg hasn't gotten one yet! Serves him right for designing so much performance into consoles that retail for \$3995* and \$4995*. Read on for the deliciously explicit details.



20-watt, Class A POWER SUPPLY with enough juice to also power a meter bridge.

4dBu to -10dBV level conversion so you can use semi-pro tape decks without the inherent noise penalty found in mixers that operate at -10dBV internal levels.

MACKIE'S SIGNATURE MIC PREAMPS. At the urging of regions of satisfied CR-1604 and MS1202 users, we didn't mess with a good thing. Our 8-Bus consoles' mic preamps deliver -129.6dBm E.I.N. at 0.005% THD with a 300K bandwidth, yet can handle +14dBu inputs without a pad. The consoles' working S/N is 90dBu with 116dB internal headroom. For any application where noise is especially noticeable (such

as hard disk or multi-track digital recording), you've found your board — for as little as \$3995*!

SOME OF THE FEATURES GREG ADDED SINCE WE FIRST ANNOUNCED OUR 8-BUS CONSOLE LINE

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- Mix/Line switch on every ch.
- "Triple-bussed" tape outputs
- +4/-10 tape inputs & outputs (switchable in banks of 8)

the expander and your 24-8 or 32-8 board. External fader and muting MIDI automation will also be available soon.

OPTIMIZED FOR PA AND RECORDING. Along with elaborate monitor capabilities, balanced XLR main outputs and 18dB/octave

Conventional faders have a second layer of resistive material that attempts to approximate logarithmic a taper. Our **PRECISION NETWORK FADERS** are single-layer screened with both the primary linear resistive elements and also a complex auxiliary element to create the true logarithmic curve found in ultra-expensive studio console faders (blue line on graph).



hi pass filters, you get non-flexing steel construction, fiberglass thru-hole plated, horizontal circuit boards that minimize

impact damage, gold-plated internal interconnects, sealed rotary pots and a rugged 220-watt, super-regulated power supply. You won't find more roadable, compact PA boards anywhere.

READ ALL ABOUT IT. Call us toll-free and we'll ship you a comprehensive brochure including application hookups. We think you'll be impressed enough to be willing to wait a little while before you get your 24-8 or 32-8. After all, Greg is still waiting for his.

In-line **LIP** reverses tape and mic/line inputs between channel strip and Mix-B/Monitor section.

AUX SENDS 1-2 PRE button selects pre-fader/post-EQ or post-fader/post-EQ.

AUX 3-4/5-6 SHIF changes 3-4 to 5-6.

SOURCE selects signal source of AUX 3-4/5-6 from channel strip to channel's Mix B/Monitor send so you can build an effects mix (pre or post-MIX-B level) to assign to phones during tracking.

True parametric **3-OCTAVE MID EQ** that has seasoned engineers swooning (quotes and raves on file...we're not kidding). Ultra-wide 500-18k frequency sweep range; bandwidth can be adjusted from a very wide 3-octave width to a very narrow 1/3-octave width. 15dB boost/cut.

LOW MID EQ with ultra-wide 45Hz-3K sweep. 15dB boost/cut. ±15dB shelving **HI (12kHz) & LO (80Hz) EQ.**

Multipurpose 18dB/oct. **LO CUT** filter @75Hz. Cleans up "mix mud," cuts PA rumble, creates a "neo-peaking" bass control when used with LO shelving boost.

Independent **MIX-B (Monitor)** section with pan, level & source. During mixdown, use as extra pre-fader stereo AUX send or double your inputs.

MIX-B SPLIT EQ assigns HI & LO EQ to Mix-B.

MIX-B SOURCE can route the monitor section to an extra stereo output for 2-track taping or broadcast feed during live mixing.

Constant power, buffered **PAN** pot for rock-solid panning.

Overload LED and Hyperactive -20dB **Digital Present LED**

Selectable **SOLO** with **CHANNEL METERING** allows soloing in full stereo perspective; displays soloed channel operating level on master L/R meters so input trims can be adjusted for optimum levels.

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CIRCLE 36 ON FREE INFO CARD



Symetrix 601 Voice Processor



MANUFACTURER: Symetrix, 4211 24th Ave., West Seattle, WA 98199. Tel: 206-282-2555.

APPLICATION: Mono mic preamp with digital signal processing provides a direct digital interface to AES/EBU and S/PDIF compatible gear; additional digital inputs and XLR audio outputs allow for interfacing in several different types of setups, including broadcast and postproduction houses.

SUMMARY: The 601 is not cheap, but when you want an extremely clean miked sound with digital presence and processing, as well as total MIDI control, this is the ticket.

STRENGTHS: Easy to figure out; clean, present sound quality; digital and analog I/O; MIDI programmability; comprehensive feature set and metering.

WEAKNESSES: Older models required external clock to run at 44.1 kHz (newer models can run at 44.1 kHz and 48 kHz); can't name programs; somewhat tedious MIDI programming; no phase-change switch.

PRICE: \$1995

EQ FREE LIT. #: 120

ANOTHER MIC PREAMP? If you think "big deal," you might want to think again once you see the Symetrix 601.

Check out its rear panel and you'll see AES/EBU and S/PDIF digital outputs, along with stereo line-level XLR audio outs. And to answer the obvious question: Once the mic- or line-level XLR audio input hits the 601's 18-bit, 64x oversampling A/D converter, you're digital. You can then bypass existing A/D converters and pump your digitized signal directly to hard-disk recorders, DAT, or any modular digital multitrack that can accept AES/EBU (i.e., ADAT with an AI-1). There are also AES/EBU and S/PDIF

digital inputs, so you can process digital signals and remain in the digital domain.

I first became aware of the 601 when Symetrix approached me about doing some factory patches and sent a prototype. I became quite dependent on it for recording narration, so I ended up paying for it with the patches I created — and I still use the unit to this day. Obviously, I like the 601 a lot—but that doesn't mean I'd recommend it for everyone. This box is for a fairly specialized clientele; if you don't have a digitally oriented studio or care about storing presets, you can flip the page right now since you can do the

same basic functions in analog for a lot fewer bucks. (Bye! See you next issue!). However, digital aficionados — as well as those who need digital repeatability — should read on.

FACTS AND SPECS

The functions seem relatively standard: 3-band parametric EQ (the highest and/or lowest bands can shelve instead), dynamics processing (compressor/AGC or expander, with optional sliding-filter noise reduction and de-essing), and stereo delay (up to 330 ms, with individually adjustable channel delay times). But there are tons of little touches that identify this as a pro device: +4 dB signal levels only, up to -50 dB cut on the parametric for notch filtering, musician-oriented delay options (variable low-pass filter, feedback, and sine/triangle/random wave modulation), panning, adjustable attack and decay for dynamics, front-panel lockout for security, optional phantom mic power, solid construction, and so on. The specs explain the clean sound: mic input EIN of -127 dBm (150 ohm source), dynamic range >104 dB, and 24-bit internal processing.

Any input can drive any output, so you can convert a digital input to an analog output, or vice-versa. You can't mix digital and analog ins, although you can combine the analog mic and line inputs.

Digitally speaking, the internal



clock in newer models is selectable between 44.1 kHz and 48 kHz. (The original version could do 48 kHz but needed an external clock source to run at 44.1 kHz). Regarding MIDI, the 601 responds to program changes (since there are 128 RAM and 128 ROM programs, the 601 responds to MIDI bank select messages), continuous controllers, pitch bend, pressure, and sys ex. Volume and pan are always "soft-wired" to controllers 7 and 10, respectively.

All parameters (except line and mic gain) are MIDI-controllable in real time via sys ex messages. Additionally, up to two parameters per patch can be assigned to one of the real-time MIDI sources mentioned in the last paragraph, or more interestingly, by one of six different internal sources (delay time modulators and several signals derived from the dynamics detector — the latter being good for envelope-follower-style effects). The manual tries to be helpful about all this; experts will have no problems, but beginners will be intimidated.

The MIDI out connector functions more like a MIDI thru, since it normally echoes the MIDI input (less any sys ex targeted to the 601). If you send sys ex from the 601, however, this connector becomes a true MIDI out.

The manual is applications oriented and comprehensive. There's a glossary of terms, details on interfacing with balanced and unbalanced systems, disassembly instructions, MIDI sys ex info, and instructions on how to use the Lexicon MRC to edit parameters and even the bandwidth

ranges of various popular console EQs. Its one major shortcoming is its explanation how to use MIDI. Although the technical info is there, you have to bounce back and forth between the text and various appendices, not all of which are clearly written.

IN YOUR (INTER)FACE

The user interface is simple to figure out. Each of the 31 different front-panel functions has a button, with an internal LED that is either on, off, or flashing to illustrate various operating statuses. Three more LEDs indicate which inputs are active; a data wheel changes parameter values.

Indicators include a 10-step input LED meter, 8-step output headroom/gain reduction LED meter, and four digits of 7-segment LEDs to read out parameter values and program numbers. There's no way to spell out program names, and some of the abbreviations are rather cryptic. On the plus side, though, you can read the LEDs from the other side of the studio, which you can't always do with an LCD.

OPINIONS AND APPLICATIONS

The 601 works very well with a variety of signal sources. Putting a guitar through a buffer (to prevent impedance loading) and then going direct into a digital recorder via the 601 gives an extremely clean sound. With vocals, there's a presence that comes from going "direct to digital." The sound is fundamentally different from going through a tube preamp; whether to use one preamp technology or another seems to depend on the singers —

some sound good with digital, others work better with tubes.

At almost two grand, we're looking at a pretty pricey box if all you need is 3-band parametric EQ, delay, noise reduction, de-essing, and dynamics processing. What justifies the price is that the 601 controls these processors digitally (including I/O) and offers a great degree of depth. Granted, it takes some effort to get to the less-well-traveled corners of the operating system (like others in the latest generation of signal processors, the 601 cries out for a computer-based editor), but you can create some pretty radical sounds that go beyond what you'd expect for this type of product.

As more and more studios upgrade their setups to accommodate the new sonic standards of digital multitracks, the 601 offers a quality alternative if you want to bypass a digital recorder's internal preamps and D/A converters and go direct to digital. Being able to add processing in the digital domain during the same step is another big advantage. For stereo mastering, a 601 using digital I/O will let you transfer digitally from one DAT to another and add signal processing to tweak the sound a bit further — but you'll need two 601's if you want independent settings for each channel, since both channels share the front-panel controls.

Bottom line: If you have the bucks, want to get further embroiled in digital, and like to have a lot of power under the hood, thumbs up.

—Craig Anderton



Fostex D-10 DAT Recorder



MANUFACTURER: Fostex Corp. of America, 15431 Blackburn Ave., Norwalk, CA 90650. Tel: 310-921-1112.

APPLICATIONS: Good for engineers who need a versatile DAT machine or do a lot of sequencing and sample recording.

SUMMARY: High-quality DAT machine that includes an internal memory, GPI inputs for DAT-to-DAT editing, and expansion slots for future use.

STRENGTHS: Comprehensive display; auto cue capability; precise editing abilities.

WEAKNESSES: Poor low-frequency performance below 20 Hz.

PRICE: \$3295

EQ FREE LIT. #: 121

FOSTEX HAS DONE IT AGAIN. It seems that over the last five or six years Fostex has either introduced a product before anyone else could get around to it, or taken a product and improved on it and made it less expensive.

Fostex was the first company to offer a timecode DAT machine. The D-20 would record any timecode format and chase lock with an external synchronizer. It also was a four-head machine that enabled perfect crossfade punch-ins and the ability to add timecode to an existing tape. Fostex later introduced the PD2 portable timecode DAT machine for digital field recording.

This year Fostex has introduced an 8-track digital recorder that is ADAT compatible; the Foundation 2000 multitrack hard-disk recorder/editor; and the D-10 DAT machine.

The D-10 is basically everything you ever wanted in a DAT machine. It has a four-motor transport for exceptional tape handling; optical and AES

digital inputs; the ability to do DAT-to-DAT edits with a second D-10 connected; internal memory for instant start of audio playback; a scrub wheel for finding the start and edit points; and a pair of slots in the back for later options such as a timecode board and synchronizer.

The D-10 has analog I/O that can be switched between +4 XLRs or -10 RCAs. The digital I/O is either AES/EBU or optical/IEC format and ignores anything that even looks like copy protection. You will also find what looks like a MIDI connector for interconnecting two D-10's for DAT editing.

The D-10 comes with a wireless remote that can be switched between two different machine addresses. If you have a stack of D-10's on the same address, they will all act together when commanded. If two machines are set to different addresses, they can be controlled separately by a selector switch on the remote.

The transport controls are big backlit buttons similar to those on the Fostex D-20 or on Sony BVU-style video machines. You can easily tell from across the room what mode the transport is in. There are additional controls for ID search forward and backward, just as there are on CD players and consumer DAT machines. The D-10 supports the full 799 start IDs instead of the 99 limit encountered on most DAT machines. This is great for storing the plethora of samples you will be recording with your new D-10. For those detail mongers out there, the D-10 records start IDs and PNOs (program numbers) so that if you put a tape into the digital domain in the machine, the correct PNO will be displayed. Some earlier DAT machines only record start IDs and keep track of how many IDs have gone by since the start of the tape. To ensure that you are in the right place, you have to go back to the beginning of the tape if you insert a tape in the middle.

DISPLAY

The display in the D-10 is about the most comprehensive you could ask for. There are three buttons to the left of the display that control the information displayed. Disp. Time switches among three time displays. A-Time is the default and displays DAT absolute timecode, which includes hours, minutes, seconds, and DAT frames. R-Time displays the DAT implementation of IEC timecode (SMPTE). The third



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The new MicroPiano – The half-rack module features 32 Presets including Kurzweil's new Grand Piano samples, Strings, Hammond Organ, Electric/Electronic Pianos as well as 16 superb digital multi-effects.

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The *MicroPiano* features 32 of the most sought-after keyboard sounds with full 32-note polyphony (64-note with two *MicroPianos* in the exclusive *Link Mode*). In addition to keyboard sounds, Kurzweil's lush string section, played solo or layered with another sound, creates a gorgeous orchestral ambiance. Some sounds are based on the proprietary samples from the award-winning *K2000*, but many are brand new, available only in the *MicroPiano*. If you don't have a nine-foot concert grand and a great recording engineer, you need the *MicroPiano*.

Besides the acclaimed Kurzweil samples, the compact, half-rack module offers the kind of playability a keyboard player expects, with 16 superb, crystal-clear digital multi-effects, useful MIDI control capabilities and fully-functional soft, sostenuto and sustain pedal response. The user interface is straightforward, easy-to-use and includes Tuning and Transposition as well as Stereo Outputs.

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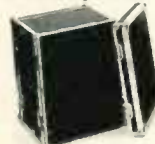


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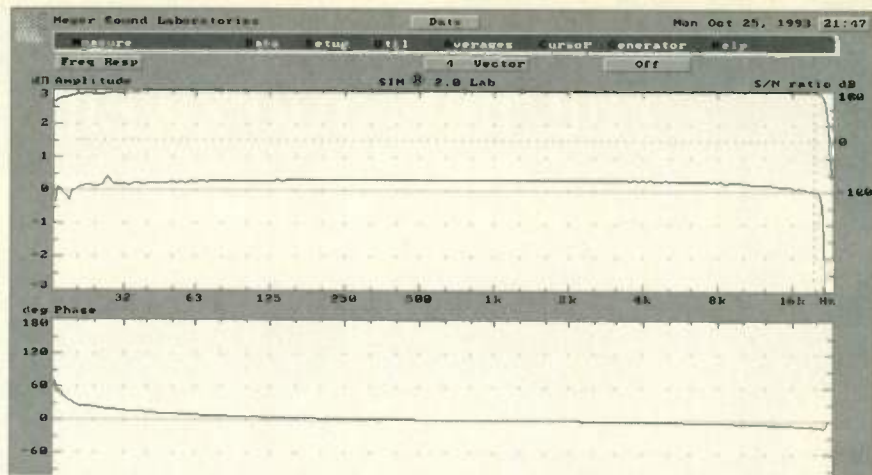


Figure 1: D-10 at 44.1 kHz. Noise and slight distortion below 30 Hz because of analog section.

choice is Date-Pack, which gives a continuous record of the year, month, day, hour, minute, and second when the DAT was recorded. Date-Pack is part of the standard DAT format, but very few machines implement it.

There is a secondary display area that shows the PNO number of the current location. Just to the right of the PNO display is an area controlled by the Disp/Level button. The first choice is cumulative head room. This displays the highest audio level since the Reset button was last pressed. The resolution is in tenths of a dB and very accurate. The second choice is the numerical readout of the level in either the left or right channel. The resolution is in tenths of a dB and is used for setting reference levels.

The "over" indication is the most accurate I have ever measured. I used a computer-generated signal to check the accuracy. When one or two samples are at full digital level, the "over" indication does not come on. This is correct, because both these conditions are possible without actually having part of the signal exceed the full digital range. The "over" indication does come on, however, if there are three or more samples at the full digital level. This is not possible in digital recording of audio without one of the incoming samples having been clipped. The meters are accurate whether the "over" is positive or negative. Some meters only look at one half of the waveform.

I compared the readings with those obtained using my Sony DMU-30 digital meter, and the results were identical. The DMU-30 meter cost \$2500 all by itself, so I guess you could look at it like you were buying a very accurate digital level meter that comes with a free DAT machine. The third choice is to display errors. This

shows a percentage of errors during tape playback.

Besides the 799 start ID locations, there are 99 memory locations for searching by A-Time or R-Time. If you want to store a location on the fly, select a memory location on the ten-key pad and press Mark-Set. If you want to store a specific time in memory, enter the memory number, enter the time, and then press Mark-Set. To locate to one of the memory locations, select the memory location, press Rcl. Mem. and then press Mem. Loc.

JOGGING EXERCISES

The wheel on the D-10 is made up of two concentric parts. The outer portion works like a shuttle wheel. The further you turn it, the faster the tape travels. The inner wheel operates like a video-style jog wheel or audio scrub control. The three buttons above the control wheel select the edit mode. Search Cue moves the tape against the heads to find the general location of the edit spot. Shuttle varies between 1/2 to ten times normal play speed. With this method you can come to within a few frames of the edit point.

For tighter edit point selection, audio RAM comes into play. The inner wheel controls the "digital scrub" of the audio in memory. Unlike the usual scrub wheels that try to emulate rocking tape across the tape heads, the audio produced is actually one frame of DAT audio continuously looped at normal speed and pitch. It takes some getting used to, but you can actually find the edit points very easily. If you are in Play mode when you press Stop, the last five seconds of audio is already stored in RAM, so you are ready to scrub. If you press Mem. Scrub while in the play mode, the tape stops and you have 2 1/2 seconds either side of the selected spot. At this point you can use

the outer wheel to shuttle closer to the edit point and then use the digital jog wheel to get down to the DAT frame.

Remember I mentioned audio RAM? Well the first thing that might come to mind is Instant Start. After the Instant Start button is pressed, the RAM is always kept updated and ready for Instant Start. If you wind to another location on the tape or insert another tape, the RAM update will take place automatically. The LED next to the Instant Start button will flash while the update process is taking place. Above the Shuttle/Jog wheel is a button labeled RAM Repeat. This will loop the first second and a half of RAM, allowing you to adjust the start point with the inner wheel. Once you have selected the start point, press the Preview button to hear what the start will be like once you hit the Play button.

Next let's check out the Auto Cue button. With this feature turned on, you locate to a start ID and the D-10 automatically finds the start of program material, and parks. This feature works like a broadcast CD player. Using it insures flawless cartlike operation from a DAT machine.

EDITING

On the back of the D-10 are a couple of what look like MIDI connectors. They are actually GPI connections. This is where two D-10's are connected to enable DAT-to-DAT editing. The controlling D-10 sends transport commands over this cable. Any MIDI cable can be used to connect the two machines. This eliminates the possibility of misplacing yet another specialized one-of-a-kind cable.

Editing couldn't be simpler. Connect the digital out of the play machine to digital in of the record machine. Connect a MIDI cable from the GPI out of the record machine to GPI in on the play machine. Select Instant Start on the play machine. Find the in point on the record machine and press Mark Set. Find the in point on the play machine and press Mark Set. They are automatically stored in memory "00" of their respective machines. Pressing the Preview button on the record

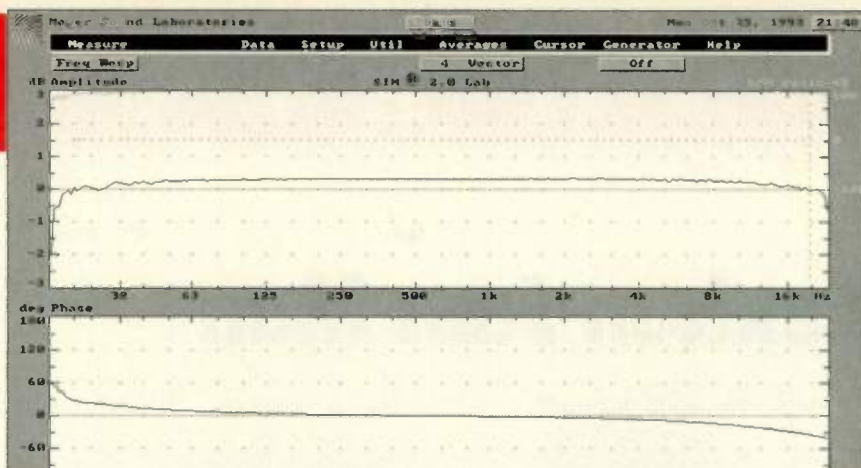


Figure 2: D-10 at 48 kHz. The same low end anomaly, but better high end response.

machine and you can hear the effects of your edit. If all is satisfactory, press Mem. Loc. and then Record on the record machine. The record machine will preroll and start playing. When the record machine reaches its in point, it drops into record and sends a play command to the play machine. Bingo, the edit is performed.

The assembly editing function was designed into the D-10 primarily for sequencing tunes or assembling lots of samples onto DAT tape without the normal glitches encountered using the pause-editing technique. The accuracy of the D-10, however, allows some pretty good music edits. The resolution is similar to that of razor-blade editing analog tape. Close enough for most applications.

MORE TO COME

One of the first things you will notice when you look at the back of the D-10 is a couple of empty slots for future expansion. It seems clear that these will be for a timecode generator/reader and some type of synchronizer card such as those available on other Fostex gear. The wireless remote even has four but-

tons marked F1, F2, F3, and F4 that are slated for future expansion features.

AND SO?

The only negative thing I could find about the Fostex D-10 was the low frequency performance. The distortion levels rise when you get down to about 20 Hz and deteriorate rapidly below that. This is typically because of too-small capacitors in the analog section either before or after the digital converter section. Other than that, the D-10 is flat as a pancake. Using the Apogees as my reference, you can hear a slight difference in the low end, but the D-10 does sound very good.

Overall, I think the Fostex D-10 could become the standard by which all other basic DAT machines will be judged. If you are looking for one machine that will do almost everything, the D-10 is the baby.

Keep in mind that the editing capability of the D-10 is not the sample accurate editing you get with hard-disk editors, but for compilations, dialog editing, and other straight-ahead tasks, the D-10 is going to get plenty of use. —Roger Nichols

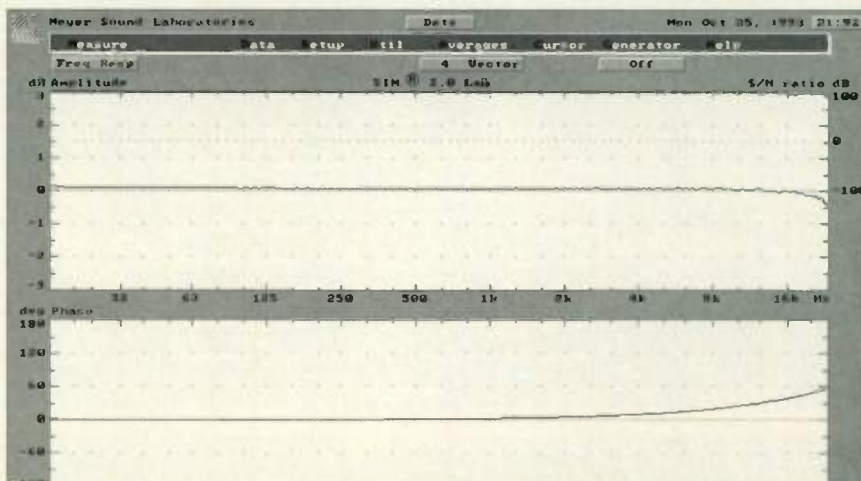


Figure 3: Apogee A/D/A combination, the way everything should look.

Lexicon Jam Man



MANUFACTURER: Lexicon, 100 Beaver St., Waltham, MA 02154. Tel: 617-736-0300.

APPLICATION: Looping echo/digital recording/sampling unit for studio, stage, or remix use.

SUMMARY: Definitely not a me-too box, JamMan brings a very different type of time processing to the party. It's not everybody's cup of tea, but is rich with creative possibilities.

STRENGTHS: Fulfills long-neglected need; expandable to 32 seconds; pretty painless learning curve; high fun factor.

WEAKNESSES: Volatile memory with no provisions for backup; only loop times, not echoes, can relate to MIDI clocks.

PRICE: \$459

EQ FREE LIT. #: 123

THIS SPECIAL-PURPOSE single-rack-space digital delay is optimized for three applications: long delays; continuous looping of audio (with optional overdubbing); and rudimentary, audio-triggered sampling.

Who needs a box like this? Apparently, almost no one did back in the early '80s. Imagineering Audio and DeltaLab both made digital delay/looper/sampler devices (16 and 4 seconds, respectively) that flopped. Nonetheless, a few creative musicians, like guitarist David Torn, used these or modified gear (i.e., Lexicon's PCM-42 with extra memory) to create

looping effects that staked out a very individualistic and haunting style.

But that was before MIDI, new-age dance music, and today's digital sound quality. Maybe the Jam Man concept is finally in the right place at the right time.

FACTS AND SPECS

Jam Man can record and play back up to 8 seconds of audio (user-expandable to 32 seconds with additional ZIP ICs). The 31.25 kHz sample rate is not as "sparkly" as 44.1 kHz, but saves memory for long delay applications.

Inputs and outputs are left and

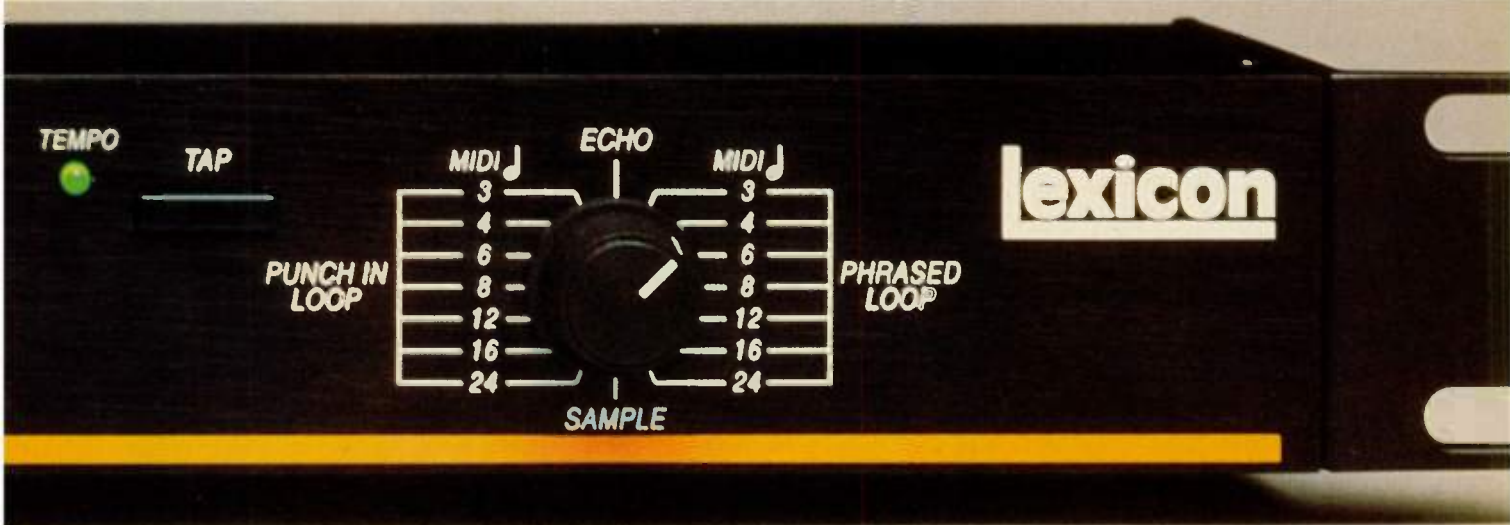
right 1/4-inch unbalanced phone jacks (one out doubles as a moderate-volume headphone out). Although Jam Man is being pitched to guitarists, the 50k ohm mono input impedance degrades the sound of nonactive pickups. To compensate for this, go through a preamp or other signal conditioner first, or use your amp's loop jacks (synthesizers and other line level sources work fine). The rear panel also sports MIDI in, MIDI out, two footswitch jacks, and an AC adapter jack — yes, Jam Man adds yet another wall transformer to your overburdened barrier strip.

The front panel is pretty simple. Input, output, and mix knobs set levels and adjust the dry/wet blend. A bicolor LED level monitor glows green for nominal and red for near-overload. Two stepped controls select various modes and parameters, a 2 1/2-digit LED display provides operating status feedback, and there are three switches (bypass/reset, function, and "tap").

JAM MAN À LA MODE

There are three main modes.

In Echo mode, hitting the tap button (or footswitch) twice establishes a delay time — no calculator required — and an LED provides a



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visual metronome. You can alter the echo time even while signals are echoing, and without any side effects except (sometimes) a very brief muting of the echoed signal after the second button press. A separate button divides the echo rate by two, three, or four (eighth note, triplet, or 16th-note echo rates) either before or after setting the tempo. Making these changes can occasionally cause clicks.

You can choose from 16 different feedback levels (from 0 to 100 percent) via front panel or footswitch. There's no optional high-cut filter to

give subsequent echoes a more muted sound; this is an advantage of tape echo, because older echoes don't overpower the newer, brighter ones.

Since Jam Man's memory is volatile, sample mode is pretty much a live-performance tool. You can sample a piece of audio by hitting the tap button for start and stop, or by triggering from an external audio source. Then, initiate forward or backward playback either manually, by footswitch, or when the input level exceeds one of 15 different selectable audio levels.

On playback, you can retrigger the sample at any time — which is great for dance stuff when the sample is a little too long, since retriggering cuts off any excess and starts the sample from the beginning. One caution: when triggering via audio level, Jam Man likes clean triggers (i.e., a drum hit). You'll invite retriggering and jitter if you turn up the sensitivity and play a power chord. (Jam Man's sensitivity would be less critical if the trigger's reference level "floated" with the input signal average and looked for peaks that exceeded the average.)

Loop mode is Jam Man's main squeeze. Once you've looped a sound you can overdub additional sounds at any time, replace a portion of the loop, and create up to seven additional loops. Only one loop can play back at a time, but you can select the desired loop via front panel, footswitch, or MIDI program changes. You can also mute a loop. Timing continues in the background, however, so when you unmute, the loop remains in sync.

Loop recording modes are punch in (actions such as mute and replace take place immediately) and phrased (actions occur on the next loop boundary).

MIDILAND JAM

Jam Man can either emit or receive MIDI clocks (song pointer data is not applicable), so you can sync sequencers and drum machines. You can also define a loop's duration as a particular number of MIDI quarter notes. Even more interesting are the MIDI program change options, which vary depending on the mode. In loop mode, for example, program changes can select tap button, reset/replace/mute (punch in or phrased versions), layer, one of three fadeouts, one of the eight cue loops, and mute/restart. Translation: Hook this baby up to a

SMART ALEX

Alex, Lexicon's other recent entry into the project studio world, is a reverb priced at \$399 that nonetheless captures a good part of the "Lexicon sound." There are 16 factory presets (13 reverb variations, chorus, flange, and two echo options). Each has adjustable effects level and two other variable parameters: reverb decay and predelay for the reverbs, and feedback for the others (along with chorus delay time, flanger depth, echo delay, and tapped delay spacing). Once edited, you can store the results in one of 16 user-memory locations.

Alex is physically similar to Jam Man — 1U rack, stereo in and out phone jacks, external AC adapter — and has the same number of controls, since the front panels of both are identical (aside from the silkscreening). There are no MIDI capabilities, but a footswitch lets you step through the registers, and/or bypass the effect.

Spec-wise, frequency response is -3 dB at 15 kHz due to the 31.25 kHz sampling rate, but 16-bit conversion provides a typical 85 dB dynamic range. Alex can pump out up to 8 dBu maximum, which should be sufficient to drive whatever you're feeding.

But all that really matters is sound, and Alex delivers the goods. For short reverbs, I've tested several other budget units that do an equal or even somewhat better job. For long reverbs, however, Alex shows the Lexicon pedigree — there's an airy, nonperiodic quality that has been the trademark of Lexicon's high-end gear for years.

There are some great multieffects in the same price range, but none I've tried offers the same kind of sonic integrity that Alex does for reverb. Conversely, Alex's other effects are not as good as the versions found in multieffects; you can't even vary the chorus or flange rate. Overall, though, if it's just reverb you want — without frills, lots of program locations, or MIDI control — you'll have a hard time finding anything this cost-effective. —C.A.



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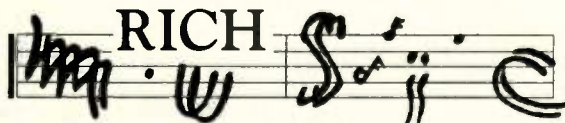
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sequencer or MIDI footswitch, and you can really go nuts.

OPINIONS AND APPLICATIONS

If you're tantalized by the looping techniques used by Robert Fripp, Brian Eno, and others, Jam Man brings the concept into the MIDI age. (One tip for loopologists: check out the Heet E-Bow for guitar, which allows for infinite sustain, and try it with loops in the 2- to 4-second range. This doubles as an endorphin generator.)

Where Jam Man really slams, though, is dance remixes. Being able to record snippets of music, spin them in with your sequencer, and add new layers gives remixing even more interactivity. This is an application where audio-level triggers are extremely helpful.

The user interface is easy because there's not that much to the unit. Once you get some basic concepts, you're ready to go. Jam Man includes a dual footswitch, but you can add a second one to access four foot-switchable functions at once. This is a welcome concession to live applications.

The biggest problem is audio back-up. The pricey but best solution is a sequencer-with-hard-disk program (Studio Vision, Deck II, Digital Performer, Cubase Audio, etc.). Sync Jam Man to the sequencer, and play the loop into the computer's hard disk. Another option is to record a loop into DAT for later playback into Jam Man. Too bad nonvolatile RAM is so expensive. Maybe if this box takes off, someone will come up with a way to transfer MIDI Sample Dump Standard files to and from memory.

Meanwhile, though, Jam Man shows that Lexicon is serious about products for the MI and project studio markets (see Alex sidebar), and, perhaps even better, is willing to try something with unknown commercial potential. A looping signal processor may seem like a weird idea, but check it out before you make up your mind. Looping can be extremely addictive — it doesn't take too long before you're blissing out to cosmic repetitive guitars or jammin' to looped percussion grooves. Fun stuff! At least for now, Jam Man is the way to go if looping turns your crank. —Craig Anderton

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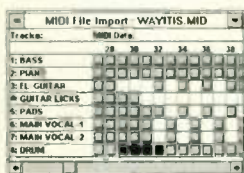
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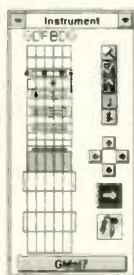


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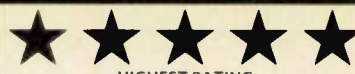
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Tahiti is a new digital audio card from **Turtle Beach** that provides two tracks of 16-bit CD-quality hard-disk recording, Hurricane Architecture, and a Creative Labs WaveBlaster compatible header that allows a synthesizer to be added at a later date...**Mark of the Unicorn** has released a new set of profiles for its UNISYN universal editor/librarian for the Mac. This update gives UNISYN new templates to work with 21 additional MIDI devices including the Alesis D4, Roland JV80/880, Yamaha TG-100, and Mackie OttoMix...**Opcode** has released version 2.0 of Vision, its pro sequencing software for Macintosh. The upgrade adds such features as music notation editing and printing, track overview, and groove quantize, plus many other enhancements to the recording/editing/playback system for MIDI-based music...**Passport Designs'** Producer Pro, is now available as an upgrade for the company's Director, Premier, and Authorware tools at a retail price of \$495. Producer Pro is a time-based production tool that combines and synchronizes animation, video, sound, music, and graphics in a real-time desktop environment. In addition, the company has reduced the price of the Producer Pro multimedia authoring system from \$1495 to \$995...**Digidesign** has begun shipping the first of its PostView software-based desktop postproduction products. PostView adds two primary features to Pro Tools: integrated random-access digital video and VTR control for external video (and audio) decks. You get complete random-access assembly of audio tracks, while watching video in the form of a "PostView Movie" on screen with the Pro Tools session...A new large-memory CD-ROM sound library for the **Ensoniq** ASR-10 Advanced Sampling Recorder, the third library available for



the system, has just been released by the company. *CDR-3 Studio Essential Vol. 1*, offers over 500 MB of data and 12 new 44.1 kHz effects algorithms and features all new material including world percussion, grand piano sounds, and large, unlooped

vocal sounds. The company has also released a new series of training videos designed to help musicians learn and understand features and applications of Ensoniq keyboards and other sound products...**Alpha Systems** has licensed **SRS Labs'** proprietary SRS (Sound Retrieval System) 3D audio technology, and is introducing the first software-upgradable sound card with the technology; the Cyber Audio/SRS. This card enables PC users to create, produce, edit and play back CD-quality sound, with integrated voice recognition. The voice recognition technology on the Cyber Audio/SRS enables your PC to learn up to 125 words with no limit to the number of vocabularies that can be stored. Any voice, regardless of quality, rate of speech or accent, can be recognized. The card uses Aria synthesized sound, featuring DSP architecture and is expandable; the system's sound options can be upgraded with software.



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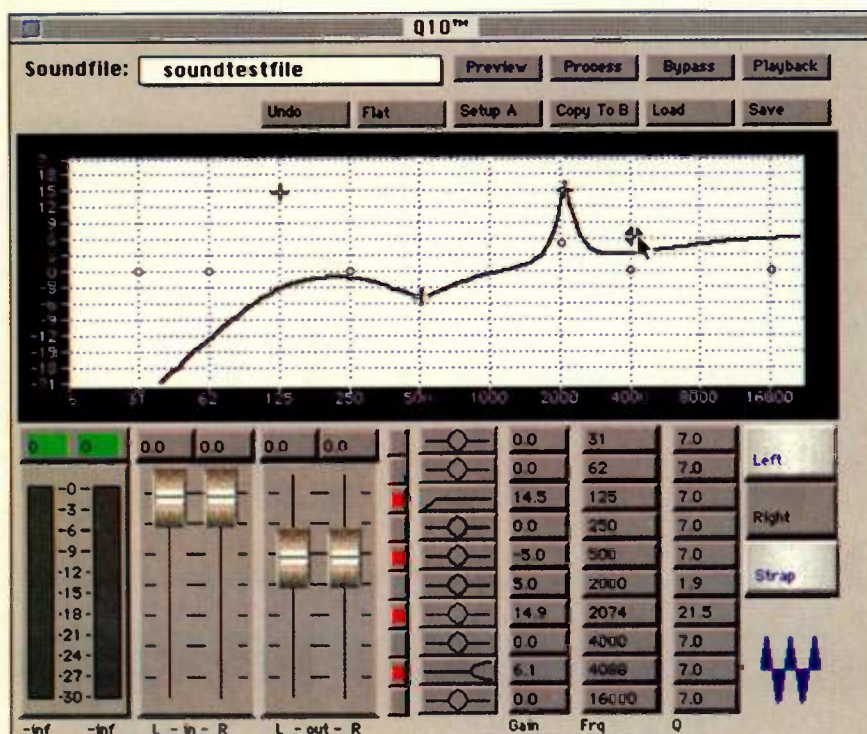
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REVIEW SHORT



The Waves Q10

"If you're doing serious audio editing with Sound Designer II, there's no question that the functionality provided by Q10 should be a welcome addition."

I have to confess that, in general, I'm not a big fan of digital EQ. Personally, I prefer the warmth that a good, clean analog equalizer can add to a signal. However, there's much to be said for avoiding the noise added by such devices, and there's also no question that digital EQ provides a finer degree of control than its analog counterpart.

With the recent demise of Alchemy, Digidesign's Sound Designer II (SDII) software has become the de facto standard for digital audio editing on the Macintosh platform. Certainly the phenomenal sales of Digi's various products (ProMaster 20, Pro Tools,

Sound Tools I and II, and AudioMedia II) are testimony to the inherent strength of SDII, which includes a number of DSP routines such as equalization, dynamics processing, and time compression/expansion. What's more, SDII employs an open-ended architecture so that its functionality can be expanded with the addition of "plug-in" software modules. The first of these modules was Digi's own widely touted DINR noise and hum reduction software package. More recently, a third-party company from Israel — ks Waves — has introduced Q10 (\$399.95), a plug-in module for Sound Designer II that adds ten bands of parametric EQ.

CATCH THE WAVE

Veteran users of SDII may be wondering why such a product is necessary, since the program already provides a parametric EQ option. The reason is that Sound Designer offers only one band of parametric EQ, since it allows the selection of only a single filter type (peak/notch, high-pass, low-pass, high-shelf, or low-shelf), center frequency, and resonance ("Q") value (in stereo soundfiles, this setting can be

applied to either or both channels). To apply more than one band of parametric EQ, you need to reprocess the soundfile repeatedly, one band at a time. In contrast, Q10 provides ten independent bands of parametric EQ with user-selectable filter type, center frequency, and Q control for each of the ten bands. (In stereo soundfiles, these can be set independently for each channel or the same EQ can be applied to both channels simultaneously.) The frequency range is an impressive 16 Hz to more than 21 kHz, with Q values of 0.5 to 100, and up to 18 dB of cut or boost for each band.

Q10's various parameters can be changed either with standard mouse click-and-drag operations or, more impressively, by moving points in an onscreen graph. This latter operation is very similar to the envelope-drawing technique provided by most patch editors; simply grab a point and drag it around. By shift-clicking, you can even adjust multiple bands simultaneously, which is handy when you want to adjust the overall effect of the EQ without having to go in and tweak each band separately.

As with SDII's own DSP functions, a Preview option allows you to hear a looped section of the soundfile while equalization values are being adjusted, and equalization settings can be freely saved and loaded independently of the soundfile itself. Q10 allows you to compare two equalization setups per soundfile, and a Bypass button enables you to quickly make comparisons with the original. An Undo function is also provided, and parameter values can be freely copied and pasted. Finally, a Flat button allows you to reset all parameters with a single mouse click.

Q10 also provides onscreen faders that allow the input and output levels of the soundfile to be adjusted, which is useful for maximizing headroom and avoiding nasty digital clipping (an on-screen display shows the number of clipped samples that occur as a result of the equalization

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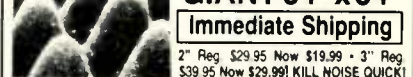
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CD Distributor In A Box, Part 1

Could this be the end of your favorite record store?

BY MARTIN POLON



A recent agreement to produce an in-store kiosk capable of downloading any available CD title to a CD recorder (CD-R) could upset "the very balance of nature" in the record industry, according to many record label executives. The public announcement of a planned joint venture between computer giant IBM and the Blockbuster video rental and sales chain has both caught the interest of Wall Street speculators and sparked the real or feigned horror and disgust of both the record-making and record-selling communities.

But what is the real impact of the agreement and are record stores as we know them really in danger of extinction? Will this or other similar direct download retail schemes doom conventional record purchasing?

What we know at this time is that two electronic information and entertainment giants — IBM, with its more than \$50 billion gross sales and Blockbuster, with nearly 3500 stores devoted to selling and renting home videos in addition to music and games — have agreed to form Fairway Technology Associates. The goals of the new venture are: to further develop and improve the technology required to download video, music, or computer game software from a central computer site to an in-store kiosk; provide it to some or all of the Blockbuster

stores, license the technology or the complete service to other competitive record vendors; and negotiate with music, film and game companies for the rights to sell their wares through the downloading system.

At the root of the system is the technology to transfer a complete CD album to a remote CD recorder in a retail kiosk, while a color laser printer produces the album liner notes and CD jacket. The queue time for the production of a finished copy in a jewel box is quoted as being approximately six minutes by the system's developers.

Several questions come up in relation to the technology being utilized. First, will consumers, who tend to buy on impulse, be willing to wait the estimated six minutes, or even longer if potential customers are stacked up waiting for the service?

Second, will the quoted queue time really hold if hundreds or even thousands of Blockbuster and system licensee retail locations query the central computer(s) at the same time, or will further time then need to be spent waiting for modem ports or central processor array system capacity?

Third, the implications of downloading and the use of digital coding techniques with a CD-R unit operating optimally at 12 times the real-time rate for a 72-minute album, raise questions about the ability to consistently deliver a complete and accurate album copy over copper lines. When you consider the number of data errors at relatively high speed on commercial data modems, no matter how small the error percentage, the ability to guarantee a perfect copy 100 percent of the time is volume-limited.

The speed needed for the capture of a full album in six minutes would require considerably greater rates of data passed than what is commonly used for computer information transfer over the public switched telephone network. While it would be possible to eliminate even the possibility of transfer error via T carrier, fiber optic cabling, and ISDN (integrated services digital network) links, these options do not exist everywhere in America today, may not reach all locales tomorrow,

and raise kiosk operating costs for what are essentially dedicated connections.

Fourth, the use of coding schemes to facilitate the rate and amount of transfer between the central system and the remote CD-R unit means that the kiosk will be vending a CD that has been subject to digital audio data compression whereas the record store version will be in no way similarly data volume limited.

Yet it is equally clear that the technology does exist to accomplish this or some future partnership's financial goals, whatever the logistical drawbacks of downloading over the existing switched copper network of the telephone companies today. It is equally clear that some, if not all, of these problems will be solved tomorrow. Certainly, the arrival of new transmission technologies will help to solve transmission glitches while the ultimate use of fiber optics will eliminate data-volume problems and speed traps altogether.

Whatever position we decide to take on the technology of the IBM/Blockbuster system, there is another more important issue that cannot be dismissed. The basic premise powerfully identified by nearly everyone in the record retail business and echoed by the major record labels, is that they do not want to see the new system adopted. The position of most record stores — both independent and chain — is also clear. The demise of the browsable record buy is virtually synonymous with the demise of the record store. You don't need all that display space and overhead to operate from a computer kiosk.

Next issue, we will look at what impact the success of this and other direct record-retailing schemes targeted at the mall and the home will have on record production, record manufacturing, and record retailing.

Martin Polon is the principal of Boston-based Polon Research International (PRI). PRI forecasts the electronic entertainment industry for the financial community.

FRONDELLI

continued from page 20

usable tracks, upgrade them to a multi-track format where the producer can work with part or all of those tracks as a template, and rebuild from there."

Some of the equipment he would like to see in these proposed studios would include multiple Alesis ADAT systems, Mackie consoles, and Digidesign Pro Tools workstations. As the rooms would vary in needs, software for Capitol's already utilized Macs would encompass any version the artist required such as Opcode's Studio Vision or MOTU's Performer. For IBM PCs, Frondelli likes Cakewalk, and will even stock Atari for the artists who use those computers and programs.

If there are any "cons" to Capitol's "pros" concerning this project, it may be that the company finds itself redemoing the demos that got the artists signed in the first place. Not so, according to Frondelli: "As a producer I know that demos can feel great. The problem is that they're on an unacceptable recording format. Right now, a lot of alternative music is done acoustically with live guitars, drums, and especially vocals, and you want them to be recorded as cleanly as possible in order to be able to use the tracks on the finished recording."



BEST QUOTE TO COME
FROM A PRESS KIT

Phil Collins

"This batch of songs crept up behind me during the last few months of '92 and the first half of '93. I improvised, recorded, improvised again, added, recorded some more, and in all had a great time. For the first time ever, I played all the instruments. It was during this time that I realized that the real fun to be had was actually in my little 12-track demo room. I've always used my home demos (either 8-track or 12-track) as my basic masters. This time I looked behind me and realized that I'd played everything I wanted to hear: guitar, bass, even the lead vocals were all recorded at home. With my basic masters recorded, I then went to The Farm studios with engineer Paul Gomersall and assistant Mark Robinson, both of whom I have built a relationship with over the last few years, collaborating on various projects and culminating in the *Serious Hits* live album with Paul and the *Genesis Dance* album with Mark. There at The Farm we overdubbed real drums and the odd new line of guitar or harmony, and, of course, we finally mixed the songs."

—Phil Collins speaking about his new album, *Both Sides*

Another sore point with artists could be the feeling that "Big Brother" is watching; after all, these studios would only be an elevator's flight away from scrutinizing executives. Frondelli disagrees; "Our concept is to create an atmosphere of 'if you build it, they will come.' If it's a hip place to be and has the right vibe, we know that artists will enjoy coming here to work in the studios."

With 20 engineers already on staff, Frondelli sees a time soon when Capitol's preproduction recording stage will expand. He confidently says: "I think the preproduction stage is the most important to begin with, working out the arrangements, choosing the instrumentation, the orchestration ideas, choosing the path the song dictates — that's making a record. Getting it on tape is getting a great performance, and it's always easier to get a great performance when you have a direction to follow."

Music videos may even play a part in Capitol's future preproduction plans: "I think that's very much a situation that will come into focus in a few years; young film directors coming up with fresh approaches, while we give them a place to work in and use as a blank canvas."

FrondeLLi also views CD-I as the inevitable future of the music industry and for Capitol Records within five years: "Multimedia will encompass all of this — integration of music, video, graphics, and art all in the same package. I think anybody who doesn't get in on it now will be lost."

— Larry Lange

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3D PROJECT STUDIOS

continued from page 58

ambient information present in the input signal to produce multidimensional effects. The advanced steering logic in these circuits use this detected information to place sounds at specific locations around the listener. The decoder allows for full bandwidth and channel separation in the rear surround speakers.

RIGHT ON Q

Perhaps the most widely publicized 3D audio system in recent years hails from a Canadian company called QSound Labs. Listed on both American and Canadian stock exchanges, QSound Labs began marketing efforts by licensing its technology for individual mixes and collecting royalties on record sales. You couldn't purchase the equipment. More recently, however, QSound has relaxed its availability restrictions, making the technology accessible to a larger clientele.

Some of QSound's more notable applications include mixes for Paula Abdul, Julian Lennon, Roger Waters, Sting, and Madonna. After reeling from initial reports of poor mono compatibility, it was later found that QSound wasn't specifically at fault. All recent mixes employing QSound are said to be rock solid in mono. If Roger Waters's recent *Amused to Death* is any indication, it's clear to me that solid mono compatibility and wide stereo imaging is achievable using QSound.

The QSound system consists of eight independent parallel-processing channels, each channel providing sound placement outside of the physical stereo-speaker locations. Most every function is hardware independent and QSound Labs has been continually upgrading software. The company is said to have characterized human auditory spatial perception in over 550,000 experiments and to have applied its findings into the QSound hardware and software.

Integrated circuit manufacturers such as Analog Devices and Sierra Semiconductor have licensed QSound's technology for application into multimedia, synthesis, research, games, and more. Computer guru John Dvorak says we should expect to see 3D audio incorporated into the next generation of games and CD-ROMs. Indeed, Sega and Capcom have already implemented the QSound system into their stereo feeds

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(studio owners take note). And on a more practical level, a binaural QSound hearing aid, said to be the world's most accurate and natural sounding, is planned for production via a joint venture with the world's largest manufacturer of hearing aids.

"QSound really opens up the soundstage," says James Guthrie, producer/engineer for Pink Floyd, Julian Lennon, and many others. "It allows more depth and more space in the mix environment. On Roger's record, I placed ambience sound — such as airplanes, televisions, and a dripping faucet — extended to the limits. We used it similarly on guitars and keyboards with very nice results. Echoes were often placed at extreme left/right positions, as well."

When asked about mono compatibility, Guthrie replied, "No problems in mono. I think some of the early war stories were due to mix oversight rather than to any inherent QSound problem."

ISN'T THAT SPATIAL?

Here's a class act in start-up companies. From a penthouse suite in Beverly Hills, and with a board of directors that includes an eight-time Grammy winner and the ex-chairman of United Artists and ABC Records, Spatializer Audio Laboratories (SAL) brings its first product to market — the Spatializer.

I first heard Spatializer (\$8450) at the 1992 AES Convention in San Francisco. Installed into various corners of its booth were individual Spatializers, allowing personal, interactive auditioning of the technology. A music source was fed continuously through the Spatializer into a pair of small speakers. By

design, the user stood in the sweet spot.

The Spatializer worked nicely, providing an impressive display of swirling images. Though not convincing in all 3D positions, especially at locations vertical to or behind the listener, the Spatializer nevertheless placed sound far beyond the speakers.

SAL's designers claim their circuit mimics 3D space by producing a variable matrix of four fixed-point sound sources: two real sources (left and right speakers) and two virtual sources. Together, these sources generate a hard front center image and a soft rear center image. It's said that algorithms are not used to generate corrections. Rather, Spatializer continuously processes the sound field into something they call Conceptual Image Space.

One Spatializer is configured as eight joysticks, with additional but-

tons for controlling MIDI, mutes, solo-in-place, and spatialization selection modes. The joysticks are designed on 1.5-inch centers for optional in-line mounting with console faders. Internal processing is 24-bit with 16-bit A/D and D/A conversion.

OTHER 3D STUFF

Though not designed exclusively for 3D sound, certain devices now on the market claim to offer some degree of 3D audio capability.

t.c. electronic's 1210 (\$1502) has long been known for its rich analog choral and flanging abilities. Michael Hedges, for example, often adds TC-1210 to his liquid, bigger-than-life acoustic guitar sound. The 1210 is an entirely analog circuit that utilizes the well-known Haas effect to shift L/R phase cues; spreading sound well beyond the limits of stereo speakers. t.c. really doesn't claim the 1210 to be a 3D processor, but it is very effective in broadening the apparent soundstage.

The Roland SRV-330 (\$1095) was announced recently and should be shipping as you read this. [See *EQ*, Dec. '93 for a review.] In essence, the SRV-330 is a reverb unit that utilizes Roland's proprietary localization technologies and is said to deliver "a three-dimensional sound environment" using a 67 MIPS DSP and 30-bit processing, including reverb algorithms derived from the Roland R-880, 3-band parametric EQ, MIDI control, and true stereo inputs and outputs.

Recording studios and audio prs should prepare now for the not too distant wave of 3D audio applications. There's a lot more coming in the realm of 3D audio recording products. In the meantime, be encouraged to audition for yourself, in your own studio, what these products can really do for you. **EQ**

FOR MORE INFORMATION

Crystal River Engineering, Inc., 12350 Wards Ferry Road, Groveland, CA 95321. Tel: 209-962-6382. Circle EQ free lit. #125.

Roland Corp. USA, 7200 Dominion Circle, Los Angeles, CA 90040-3647. Tel: 213-685-5141. Circle EQ free lit. #126.

Spatializer — Desper Products, distributed by A.I.D., 1155 N. La Brea Avenue W., Hollywood, CA 90038. Tel: 213-845-1155. Circle EQ free lit. #127.

QSound Labs, Inc., P.O. Box 93998, Los Angeles, CA 90093-0998. Tel: 213-876-6137. Circle EQ free lit. #128.

t.c. electronic USA, 717-C Lakefield Road, Westlake Village, CA 91361. Tel: 805-373-1828. Circle EQ free lit. #129.

RSP Technologies, 2870 Technology Drive, Rochester Hills, MI 48309. Tel: 313-853-3055. Circle EQ free lit. #130.

FURMAN Q-302B

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The 12 dB-per-octave high-pass filter can be varied continuously between 15 and 135 Hz. This range is excellent for removing of subbass to protect full-range loudspeakers or removing breath noise from voices. The 12 dB-per-octave low-pass filter can swing from 34 kHz down to 12.5 kHz, allowing the trimming of the audio response to remove spurious RF artifacts or just to reduce high-frequency noise. These filters do not reduce the bandwidth of the Q-302B enough to create a "voice-band" paging system, but are well suited to removing the worst effects of low-frequency noise from wind and foot-falls on stage, or high-frequency noise from keyboards. The scale for each control is reasonably accurate and the knobs have a clear indication of position.

The Q-302 uses a relay to remove the EQ's active circuitry from the audio chain when bypassed or powered down. This hard-wire bypass provides for fail-safe operation of the sound-reinforcement system or studio monitor chain. Mixing balanced and unbalanced connections, however, may cause a significant change in level (6 dB) when the bypass switch is engaged. Furman has allowed for this by providing these equalizers with gain controls that only affect the

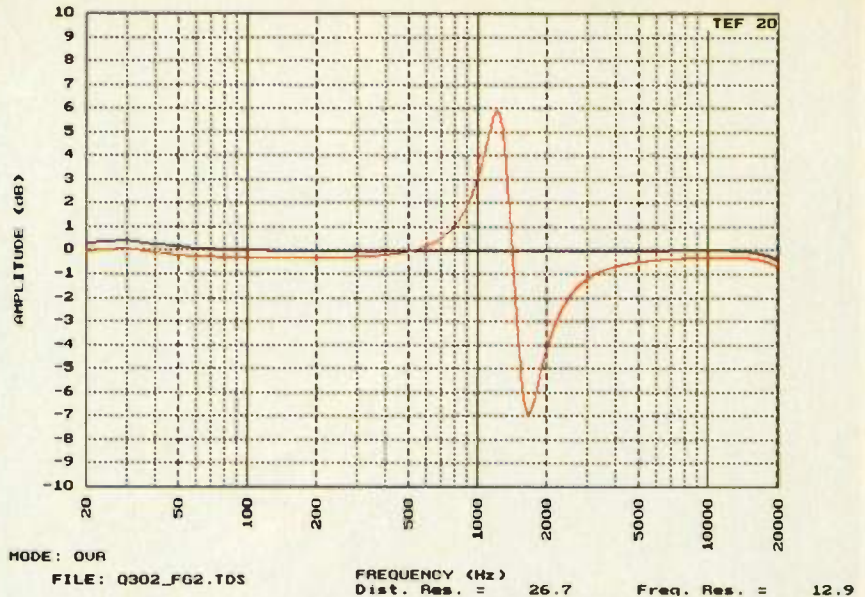


Figure 3. Adjacent bands at opposite extremes will reduce the amount of boost or cut: +12 dB at 1.25 kHz and -12 dB at 1.6 kHz combine to +6 dB and -7 dB.

equalized level and can be used to compensate for a level change when the EQ is bypassed.

CRITIC'S CORNER

There is very little to criticize in the very clean and clear layout of the Q-302B. The one fault I found with the unit's construction was the poorly fitted screws that attach the top and bottom panels of the case. These did not fit flush to the case and gave the unit a haphazard look (when outside of a rack) that is at odds with the fine construction of the front panel and

internal assemblies.

The owner's manual for the Q-Series equalizers provides some very basic introductory information regarding the use of equalization — useful especially to those new to the process of equalization. Unfortunately, there is reference to the correction of room acoustic problems through the application of 1/3-octave equalization. I don't believe it is possible to positively affect the acoustic properties of a room through this form of electronic device. Generally, room acoustics must be dealt with mechanically — by repositioning loudspeakers or altering the acoustic treatment of the room. Using equalization to correct an acoustic problem will usually result in the sound from the loudspeaker being as bad as the room acoustics, albeit inversely. Schematics are also included in the manual but are too small to show component values clearly.

Furman has created a fine tool for sound system and recording equalization. The familiar 1/3-octave format is a convenient tool for shaping sound with the least amount of fuss. The clean sound and clear layout of the Q-302 make it an excellent tool in applications where the main effort should be focused on deciding what and why to equalize and not on dealing with the equalizer.

Wade McGregor, EQ's resident road tester, reviewed the E-VI Dynacord DRP 10 reverb in the January issue.

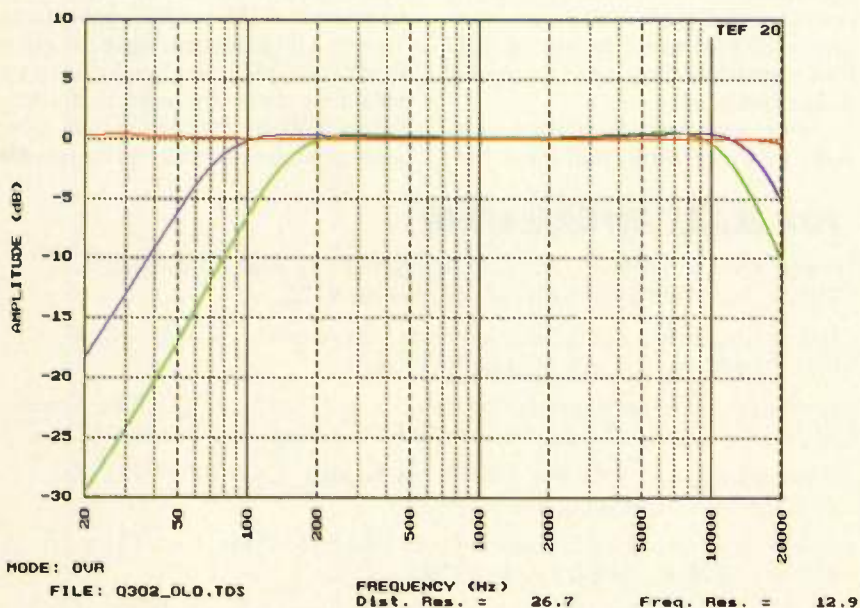


Figure 4. Furman Q-302 Continuously Variable High and Low Pass Filters; Low Pass shown set to 35 kHz, 16 kHz and 12.5 kHz; High Pass shown set to 15 Hz, 70 Hz and 135 Hz.

WAVES Q10

continued from page 98

process). Like SDII's own DSP functions, Q10's EQ can be applied in one of two ways: destructively, in "Process" mode (where the soundfile is rewritten), or nondestructively, in "Playback" mode (where it is applied in real time during playback only). Though the manufacturer has acknowledged that there are some bugs when Q10 is used in Playback mode, you won't be able to select any other DSP process or enter the Tape Deck or Loop windows while it is enabled.

LISTEN UP

In subjective listening tests, I found that Q10 did as good a job as SDII's onboard digital EQ, adding perceptible artifacts only when used at fairly radical settings (such as at very high Q values). If you're doing serious audio editing with Sound Designer II, there's no question that the functionality provided by Q10 should be a welcome addition.

Users of Sound Tools I systems

(those with the original Digidesign Sound Accelerator card) will not be able to avail themselves of Q10's ten bands of parametric EQ. For those users, ks Waves manufactures Q6 (list price: \$399.95), which is essentially identical to Q10, but with six bands of EQ.

The company also offers an interesting and inexpensive utility called Region Munger (list price: \$34.95); it automatically creates independent soundfiles (optionally normalizing them) from the region list contained in a specified SDII file, and can also convert those regions to AIFF format if desired.

For more information, contact ks Waves, Distributed by Rockwell Digital, 1245 16th Street, Suite 100, Santa Monica, CA 90404. Tel: 310-315-3463. EQ free lit. #124.

Howard Massey heads up On The Right Wavelength, a MIDI consulting company, as well as Workaday World Productions, a full-service music production studio.

SOUND FACTORY

continued from page 68

major part of the club's setup lies in the signal-processing equipment: "We use a lot of Rane gear, and they're a great company to work with. They're not overpriced and their engineering department is extremely helpful," he explains. "They make a good product and are very nice people. People come into Sound Factory and think that we use Brooke-Siren and Klark-Teknik, and all of the other big boys. We don't — 90 percent of our sound-processing gear is Rane. It sounds good and if you want to do something to it, whatever you do seems to work without a problem."

With five years of booming house music behind Sound Factory and many more yet to come, the club's mission is to continue onward and upward. "We're at the point now where we don't add any new equipment — in fact, we haven't added anything new in two years," says Dash, whose routine sees him checking the system (namely the drivers) weekly and tweaking it monthly. "We just keep figuring out ways of making things sound even better." **EQ**

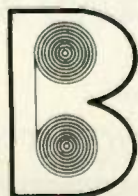
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ACROSS THE BOARD

continued from page 114

thing in her computer into the trash, they got on the network and tried to do the same thing to my samples. Luckily they were tagged "cannot throw away." The scary thing is that I only set it up this way the day before the incident.

BUGG GNUS

I got a great response last month concerning bug reports. Opcode said they would supply me with bug reports to include in the listing. This whole thing will only make sense if we get it online somehow. The lead time at a magazine is such that any bugs reported would be old news by the time the issue goes to print. I'm working on it.

Here is where I need your help. I hear stories all the time about someone who knows someone whose wife met a guy whose tape machine goes into record when his kid flushes the toilet. I am not saying that I don't believe the story, I would just like to get the information right from the horse's mouth.

If you have any first hand experience with gear that has been causing

you problems, then let me know. I am trying to compile some hard data as to what is really going on. I am most interested in ADATs, both Alesis and Fostex (if they ever get the software from Fast Forward so they can ship them), Tascam DA-88's, one-inch analog 24-tracks from Tascam and Fostex, Pro machines like the Sony PCM3324S or PCM3348, Otari digital machines, hard-disk recorders, Digital Audio Workstations, Porsche 968 convertibles, expensive reverbs, and anything

made of Titanium. Please send responses to me care of EQ Magazine, Compuserve (70241,1142), or via Internet (rsn@world.std.com). Your views will be for my information and will be made available to the manufacturers unless you specify otherwise.

Try to include facts documented well enough so that the problem can be re-created. Please skip problems such as "I can't seem to get any samples off the CD-ROM after it has been microwaved." My wife has already used that one. **EQ**

BUGGED PEOPLE

Here is just a sampling of the online responses I received from my column last issue:

"I'm quite tired of the often ignorant support staff I encounter. Now some companies do have one or two phone jockeys that know how to steer their product but you know how complex hardware and software combinations can be a real bitch to debug."

—Andrew Van Veld, Expanse, Inc.

"Whenever I receive upgrades to my various software packages, my first reaction is a gut churning cringe and a 100 Hz groan, because I just know it 'ain't gonna work as advertised."

—Jeff Lindeman

"I find that tech support departments will tell me about bugs, then others will deny the bugs exist, then I will get stonewalled. It's pretty challenging just to get functional software these days."

—Irish McIntyre, Broken Measure Sound

"This month's article hit very close to home both as a user and as a manufacturer of products that use computers in their operation...I can say with a good clear mind that Grass Valley Group have practiced thoughtful engineering when it comes to our customers!"

—D.R. "Chris" Christensen, Grass Valley Group

[P.S. Neither I nor my employer is responsible for anything I say or do.]

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Mac & Me



More computer talk from the bug-buster himself

BY ROGER NICHOLS

It's been a year since the Sony Mini-Disc recorder hit the scene, and even longer since the DCCs showed up. I still can't find software for either one of them anywhere except Tower Records. Not every town is lucky enough to have a Tower. I have been to those high-tech electronic stores that they have in every mall and found the display racks for the Sony MD, but they don't have any software. When they get the MD display rack, they also get a pile of software to display along with it, but after they sell the samples, they never get any more. Radio Shack ("America's Technology Store" where every Gear Slut must buy something once a week, whether you can find a use for it or not) has been slowly moving DCC units, but they only have a few "Sampler" type albums that they offer for sale along with the deck. I guess everybody is waiting for the erasable CD that should be here any year now.

A/V MACINTOSHES

I have been playing with the new Macintosh 840av. We have Vision 2.0 up

and running on it. Be careful. The 840av seems to have funny little quirks of its own that make it hard to run Vision and SampleCell and other real-time software.

With the built-in voice recognition software you can add some fancy little features. I programmed it so that every time I yell "S**T," it knows to undo the very last thing I did! It also has built-in video capture ability so that you can freeze your favorite instant of C-SPAN and display it as a startup screen whenever you boot your computer after a crash.

The 840av is very fast. It has to be, so you don't have time to get your shotgun before the desktop shows up again.

I've started a weight training program. I now carry 100 lbs. of batteries with me on plane trips so that I can use my Powerbook 180c longer than just the obligatory turn on at airport security.

I think the twitching condition you get from watching your computer reboot should be called "Appleplexy."

NETWORKS

If you have more than one computer in your life, you undoubtedly have run across "the-file-I-need-is-on-the-other-computer" syndrome. If Murphy has anything to say about it, the more important the file is, the harder it will be to get it onto the right computer.

The easiest solution, if the computers are in the same building, is to connect them with telephone wires through "phone net" connectors that plug in to the printer port on each of the computers. You can then use software that comes with System 7 or third-party software such as Tops that allows you to intermingle Macs and PCs on your network. Yes, what you have when you connect these two puppies together is the beginning of a computer network. If you are a Gear Slut, it is mandatory that you be at least on this level of network connectivity.

If you have a laser printer hooked up to your Mac, that printer can now be connected via the same phone net connector, adding a third device to the network. Either computer can print to the printer without having to discon-

nect and reconnect wires. If you just have a Style Writer or other ink jet printer that won't connect directly to the network, Apple has software called "Gray Share" that will let one computer share the printer that is connected to another computer on the network.

Now that you have this blossoming AT&T network, you can transfer files from one computer to the other with just a few clicks of the mouse. At first it will seem as though the transfer speeds are lightning fast. "This is much better than copying on to floppies and carrying them over to the other computer," you say to yourself. But low and behold, after the novelty wears off, you will be cursing the snail pace at which your 10 MB EDO samples ooze from computer to computer. You lust for more speed. Someone once said, "The only substitute for horsepower is more." (I think it may have been me, but I'm not sure.) A voice whispers "Ethernet." The big boys use Ethernet. Little boys long to be big boys with Ethernet.

Without going into a whole explanation of Ethernet, basically it enables you to transfer files about ten times as fast as Apple's Local Talk network. Until recently, you needed to run expensive cables between computers and connect them all to a central device called a hub. A version of Ethernet connectivity called 10BaseT allows for the use of twisted pair wiring between computers. A company named Farallon, who invented the phone net connector almost ten years ago, has come up with a system that allows you to connect computers together without a central hub. You just string them all together in a daisy chain fashion using its new EtherWave interface modules. If you have a computer with an Ethernet card already in it, you can use that computer at either end of the daisy chain.

Now you are cooking. You can now keep track of all those samples and sequences that have been avoiding you. Oh, don't forget about password protecting your files from network access. My daughter's computer has a talking trash can. It belches every time you empty it. She had a friend over one evening, and after they threw every-

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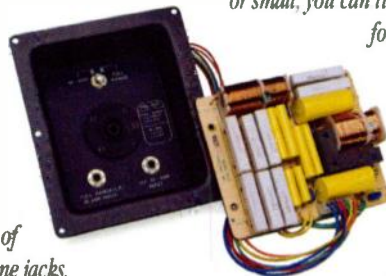
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