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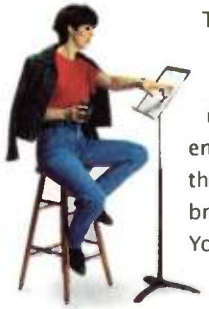

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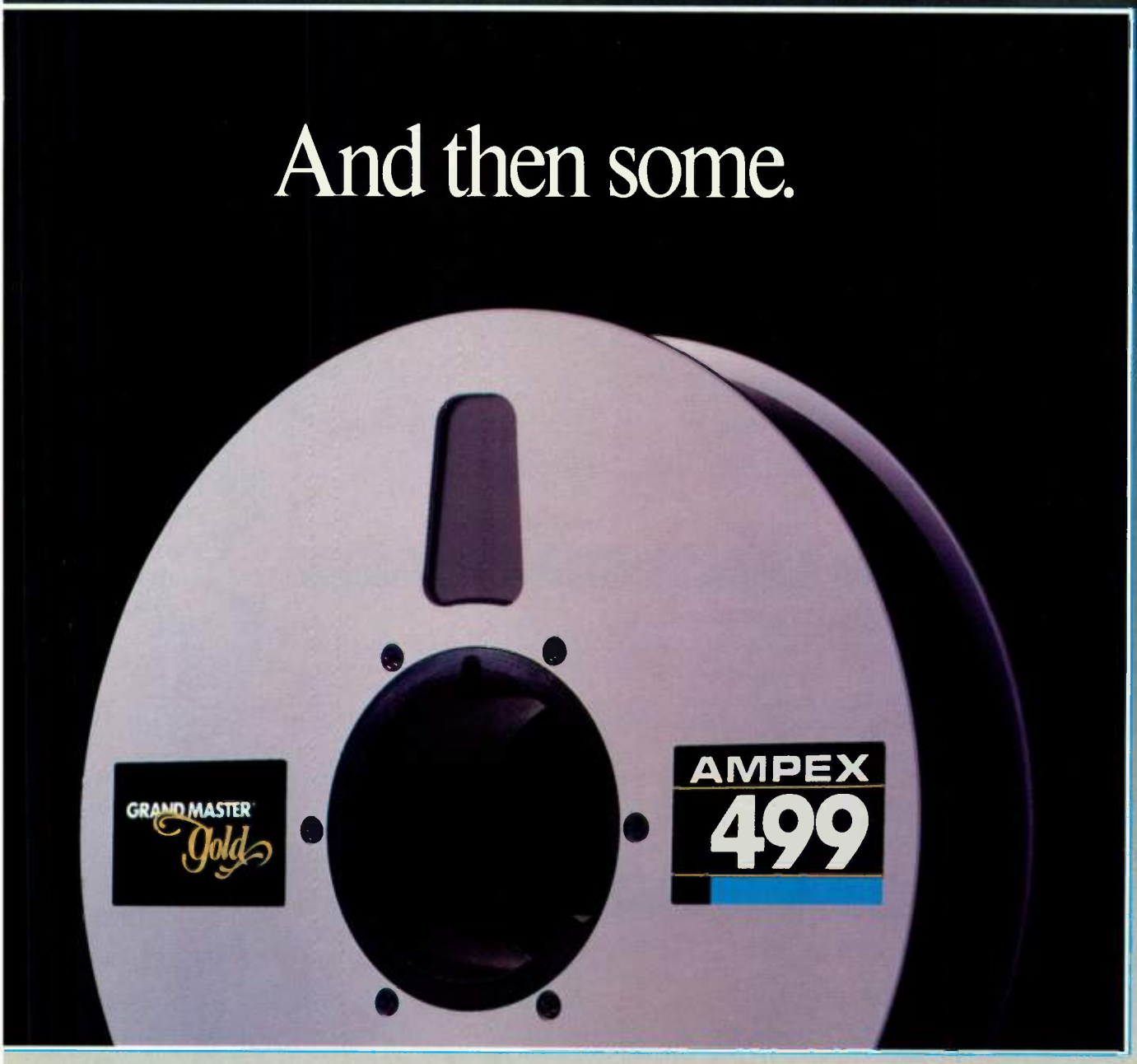

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& SOUND TECHNIQUES
VOLUME 2, ISSUE 5
DECEMBER 1991

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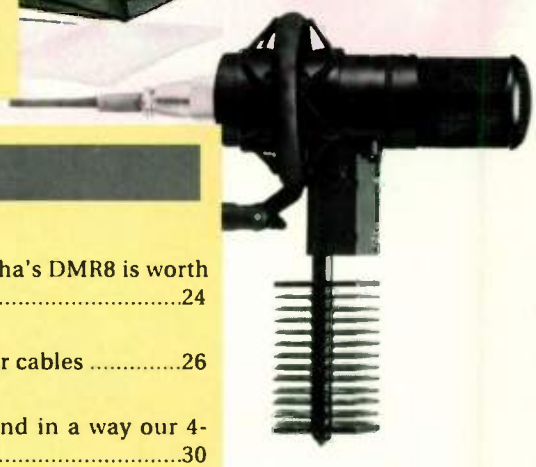

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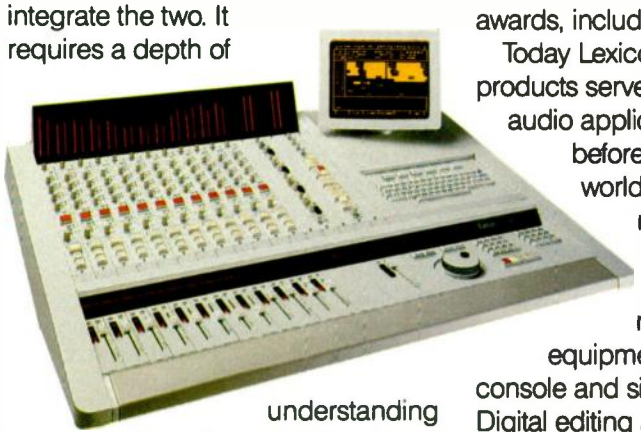

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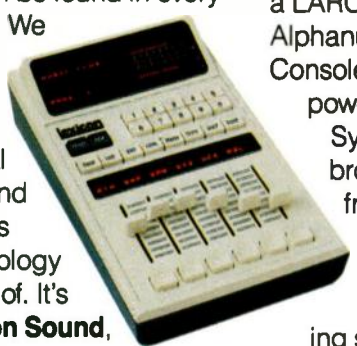

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CIRCLE 38 ON FREE INFO CARD

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LETTERS TO EQ

SCHOOL OF HARD KNOCKS

I just finished reading the August 1991 issue of *EQ*, and I must first compliment you on your excellent work in putting together very readable articles on audio production. There was one short piece that covered various schools and the percentage of students who located work after graduation, however, that I felt was so far from reality that I had to write to you to relate my own experience with the "Back to School" method of finding work in the industry. I graduated from a trade school in Seattle with a degree in audio engineering a year and a half ago. The reason that I chose that school was because of their claim that 98 percent of their graduates found work in audio production within a short time after graduation. I have yet to find any work whatsoever in this field, whether it be on-call, part time, or otherwise. The other students I have been in contact with have yet to locate work in this field either. I doubt seriously if 9.8 percent of the class I graduated with has located work in any related field. Most are working at the same job they had while attending school.

So, the claims made by those schools listed in the graph on page 18 of the August 1991 issue of *EQ* do not appear to me to be at all possible. I wish *EQ* would do more in-depth research to expose these high percentage claims for what they are, absolute nonsense. Recording and audio post production studios in this country are not hurting at all for qualified applicants. The only way I know of finding work in this industry is to start your own studio (if you have the money) or know a friend or relative who owns a studio.

I do not wish to suggest those interested in a higher education should forget about it altogether, but do not expect to find a job simply because you have a diploma.

Steven Persinger
Seattle

HOW SWEDEN IT IS

I'm a notorious home recorder fan, building up my studio from the beginning via 2-channel Philips tape-recorder via Studer Revox and Tascam 4 to 8 to 24 tracks. I have built a whole bunch of electronic gear, from simple mixers via Craig Anderton's flangers to MIDI gear. I have been recording my own stuff for longer than I can remember.

When I bought the MSR24 some time ago (the first that arrived to Sweden), I thought of selling my old TEAC 80-8 8-track recorder. But it seems as if I can get virtually nothing paid for it. So instead of giving it away for peanuts, and still having a lot of half-inch tapes with my old songs on, it went to sleep in a corner of my studio (the smallest in the northern hemisphere).

Lately I've been thinking of using the 8-track as a 4-track master-recorder for some quadraphonic stereo. So I've been checking around for quad electronics, for example, a quad panpot. You know they used a joystick in some mixing consoles for panning in quad.

I have found out that I can use three pots for this kind of panning; one for an ordinary left-right pan, one for panning the left side front-back and one for the right side front-back. These two front-back pots could of course be ganged. This would give me one knob for left-right and one for front-back.

There is of course another way to pan, using a dual-ganged log-neglog pot, but that would give me six pots for a quad-pan system. Do you know a simpler way for a quad-pot using only two pots as in the normal joysticks that are commercially available?

I have a bunch of small mixers and connecting them in different ways would give me an easy way to create a 24-track mix to a 4-track quad. Monitoring via a dual stereo system is a bit cheaper in the beginning.

So now to this letter. What happened to the quad stereo? Now that all of you have your old 4 or 8 track recorders stuck in the corner of your studio, and you have your 16 or 24 track tape decks up and running, why don't we wake up the sleeping quad thing and start doing some mixing for 4-track stereo? Even if you may not make

WRITE TO US

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records or CDs from the 4-track masters, you may enjoy the quad privately.

Urban Osterman
Stockholm, Sweden

(For starters, and for more on quad, turn to page 30. —ed.)

KING OF THE CAHILL?

In response to Brian Hallas's inquiry about the Telharmonium of Thaddeus Cahill [August 1991 issue], I have been doing considerable research on the topic and would be pleased to answer specific questions about Cahill and his inventions. Your readers may write me at the address below or can reach me by e-mail at Weidenaar@nyuacf(Bitnet) or Weidenaar@acfcluster.nyu.edu (Internet). My Ph.D dissertation, *The Telharmonium: A History of the First Music Synthesizer, 1893-1918* (1989), may well answer most questions. It contains 40 full-page photographs. The work may be obtained in microfilm, microfiche, softcover book, or hardcover book from University Microfilms of Ann Arbor, Michigan (publication number 89-16049).

Having completed this, I continued to pursue some loose ends, and was fortunate indeed to finally locate Cahill's niece and only living relative after six years of searching. I then obtained the legislature, military, and pension records of Cahill's father. The resulting information has considerably filled out the story of the inventor's background and family life. The expanded tale is being published in book form later this year by Scarecrow Press of Metuchen, NJ, and as a CD-ROM in 1992 by Wayzata Technology of Grand Rapids, MN (with textware, hundreds of pictures, a narration, a 30 minute 44.1 kHz digital soundtrack of reconstructed Telharmonium music, and 50 MIDI files of tunes played on the instrument). I'm also producing a half hour TV program on the subject.

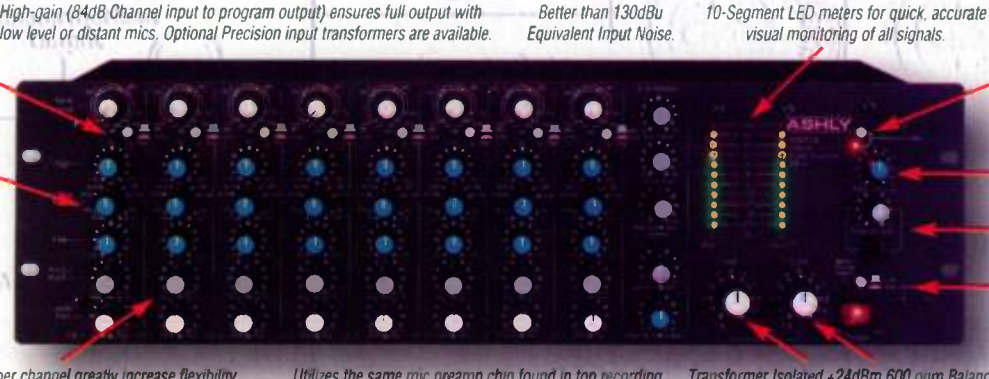
The story is significant because Cahill laid the foundation stones of a tremendous change in our musical lives. He worked like a dog to develop a commercially successful system of electrical music, but the technology was so primitive that his early flush of financial success was wiped out. Yet his revolutionary ideas eventually prevailed. Today, most of what we hear in popular music and in television and movie soundtracks is electronic. More synthesizers are sold now than any other instrument. And the root concept can be traced right back to Thaddeus Cahill's first electrical music patent application of 1895. Lord Kelvin was right: "One of the greatest accomplishments of the brain of man."

Reynold Weidenaar
NYU Dept. of Film-TV
721 Broadway, 9th Floor
New York, NY. 10003

CORRECTION

The article "Sampling and the Law" (June '91) should have stated that only sound recordings made after 1971 are protected by Federal copyright law, not Federal law, and that "California anti-privacy statue" should have read "anti-piracy."

Features Like These Are Usually Found Only In Larger Mixing Consoles.



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IN THE PINK?

Q *I have a DOD pink noise generator/analyzer, but I'm unsure about how to best utilize it. What exactly is a definition of "nearfield"? Also, when the mic is in a "representative listening position," do I turn up the pink noise level or the mic's sensitivity?*

Don Ullstrom, Scottsbluff, NE

A When using a real time analyzer such as the DOD-4315, first connect the pink noise output to a channel input on your PA mixer. Set all equalization on that channel flat or at 0. Next set all bands of equalization on your offboard graphic equalizer so that they are also flat. Set the window resolution switch on the 4315 to 1 dB per LED. Adjust the mic sensitivity so that the ambient noise in the room is lighting most of the bottom row of LEDs. Place the mic in the nearfield of the PA speakers. (Nearfield is defined as the area directly in front of a speaker, where the sound coming out has not had a chance to be absorbed or reflected by the surroundings.) At this point, turn on the pink noise generator and adjust the pink noise level until the next row or two of LEDs are lighting on the 4315. Now you're ready to start equalizing.

Adjust the upper range of frequencies first. Starting at 500 Hz, adjust the sliders on your equalizer up or down to compensate for peaks or dips your 4315 is showing. When you have a flat response from 500 Hz and up, then change the window resolution to 3 dB per LED and adjust the frequencies below 500 Hz until they're also flat. Now that the RTA-4315 is displaying equal levels of all audible frequencies it's time to move your microphone.

Move the mic back to the focal point, or where the sounds of the speakers positioned at the right and left side meet. The RTA-4315 will most likely show a high end rolloff and a few dips in the low end. Flatten out *only* the low-end dips. If you try to balance out the rolled off highs, the sound will be harsh and unpleasant. Make sure to note where the frequencies start to roll off, because these frequencies may need to be slightly further adjusted in the next step.

Now you're ready to play some recorded music through your system. Turn off the pink noise and put on some music you're familiar with. Adjust the high end by ear to suit your personal taste. Adjust only the high frequencies that were rolled off.

Bruce Holt
Customer Service
DOD Electronic Corp.

THE PHANTOM KNOWS

Q *Help! I recently purchased a Tascam 688 Midistudio, an AKG C535EB condenser mic and an AKG N62 two-channel phantom power supply (there's no on-board phantom power source on the 688). Plugging the C535EB into the supply and then into the 688 results in a dull roar. Directly plugging in a dynamic mic, however, brings good results. (dbx is in on all channels.) What am I doing wrong?*

Charles Sui
Schaumburg, IL

A You're doing nothing wrong. The Tascam MIDIStudios (688 and 644) were designed under the assumption that the majority of users would be recording electronic instruments operating at line level. Use of the MIDIStudios systems in situations where dynamic and low-powered electret condenser mics would be needed, it was felt, would be at a minimum. Therefore, phantom power on the inputs was not provided. If you do need to facilitate the use of an external 48-volt phantom power supply, a minor modification can be made to the input section of your 688. Contact the Tascam service department for details at 213-726-0303.

Paul Young
Product Planning
TEAC/Tascam

THE FAST TRACK

Q *Why does the multitrack machine I bought overseas always run fast, even with a voltage transformer?*

Michael Habershaw
Fort Meyers, FL

A The electricity that comes from the wall socket is called AC or Alternating Current. It's so named because the current alternates between positive and negative, or minus, at a specific rate. However, that rate is not the same in all countries. In the U.S. the rate is 60 times per second (60 cycles); in many other countries it's 50 cycles per second. A recorder with AC operated motors will vary its speed according to the cycles. Therefore, while a voltage transformer might match the current to 115 volts, 110 volts, or whatever, it doesn't match the cycles.

Jimmy Yamagishi and Bill Stevens
TEAC/Tascam

DEAD TO RIGHTS

Q *In "Raising the Dead" by Dan Healy in your April 1991 issue, he mentions "ion" speakers and "flame" speakers. Could you give me a bit more information on these two speaker types? Is there someone I can write to get more information?*

John Stevens
Northern Kentucky University

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A Not much research has been done with either "flame" or "ion" speakers. Aside from brief mention, I know of no papers or books dealing with these subjects. However, I'll relay what little I know about these speakers.

In the mid-Seventies while I was developing quintaphonic sound reproduction for *The Grateful Dead Movie*, I had the honor of working with two very brilliant people in the audio electronics field. One is Geoff Gook, who had a small but probably the finest sound reinforcement system, which he called Sound Storm. The other is Mac Turner. These two specialize in radical departures from conventional audio technique.

At the time, Mac Turner was experimenting with what he called the "ion speaker." It consisted of a styrofoam ball the size of a large grapefruit, covered with metal foil embedded with sewing needles protruding an inch or so, resembling a porcupine. The metal foil which conducts the needle is polarized with a very high voltage and also impressed with an audio frequency modulation. The expansion and contraction of ionizing air produced sound waves. It also developed positive ions which of course are harmful. Because of this, the sphere was enclosed in a plastic bag to contain positive ions. However, within the enclosure the metal needles were purged of other gases, which interfered with conductivity, causing the efficiency to diminish. There were other problems as well. Much new technology has transpired since this experiment and perhaps solutions exist now.

The "flame speaker" worked in a similar fashion, modulating ionizing gases in the fire. For the most part, this is an uncharted field.

The most significant innovation in the audio field would be to find a way to eliminate the loudspeaker motor mechanism, which is the single largest limitation in sound reproduction.

Dan Healy
Grateful Dead
San Rafael, CA

Q *I'm using a computer-based sequencer to control not only synthesizers but automated mixdown, drum machines, signal processors, etc.*

Sixteen channels aren't enough! What can I do?

Lionel Singleton
Los Angeles

A Most computers allow for add-on interfaces that drive multiple, independent MIDI outputs. Opcode's Studio 5 for the Mac provides 15 independent outputs (240 channels); Mark of the Unicorn's MIDI Time Piece has 8 outs and 128 channels (4 can be cascaded for 512 channels). There are similar options for the Atari from Steinberg-Jones and C-Lab, for the IBM from Music Quest and Voyetra, and for the Amiga from Checkpoint Technologies. Check that the sequencer and interface you want to use are compatible.

Other options: "piggyback" commands on the same channel. For example, if a drum machine responds to notes but not program changes, and a signal processor responds to program changes but not notes, tune them to the same channel and use both note and program change data. If a synth patch doesn't use continuous controllers, these can drive a signal processor set to the same channel.

You can also sync slave sequencers to a master sequencer's timing data. Each slave sequencer's MIDI out will provide 16 more channels. This is an excellent application for the sequencer in a keyboard "workstation"; sync it to your computer and bounce parts to the slave sequencer (or record directly into the slave). Splitting parts over multiple sequencers also prevents "MIDI clog" caused by trying to shove too much data down one individul MIDI out.

Craig Anderton
West Coast Editor

MOD SQUADRON

Q *I currently own an E-mu Systems Emax version 1. I'm interested in locating information on a mod I can do to help alleviate the noisy outputs. I would characterize the sound as a high electronic whine. A friend of mine mentioned to me that he had seen an article on the subject by Craig Anderton that called for the replacement of certain capacitors. Could I get a copy of the mod from Mr. Anderton? If not, could you point me in the right direction so that I could obtain a copy of the documentation?*

Ruben Ayala
Dallas, TX

A I don't recall writing the article you describe, so I checked with Riley Smith at E-mu to see if he could chase anything down. No one at E-mu was aware of any such mod. The problem sounds like it could be a ground loop: to check, plug Emax into its own outlet and mon itor it using a battery-powered amp (a headphone amp is ideal). If the whine persists, there's a problem with Emax so check with your local service center.

If the whine is gone, then the problem is due to Emax's interaction with your system. If there's no ground loop, there may be interference between Emax's clock frequency and that of other gear. E-mu reports occasional problems with Proteus driving a QuadraVerb, but isn't aware of any problems involving Emax.

Craig Anderton

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- Studios simulate the legendary SSL sound with LOGIC FX on other consoles.
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For more information about the LOGIC FX G384 Stereo Compressor and the LOGIC FX G383 Dual Mic Amplifier and Equaliser call:

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Solid State Logic, Inc. 320 West 46th Street New York, N.Y. 10036

CIRCLE 07 ON FREE INFO CARD

BLUE SUEDE SHOE-INS

October's 91st AES Convention at the New York Hilton was a winner for the whole pro audio industry, but we can't help playing favorites . . .

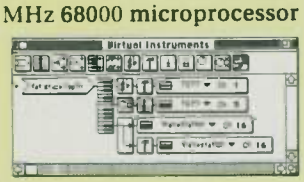
EQ's Editorial Board combed the AES floor in New York last October to investigate the literally hundreds of new product introductions. We then undertook the near superhuman task of scaling the accumulated mountain of material to come up with those products we believe most beneficial to our project recording and sound readership. Upon those lucky few, we now here proudly bestow our first annual *EQ* Blue Ribbon "Best In Show" Award for excellence. While we have had a little fun with the titles of each award, we earnestly predict that these product innovations will change the sound scene in the year ahead. (The winners below have not been arranged in any particular order, although orders will be graciously accepted by all. For the complete new prod story, and for Roger Nichols' take on the show, turn to page 54.)

THE SHOW A LITTLE SMPTE AWARD TO THE FOSTEX PD-2 PORTABLE TIMECODE DAT RECORDER

The world's first portable timecode DAT recorder, the PD-2 from Fostex, gives up-to-the-frame audio accuracy for film and stereo television recording. The recorder has many convenient features, including rapid search keys, built-in monitor loudspeaker and automatic temperature control. (List price: $10,950.) Circle EQ free lit. # 153.

THE MIDI MULTI-CHANNELING AWARD TO THE OPCODE STUDIO 5

The new Studio 5 from Opcode supports up to 240 MIDI channels and can store up to 128 MIDI processing patches. The powerful MIDI/SMPTE interface/processor/synchronizer/patchbay also features a 16 MHz 68000 microprocessor and 64K RAM. (Price to be announced.) Circle EQ free lit. # 178.



THE DIG THIS DESIGN AWARD TO DIGIDESIGN PRO TOOLS

Digidesign improves upon its popular Sound Tools with the introduction of the Pro Tools Multitrack Audio Production System. Pro Tools has integrated digital audio and MIDI recording and editing; high resolution digital mixing and high

fidelity multichannel hard-disk recording. (List price: $5995.) Circle EQ free lit. # 138.

THE AFFORDABLE DAWS OF PERCEPTION AWARD TO THE HYBRID ARTS DIGITAL MASTER SYSTEM

Hybrid Arts' new digital audio workstation, Digital Master, is an affordable complete disk recording/ editing system, including a CPU, monitor and mouse, 105 megabyte hard disk, A/D and D/A converters, MIDI/SMPTE interface and software. (Price: $4500.) Circle EQ free lit. # 157.

THE AUDIO KITCHEN SYNC AWARD TO THE TIMELINE MICRO LYNX SMPTE/MIDI SYNC/CONTROLLER

TimeLine, known for their Lynx Time Code Module, introduced the Micro Lynx SMPTE/MIDI sync/controller designed for the project studio, or smaller post production facility. At a low-cost, the expandable Micro Lynx supports two transports plus MIDI and sports a host of features, including a Macintosh interface and a full-featured keyboard. (List price: $2495.) Circle EQ free lit. # 212.

THE CUISINART FOR YOUR EARS AWARD TO THE ENSONIQ DP/4 PARALLEL EFFECTS PROCESSOR

Ensoniq enters the effects processing arena with the impressive DP/4 Parallel Effects Processor. The DP/4

has 400 presets and features four custom 24-bit DSP chips, 4 inputs/outputs and 39 effects algorithms. The powerful processor has a software-based patchbay and submixer and extensive parameter modulation capabilities. (List price: $1395.) Circle EQ free lit. # 149.

THE MULTI-FACETED, MULTI-TALENTED AWARD TO THE PEAVEY SDR 20/20 DIGITAL MULTI-EFFECTS PROCESSOR

Two separate memory banks, each supporting 128 presets, highlight Peavey's full-stereo SDR 20/20 Digital Multi-Effects Processor. The SDR 20/20 offers over 35 different effect types that can be arranged in any

order of series and/or parallel combinations. Each effect parameter is assignable to MIDI control — up to nine controllers per preset. (Price to be announced.) Circle EQ free lit. # 181.

THE YOUR INPUT IS OUR OUTPUT AWARD TO THE YAMAHA PM4000 MIXING CONSOLE

Yamaha's newest mixing console, the PM4000, succeeds their popular PM3000 with many client-friendly improvements, including a four-band fully parametric channel equalization and two stereo auxiliary sends. The PM4000 is available in 32, 40 and 48 input configurations. (Price range: to be announced). Circle EQ free lit. # 218.

THE IS IT DIGITAL OR IS IT ANALOG? AWARD TO THE EUPHONIX CRESCENDO SYSTEM II CONSOLE

Euphonix brings their Crescendo System II (CSII) digitally controlled analog studio system to America with its MixView software, Dynamic Mix Automation, SnapShot Recall, user-definable signal path and compact control surface.

The CSII comes in a variety of sizes ranging from 24- to 96-fader systems. (Prices start at $100,000.) Circle EQ free lit. # 150.

THE REAL GOLDEN REEL AWARD TO AMPEX 499 STUDIO MASTERING TAPE

Complementing their Grand Master 456, Ampex has introduced 499 Grand Master Gold mastering tape with low noise and distortion in addition to a wide dynamic range of +9.0 dB and beyond. The new 499 Grand Master Gold is available in 2-inch, 1-inch, 1/2-inch and 1/4-inch widths. Circle EQ free lit. #241.

THE HOT LIPS AWARD TO THE SONY C800G MICROPHONE

The unique C-800G from Sony is the world's first tube microphone with a thermoelectric cooling system. The microphone features a Peltier device, which is a type of semiconductor that controls cooling and heating by DC current, and permits optimization of the tube's operating temperature resulting in improved noise performance and transient response. (About $5600.) Circle EQ free lit. # 242.

THE ALFRED HITCHCOCK PROFILE AWARD TO THE JBL 4200 SERIES STUDIO MONITORS

The unique shape of JBL Professional's new 4200 Series Studio Monitors adds more than visual excitement to their loudspeakers by providing a curved surface to deflect possible reflections of shorter wavelengths away from the listening position. Each of the models in the series features a 25 mm pure titanium diaphragm high-frequency transducer. (Price range: $395 to $525.)

THE CASTRATI WITHOUT THE DRAWBACKS AWARD TO THE DIGITECH VOCALIST

Alter your voice without altering your body with the VHM 5 Vocalist from DigiTech. The VHM 5 utilizes a digital splicing system that shifts the basic vocal notes without changing the vocal cavity overtones or resonance, so all vocal harmonies are natural sounding and real. (List price: $850.) Circle EQ free lit. # 141.

THE WATTS HAPPENING AWARD TO THE CROWN MACRO-TECH 3600VZ SERIES AMP

Crown has introduced the powerful 3600VZ Macro-Tech Amplifier, which uses a variable impedance power supply circuitry that packs 3600 watts of power into a compact 3.5 inches of rack space. The 3600VZ offers a frequency response of ±.1 dB from 20 Hz to 20 kHz at 1 watt. (List price: $2895.) Circle EQ free lit. # 134.

THE NOT FADE AWAY AWARD TO THE TASCAM MOVING FADERS (FOR ITS M-700 CONSOLE)

Tascam adds moving faders to its M700 production console and also offers the moving fader system separately as the M7/MFA, which will upgrade any manufacturer's console. The package comes with all the necessary computing power, although a PC may be used as a terminal for enhanced display capabilities. A 40-channel moving fader system from Tascam sells for $50,000. Circle EQ free lit. # 207.

THE MIDI MARATHON AWARD TO THE JLCOOPER MLA-10 MIDI LINE AMPLIFIER

The MLA-10 from JLCooper is a MIDI line amplifier specifically designed for sending MIDI data over long distances. The self-powered MLA-10 can send 4 independent MIDI lines bi-directionally in excess of 1000 feet. (List price: $499.95.) Circle EQ free lit. # 161.

THE MIDI DOG COLLAR AWARD TO THE SYNCHROVOICE MIDIVOX

The voice-free, hands-free MidiVox from SynchroVoice enables the users to lock their synthesizers to their voices and precisely translate vocal nuances into MIDI instructions. MidiVox features a unique bio-sensor that electronically monitors vocal folds via a soft neck band. (Price to be announced.) Circle EQ free lit. # 203.

THE WORDS OF MOUTH AWARD TO THE AUDIO-TECHNICA AT4033 STUDIO CONDENSER MICROPHONE

Audio-Technica's new addition to its 40 series line of studio microphones, the AT4033, is of the same transformerless design as the AT4049, AT4051 and the AT4053. The AT4033 offers a low-mass, large diaphragm that's vapor-deposited with 50 angstroms of gold and aged in a five-step process. This special diaphragm provides reduced distortion and improved frequency and transient responses. (List price: $699 [includes shock mount].) Circle EQ free lit. # 120.

Gotham's Perestroika

THE WALKMAN LOOK-ALIKE AWARD TO THE TECH 21 SANSAMP

Weighing just over one pound, SansAmp from Tech 21 is a tube amplifier emulator engineered for recording direct and performing live. SansAmp delivers the warm, rich, natural tones of tube amplifiers, ranging from very clean to full saturation, in one compact unit. (List price: $295.) Circle EQ free lit. # 210.

THE MIKHAIL GORBACHEV PERESTROIKA AWARD TO THE GOTHAM AUDIO UM-70 MICROPHONE

Gotham Audio journeyed to East Germany and pulled the UM-70 Perestroika Microphone from the ruins of Communism. The UM-70 3-pattern capsule is precisely designed from a single-piece brass backplate with 153 hand-drilled holes and a gold sputtered membrane. The amplifier system (MV692) operates from any phantom power supply within a range of 12 to 48 V. (List price: $995.) Circle EQ free lit. # 156.

THE ADAT IS NOT A DAT AWARD TO THE ALESIS ADAT 8-TRACK DIGITAL AUDIO RECORDER

Alesis's new 8-track professional digital audio recorder, the ADAT, turned many (helical?) heads with its unique recording format which uses easily obtainable SVHS tapes. Up to as many as 16 ADATs can be linked together and controlled via the BRC remote control, providing 128 available tracks. (List price: $3995.) Circle EQ free lit. # 107.

Audio-Technica's AT4033

THE GRUBER/SCHNEIDERMAN PRIME RATE AWARD TO THE AMS LOGIC 2 AND SOLID STATE LOGIC SL8000 CONSOLES

Impressive new entries from high-end production console manufacturers include the Logic 2 from AMS and Solid State Logic's SL8000. The Logic 2 integrates a digital desk with an analog-style control surface and features total dynamic automation of virtually all channel parameters. The SL8000 is the world's first multi-format production system, capable of mixing for Dolby Surround, Dolby SRD-D, Kodak CDS, HDTV and "3-D" music recording.

"The Beta 58 delivers maximum SPL, to keep the vocals above screaming fans in a loud rock club — without feedback. Yet it has the sensitivity to reproduce the most subtle, breathy whisper for 80,000 people at an outdoor festival. And for guitar amps, the Beta 57 gives me the isolation I need without sacrificing the warmth and tone I want. For live sound, Shure Beta mics are the state of the art."

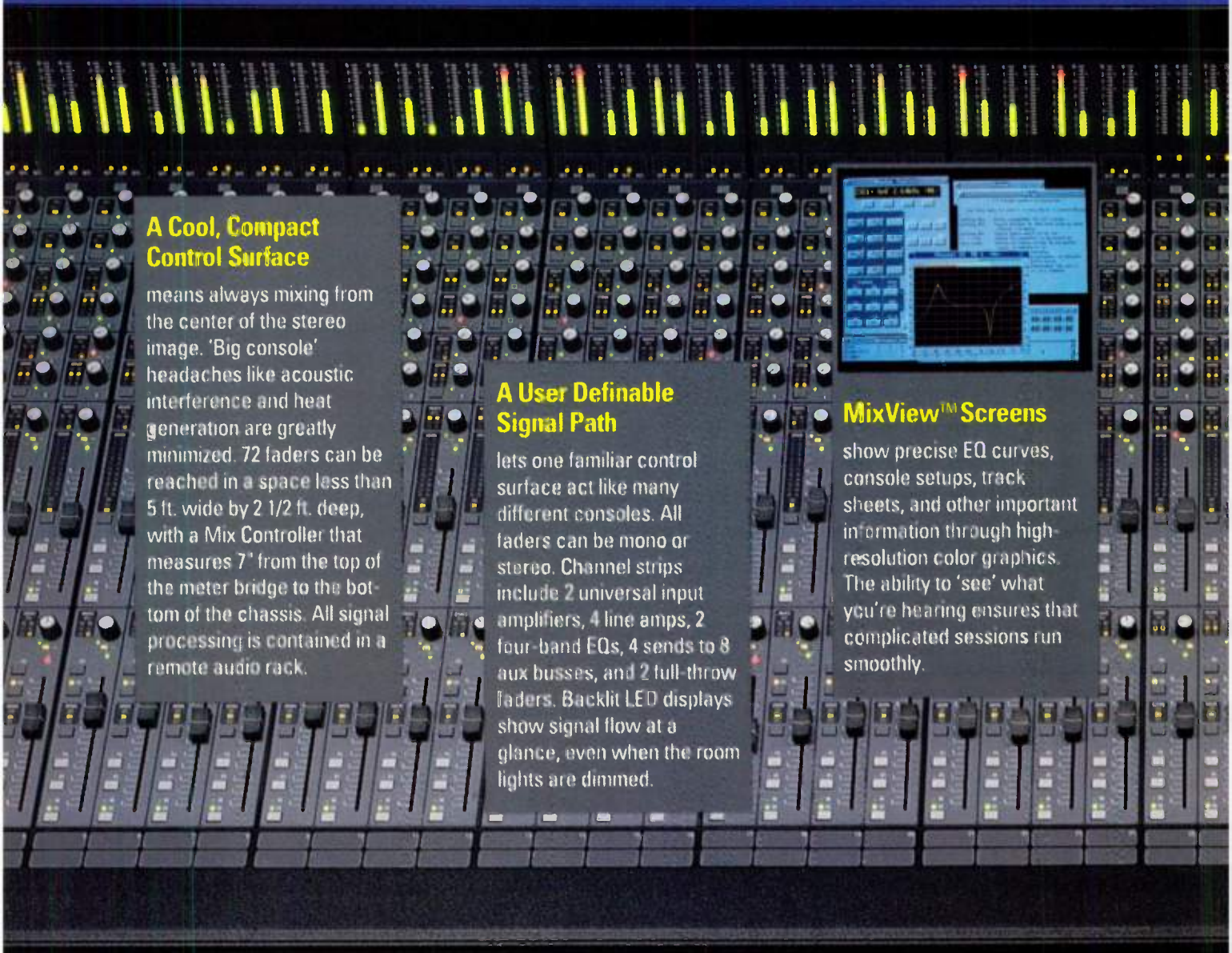
Steve Folsom, Sound Engineer for Melissa Etheridge and John Hiatt.

Shure Beta Microphones. Buy Them On Word Of Mouth Alone.

Before you select a microphone, listen to the leading pros who use the Shure Beta Series on stage. They'll tell you about the benefits of Shure Beta's advanced transducer design, extraordinary gain-before-feedback, and true supercardioid polar pattern, as well as its outstanding sensitivity and low handling noise. But most important, they'll tell you that nothing beats a Beta for live performance. And that's not just talk. Try Shure Beta today and get the final word for yourself. Or call us for more information at 1-800-25-SHURE. The Sound Of The Professionals®...Worldwide. SHURE BETA

CIRCLE 49 ON FREE INFO CARD

TOTAL AU



A Cool, Compact Control Surface

means always mixing from the center of the stereo image. 'Big console' headaches like acoustic interference and heat generation are greatly minimized. 72 faders can be reached in a space less than 5 ft. wide by 2 1/2 ft. deep, with a Mix Controller that measures 7" from the top of the meter bridge to the bottom of the chassis. All signal processing is contained in a remote audio rack.

A User Definable Signal Path

lets one familiar control surface act like many different consoles. All faders can be mono or stereo. Channel strips include 2 universal input amplifiers, 4 line amps, 2 four-band EQs, 4 sends to 8 aux busses, and 2 full-throw faders. Backlit LED displays show signal flow at a glance, even when the room lights are dimmed.

MixView™ Screens

show precise EQ curves, console setups, track sheets, and other important information through high-resolution color graphics. The ability to 'see' what you're hearing ensures that complicated sessions run smoothly.

The Crescendo System II

The Crescendo System II combines the wide dynamic range and smooth frequency response of analog signal processing with the power and flexibility of digital control. The result is a studio control center that helps to produce superior projects quickly and efficiently. If you're looking for a system that provides Total Automation™ and the highest sound quality available, consider the CSII from Euphonix.

TOMATION.™

Snapshot Recall™

reconfigures the entire system in less than 1/30th of a second. Dramatically different mixes can be compared instantly with the press of a button. Console setup time is no longer an issue when changing sessions.

Dynamic Mix Automation™

records all control changes with reference to time code including faders, mutes, EQ, aux sends, preamps, routing, and effect inserts. Let the console remember your mixes, pass after pass, project after project.

Modular 'Building Blocks'

allow systems to be configured in groups of 8 faders. System sizes range from 8 to 96 faders. Adding more inputs is as simple as plugging in more modules.

Euphonix

Digitally Controlled Studio Systems

220 Portage Avenue
Palo Alto, California 94306
(415) 855-0400 Fax: (415) 855-0410

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CIRCLE 32 ON FREE INFO CARD

Top Spin

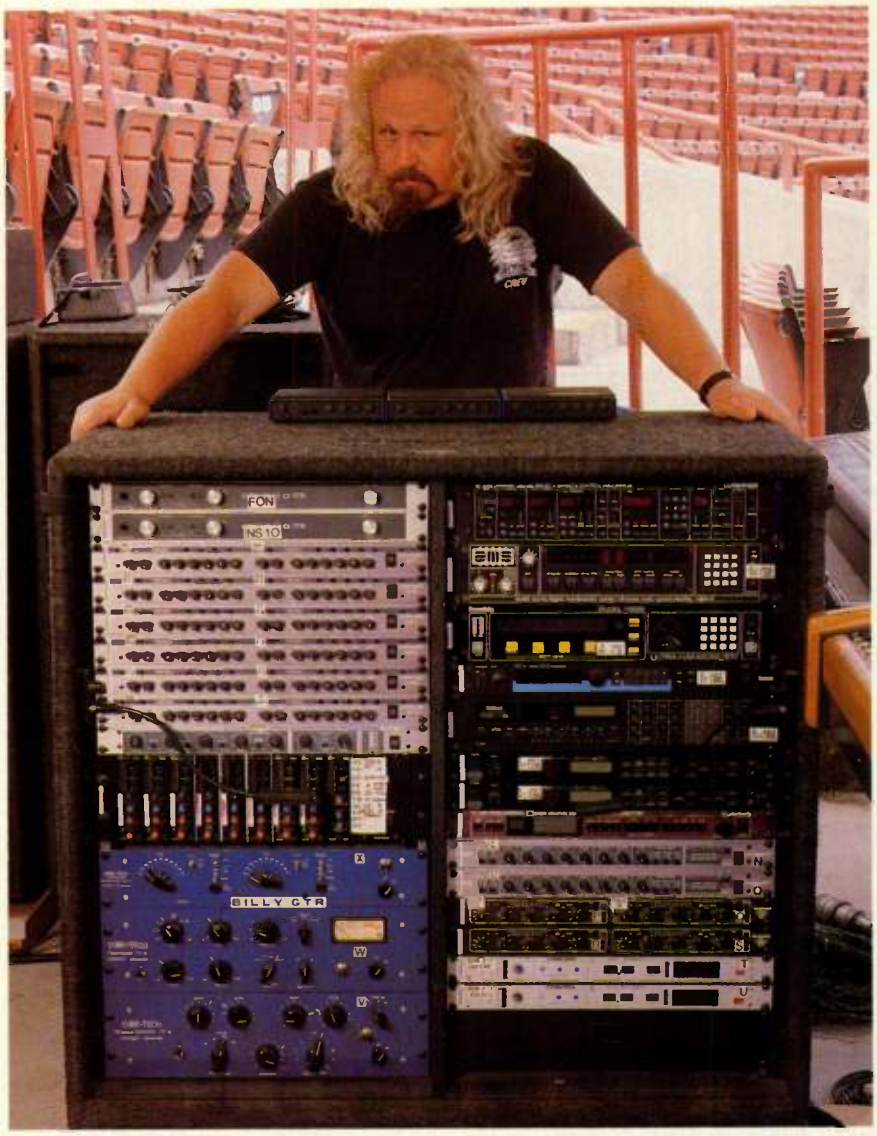


Photo by Ed Colver

Name: M.L. Procise, senior sound engineer for Showco.
Credits: ZZ Top's recent World Recycler Tour, Michael Jackson, Genesis, The Beach Boys, Boston, ELO, Average White Band, Joan Armatrading, Saturday Night Fever Tour
Main FX rack: Double rack that includes an AMS 1580 reverb as an ambience program to snares, Eventide Ultra-Harmonizer H3000 for special vocal effects and reverbs, T.C. Electronics 2290 delay for vocal delay and chorusing, a Lexicon PCM70 for tom toms, Yamaha Rev5 to add color to tom toms, Yamaha SPX900s (one for guitar delays and a second as a backup for T.C. 2290), T.C. Electronics 1128 programmable EQ and spectrum analyzer as an insert or lead vocal channel for certain effects, Aphex Expressor (single rack-mount) as vocals limiters, Drawmer DL221 stereo comp/limiter primarily for use with 2 E-mu drum kit limiters and stereo bass guitar, Klark-Teknik 716B pro digital delay line (top one as an insert on right side of vocal subgroups to add stereo imaging to vocals and a bottom one to do the same thing for guitars), 2 Crown D75 amps (one to drive NS-10s and another to drive headphones), 6 single-rack space Aphex 612 dual expander gates (12 gates on drums and the others for vocals and instruments), Aphex Dominator II peak comp/limiter (for snare drum), dbx 900 mainframe with six 904 and two 903 comp/limiters and TubeTech mic pres, comp/limiters and programmable EQs all used for guitar sound.
Recording rack: Tascam DA50 DAT recorder, Tascam CD501 CD player, 6-channel Biamp mixer, 2 Klark-Teknik 716B pro digital delay lines, Tascam cassette deck.
Console: Harrison HM5 32-channel board with 32 mic pres, 16 line level returns, 8 stereo subgroups, 8 VCA subgroups, 8 mute groups with 16 effects sounds. Also uses 20-channel Harrison HM5 expander.
Drum Kits: Electronic drum kit with D-Drum pads and D-Drum Brain, and a Tama acoustic kit.

Equipment Notes: The entire rack has been put together over the last year. Some of the equipment, like the Dominator II and the Expressor, are state-of-the-art pieces, and I've handpicked all of the equipment myself. I use all the dynamic gear including reverbs, comp/limiters and everything in the recording loop all the time. I use them so that I can have the fastest, cleanest sound possible.

The trademark guitar sounds are achieved with the help of the TubeTech gear. They offer the best, non-hurting, in-your-face sound you'll ever hear at a concert. The Eventide H3000 is my most used vocal device. I use it on one song to bring vocals down one octave, but I don't mix in the original. Some of its effects I like most are its rich chorus — which is the finest chorus sound you'll ever hear — and AutoPan and a number of other reverb sounds.
Pro Tips: I take a methodical approach to every song. Consistency and accuracy are the most important elements in executing a transient reproduction of the program material. Using your tools properly, such as the dynamic processors and effects devices, is critical to delivering a pristine audio effort. EQ

Phil Ramone photos by Michael Bloom

We asked Phil Ramone to field test our new AT4033 studio condenser microphone.

He wouldn't give it back!

AT4033 Studio Condenser Microphone

Phil Ramone knows exactly what he wants from a studio microphone. And when he tested a sample of our new AT4033 cardioid condenser microphone, he knew it was right for him and ideal for the artists he records.

He liked being able to concentrate on getting the right music from the musicians, rather than first spending time experimenting with EQ to get the right sound.

What Phil Ramone heard was the result of new condenser technology inside the AT4033. The diaphragm is only 2 microns thick, with a vapor-deposited gold conductive coating just 50 angstroms thick. This sophisticated, very low-mass diaphragm is aged in a five-step process that insures unchanging performance for years.

The high head-room and wide dynamic range, plus low noise floor, make the AT4033 ideal for the most demanding digital recordings. And the maximum input SPL is an awesome 140 dB, so important when recording high-output instruments and very close-up vocals. In addition, transformerless design contributes to overall sonic transparency. The AT4033 also includes a switchable 10 dB pad and lo-cut filter, plus a built-in pop filter and internal shock mounting.

We're not certain we'll ever get the sample AT4033 back from Phil Ramone, but no matter. We're busy making your AT4033 right now. For more details on this impressive new microphone, ask your A-T sound specialist to schedule a test of the AT4033 today.

audio-technica.

Available in Canada and the U.S.A. from Audio-Technica U.S., Inc.
1221 Commerce Drive, Stow, Ohio 44224
(216) 686-2600 • FAX (216) 686-0719

CIRCLE 37 ON FREE INFO CARD

Cutting the Ruggieri

Room: Ruggieri Music, NYC
Top gun: Robbie Ruggieri — owner, operator, composer
Main side arms: Brett Rader, engineer; José Parada, composer/programmer.
Credits: Ads for New York Telephone, Aruba (the island), New Coke, Holiday Inn, Visine, VW Jetta. Theme for ESPN. This December the ballet he composed and produced (working with choreographer Ulysses Dove) for the Alvin Ailey Dance Troupe debuts at City Center.
Console: Trident Series 75, 28 inputs; Akai MPX 820
Recorders: Otari MX-80, Otari MX-5050, Panasonic SV-3500 DAT
Mastering Tape: Ampex 456
Synchronizers: Roland SBX-80, Adams-Smith Zeta Three
Sound Generators: Yamaha DX-7S with Opcode Editor/Libarian, E-mu Proteus, Kawai K1, Roland D550, Casio VZ10M, Akai S1000 with 8 megs RAM and Eltekon 45 meg removable hard drive, two Akai S1000s with 10 megs RAM, Akai S900, two Korg EX 8000s, two Casio CZ 101s, Yamaha FB 01, Yamaha TX 81Z.
Outboard Gear: Two Lexicon LXP-1s, Lexicon LXP-5, Yamaha SPX-90, Alesis Quadraverb, two Ibanez SDR-1000s, Delta-Lab Effectron II, dbx 166 compressor, Valley People gate/ expander, Audio Tech Systems Stereo Exciter, DigiTech IPS 33B.
Monitors: Yamaha NS-10s.
Computers: Macintosh IIci, SE, and two Mac Pluses; Opcode Studio Plus II MIDI interface. Software: Sample Cell, Performer, Galaxy and Vision.
Equipment notes: Our Adams-Smith Zeta Three synchronizer saves a lot of time, and having the sampler in the Mac IIci with Sample Cell makes everything we do more streamlined and clean. The Akai S1000s are another big time and money saver; we just copy and drop in the vocals whenever and wherever we want. Still, I can't wait until all the equipment is incorporated into the computer programs.

Studio notes: Two factors make this place so much better for me than renting studio time and space. One, everything is just the way I like it. I can have it all set up the way I like and leave it like that. Having my own place allows me to get organized instead of running around town all the time. I'm no longer at the mercy of the studio and its schedule. Two, the comfortable, stylish surroundings make it more relaxing and fun for me and for my clients, especially in the film and TV business. Those guys are used to luxury. EQ

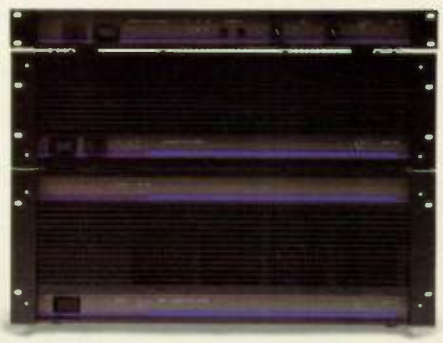
Photo by Grant Roberts

RELIABLE PLAYERS

CRYSTAL TALIEFERO ON QSC.

I always work with the best.
Billy Joel, John Mellencamp, Bob Seger,
and QSC in my monitors.
I like my vocal mix loud.
After all, background vocals
aren't always in the background.

QSC Power Amplifiers...as reliable as the players who use them.



QSC
AUDIO

QSC Audio Products, Inc.
1926 Placentia Ave., Costa Mesa, CA 92627
714 645 2540

CIRCLE 42 ON FREE INFO CARD

All In One and One for All

For many years I've been on the record about my somewhat unorthodox digital recording techniques. I've always taken a minimalist approach, going direct from the microphones to two-track digital with the least possible analog and digital interference along the way. For recordists accustomed to "fixing it in the mix," this may sound like overkill, but for me and for those who've heard how great a difference it can make in the CDs my record label, DMP, has released over the years, the difference is plain to hear. There's a distinguishable clarity, a sense of space and a dynamic range that can't be achieved by any other technique I know.

Though I've been labeled a digital "purist" since the days I experimented with the very first digital multitrack recorder for 3M back in the late Seventies, I've also continually searched for ways to improve the sound quality of CDs. This included designing custom Class A electronics, auditioning high-performance cables and numerous microphone designs and going into the recording session as prepared as humanly possible. Most recently, it included several rewarding recording sessions with Yamaha's new DMR8 digital mixer/recorder.

FEATURE PRESENTATION

The DMR8 combines a digital console and a 20-bit 8-track digital recorder in one 68-pound desktop unit. Key features include a 24-bit mixing bus and 32-bit equalizers. The DMR8 can be synchronized with sample accuracy to another DMR8 or to the Yamaha DRU8, a stand-alone, 20-bit, 8-track recorder. The DMR8 will also chase and lock to SMPTE timecode from another device. The system was designed with Yamaha SPX1000 effects processors in-board, eliminating the need for A-to-D or D-to-A conversions.

Furthermore, the DMR8's 20-bit dynamic range, which is actually higher than anything currently available in the super pro world of 32 and 48 track, means that for the first time since the CD was introduced you can work "above the threshold" of the product the consumer will hear. The end result is something similar to the "extra headroom" that recording pros achieved in LP days by using high tape speeds, or Dolby or other noise reduction.

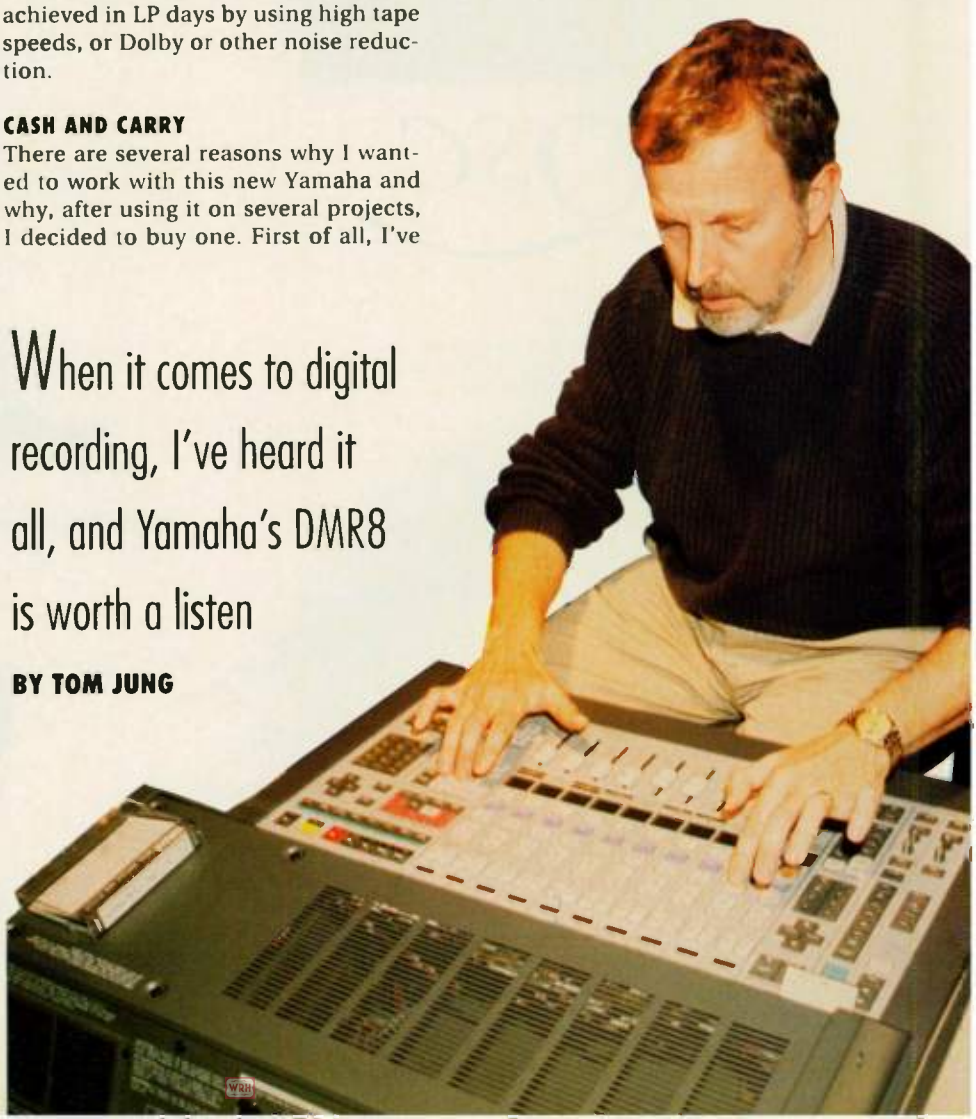
CASH AND CARRY

There are several reasons why I wanted to work with this new Yamaha and why, after using it on several projects, I decided to buy one. First of all, I've always tried to avoid any equipment that requires multiple A-to-D and D-to-A conversions. I firmly believe those conversions take something away from the music. As an integrated, all digital system for audio recording and mixing, the DMR8 allows me to convert to digital from the start. In fact, the music is converted to digital in the outboard A-to-D converters, before it even reaches the console. The next time the sound is analog again is when the CD is played in the consumer's home. The ability to do that is a very powerful, unusual and valuable capability for my type of recording.

My "aversion to conversions" from digital to analog and vice versa is the basic reason for my "purist" approach to recording digital. In fact,

When it comes to digital recording, I've heard it all, and Yamaha's DMR8 is worth a listen

BY TOM JUNG



since I started up DMP, I've rarely touched any recording studio equipment. I use their "real estate" or studio space, the control room, the headphones, but otherwise I bring all my own gear. In the past, this meant that I had to transport racks and racks of analog equipment, all of which then had to be patched together on-site. Now I just put the DMR8 in the trunk of my car. It's the recorder, the mixer, all the processing equipment — everything.

So far I've used the DMR8 to record two currently available compact discs — *Radioface* by the Bob Smith Band and *Balance* by Chuck Loeb — as well as recordings for The Dolphins, Warren Bernhardt and Bob Mintzer that will be out by early next year. If you listen to these discs you'll notice little sonic difference from the earlier DMP products that all went direct to two-track digital. In fact, I've found that the system is very flexible, adapting to a wide variety of recording styles. It provides preprogrammed styles but you can make your own "user" style based on track assignments, panning effects, etc.

READY, PRESET, GO

The unit can really make a difference in getting started. Because you can preset a lot of your technical requirements, the DMR8 allows you to get a quick start on a session. Virtually every parameter on the console can be programmed into several snapshot memories in the record mode, and a real-time memory in the auto/mix mode. This means you can easily pick up where you left off the day before.

The internal processing is also impressive. The effects processors have good reverb to start with, plus you can go into the programs and adjust the parameters to suit your own taste, which I like to do. The EQ also sounds great. I generally use very broad curves; the DMR8 has the ability to go down to a Q of 0.1, which is several octaves wide and has minimum phase shift. I don't use a Q that wide, but the point is that the DMR8 lets you go as broad or as narrow as you want. All in all, the resolution of Q and EQ parameters is very good.

The ability to synchronize two units comes in handy too. At one point during the recording of *Balance*, we found we had a great solo on one take, but the band had played better on another take. Since both had been done to the same click track, we locked two DMR8s together and flew the solo track over to the other band track. This was done, of course, completely in the digital domain.

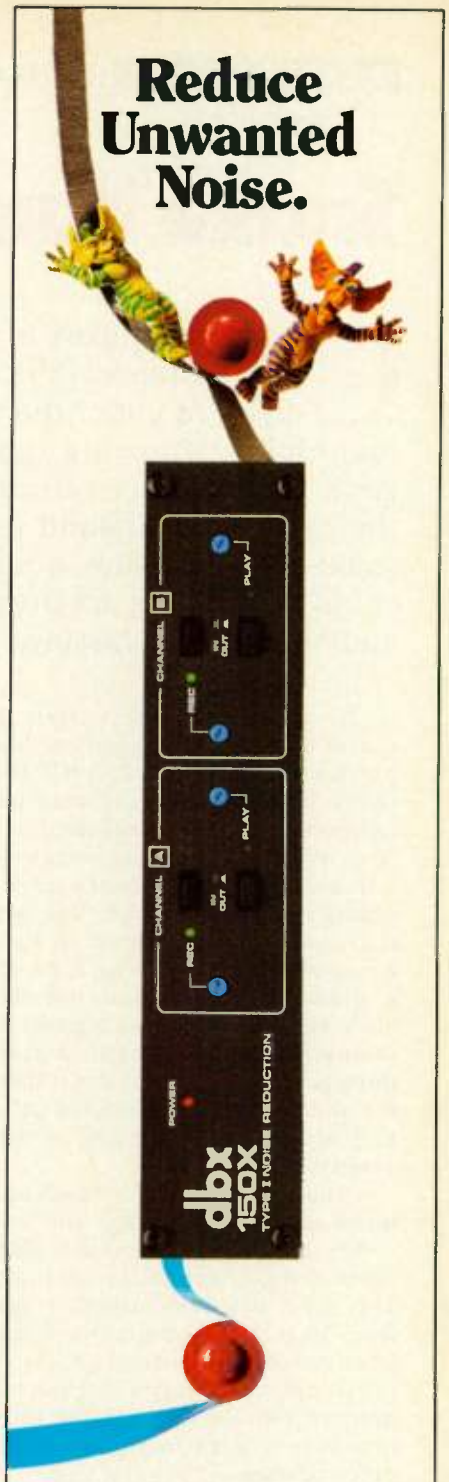
Despite a growing trend toward hard-disk storage systems, I find the DMR tape-based system a major advantage. With hard disks you have to sit around while it loads and unloads information. Maybe I'm old fashioned but I prefer to pull the DMR8's 8mm tape cartridge out of the machine when I'm finished and slip it back in when I begin again. There's no waiting time. Hard disks also don't always give back the exact information you put in. With tape you always get back the exact information you put in. With tape you're always reading off the exact magnetic particles you recorded onto.

SUGGESTION BOX

I do have some recommendations for the Yamaha design team. For one, I would have designed the faders differently. The DMR8 has short-throw faders. I'd prefer longer throw faders with more resolution (even though there's a relative mode that provides additional resolution when the need arises). Another minor drawback is that the tape transport is a little slow (however much I've gotten used to it).

Still, the DMR8 is a great tool with many applications for the home and commercial studio, and even for broadcast and video post-production applications. You plug a power amp, a pair of speakers and a DAT machine into it and you've got all you need to mix and record. To expand your track capacity to 24, just plug in two 8-track rack-mounted units. There's a serial hookup whereby you can record continuously. That is, if you want to record for ten hours straight without missing a note of music, you can.

To sum up, the DMR8 meets all my demands for digital sound quality and provides me with the ability to manipulate and process sound without sacrifice. In fact, after using this system, I'd find it hard to go back to my "old" ways of working. EQ



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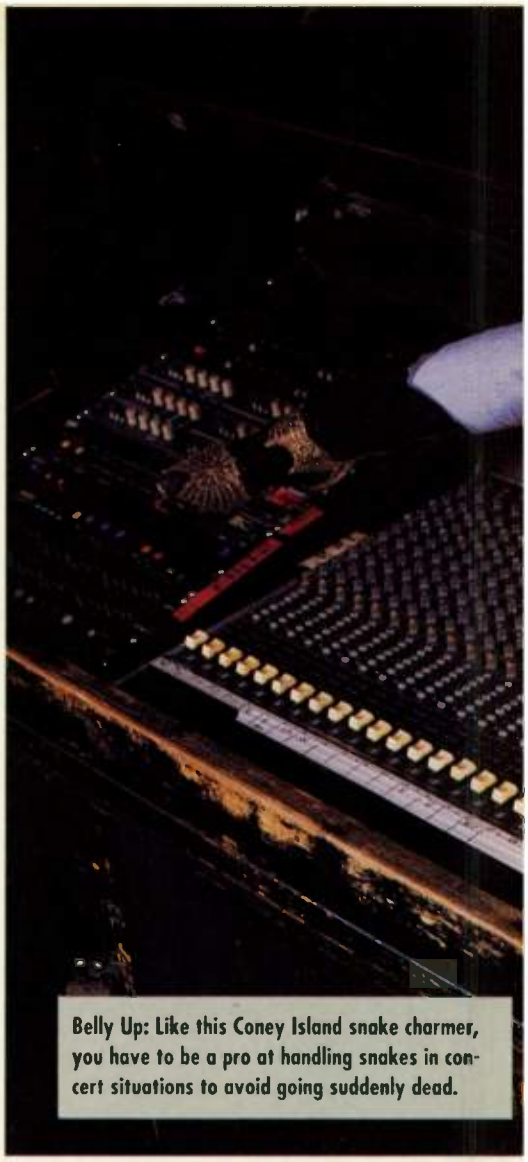
CIRCLE 06 ON FREE INFO CARD

Snake Handling

Charming snakes is a mysterious art, but when a snake connects the mixer to the stage it must be a creature under the complete control of the sound technician. Knowing the best techniques to charm a good performance out of the snake is as important to the professional sound tech as it is to the professional snake charmer. Sure, a mistake won't kill anyone, but it could prevent the act from killing. And no one wants the audience to start hissing.



Belly Up: Like this Coney Island snake charmer, you have to be a pro at handling snakes in concert situations to avoid going suddenly dead.

Photo by Peter Monroe; photographed at Limelight, NYC

There are a wide variety of snakes in the audio industry (nothing personal intended). "Snake," of course, is a slang term for multi-pair cables, which carry anywhere from a few to hundreds of audio signals. These circuits can contain microphone signals, line level audio signals, loudspeaker power, headset communications, MIDI data, PA-422 or other sound system control data, video signals, DC control signals, AC mains-power, etc. The important thing is that the signals do not interact and the signals reach the other end of the snake exactly as they entered it.

There are snakes for many purposes and in many forms. The most common snake in live sound applications is the Front-of-House snake. This multi-pair cable usually carries from 16 to 120 microphone signals from the stage to the mix position in the audience. It may also carry the outputs from the mixer, EQ or active crossovers back to the amplifier racks, onstage.

There are also smaller sub-snakes that typically lead from drum kits, keyboard rigs, or the front line of vocal mics to the main snake. These greatly speed up setup and tear-out when compared to running a dozen separate mic cables each time. In some venues a permanently installed snake will already be in place that leads from the stage to the mixer in the house. These can save some work in setup and tear out, if they work; if they don't, it can mean wasted time troubleshooting someone else's equipment.

LIVE WIRES

The snake consists of three main components. The head is usually a metal box with female XLR-type connectors for inputs and male XLR-type connectors or 1/4-inch phone jacks for outputs (returns). Some situations require a fan-out of in-line connectors instead of the box. Each connector is numbered and commonly the "returns" are given letter designations. Each connector is wired to a shielded-twisted-pair of wires in the multi-cable.

The multi-cable may be 20-feet long or 1000-feet long depending on the application. Special consideration of the wire size and capacitance must be made if long runs of cable are used or the cable will have an impact on the sound quality that reaches the other end.

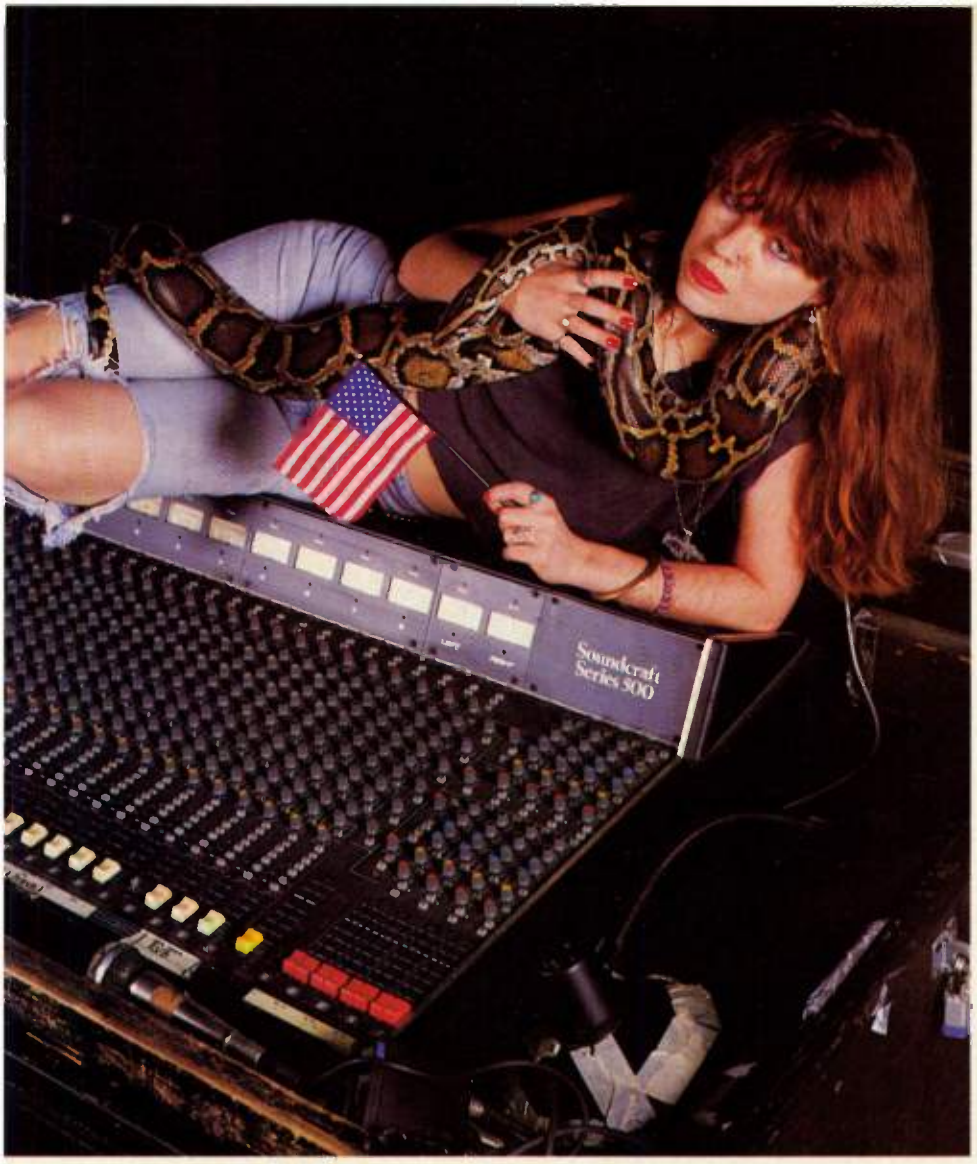
At that end the cable will again enter a box or fan-out that has connectors of the opposite sex but (hopefully) the same labeling as the stage end.

A few lines about the twists and turns of those tricky multi-pair cables

BY WADE McGREGOR

BALANCING THE SCALES

The signals running through a snake should be balanced and low in impedance. This will help to minimize the impact the cable resistance and various electro-magnetic fields encountered along the way have on the signals carried in the snake. Whenever practical, a separate snake should be used for signals that are at different levels and impedances — a snake for the microphone signals (sources in the 0.006 volt region and 200 ohm impedance), a snake for line level signals (sources in the region of one volt and 60 ohm impedance) and a snake for the loudspeaker runs (in the tens of volts, possibly even over 100 volts and extremely low output impedance). It's common, however, to find mic and line levels using the same multi-pair cable. This should only be done if the signals are all balanced, the shielding on the individual pairs are in good condition and the



New digital snakes allow signals of various types to be carried in the same cable without interacting.

cable is not extremely long. Mic level signals should not be mixed with loudspeaker level signals in the same cable. The loudspeaker cable has very different needs in terms of wire conductor size and shielding (none). Problems of incompatible signals in a cable may be exhibited in several ways: crosstalk between circuits, distortion, clicks, pops, and sometimes even high-frequency oscillation (feedback) can occur when the output signal from a line or power amplifier is coupled back into the mic input of the mixer.

SNAKE OILING

In order to preserve the snake for as long as possible (good ones can be expensive) there are several practices to follow. Do not pull the snake into place using the connector box; hold onto the cable. If the snake binds on something, go back and check it out, it may have caught on a jagged edge and be tearing into the outer jacket or even the conductors. Try to feed the cable out so that it will lay flat, this will make it easier to tape down so no one trips over it. Tape it down anywhere there is pedestrian traffic or cover it with rubber mats, if available. This will prevent a patron from suing you and it also prevents someone from tripping over the thing and breaking the connections within the sound system. If you can foresee vehicular traffic passing over the snake, try to find the type of rubber mat that's about three-inches deep with slots the width of your cable in it (two-by-fours strapped together can also work). Lay those across the roadway (it's not a highway, right?) with

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I was shocked when I got the call from Hafler to do an ad!

Usually manufacturers want some big name producer or **mixing** engineer with a lot of big name credits. Rarely do they want a **technical** engineer to endorse a product. Well, this ad proves I'm wrong. I've been using Hafler amplifiers since first cutting my teeth in the recording industry. Over ten years ago I started using the 200's at the Record Plant as headphone amplifiers. I was quite surprised at how good they performed and sounded. I moved to Capitol Records and started using the 500's to drive the studio monitors in Studio B and Studio C. We put the 200's on the nearfield monitors which most engineers reference to. When it came time to rebuild the world famous echo chambers at Capitol Records, naturally my choice was Hafler amplifiers. Then I designed MCA recording studios and the Uni Manufacturing Plant. I chose Hafler amplifiers exclusively to drive their speaker systems as critical listening is a must for final QC product.

One might ask why I chose Hafler, when with the budgets I've had I could have spent thousands more on esoteric amplifiers. The answer is simple. ***I think for the money spent, these are the finest amplifiers obtainable.*** End of story."

Pat Weber, Technical Engineer
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CIRCLE 34 ON FREE INFO CARD

your snake tucked into it. This will prevent a truck tire from crushing the snake into a mass of copper strands and plastic pulp. Whenever practical, secure the ends of the snake so that any strain placed on the cable won't unplug the thing or pull over the mixer. Keep the snake in a cable box big enough so that the coils aren't too small. If possible, coil the snake in a figure-eight pattern so it will have fewer twists and kinks in it. And keep it clean! Dirty connections are the most common cause of failure. Mud on the cable after that three-day festival will obscure damage to the cable jacket, as well as, eventually, find it's way into the connectors.

A DIFFERENT BREED

Sub-snakes carry signals from one part of the stage or studio to another. They help to simplify the setup and patching as well as reduce the number of cables that need to be taped down or stepped over. These snakes can connect MIDI equipment, guitar footboards or audio signals crossing the stage/studio. Anywhere a number of cables is required — drum kits, keyboard rigs, between mixer and effects rack, etc. — this type of snake can help keep the signals straight. When a repatch is required during the performance, a numbered snake is much easier to note on the patch list than a pile of coiled and unlabeled mic cables.

Special snakes can also be built: simply encircle a bundle of labeled mic cables with spiral wrap or cable ties every six inches or so. This will create a custom snake running from each mic in the drum kit, for instance, to the main snake with any excess neatly coiled and bound.

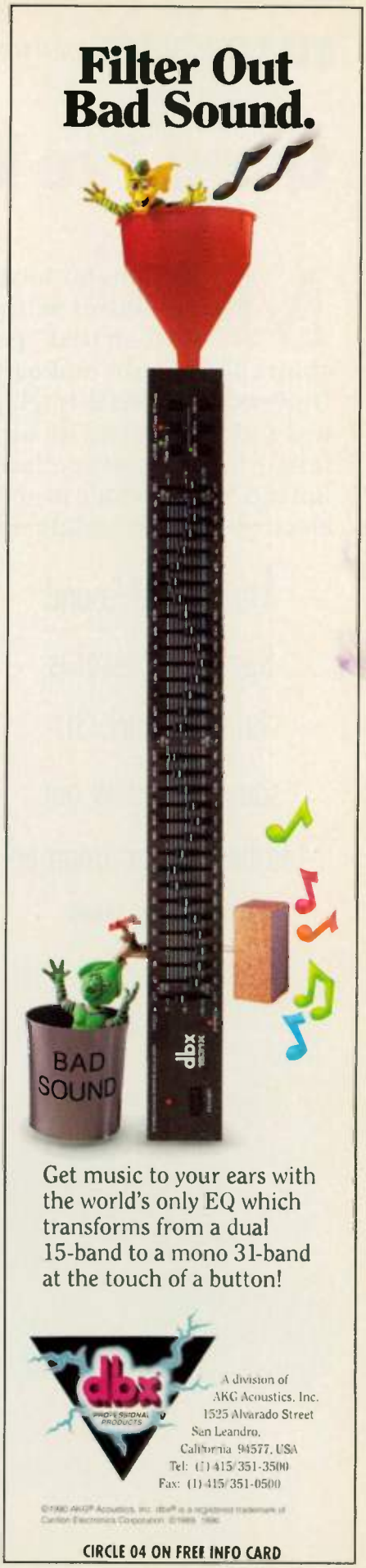
SNAKE, RATTLE AND ROLL

It's common to have an area above each connector on the snake box to note the assignment for later reference. This really can help tracing problems in the heat of a show, especially when there are several snakes in use. Carrying handles can be designed to also protect the connectors from damage.

Where the FOH mixer, onstage monitor mixer, broadcast or recording trucks may need to use the same microphones, DI boxes, etc., a microphone splitter will be required. This is often part of the stage end of the snake or may be in a box, rack or part of the onstage monitor mixer. This splitter will provide two to four outputs for each input. The better splitters will have transformers or active circuitry to isolate the outputs and ground lift switches to separate the grounding system of each user.

Special consideration of wire size and capacitance must be made for long snake runs.

The ideal snake should create the sonic impression that the microphone is plugged directly into the mixing console. The most modern of snakes makes this connection with a digital interface. These new snakes use digitized audio transmitted down ordinary copper cables or fiber-optic cables. The digital domain allows mics to be split and corrections for cable length, signal crosstalk and noise induction to be made, ones that are transparent to the user. Digital snakes can also allow signals of various types (audio, MIDI, remote control, video and communications) to be carried in the same cable without interacting. These new snakes carry signals long distances without the cable loss affecting audio quality and may be only the diameter of a single mic cable. The digital snake can even be smarter than its analog ancestors. We're currently at the edge of a major step (slither?) in snake evolution. You'll be able to tell your grandchildren that you remember when a snake was still a scary, mysterious animal. EQ



Quad Pro Quo?

My passion for localizing sound dates back to the late Sixties with my first use of the Buchie "quad spatial" panner (complete with voltage controlled reverb) and early experiments at the Stanford University Artificial Intelligence Lab. Then, years later, I was saddened when quadraphonic sound attempted and failed to be commercially viable. Lately, though, the Roland Sound Space processor has renewed my hopes of electronically recording my music in the round.

The Roland Sound Space Processor is bringing back 3D sound in a way our 4-fathers never dreamed

BY SUZANNE CIANI

Quad was drawn and quartered by the public and critics alike because, I think, of the confusion over what to do with its potential musically as well as by the hardware demands it made on the reluctant consumer. At that time, electronic music and production techniques were in their infancy, virtually unborn as far as most of the industry was concerned, and the prospect of moving acoustic sources around made no sense at all. So the only practical use seemed to be to replicate a "concert hall" ambience by detouring part of the front speakers' signal to the back pair. Needless to say, no one appreciated this phenomenon enough to justify its continuation and quad died a resounding death.

Now here we are, many years later, presented once again with the possibility of spatial enhancements with a variety of new devices, among them the Roland RSS, which I used in the production of my latest album, *Hotel Luna*. I am hopeful that given the major differences of "this time around," spatial sound is here to stay. This time four speakers aren't required, only two; the sounds we're dealing with are as likely to be electronic as acoustic, without need to enforce any "natural" spatial limitation. The appreciation of audiophile recordings has increased with the availability of high-quality media like CD and DAT and with the production of "sophisticated" computer-controlled mixes. MIDI as well now allows a wide variety of control possibilities.

STEREO PLACEMENT SERVICE

The fundamental questions still remain, however: How do you use this spatial possibility musically? And does anybody hear a difference anyway? My recent experience with the RSS explored some of the possibilities.

Since my music is purely instrumental, its focus is not drawn to a vocal, which allows me a broader space to play in and a chance to play with the subtleties. Whatever my choice of musical application of the RSS, I was impressed with the ease of expressing these choices. The front panel "hi touch" controls and LED feedback of position made both myself and my engineer immediately comfortable. All we had to do was make artistic decisions about what enhancements we wanted in each piece. The interface was transparent to our wishes.

This system is composed of two different types

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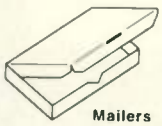
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The sound placement allowed my orchestration to "breathe" and kept sounds from trammeling each other.

of processors: binaural and transaural. The binaural processor processes the input signal to simulate the effect of a binaural (dummy head) recording. The transaural processor eliminates crosstalk when the binaural signal is played back over speakers. The basic components of this system include the controller, the processors and two A/D/A converters. The RSS system incorporates four 24-bit internal processing circuits in order for it to process up to four sound sources simultaneously.

The first thing the audio signal encounters after the A/D convertor is the binaural processor. It converts the input signal into signals resembling the L/R signals of a typical binaural recording. However, when binaurally recorded sound is reproduced through a regular stereo two-speaker system, the right channel sound, which should only be heard by the right ear, will reach the left ear as well, and the left channel sound will also reach the right ear. (This is known as L/R aural crosstalk and it's the reason headphones are suggested for playback of binaural recordings.)

In order to eliminate this L/R crosstalk, Roland included a separate transaural processor in the unit. The combination of these processors are what gives the RSS its ability to manipulate the sound source in almost three-dimensional fashion.

For those of you who need these sorts of things, the A/D converter offers selectable sampling rates of either 44.1 or 48 kHz, and has selectable emphasis. It also features the use of optical input/output terminals using the AES/EBU data format, thus allowing connection to other digital gear.

WE (AND YOU) CAN WORK IT OUT

How does it work? In a piece like "Rain," the idea of giving each drop its own space was achieved by MIDI control of the RSS, so that a unique discrete location was selected for each eighth-note drop. I learned in my Buchie days that spatial movement is a rhythmic element and the ability to control it in time with the music is essential. In the piece "Maramosso," which means "rough sea," it seemed appropriate in the middle section to create a "moving drama" of wind and waves, with sustaining, churning undulating pat-

continued on page 85

A NEW LEASE IN LIFE

If you're intrigued by this expanded stereo image experience idea but not enough to wire the asking price of $44,500 to Roland to get your hands on a Sound Space system, here are some other options:

LEASING: There are plans available for up to five years. Payments are about $1060/month, with the first and last installments up front.

RENT-TO-OWN: Payments are $2000/month for 12 months and which at the end of the rental period can be applied towards purchasing the system. (Both of the above programs are offered by Roland directly.)

RENTAL: Several pro audio rental services have made their Sound Space systems available for daily rental. For more info about rates and availability, contact:

- *Bill Tesar, Toy Specialists, New York City; 212-333-2206.*
- *Kim O'Donnell, Larrabee Studios, West Hollywood, CA; 213-657-6750 or 818-753-0717.*
- *June Johnson or Frank Wells, Masterfonics, Nashville; 615-327-4533.*

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THE BASEMENT TAPES

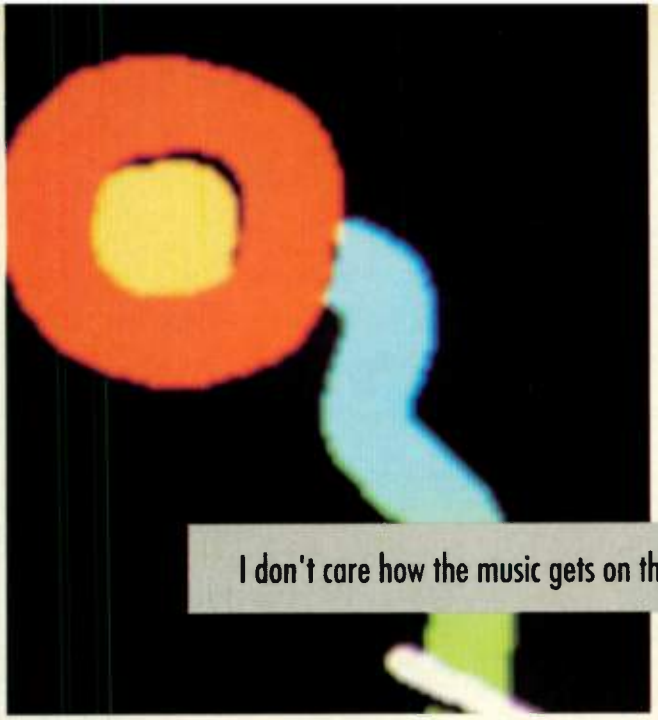
BY RIC OCASEK

I love to produce. Songwriting is more important and it's what I get the most satisfaction from, but producing is close behind. It's also something I'll probably rely on doing more of in the future. I have made a point of producing at least one record a year, mostly things that are not really pop. I'm more interested in artists whose artistic value is greater than their commercial value. The Bad Brains and Alan Vega, both of whom I've produced recently, fit that bill.

The music market and music technology are changing. There's more opportunity for artistic exploration among the independent labels than ever before. More than anything I want to maintain the freedom to do what I want to do musically. I don't want to get into having to live up to a past success. I do get pressure to bring the Cars back, but mostly from the fans, not from the record company. Warner Bros. lets me do the records I want to make. In fact, freedom was my main consideration in switching to Warner Bros. from Geffen. I know that generally these days the labels try to interfere more, simply because the music industry, both records and radio, has become so much more of a business.

COMPUTER ART BY RIC OCASEK

The former Cars leader is currently in a home stretch, tuning up an independent producing career from his basement studio



inal demos done on my basement studio 24-track. (Drums and bass were put on later in the commercial studio, but the musicians were just playing to the tracks I brought from my house.)

I don't care how the music gets on the tape. I only care about the song.

My usual procedure is fairly independent-label compatible; that is, it's not overproduced. I first write the songs on a mono cassette recorder, so that I'm not stifled by any extraneous logical considerations, arrangements and things. I then go to 4-track (a four-year-old Tascam) or onto one of a couple of old 8-tracks I own, an Otari and a Tascam. (In Boston it was always 8-track reel-to-reel. I always liked those machines. I used them a lot on my first solo record, *Beatitude*. I took the 8-track tapes and just transferred them over to 24-track to make the disk.) The performance is often very good on these tapes. Even when it's just a 4-track I'll transfer it to 24-track because I don't see the point in just duplicating the same performance, unless it needs to be completely rearranged. I'm also not a purist in the sense that a musician has to do every part. I don't care how the music gets on the tape, with a person or a machine; I only care about the song.

CARS AUDIO

Whether I'm producing, myself or others, I'm always well prepared when I go in to record. I usually have at least a 4-track tape of what I'm going to do. And if I go in with things on 24-track I almost always opt to keep them in the final mix. It's not your sound but what you play, I think, that really makes the difference. That's also why I think the independent labels will genuinely be able to compete, as long as they come up with the good ideas and interesting music. I thought that was Greg Hawkes' genius with the Cars. His sounds were toy-like but he had a fabulous idea of what made a hook.

That said, I always try to do something new or different each time I produce. My favorite albums are usually not strict pop arrangements. The first Velvet Underground record is number one on my all-time Top Ten. Those arrangements are just banged out; they're just lyrics on top of noise. There's even a little free-spirit, anti-mainstream folk-singer sensibility left in me, from when I was in the folk trio Milkwood and before. The Cars' "Since You're Gone" is really a folk, finger-pickin' song, only played through a distorted guitar.

MIDI LIFE CRISIS

I must admit I'm not all that interested in the music part of the new computer technology. Frankly, I don't do MIDI. I'd rather play it by hand. It's a technological language that I can't be bothered with learning. To me, that's the engineer's job. Let him put the timecode on. If I do it, it's only going to take away from concentrating on the song.

The odd thing is that photography is another lifelong love of mine and I have a Macintosh with a lot of graphics programs. But I don't have a single computer music program. And I don't have any computers in my basement studio. As a songwriter, I just can't see making music with a mouse. Or with a typewriter. I can't relate to it and never want to be able to. In that sense I am a purist.

My aversion to computerized music is even stranger when you consider that my father was a NASA systems analyst and I grew up with high-tech. Back in high school in Baltimore my best friend was an electronics nut. He loved ham radio and that got me interested in it. I got a first-class radio license when I was 16. I had to go to Washington, D.C., to take the test, building a transmitter from scratch and all that. When transistors were hot, I knew all the electronics.

By the time I got to college, though, I had settled on music and just forgot about the electronics, and even did photography only sporadically. I got into acoustic guitar because I couldn't afford an electric one. Then, ten to fifteen years later,

INDEPENDENTS' DAY

One factor helping the independent labels is that there are more and more alternative radio stations surfacing on the dial, and not just college stations. Another big reason for this progress is the new recording technology. It makes it possible for everybody with an original musical idea to compete in the music market. For instance, I wouldn't be surprised if in about five years you'll be able to get digital 8-track recorders like the analog 8-track Tascams now, and at the same price but with absolutely no noise and all the advantages of MIDI built-in.

In my own home studio in New York I have a 24-track Tascam recorder and a CMX Soundtracs mixing console. There's also a lot of outboard equipment. Most of it is left over from the Cars' Synchro Sound studio up in Boston, which itself had been an early version of a project studio. The Cars had sort of a garage sale, but I kept some digital reverbs, sweep equalizers, compressors and some vintage things — most of which I barely ever use now. But then, I don't think very much is essential. I have more than enough equipment considering that it's a basement and I'm not trying to get a room sound, or even an ambient sound.

For me, most of what I need are a guitar processor, which could be either a DigiTech or a Roland, and which I put the guitar through direct, and two or three keyboards, which I also run direct. In fact, the final mix of *Fireball Zone*, my latest solo album, has on it about a half dozen tracks transferred over from the orig-

I can almost ~~fit~~ my whole studio in my mouth.
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CIRCLE 40 ON FREE INFO CARD

WRH

when it came time to get into the recording studio with the Cars, the technology part didn't scare me off. The process of recording was already simple to me.

I'm more interested in artists whose artistic value is greater than their commercial value.

DEMO DERBY

I played in fifteen bands before the Cars. I never wanted to be part of a band that wouldn't play just my songs. Maybe that was selfish but I didn't want to have to deal with covers. It was a shock that the Cars ever became pop stars. My goal had always been to be a big underground star, somebody shunned by the masses and loved by the few. We played in bars and most of the groups lasted three months to a year. Even the Cars was a combination of three earlier bands of mine.

Then again, the story of the Cars really began in a recording studio. There was a studio just outside the city that I was helping to build and getting free studio time in return as part of the deal. During the day I'd be there pounding up plasterboard and wiring things and then at night I'd be recording for free, making Cars demos. Then a disk jockey at BCN named Maxanne who had been following us in the Boston clubs asked me to send some of our demos to the station. BCN started playing them and one became the most requested song

RIC OCASEK'S NEW VEHICLE

I Want My Mac-TV. The fewer things distracting people away from his music and his lyrics, the happier Ric Ocasek is. He's gone on record here that he doesn't do MIDI and doesn't particularly like computer music in general. This does not, however, mean that he doesn't like computers; his binary affections just seem to be restricted to the visual side of his brain. In addition to his home recording studio he has a Macintosh in his New York basement with both the Photoshop and Studio 8 painting programs on it, and which he uses mostly to doctor up his own photographs. (Two examples appear here, while the opening spread of this article shows one of his original abstract computer creations.)

The natural question, given this underpublicized artistic side to him, is what does he think of the continuing boom in music videos, and does he want to direct? "I like performing in videos," he says, "and I like the idea of video technology a lot. But when it comes to me coming up with a video to go with one of my songs, I get really confused. I want the song to be interpreted by each individual, the way it's always been on radio. In fact, I really would have preferred never to have had video infiltrate music."

Photo Op. The Photoshop art on the cover of his most recent album, *Fireball Zone*, in fact, was produced in the Ocasek basement — by his wife, supermodel Paulina Porizkova. "Way before the record had been made," he explains, "I told Paulina I was going to call it *Fireball Zone*, from Pynchon's *Gravity's Rainbow*. Basically, she took it upon herself to go down and do the cover on the Mac, just for fun. She's a real painter, with oil and things. Both her grandfather and father were painters. Then when the art director for the album came over to look through photographs and pictures for possible covers, he picked that one."

— Greg Collins

How Two Men Separated Jim Morrison From Thousands Of Screaming Fans.

Wilie Stateman and Scott Martin Gershin of Soundelux, Inc., creators of digital sound effect tracks for "The Doors," shown with the ADAP PORTABLE and Atari laptop STACY.

Without ever leaving the safety of the digital domain provided by ADAP, sound designers Stateman and Gershin layered hundreds of crowd samples, replaced dialog, prepared tracks, designed special audio effects and synchronized foley. Armed with powerful 16-bit ADAP systems, they created an entire world of audio illusion for Oliver Stone's blockbuster movie, "The Doors."

They did it all with unsurpassed digital sound quality, while being able to take their sound creations from their stationary ADAP workstation directly to the sound stage using the fully compatible ADAP PORTABLE.

And they're not alone. These days, more and more film and post production houses, recording studios, and radio and TV stations are using ADAP to bring audiences to their feet. And all this at the best price/performance ratio in the industry.

Hybrid Arts, Inc.

Good Things From A Small Box.

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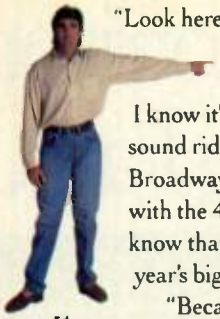
CIRCLE 23 ON FREE INFO CARD

WRH



Ed
Sound Engineer

"Look here, I know the PM3000.

"I know it's at the top of the list of the best live sound-reinforcement consoles. I know it's written into all those big concert tour sound riders. I know it's in the major theaters on Broadway. I know it's in the 5,000-seat churches with the 400-seat choirs. And I also happen to know that it's in all those T.V. trucks producing this year's biggest sporting events. And I know why.

"Because the PM3000 is flexible. Because it's logically put together. Because it performs. Because it's a pleasure to use. Because everyone likes working with it.

"But, here's the news.

"There are two more PM series consoles. And they start at a mere $5,500 MSRP. So obviously, they're for those situations where you want the best console available. But you don't have the space or the budget to get the 3000.

"The PM1800A was just updated. So it has an improved signal-to-noise ratio (6 dB better). And 0dB insert points for easy gain matching with external processors. It's got 8 groups, 6 aux sends and 4 mix matrices. It even has the same mute grouping feature you find on the 3000. But that's not the end of it.

"The PM1200 has the same roots. But in a more compact format. It's got 4 groups plus stereo, 4 aux buses, and 4 mute groups. You can get 16, 24, or 32 input channels and you still get two additional full-function stereo input channels.

"Obviously, they're both ripoffs of the Yamaha PM3000."

YAMAHA®

"Obviously, they're both ripoffs of the Yamaha PM3000."

Ed and his opinions are a composite of several obviously brilliant and successful sound engineers. © 1991 Yamaha Corporation of America, Professional Audio Products, P.O. Box 6600, Buena Park, California 90622-6600. (714) 522-9011

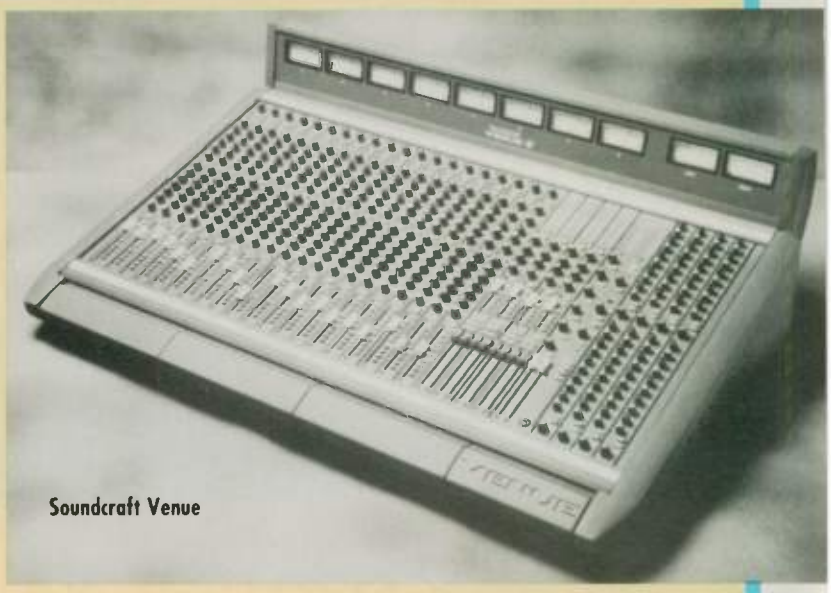
CIRCLE 33 ON FREE INFO CARD

BOOGIE BOARDS

EQ

A HAPPENING GUIDE TO TOURING MIXING CONSOLES UNDER $15,000

BOOGIE EQ BOARDS


Soundcraft Venue

Hear ye, Hear ye! It's a new era in live sound. Sound quality in auditoriums, conference rooms, even houses of worship is now as good as your favorite rock-and-roll venue. So, now your rock gigs have to sound better. Fortunately, some enterprising console manufacturers have begun producing high-quality, versatile and portable sound reinforcement mixers at pricetags even a struggling local bar band can afford.

It's a development that owes its stuff to the MIDI-based project room (perhaps yours), where musicians started using smaller, less sophisticated boards to submix several keyboards prior to sending signals to the main console. This method then made its way on to the stage, where live sound mixers found the technique more efficient. Keyboardists, for instance, were able to "premix" their signals and then send a pair or two or more of stereo signals out to the house. This not only created a simpler mixing environment but saved on house inputs.

Downsized does not mean inferior, either. Many of the new small mixers listed here offer all the available big-boy technology: parametric EQ, multiple sends/returns, aux systems, monitoring, 48V phantom power. Then add to the feature mix a few things the behemoths can't match: less weight, greater flexibility, and reduced cost.

Of course, everybody has different needs for specific features, depending on the type of sound being reinforced, so don't let cost be your only guideline. To simplify matters, we've narrowed the field (which is enormous) to models between $3000 and $15,000, with a short detour to pay homage to the insurgent under $1000 set. If you don't win the state lottery in the near future, or score tour support from Pepsi, these are the boards you'll most likely be using in your small-venue touring life. As for the rest of the particulars, let our experts in the following pages help you choose and use the best board for you.

—Hector La Torre

HOW NOT TO GET MIXED UP WHEN CHOOSING A MIXER FOR YOUR TOURING NEEDS

BY KEVIN McCANN ELDER

MIXED BLESSINGS

How do you match the right PA mixer to your music? It's the kind of question that every band must ask before taking their show on the road. And it's a critical decision that ultimately determines if your carefully crafted and perpetually rehearsed melodies make their way from the stage to the audience's ears.

These days the choices are plentiful. There is plenty of action in the under $1000 category. And, likewise, for those with more requirements, there are more consoles in the $3500 to $15,000 range than ever before (see accompanying chart). Where to begin?

To determine what features and functions you need in a small mixing console, you must first analyze the immediate requirements of your band as well as think about any variations, such as the addition of musicians or instruments down the road. Essentially, the mixer requirements are determined by the number and types of musicians and instruments employed in the band. You must ask yourself: how many vocalists there are and how many instruments will be put through the mixer, either via a microphone or direct box. How many microphones will I be using on the drum kit? How many effects processors do I plan on using? When you arrive at a number for each of these questions, add them all together and then tack on an additional two or four

Panasonic/RAMSA WR-8616

(for future expansion) to determine how many channels you'll want in your mixer.

SUB GROUPIES

The greater the number of channels required and the more varied the vocal and instrument complement within the band, the more you'll need a mixer featuring sub group capability. Six or eight channels might be managed without sub groups, but twelve, sixteen, twenty-four or more channels require that the mixer provide for sub mixing groups in the master section. Sub groups let you more easily manage the levels between assigned groups of instruments. If you have five vocalists and you want to bring up all of the vocals, with a vocal sub group assignment you can bring all of the vocals up or down with just one control. This is a whole lot easier and smoother than increasing and decreasing the level of all five individual vocal channels.

BALANCING ACT

After deciding on the number of channels, you'll want to make sure that the mixer you choose has balanced microphone inputs. A properly balanced microphone input will ensure freedom from hum, noise and radio frequency interference (RFI). All microphone cables act as antennae (i.e., they pick up unwanted interference signals) that are induced into the cable itself, particularly when you have long microphone runs. These induced signals are said to be at a common mode, or they're the same in all of the conducting wires in the cable. A balanced microphone offers common mode rejection (CMR) to these induced interference signals.

There are basically two methods employed to obtain a balanced input. Either the mixer will have an electronically balanced input or a transformer. Both offer common mode rejection of the induced interference hum, noise or RFI. However, there are various levels of performance offered by transformers and electronically balanced inputs. Some mixers have an inexpensive integrated circuit or IC as a differential input that can do a good job to eliminate noise and hum. The inexpensive IC, though, may not offer adequate rejection to RFI types of interference. These inexpensive ICs will only offer about -20 dB of CMR at radio frequencies, if they don't have precision resistors in the circuit. Check out the CMR rating in dB in the specifications. You want to have at least -60 dB of available CMR which can be obtained if 0.1 percent trimming resistors are used. A good quality transformer for the balancing component is a better choice than the inexpensive IC.

The mixer may also offer balanced outputs. These may not be necessary if the graphic equalizer or an electronic crossover has balanced outputs and is also located at the mixer position.

FINE TUNING

Also make sure to consider the number of EQ or tone controls per channel. Most inexpensive mixers have just bass and treble controls. If the mixer is mainly used to mix like sources (i.e., just voices or just keyboards), two tone controls may be

continued on page 48

Catch a Wave

BOOGIE EQ BOARDS

CHART TOPPERS

A Select Listing of Touring Mixers Between (Roughly) $3000 and $15,000

*4 subs on Olympia; 8 subs on Columbia
**4 sub-outs, 2 monitor sends

BRAND	MODEL #	PRICE	# OF INPUTS	WEIGHT (lbs)
Allan & Heath	SC-432XA	9,370	32	150
Amek/TAC	Scorpion II	18,756	40	300
Biamp*	Olympia 24/464	6,599	24	82
	Olympia 32/464	8,339	32	112
	Columbia 24/468	7,699	24	85
	Columbia 40/468	10,099	40	120
Carvin	MX2488	3,679	24	114
ElectroVoice, Inc.	BK-2442	2,500	24	63
Hill Audio (Datum Series)	16 x 4 x 2	6,300	16	66
	24 x 4 x 2	8,750	24	88
	40 x 4 x 2	13,580	40	132
Peavey	Mark VIII/24	7,999	24	132
	Mark VIII/36	10,000	36	176
	Performance 2480	11,250	24	147.5
	Performance 3680	13,750	36	190
Ramsa/Panasonic	WR-4424	3,195	24	60.5
	WR-8616	11,500	16	114
Soundcraft	Spirit 24 x 3	3,495	24	63
	Venue 16 x 8	11,550	16	110
	Venue 24 x 8	14,680	24	145
SoundTech**	ST324	4,749.90	32	100
Soundtracs	Megas Stage	19,500	48	210
Studiomaster	Showmix 16x4x2	3, 425	16	60
Tascam/TEAC	M-2524	3,999	24	57
TOA	CX-164	3,150	16	59.5
Yamaha	PM 1200-16	5,500	16	97
	PM 1200-24	6,500	24	123.5
	PM 1200-32	8,000	32	150
	PM 1800A-16	14,000	16	125.6

THE FIRST AUTOMATED MIXER THAT WAS COMPOSED, NOT IMPROVISED.

If you'd rather mix than mess around with a bunch of outboard boxes, we suggest a serious look at the new M-3700 Series from Tascam.

The M-3700 Series is a professional-quality mixing console with a perfect memory of its fader settings. A console whose automation isn't a pain in the pots. And whose under $14,000 suggested retail price isn't either.

Ours is the only automated console that provides you with both *snapshot* automation (to recall any pre-set levels or switch positions stored as "scenes") and *dynamic* automation (to recall levels and switch positions locked to real-time locations).

The M-3700 also features an onboard disk drive; SMPTE timecode generator/reader; write/update mode; choice of 24- or 32-channel configuration; and the ability to automate the main, monitor and aux send mutes, and EQ ON/OFF for each channel. Without outboard computer screens, wires, mouses or the usual added-on hassles.

From us, you'll get a compact, familiar-looking system that'll help you create the mix you want. And precisely recall any previous mix, so you can tweak some channels without affecting others. All without wasting your valuable time or talent.

The musician-friendly M-3700 Series automated mixing console. Now waiting to wow you at your nearest Tascam dealer.

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DIMENSIONS W x H x D (in)	EQ	FX RETURNS	AUX SENDS	EQ FREE LIT #	PHONE
55 x 4 x 27	3 band/sweepable	2 assignable	4	247	(801)-268-8400
68 x 10 x 33	4 band/midsweep	2 assignable	4	250	(818)-508-9788
46 x 6 x 30 in	4 band/midsweep	4 mono, 2 stereo	6	221	1-(800)-826-1457
63.25 x 6 x 30	4 band/midsweep	4 mono, 2 stereo	6		
46 x 6 x 30	4 band/midsweep	8 mono, 2 stereo	8		
63.25 x 6 x 30	4 band/midsweep	8 mono, 2 stereo	8		
46 x 9 x 29	3 band/sweepable	**4 mono**	4	248	(800)-854-2235
5.5 x 39 x 20.5	3 band/midsweep	2 assignable	2	222	(616)-695-6831
34.2 x 8.9 x 30	4 band/midsweep	8 assignable	8	223	(817)-336-5114
45.4 x 8.9 x 30	4 band/midsweep	8 assignable	8		
67.8 x 8.9 x 30	4 band/midsweep	8 assignable	8		
53 x 14.25 x 34	4 band/low filter	8 mono	8	224	(601)-483-5365
70 x 14.25 x 34	4 band/low filter	8 mono	8		
53 x 14.25 x 34	3 band/low filter	8 stereo	8		
70 x 14.25 x 34	3 band/low filter	8 stereo	8		
38.6 x 6 x 22	3 band/sweepable	4 stereo	4	225	(714)373-7277
35 x 10 x 29	3 band/sweepable	2-18 mono	4		
41 x 3.3 x 23.6	4 band/midsweep	4 stereo	4	226	(818)-893-8411
31.5 x 8.5 x 26.6	4 band/midsweep	4 stereo	6		
41.3 x 8.5 x 26.6	4 band/midsweep	4 stereo	6		
60 x 5.25 x 27	3 band/midsweep	2 assignable	2	227	(708)-541-3520
71 x 12.5 x 31	4 band/midsweep	**8 mono**	6	249	(516)-932-3810
31.7 x 5.7 x 22.6	4 band/midsweep	4 stereo	6	228	(714)-524-2227
39.5 x 6 x 25	3 band/mid and low sweep	2 stereo, 2 mono	4	229	(213)-726-0303
40 x 6 x 27	3 band/hi-pass filter	2 stereo	3	230	(415)-588-2538
37 x 9 x 27	3 band/hi-pass filter	4 stereo	4	231	(714)-522-9011
46.4 x 9 x 27	3 band/hi-pass filter	4 stereo	4		
56 x 9 x 27	3 band/hi-pass filter	4 stereo	4		
40 x 12 x 34.6	4 band/hi-pass filter	4 stereo	6		

LIVE MIXER TECHNICAL CLOSEUP

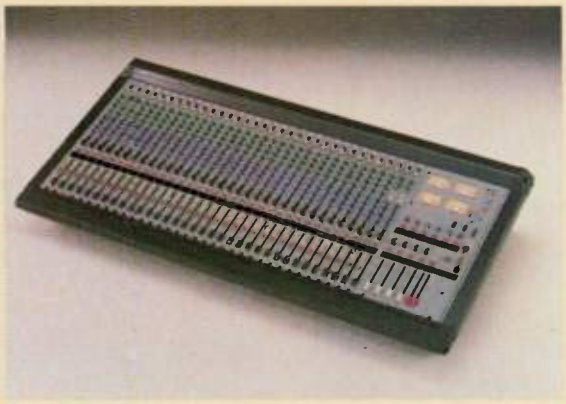
BIAMP OLYMPIA & COLUMBIA

The Olympia and Columbia Series are 4- and 8-submaster mixing consoles which provide professional features, solid reliability and excellent sonic performance. Both series are compact, with a logical layout of controls and conveniently located connector panels. Each model features discrete transistor Mic/Line preamplifiers for extremely noise-free, high-fidelity performance. All Submaster, Main and Auxiliary Send outputs are balanced. Standard features include metering for all outputs & Solo, a Talkback section, Lamp connectors and an external power supply. Rugged assemblies, utilizing individual circuit boards and all metal chassis, provide long-term dependability for either mobile usage of fixed installation. Made in the U.S.A.

PANASONIC/RAMSA WR-S4400

The Ramsa WR-S4400 Series consists of 12-, 16- and 24-channel professional 4-bus mixers with sophisticated features and legendary Ramsa quality. The WR-S4400 Series features professional-length faders (100 mm), two selectable inputs per channel, individually switchable 48-volt phantom power, flexible 3-band EQ with sweepable midrange and layout which is comparable to Ramsa's popular WR-S840 Series of concert sound mixing consoles. Contact: Chris Foreman, Ramsa, 6550 Katella Ave., Cypress, CA 90630; phone, 714-373-7232; fax: 714-373-7903.

YAMAHA PM1200



The PM1200 from Yamaha has simplified all user controls with well-organized color-coded controls and LED indicators for only the most important functions — Signal and Clip — unlike other models which have superfluous distracting flashing lights and channel meters. Each channel is equipped with individually switchable +48V phantom powering and a single TRS connector for insert operations, allowing for post-EQ compression, gating, etc. The PM1200 features a 3-band equalizer, 4 AUX busses and balanced XLR inputs on every channel. The PM1200 also has the ability to be linked to a PM1800A, PM3000 or another PM1200 console, so that programmable MUTE functions can be controlled from one console.

PEAVEY MARK VIII

The Mark VIII™ Series sound reinforcement console from Peavey Electronics is totally modular with each module being built in its own mini chassis that houses fader, input and output jacks and all associated electronics. A unique "monocoque" construction is used for the mainframe to provide maximum rigidity so that the console can easily undergo the rigors of repeated setup, tear down and transportation free from mechanically induced problems. The transportation performance of the console is enhanced by use of completely differential internal signal busses, gold plated contacts on all critical innerconnects and state-of-the-art discrete low noise amplifiers on all mic inputs and group summing amps. Contact Peavey Electronics, 711 A Street, Meridian, MS 39302-2898; phone, 601-483-5365.

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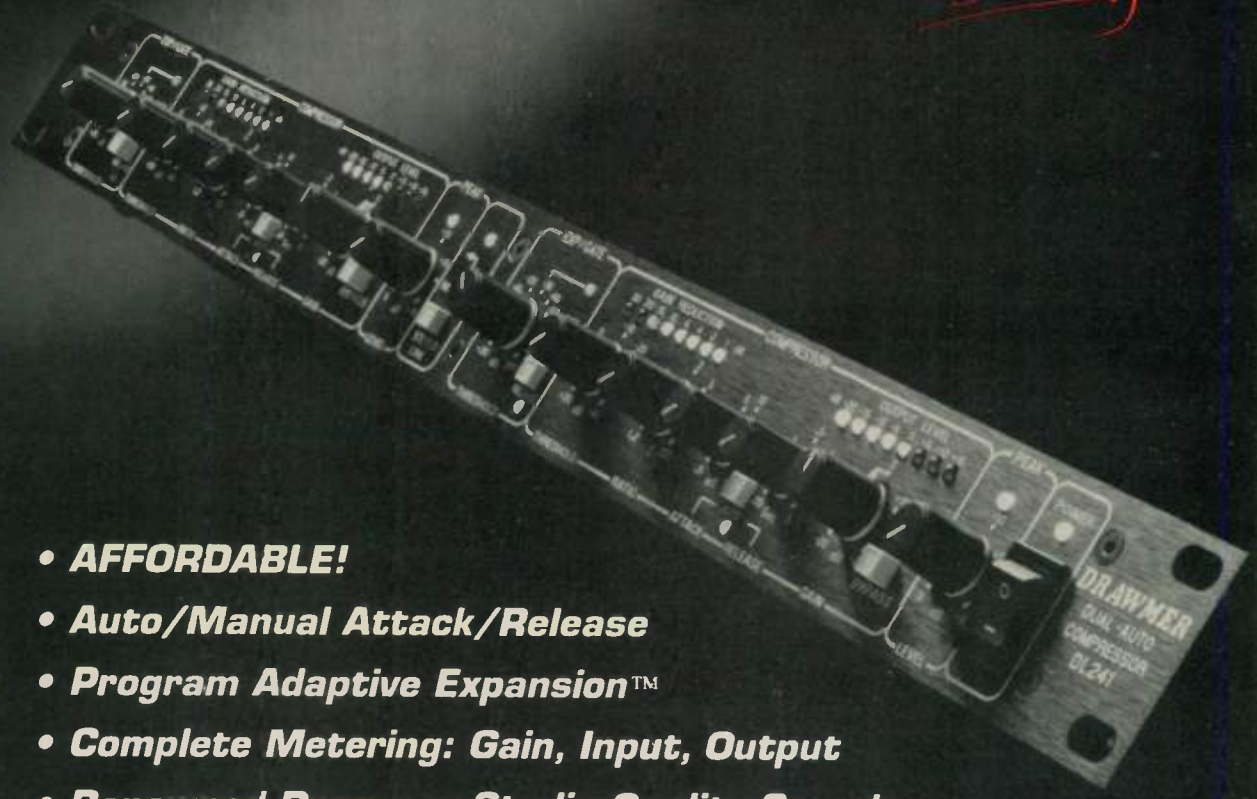
Ingenuity



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BOOGIE EQ BOARDS

continued from page 43

sufficient. Once again, the more varied the signal sources, the greater the control over the signals that will be needed. Get it with more EQ knobs. Some mixers have three bands of fixed EQ, and some have three bands with a sweepable midrange frequency control that enables the operator to adjust the middle EQ bands' center frequency. Some mixers have four bands of fixed EQ, and there are mixers with four bands of equalization where the two center bands have sweepable frequency controls. There are also mixers available with four bands of EQ, with all four bands offering adjustable frequency controls. Just remember, the number and type of channel equalization will be directly proportional to the retail price.

YOU SEND ME

The next thing to consider is the number of monitor sends the mixer offers. In the past, mixers had only one monitor mixing bus. These days I would recommend at least two monitor sends per channel; with two monitor sends, you can at least provide an individual monitor mix for the drummer.

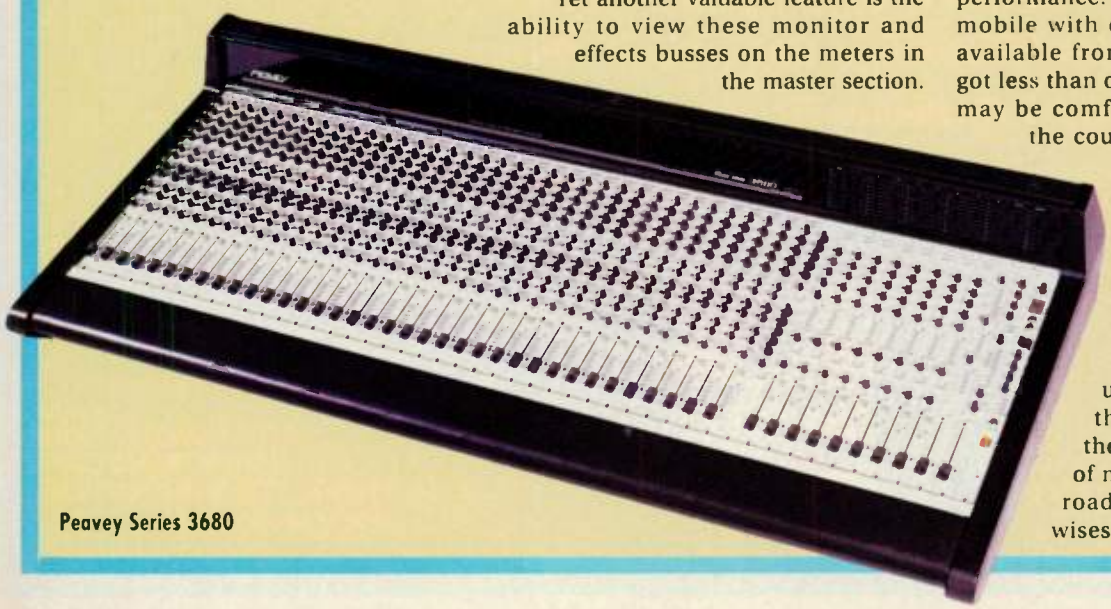
Another feature to consider is the number of effects sends per channel. Today most people will want at least two effects sends per channel. Some mixers will have six or more auxiliary controls per channel which can be assigned "pre" EQ or "post" fader. The "pre" position would be used as a monitor send and the "post" position would make the control an effects send.

Twelve or more channels require a mixer that provides sub mixing groups in the master section.

Yet another valuable feature is the ability to view these monitor and effects busses on the meters in the master section. There are still some mixers that have VU meters with mechanical moving parts. Most sound people consider the peak reading LED array to be the better option for present-day metering requirements. A very useful feature is the ability to view the PFL (pre fade listen) bus on one of the meters. This is very handy at the soundcheck when you would set the input gain via the level indicated on the metered PFL for each channel.

HOW NOT TO GET CONSOLED LATER

In this day and age of "bells and whistles" mixer marketing, there are more features and specs to digest than ever when you start your sound reinforcement shopping spree. Of course, just having numerous available features on the console itself may look good on paper, but it's also important that the mixer have design specifications that will insure good performance. If you had a new automobile with every optional feature available from Detroit, and the car got less than one mile per gallon, you may be comfortable driving across the country in the car but it'd be an awfully expensive trip. So one more word of advice: make sure to check around with other sound techs in your area. Which mixers do they use? Which have caused them trouble? What are the trials and tribulations of mixing on the road? The road weary are usually the wisest about the touring life.



Peavey Series 3680

NEW! MicroSeries 1202

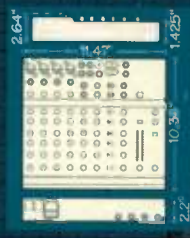
Mackie design and manufacturing technology creates a $399 mixer without compromises! In the past, small mixer specifications and quality dropped in direct proportion to price, making lower cost models unacceptable for serious recording, broadcast or sound reinforcement.

But with the **MicroSeries 1202**, you get the same high performance electronics and rugged all-steel construction as its famous big brother, the CR-1604. The result is a rare combination of performance and reliability in a small, very affordable mixer.

From the noise and distortion specs, you'd think it was a big studio console. After all, it has discrete mic preamps, +28dBu balanced output drivers, and a 90dB working S/N ratio.

The **MicroSeries 1202**'s footprint is under one square foot, yet it packs an amazing total of 20 inputs, all designed to work with any level, from instrument level, to semi-pro –10, to professional +4 levels. With performance equal to the proven CR-1604, the rack-mountable **MicroSeries 1202** excells in applications where other small mixers can't measure up:

Mini recording mixer
Broadcast remotes
8-track monitor mixer
AUX inputs for a bigger console
Headphone or cue mix
Compact keyboard mixer
Small church or school systems
Impedance/level converter



Four +48V phantom-powered mic preamps. Like the CR-1604, the new 1202's preamps are designed to handle screaming vocals or close-miked drums without overload — yet can capture the subtle nuances of delicate strings or woodwinds with the extraordinary fidelity of the best studio mic preamps... Specs like these have never before been available on a $399 mixer: –129 dBm E.I.N., 0.005% THD, +14dBu max input.

4 stereo channels w/separate L/R inputs (along with 4 mic & 4 mono lines, 20 inputs total!)

Trim matches any signal, including instrument levels, –10 semi-pro and +4 pro gear.

Two AUX sends with plenty of gain for special effects and center detent at unity gain.

EQ at musically useful frequencies: 80Hz (more real thump than 100) and 12.5kHz (more sizzle than 10k).

Inside: Less than **0.025%** THD 20-20kHz; **90dB** S/N ratio (ref +4dBu), **108dB** dynamic range.

UnityPlus channel gain controls minimize noise, maximize headroom. 20dB gain above unity reduces need to constantly re-adjust trims during performance.

No wall wart! Like the CR-1604, our new MicroSeries 1202 has an internal power supply.

Rugged and reliable...all-steel, heavy-duty construction; double-sided, through-hole-plated fiberglass circuit boards for maximum durability and full electronic protection for input/output circuitry from power surges, static discharges, misuse and impedance mis-match.

AUX Outputs for stage monitoring, effects, recording, 22dBu max out.

Stereo AUX Returns. Separate left and right inputs & 20dB gain for effects, tape playback, extra line inputs, etc.

Bal./unbal. mono line inputs

"Phono" style **tape input and output** connectors for recording and playback.

MicroSeries 1202 12-Channel Mic/Line Mixer – Suggested Retail $399

Lurking in the shadows: The MicroSeries 1202's big brother, the **CR-1604** 16-channel Mic/Line Mixer. Road and studio-proven by professional musicians, producers, sound contractors and broadcasters worldwide and rave reviewed by major pro audio publications. Naturally, the new 1202 has the same great sound, specifications and performance.

Main Outs. TRS output drives balanced or unbalanced inputs. Max bal out =+28dB. unbal.=+22dB.

3-Year Warranty

Stereo AUX returns have enough gain to work with all levels, are ultra quiet with super-high headroom.

Tape monitor switch brings tape inputs up in AUX 2 so you have level control.

12-segment LED VU meters. Via Ch. Metering button, display reads main output levels, mic input levels, or line input levels for far more accuracy and detail than mere overload LED's.

Same long-life, contamination-resistant **sealed rotary potentiometers** as CR-1604.

High output headphone amp drives headphones to max level.

Made in Woodinville, WA, USA.

Channel inserts provide both uninterrupted and interrupted direct outputs as well as pre-fader & post-fader effect loop channel patching for equalizers, compressors, limiters etc.

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BOOGIE EQ BOARDS

Flyin' Faders

Illustrations by Robert Leighton

IT'S SHOWTIME AND YOU'RE ON THE BOARD — A FEW TIPS ON HOW NOT ACCIDENTALLY TO BECOME THE SHOW STOPPER

BY WADE McGREGOR

MIXING IT UP ON TOUR

The mixer is the hub of a sound system. All audio signals will hopefully be brought under control at this point. What, then, is the procedure to get the best sounding show out of the thing? The more you can do ahead of time, the fewer shock waves you'll experience when the room starts shaking. Here are a few key things that can be done to optimize the mixer before the show starts.

PICKING THE MIX POSITION

The mixer should be placed in a position that will have the fewest acoustical anomalies to have to contend with. Avoid being under a deep balcony, in an alcove or tucked into a corner. The place where you can hear the same sound as your intended audience is the ideal mixer location.

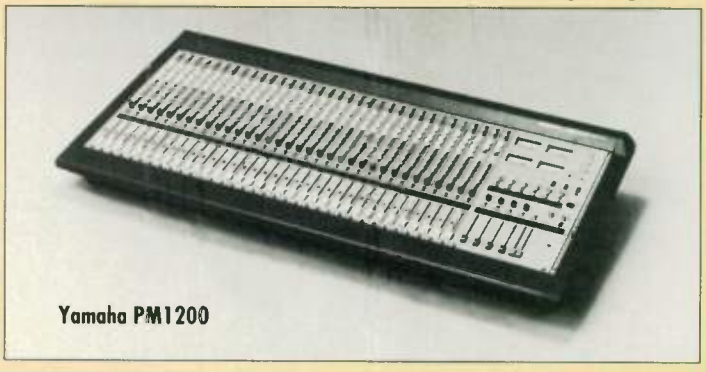
★The mixer will need a rigid table, metal stand or sturdy road cases to support it. Some people prefer to mix standing up, others like to minimize their profile. This will decide the height of the mixer so keep in mind that if people are paying to sit behind you, they're not paying to watch you, fascinating as that may be. Sight lines and clear aisles will need to be considered, this also applies to your effect racks, and other gear.

★The mic snake from the stage should be securely taped down where it crosses walkways, even covered with carpet if possible. The snake should also be secured to the floor or the base of the mixer stand so that it can't topple the mixer, if it should be pulled on. [For more on live snake charming, see my Techniques article in this issue.]

★AC power to the mix position should be supplied by a cable that has large enough conductors to supply the current all this equipment will draw. It's worth getting out a voltmeter to check the power. Be sure that the hookup is correct, the right voltage is on the hot conductor, hot and neutral aren't reversed, and there isn't voltage between neutral and ground. The connectors shouldn't be corroded or worn if you're going to receive sufficient current and a good quality ground connection.

SET UP HIT LIST:

Make sure that the AC power is not being shared with the lighting dim-



Yamaha PM1200

Everything About Our New Digital Audio Equipment Is Designed To Sound Better Than Ever.

SONY

TCD-D10 Pro II
Portable DAT Recorder

The TCD-D10 Pro II is the smallest professional DAT recorder from Sony. Yet, while it weighs only 4 lbs. 7 oz., the TCD-D10 Pro II is no lightweight when it comes to performance.

Built to withstand the rigorous demands of field work, the TCD-D10 Pro II allows you to stay in the digital domain from acquisition to studio. It also features absolute time (A-time) recording/playback which places a continuous time code on tape, allowing you to locate recorded segments faster and more easily.

Plus, A-time is compatible with SMPTE time code DAT recorders like our PCM-7000 Series. There's even an improved digital I/O and LCD multi-display with a combination of safety/warning indicators to help insure fail-safe operation. And when combined with one of Sony's high quality microphones, you're fully equipped to meet the most demanding challenges in the field.

KEY SPECIFICATIONS

DYNAMIC RANGE: MORE THAN 85 dB

FREQUENCY RESPONSE: 20 Hz-22 kHz

THD: 0.06%

I/O: ANALOG—MIC/LINE BAL, DIGITAL—AES/EBU

ACCESSORIES: BATTERY (X2), CHARGER, REMOTE, AC SUPPLY, CASE

▼ SHOWN WITH OPTIONAL SONY ECM-MS5 STEREO MICROPHONE.

PCM-2700
Studio DAT Recorder

Taking advantage of Sony's latest innovations in digital technology, the PCM-2700 is the first affordable professional 4-head DAT recorder.

Featuring Sony's advanced HDLC (High Density Linear Converter™) System, the PCM-2700 delivers superior sound quality. The PCM-2700 also employs a 4-motor direct drive transport to insure tape stability, accuracy and reliability. Its 4-head design provides off-tape monitoring to verify your recordings.

There's even a duration adjustable digital auto fader for fade-in and fade-out times as well as an A-time search function for rapid access to any recorded A-time location—all giving you the utmost in professional performance.

KEY SPECIFICATIONS

SIGNAL TO NOISE RATIO: MORE THAN 90 dB

FREQUENCY RESPONSE: 20 Hz-22 kHz

THD: <0.045%

ANALOG I/O: +4 dBs (+24 dBs MAX.) ADJUSTABLE

PARALLEL REMOTE: TTL COMPATIBLE, D-SUB 37

DPS-R7

Digital Reverb

If you want to add even more power and versatility to your audio system, Sony's DPS-R7 is right on the money.

Offering two discreet channels of advanced digital reverb effects, the DPS-R7 is an invaluable tool for the audio professional. As with the DPS-D7, the DPS-R7 employs HDLC D/A converters for superior sound reproduction as well as high-speed 32-bit digital signal processing, which deliver sophisticated, multiple reverb effects.

It also includes 100 factory presets as well as 256 memory locations for your own presets. In addition, the DPS-R7 features an ingenious "data wheel" and large graphic display for easy operation.

KEY SPECIFICATIONS

DYNAMIC RANGE: MORE THAN 90 dB

FREQUENCY RESPONSE: 10 Hz-18 kHz

THD: < 0.004%

ANALOG I/O: BALANCED +4 dBs (+24 dBs MAX.), UNBALANCED –10 dBs (+10 dBs MAX).

MAXIMUM SIMULTANEOUS EFFECTS (TEN): 4 PRE EFFECTS (2 PER CHANNEL), 2 REVERB (1 PER CHANNEL), 4 POST EFFECTS (2 PER CHANNEL)

CDP-2700

Compact Disc Player

The CDP-2700 compact disc player delivers a multitude of professional features for a very compact price.

Like all Pro Standard equipment, the CDP-2700 is rugged and reliable while delivering superb sound quality. Ideal for on-air applications in radio broadcasting and sound sweetening in video post, the CDP-2700 includes important features such as variable speed playback, fader stop/start control from a mixing console and an auto cue function for instant start.

And because its digital output conforms to both the AES/EBU and IEC-958 formats, the CDP-2700 directly interfaces with other professional equipment for flexible system expandability.

KEY SPECIFICATIONS

DYNAMIC RANGE: MORE THAN 110 dB

CROSSTALK: 100 dB

THD: 0.04%

VARI-SPEED RANGE: ± 12.7% (0.1% STEPS)

D/A CONVERSION: DUAL 18-BIT 8X OVERSAMPLING

Including The Price.

Introducing The New Pro Standard Digital Audio Series From Sony

If you've been looking to expand your capabilities with a new professional DAT recorder, CD player or signal processor, Sony quality is now within your reach.

Featuring some of the most highly advanced, great sounding digital audio products in the world, the Pro Standard™ Series covers a wide spectrum of the needs of today's audio professional. Making it easier than ever for studio recording, post-production and radio broadcasting to benefit from the advantages of digital.

Because the Pro Standard Series is so advanced, it allows you to push the limits of creativity like never before. And because it's designed and built for professional use, you can always count on it to stand up to your toughest demands.

The Pro Standard Series. It's just what you'd expect from The Leader in Digital Audio.™ Sony.

PRO/STANDARD DIGITAL AUDIO SERIES

DPS-D7

Digital Hyper Delay

If you want to take your creativity in exciting new directions, Sony's DPS-D7 Digital Hyper Delay is the way to go.

Featuring seven sophisticated algorithms, there's virtually no limit to the number of unique and complex digital delay effects you can create. The DPS-D7 incorporates an 18-bit over-sampling A/D and 1-bit HDLC D/A converter system with digital filters for excellent linearity, ultra low noise and wide dynamic range.

Second generation LSI's allow for high-speed 32-bit digital signal processing. And with its large graphic display and help button for assistance on any function, the DPS-D7 is always simple to use.

KEY SPECIFICATIONS

DYNAMIC RANGE: MORE THAN 94 dB

FREQUENCY RESPONSE: 10 Hz-22 kHz

THD: <0.0035%

ANALOG I/O: BALANCED +4 dBs (+24 dBs MAX.), UNBALANCED –10 dBs (+10 dBs MAX.)

MEMORY CAPACITY: 100 FACTORY PRESETS, 256 USER LOCATIONS

PCM-2300

Studio DAT Recorder

As Sony's most affordable professional DAT recorder, the PCM-2300 is ideally suited for a wide variety of applications where high quality recording and playback are necessary.

Like the PCM-2700, the PCM-2300 incorporates the latest conversion devices—1-bit delta Σ A/D converter and HDLC 1-bit D/A converter—for outstanding sound quality. The PCM-2300 also incorporates a sophisticated 3-motor transport design for solid reliability. And in 32kHz long-play mode, it delivers twice the normal recording and playback time—a full four hours.

Plus, its analog and digital I/O's provide a wide range of flexible interfacing possiblities.

KEY SPECIFICATIONS

SIGNAL TO NOISE RATIO: MORE THAN 86 dB

FREQUENCY RESPONSE: 20 Hz-20 kHz

THD: <0.05%

ANALOG I/O: +4 dBs (+24 dBs MAX.) ADJUSTABLE

SUPPLIED ACCESSORIES: WIRED/WIRELESS REMOTE, 19" RACK MOUNT, POWER AND REMOTE CABLES

HDLC. One Of The Great Technologies Behind Our Great Sound.

Representing a breakthrough in high-performance D/A conversion, Sony's new High Density Linear Converter™ (HDLC) System defines a new level of performance in sound quality.

More specifically, HDLC, a single-bit technology, recreates an analog wave form from digital data by representing it as a rapid series of pulses, overcoming differential non-linear distortion and glitch-induced distortion as well as zero-cross distortion inherent in previous technologies.

The HDLC system also employs Sony's proven 45-bit noise-shaping digital filter, circumventing base band dynamic range deterioration and assuring a high degree of oversampling accuracy. All of which translates into the purest, most accurate sound reproduction. All from Sony.

To experience the power of HDLC, along with the other advanced technologies behind our new digital audio products, call 1-800-635-SONY, ext. 914, for the Pro Standard dealer nearest you.

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SONY

mers, HVAC (heating, ventilation and air conditioning), coffee machines, etc.

★ The cables connecting the inputs, processing and effects units and the outputs should be clearly marked to allow quick repatching in the event of changes or problems during the show.

★ Cables that carry unlike signals (mic level audio, line level, MIDI control, lighting control, AC power, dimmed AC, etc.) should be separated, whenever possible, by at least a foot or more.

★ To achieve the greatest immunity from external noise sources, balanced audio lines and good grounding techniques must be used. Balanced lines also allow system grounding to be handled separately from the audio signal.

★ Apply the rule of thumb for grounding a cable shield — connect to ground only once and usually only at the output of each device (except microphones; their only connection to ground is at the console mic input).

★ Ground loops, having the ground connected to a signal line in more than one place, can cause buzzing, radio frequency interference and other noises to appear in the mixer, external processing, etc.

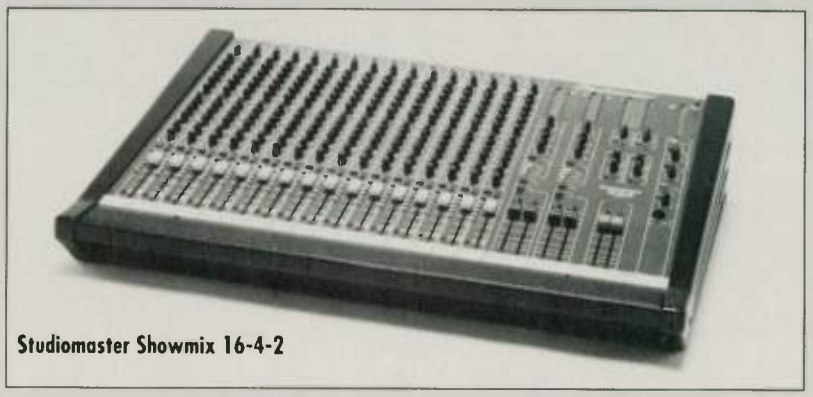
★ Unbalanced connections should always be kept as short as possible.

ONCE A GAIN . . .

Once the system is connected to minimize the noise, gain must be structured to maximize the signal level. Here is the basis of quiet sound systems:

★ Send as much level as possible without causing noticeable distortion in the system. This means that a sound system that's properly designed and optimized will cause each stage to reach the onset of clipping at exactly the same level. This will allow an adequate level of headroom to be set and remain constant throughout the system.

★ The most common gain structure faults are too little or too much input gain in the mixer and too much gain in the power amplifier. The mixer input gain should be set so that the normal position of the channel fader is at "unity" (10 to 15 dB from the top of the fader travel). This unity setting will not only optimize for signal-to-noise and distortion, it will allow you to use the maximum resolution of the fader to adjust dynamics during the show and always tell you where the fader should be reset to.



Studiomaster Showmix 16-4-2

BIG GAIN HUNTING LIST

Set the gain structure for each of the auxilliary, monitor and effect sends.

★ Label the mixer channels and sends to allow changes to be made quickly and accurately.

★ Structure the gain of the power amplifiers to suit the volume requirements for the show. This should allow a reasonable level to be used in the mixing console (typically 16 dB from clipping) when the loudest section, typical of the show, is sound-checked. There is little need to have a system hissing at an attentive audience because it's set up to provide 130 dB SPL when the show consists entirely of speeches (at 80 dB SPL). That system could be 40 dB quieter and still have 10 dB of headroom!

What it all boils down to is that if you take care of the technicalities in the setup and soundcheck, the show can be fun for the guy mixing it too.

CASE HISTORIES

FROM HERE TO ETERNITY (HOPEFULLY) WHEN TRANSPORTING YOUR SMALL MIXING CONSOLE.

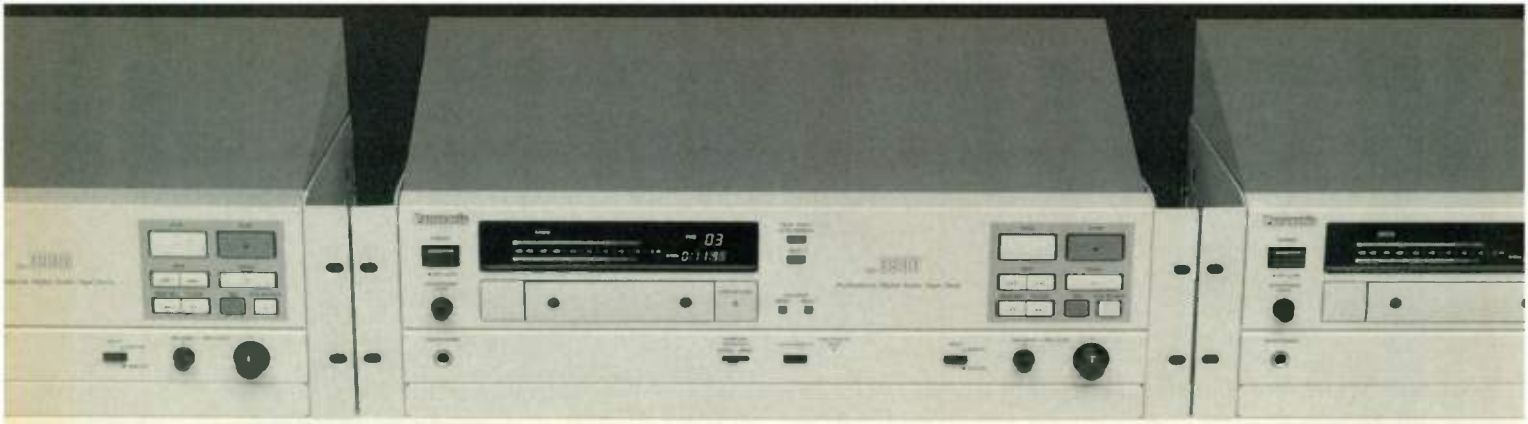
BY KEVIN McCANN ELDER

No matter how economical your new small mixer is, bumps in the night (especially during those high-velocity twists and turns of the Interstate, in that moon-crater club parking lot and in your favorite airline's storage compartment) can leave you paying the ultimate price to replace it. So, to obtain continued high performance from your mixing console, it's a good idea to consider how you'll go about transporting it from job to job.

Usually, the less expensive mixing consoles are sold without any kind of case. ATA (Airline Transportation Association) approved cases, which are reinforced with metal corners and metal strips on all the edges, can be expensive but are usually worth the investment over the long haul. A less expensive alternative can be some packing foam glued to a moving blanket or quilt, with some kind of hard board behind the foam that covers the top or knob side of the console. The mixer can be wrapped in this now shock-absorbent quilt and be placed on top of the other equipment in the van or truck.

KILLER REVERB

It's very important that those consoles with mechanical reberb trays always be transported in their normal upright position. Trucking these units on their sides or back can cause the reverb springs to break. Also, whether the means of transportation you employ is a station wagon, van, or a larger truck, there's less shock transferred to equipment placed as far forward as possible in the vehicle. Equipment placed directly above the rear wheels will generally be exposed to more shock or vibration from the rear axle when the vehicle encounters those inevitable bumps, pot-holes and other hazards of the roadways. It's also a very good idea



Multiple DAT automation isn't impossible.

Take control. It's *free.*

It's not often we let our imagination take control. But with the Panasonic SH MK-390 Controller for our SV-3900 Pro DAT you can do just that. And for a limited time, we'll give you one *free* when you purchase an SV-3900.

The SV-3900 features all of the award winning features, sound quality, and performance of the SV-3700. But with much more. If you are ever going to need more than one DAT, there is only one choice for this much control and automation. Up to 32 SV-3900s can be controlled and monitored from one SH MK-390. Interfaced with your digital workstation and hard disc recorder for on-screen control. Or in a virtually limitless variety of studio, broadcast, or installed sound applications.

Those are only a few reasons why the SV-3900 is essential equipment. The best reason is that it frees your imagination to explore the almost limitless possibilities this technology represents. But there's only one way to find out for yourself– that's to *buy* an SV-3900 Pro DAT. Do it by December 31, 1991 and you'll be able to take complete control with a free SH MK-390 Controller.

Panasonic
Professional Audio Systems

For your nearest dealer, call 714-373-7278, or write: Panasonic DAT, 6550 Katella Avenue, Cypress, CA 90630.
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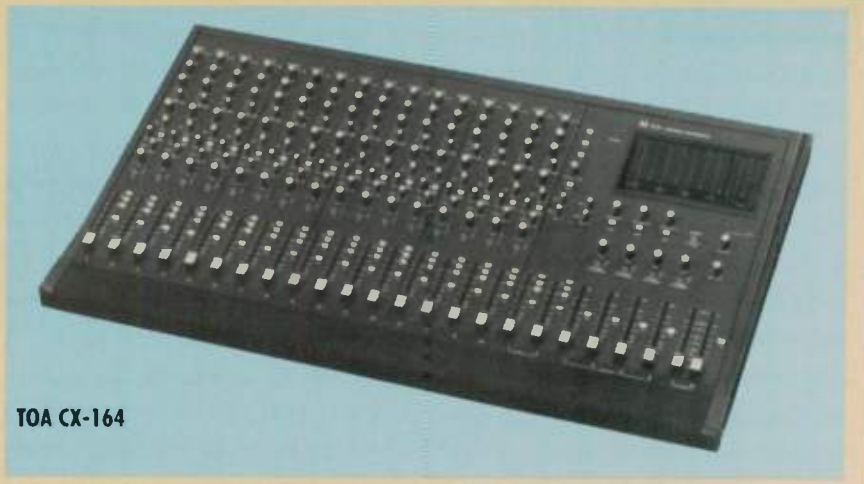
CIRCLE 60 ON FREE INFO CARD

WRH

to replace the vehicle's shocks at the first sign of wear. If you have no other way to transport the mixer except in the back seat or trunk of a car, at least make sure the console will not move around when braking or accelerating.



TOA CX-164

FASTEN YOUR SEAT (AND MIXER) BELTS

Many smaller mixers that are transported in ATA type flight cases are often put on the very top of all of the other equipment in the truck. This is fine as long as the case can't move or slide around. I remember many years ago a band on the run that had to brake hard to avoid a little old lady in a Buick who had pulled out right in front of them. The brakes of the van did a very good job of stopping everything except their mixing console, which kept right on moving — out through the front windshield and onto the paved highway. They received a very expensive lesson on the laws of inertia, i.e,. a body in motion tends to stay in motion. So, for the sake of your small mixer, wait till you get to the venue to start rockin' and rollin'.

THE UNDER $1000 MIXER MARKET IS MAKING SOME NOISE

BY JON VARMAN

SPECIAL $K

Lets face it. A Peavey Mark VIII or a Biamp Columbia console may be out of your price range right now. In fact, there may be quite a few consoles listed on the accompanying chart (page 44) that just don't make the budget-cut. No need to worry. An increasing number of manufacturers are offering professional live consoles for under a grand and they could be the cure to your mixing-board blues.

DOD, Mackie and Alesis are the current leaders of the <$1000 set with DOD offering the widest variety of models. Their 820 ($399) and 1220 ($599) come equipped with 2 bands of EQ, aux sends, and stereo FX returns. Recently, DOD unveiled their new 1642 mixer, featuring 8 inputs, 6 aux sends, FX returns, insert points and phantom power — all this and a back panel which configures to rack-mount or tabletop for less than a G.

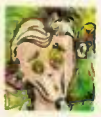
Mackie also proves that good sounds come in small packages with the MicroSeries 1202 at $399. This pint-sized powerhouse occupies less than one square foot of space yet offers a total of 20 inputs, 2 stereo effects returns and phantom power. (The sonic performance is even said to equal Mackie's CR-1604, a larger and more expensive version of the 1202.)

The Alesis 1622 Audio Console ($899) features an Integrated Monolithic Surface, which allows expensive features to be placed within an inexpensive mixer. Features such as hi and low frequency EQ controls, 6 auxiliary send masters and insert patching have made this discount board popular.

The sub $1000 mixer club continues to grow. Other members include Peavey and Yamaha, who in addition to producing a wide variety of high-end SR consoles, now offer a potpourri of budget-conscious items. In fact, Peavey has produced an entire line of live consoles that fall within the $400 to $800 range called the Unity Series. And Yamaha, riding high on the entry of their big-budget PM4000, recently entered the downscaled derby with the new EM1629 ($795), featuring 6 inputs, five-bands of EQ and one mono effects return.

YOUR SHOW OF SHOWS THE 91ST AES

BY ROGER NICHOLS



It was a good showing for nearly everybody in New York last October. On the facing page, the *EQ* editors chart the vast terrain of new product introductions, while, below, they've given me a "generous" eight hundred words or less to cram in my own impressions of what was hot at the Hilton.

The new Sony tube microphones at the show will blow your socks off. If the price doesn't do it then the sound will. At one end of the spectrum is the C-800. It uses an updated version of Sony's time proven C-37 capsule. The C-800G incorporates a dual diaphragm capsule and patterns are changed electrically. Sony let me borrow the prototypes for a recording session a week after the AES show. I first tried one of them on Jeremy Steig's flute. It was his album, so he was the guinea pig. We started with a pair of U-87s on the piano and then switched to the Sony C-800Gs. The mics were amazing. The piano jumped to life. The Sonys were very transparent, seeming to pick out the detail in the sound of the piano, the nuances in the harp resonance, the ambience in the piano itself. Oh, by the way, the C-800s cost $4,400 each and the C-800G is $5,600. I may have to sell a kid.

More and more digital audio products crowd the floors of the AES show every year. This year I noticed

that everybody had some type of digital hard-disk recording system.

Opcode Systems displayed Studio Vision, a software program which is an upgraded version of their original Vision MIDI sequencing program. Studio Vision allows you to record two separate mono tracks of digital audio onto your hard disk with the songs' MIDI information.

Korg presented their hard-disk recording system called Soundlink. Instead of using a Mac front end, they chose a dedicated controller that looks like a cross between a mixing console and a video editing controller.

Sonic Solutions showed NoNOISE, a software add-on that removes noise. It was originally developed for Lucasfilm to remove noise from film audio. MCA and other major record companies have purchased this system for cleaning up old master tapes for re-release. They can cut CD refs directly from the hard disk data in half real time.

For all you IBM diehards, Turtle Beach software offers a record-to-hard-disk system for IBMs and compatibles. Masterfonics in Nashville used that system to sequence and edit Donald Fagen's *Rock & Soul Review* CD that should be just out now.

The most crowded demo room at the show was Alesis's, where they showed the ADAT 8-track digital audio recorder. Each 8-track module is three rack spaces high. The tape is SVHS videotape, but, because of the higher speed of the transport, it only lasts for 40 minutes. The recorder has a built-in VSO and two-point auto-locator. The recorder can be used by itself, or in a system of up to sixteen ADATs controlled by a single remote control. The remote control contains all the external SMPTE references for real world lock-up to video machines. The actual SMPTE is not recorded on the ADAT tape but is referenced to the ADAT's internal timecode much in the same way as SMPTE is recorded on SMPTE DAT machines. This means that you can record with reference to Drop Frame SMPTE and play back referenced to Non-Drop SMPTE with no problems.

The Akai ADAM 12-track digital machine was there too and was generating plenty of enthusiasm of its own. The recording medium is 8mm video-

tape and the recording time is about 17 minutes per tape. There's a thirteenth track for longitudinal timecode so that you don't have to use one of the twelve digital audio tracks for lock-up. Multiple units can be locked together.

In the console department, the Crescendo CS-II from Euphonix was simply amazing. It's a digitally controlled analog console. What looks like the physical console is just the control surface. No audio at all passes through the control section of the console. Since there's no audio in the control section, there's less wiring and electronic circuitry, enabling the control modules to be a lot smaller than would otherwise be necessary. And since you can assign any control surface to any audio function, you can control a lot more audio paths than you have knobs for. This would allow you to have a 96 in by 32 out console in a 3 x 4 foot space. Great for remote trucks or small project studios. Because all the audio circuitry is in a remote rack, the audio signal path is very short. They've been able to come up with some amazing signal to noise figures, around 110 db. Not bad for analog.

Digital consoles are still the answer to my prayers, though. There is a God, and He is in the digital domain. (That's why we can't see Him, because we see analog.) Nobody is ever at 13/64ths or 0.00372654 with the universe, it's either ONE or nothing. That's DIGITAL!

To the Hilt(on)

Charting the 91st AES New Product Introductions

BRAND	MODEL	PRODUCT TYPE	NOTES	PHONE #	PRICE	LIT #
AB International	1200C	2-Channel Amp	800 watts/channel @ 8Ω; slide drawer concert touring amp.	(916) 783-7800	$2649	101
Adamson AcousticDesign	S-218	Bass Enclosure	Dual 18" manifold; compact; 133 dB maximum SPL; 900 watts RMS; 3.3Ω min. impedance.	(416) 420-0813		102
Adams-Smith	2600	Audio Editing Software	Runs on any standard AT 286 computer.	(508) 562-3801	$9995	103
Adaptive Digital Systems, Inc.	TDAP 408A	Noise Canceller	Real time noise canceller that can also be used in post-prod. mode.	(714) 955-3116	$20,000	104
	JBIPD	Semiconductor Recorder	Solid State recorder; expandable; DAT interface rates up to 44.1 kHz.		$6500	
Akai	DL1000	Remote Unit	Full-function remote; completely duplicates the front panel of the DD1000 Magneto Optical Disc Recorder; includes SMPTE time code read and write capabilities; can control up to 7 DD1000s.	(817) 336-5114	$2500	105
AKG Acoustics	K-400/K-500	Headphones	Large diaphragm dynamic; acoustically open, oxygen free copper cable and gold plated plugs; 15 Hz to 27 kHz, 94 dB sensitivity.	(415) 351-3500		106
Alesis	ADAT	Digital Audio Recorder	8 tracks; uses SVHS tape; up to 16 units can be linked.	(213) 467-8000	$3995	107
AMEK	Hendrix	Multitrack Recording Console	Fader, mute and switch automation; parametric EQ with variable filters.	(818) 508-9788	$84,857	108
Ampex	499 Grand Master Gold	Audio Mastering Tape	Non-porous, high-energy, ferric oxide formulation allows for operating levels of +9.0 dB.	(415) 367-3889		109
AMS Industries	Logic 2	Console	Completely digital; Total Dynamic Automation; 48 aux sends available.	(203) 792-4997		110
Analog Devices	AD1879	A/D Converter IC	Dynamic range: 103 dB.	(617) 329-4700	$42	111
Aphex	8126	Modular Amp & Rack	Transformerless; 6 servo-balanced output stages; LED; power sensing.	(818) 767-2929	$395	112
API Audio Products	—	Console w/Touch Reset	128 inputs; 48 buses; knobs and faders can be reset automatically.	(703) 455-8188		113
Apogee Electronics	AD-500	A/D Converter	Gold-plated XLR input connectors; 2 levels of input gain control.	(213) 399-2991	$1995	114
	DA-1000E	D/A Converter	Many interfaces; 8x oversampled digital data drives 2 20 bit D/A converters.		$1995	
Applied Research & Technology	MDC 2001	System Controller	2 channels of stereo processing; independent control of all needed functions.	(716) 436-2720	$499	115
	Alpha	Digital Effects Processor	7 simultaneous effects; ASIC 24-bit digital integrated effects system.		$499	
Ariel	DAT/PORT	Digital Audio Interface	3-way digital input/output.	(908) 249-2900	$895	116
	DAT-Link	Interface for DAW	24-bit audio with onboard DSP.		$3995	
Audio Logic	D11	1 Input/1 Output Digital Delay	Delay increments of 1.25 milliseconds; max delay time is 1280 milliseconds.	(801) 268-8400	$400	117
Audiomation Systems/Uptown	System 990	Automation System	Automated frame accurate with 256 levels; up to 60 automated channels.	(303) 443-1171		118
Audio Precision	Portable One Plus	Audio Test Set	Graphic sweeps; hard-copy output.	(503) 627-0832	$4600	119
Audio-Technica	AT4033	Studio Condensor Mic	Low-mass diaphragm; open-air housing.	(216) 686-2600		120
	AT822	DAT Microphone	101 dB dynamic range.		$299	

BRAND	MODEL	PRODUCT TYPE	NOTES	PHONE #	PRICE	LIT
Augan Instruments	408 OMX	Optical Multitrack Rec./Ed.	More than 64 sound effects on line; MIDI/event/sync editor pages.	(31) 85 648966		121
Australian Monitor	K7	MOSFET Power Amplifier	400 watts/channel @ 4 Ohms; stereo dual channel or bridged mono operation.	011-612-8 16-3544	$1430-$1595	122
Avalon Design	A-19	Module System	Available in various sizes to fit individual needs.	(213) 469-4773		123
BASF	911	Studio Mastering Tape	Signal-to-print-through ratio: 57dB	(617) 271-4100		124
beyerdynamic	MCE 52	Mini Condensor Mic	For percussion with remote 12-48v pre-amp.	(516) 935-8000	$399.95	125
	MC833	Stereo Condensor Mic	3 internally shockmount condensor diaphragms; 2 capsules are adjustable to offer MS and XY stereo miking without the need for an outboard matrix decoder.			
BGW Systems	GTC	Amplifier	2 rack space; 48 lbs; 600W/4 ohms per side 350W/8 ohms per side; XLR inputs; Neutrik output connectors; twin DC variable speed fans; module circuitry.	(213) 973-8090	$2099	126
Brainstorm Electronics	SR-15	Time Code Distripalyzer	Includes a 1x5 time code distributor; a time code analyzer and a pilot tone stripper.	(213) 475-7570	$1095	127
Bruel & Kjaer	Type 2012	Audio Analyzer	Response is analyzed in parallel, increasing speed.	(508) 481-7000		128
BSS	FCS-960	Graphic EQ	Dual channel, dual mode 1/3 octave graphic equalizer; each channel front panel switchable between wide and narrow constant bandwidth characteristics.	(415) 351-3500		129
	FCS-926	Parametric EQ	Digitally controlled analog multi-band parametric EQ; new type of user interface makes complexities of parametric filter setup transparent to the operator.			
CAD/CTI	MG215	Gooseneck Microphone	Ultra mini; swivel headpiece; super cardioid.	(800) 762-9266		130
	ST100	Boundary Microphone	Self-contained.			
Community Light & Sound	RS660	Flying Array Loudspeaker System	Compact 3-way trapezoidial live/playback loudspeaker; LF 2-10", MF 1-2", HF 1-1" with rigging.	(215) 876-3400	$1895	131
Crest	PFA-600	Amplifier	24v DC operated; 600 watts/channel at 4 ohms.	(201) 423-1300	$3990	132
Crest/Gamble	Series EX32	Live House Mixing Console	32-channels; 8 stereo groups; 8 stereo matrixes; full patchbay.	(201) 423-1300	$52,000	133
Crown	SMX-6	Multiplexer	8 level detectors on the inputs and outputs.	(219) 294-800	$1795	134
	3600VZ	Amplifier	Variable impedance power supply circuitry packs 3600 watts of power.		$2895	
dbx	363X	Noise Gate	2 independent or stereo-strappable channels; front panel controls; RMS detection.	(415) 351-3500		135
Demeter Amplification	VTMP-2	Tube Mic Pre-Amp	Each channel has a variable gain 30-50 dB; a peak indicator; a fader and 48 volt phantom power.	(213) 470-6426	$1395	136
	STDB-2	Stereo Tube Direct Box	Variable gain in boost mode; 180 volt b+ power supply; 27 MΩ input section.		$850	
DIC Digital	15/30/48/62/92/122MQ	DAT Cassettes	Formulation finish reduces friction and provides better tape-to-head contact.	1 (800) DAT-1-DIC		137
Digidesign	Pro Tools	Digital Audio Production Sys.	Integrated multitrack digital audio & MIDI recording and editing; high resolution digital mixing.	(415) 688-0600	$5995	138
	Pro Store	Magneto Optical Drive	2 channels of recording & playback or multichannel archival.		$4995	
	PDS	Compact Disc Recorder	Write-once CD recorder for use with Sound Tools or Pro Tools.		$24,995	
Digigram	Xtrack	Digital Recorder	Can manage between 2 and 8 digital tracks in the same PC and the same hard/optical disk.	(33) 76.52.47.47		139
Digital Expressions Inc.	Soft Splice	Digital Audio Editor	Runs on a Macintosh Plus and higher; built-in DSP; 4 tracks internal with stereo digital I/O.	(206) 389-9895	$3995-$4695	140
DigiTech	VHM 5 Vocalist	Human Voice Harmony Processor	Creates up to 5-part harmony from a single voice input without changing the vocal cavity tone or resonance.	(801) 268-8400	$849.95	141
DOD Electronics	1642	16 Channel Mixer	8 mic/line inputs; 8 line inputs; 4 sub mixes; 2 outputs; rack mountable.	(801) 268-8400	$999.95	142
Dolby	DP5500	950 MHz STL	All-digital system consisting of the DP5501 transmitter and the DP5502 receiver.	(415) 863-1373		143

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BRAND	MODEL	PRODUCT TYPE	NOTES	PHONE #	PRICE	LIT
Dolby	430 Series	Noise Suppressor	Gives 16-18 dB of noise suppression above and below dominant mid-freq.for cleaning up field recordings.	(415)863-1373		143
Drawmer Distributors	DS404	Quad Noise Gate	Hard/soft gating; L.F. & H.F. filters chain linking.	(508) 650-9444	$1149	144
Dynacord	CLS222	Compact Rotor System	2-way operation; different speed up and slow down times true to the original sound for bass and treble.	(516) 249-3660	$795	145
Eastern Acoustic Works	KF300/SB33	Visual Array Technical System	SB33 (subwoofer) has been optimized for hanging with the KF300.	(508) 234-6158		146
Elettronica Montarbo	Digal 56	Real-Time Spectral Analyzer	Real-time analyses on 2 channels simultaneously, with a dynamic range exceeding 90 dB.	(05) 1/766437		147
E-Mu Systems	Proteus	Keypad	5-octave, velocity and pressure sensing keyboard.	(408) 438-1921		148
	EIIIx	Expander	8 MB of internal sound memory expandable to 32 MB; 16-bit DSP functions.		$7995	
Ensoniq	DP/4	Parallel Effects Processor	400 presets; 4 custom 24-bit DSP chips; 4 inputs; 4 outputs.	(215) 647-3930	$1395	149
Euphonix	CSII	Console	Offered in a variety of sizes from 24- to 96-fader systems; runs MixView software; SnapShot Recall; total automation of every control.	(818) 766-1666	From $100,000	150
Eventide	VR240	Recorder	8 channels; uninterruptable power supply.	(201) 641-1200	$9995	151
Fairlight	MFX2	DAW	Can play up to 16 continuous tracks; rewritable optical disk.	(61) 212 6111		152
Fostex	PD-2	DAT Recorder	Portable; built-in timecode generator; switchable sampling frequencies.	(213) 921-1112		153
Genelec	1031A	Active Monitor Loudspeaker	8" polymer composite cone woofer; 1" aluminum dome midrange; tweeter; 2 120w amps; active cross over filters; balanced input 47Hz-22kHz ±2 dB.	(358) 771-3311	$1499 /each	154
Gold Line/Loft	DSP 30	Real Time Spectral Analyzer	Full 85 dB window; memory can be scrolled up or down; measures in either 1/4, 1/2, 1, 2, 3, 4 or 5 dB increments.	(203) 938-2588	$1500	155
Gotham Audio Corp.	UM-70	Perestroika Microphone	Brass backplate with gold sputtered membrane; switching power supply (12-48v) from a phantom power source; 3 pattern microphone.	(212) 765-3410	$995	156
Hybrid Arts Inc.	Digital Master	Disk Recorder/Editor	Direct to disk recording; 64x over-sampling; MIDI/SMPTE interface.	(213) 841-0340	$4500	157
	ADAP IV	Digital Audio Recorder	Waveform or non-waveform display; inter-application communication.			
Innovative Technologies	2000	Machine Control Software	Many different software packages available for the Panasonic SV-3900.	(508) 224-7338	$150-$2000	158
Intelix	MIND-Net	Communications Protocol	Open System Intergration (OSI) based.	(608) 273-6333		159
JBL Professional	4200 Series	Studio Monitor	1-inch pure titanium diaphragm; magnetic shielding.	(818) 893-8411		—
	ES 52000	Digital System Controller	Steep sloped crossover filters; digital equalization.			
	CADP2	Complex Array Design Pro.	Runs under Microsoft Windows 3.0; true 3-D modeling.			
JLCooper Electronics	CS-10	Control Station	Designed to work with Digidesign's Pro Tools and Q-Sheet; audio recording and editing system.	(213) 306-4131		161
	MLA-10	MIDI-Line Amplifier	Self-powered; can power JLCooper's MLA-1; converts MIDI signals.		$499.95	
JRF Magnetic	TC-50	Time Code Conversion Kits	Available for Sony, Otari, Studer and Ampex equipment.	(201) 579-5773		162
KABA	—	4-Track Dupe Deck	Incorporates Digidesign's Pro Tools as a tapeless digital master.	(800) 231-TAPE		163
Klark-Teknik	Milab LSR-2000	Condenser Microphone	Transformerless; soft-silicone rubber capsule cradle; switchable 10dB pad.	(516) 249-3660		164
Klipsch	KP-480-SW	Subwoofer	18" bass-reflex speaker; 15" passive radiator.	(501) 777-6751		165
Korg	A1	Signal Processor	User configurable effects chains; 59 effects, simultaneous use of seven effects.	(516) 333-9100		166
	A2	Effects Processor	104 internal effects chains; simultaneous use of 6 effects.			
	Soundlink	Random Access System	Multitrack hard disc recorder/editor; auto mixing/automation; MIDI data recording/playback/editing.			

BRAND	MODEL	PRODUCT TYPE	NOTES	PHONE #	PRICE	LIT
KRK Monitoring Systems	Model 9000	Close-Field Monitors	Low distortion; wide dynamic with precise imaging.	(714) 841-1600	$1950 /pr.	167
Leitch	1300 CC	Code Converter	Takes Real Time from any SMPTE/EBU Real Time source and outputs video-locked Drop Frame Longitudinal Serial SMPTE/EBU Time Code; card installed in SPG 1300 Sync Pulse Code Generator.	(800) 231-9673		168
Lexicon	LARES	Acous. Reverbance Enhancement Sys	Electro-acoustic sys. that uses mics, speakers and digital electronics to augment the natural direct and reflected energy in spaces that require flexible acoustical character.	(617) 736-0300		169
	LFI-10	Digital Audio Format Interface	Converts between AES/EBU, SPDIF and SPDIF-2 and allows viewing and editing of all auxiliary data embedded in the digital audio bitstream.		$1995	
Mark of the Unicorn	Digital Performer Software	Software	Tracks overview window; real-time editing while playing; independent track looping.	(617) 576-2760	$895	170
Meyer Sound Labs	SIM® System II	Source Independent Acoustical Measurement Sys.	Includes the SIM-2201 analyzer, SIM-2043 interface network and many software options; expandable.	(510) 486-1166	$27,500+	171
	USM-1	High-Power Stage Monitor	15" low frequency cone; 2" throat high-frequency compression driver on a modified radial horn; requires S-1 Control Electronics Unit.		$3200 (USM-1)	
Nady	750VHF	Dual Discrete Channel Wireless Sys.	2 VHF wireless systems in one component; with True Diversity and 120 dB dynamic range.	(415) 652-2411	$1199+	172
Neotek	Espirit	Mixing Console	8 group buses; 2 main buses; extensive broadcast features and options; choice of frame sizes, automation packages.	(312) 929-6699	$18000-40000+	173
Neutrik	A-1	Test & Service System	Multi-function; 256 x 128 backlit graphics LCD.	(201) 901-9488		174
Neve	HRC-1	A/D-D/A Converter	Stereo 20-bit A/D-D/A converters; AES/EBU output available in 2 separate independently driven connectors.	(203) 744-6230		175
New England Digital	—	DSP Mixer	16-channel digital mixer for the PostPro; 5-band parametric EQ; panning; summing; gain control; digital crossfades; controllable by Mac-based AudioMation™ software or any MIDI fader unit.	(603) 448-5870		176
NVision	NV3512A	Audio Routing Switcher	Capable of data rates up to 50 Mbits/sec; can be slaved to most existing audio and video routers.	(916) 265-1000		177
Opcode Systems	Studio 5	MIDI Interface/Ptchby/Synchron./ Proc.	Supports 240 MIDI channels; stores up to 128 MIDI processing patches.	(415) 369-8131		178
Otari	DTR-90	R-DAT Recorder	Removable front panel; 4 heads; time code standard option; designed to work in tandem with its companion editor.	(415) 341-5900		179
Panasonic/ RAMSA	SV-3900	Pro-DAT Recorder	Full remote control of virtually all transport functions; selectable sampling rates.	(201) 348-7846		180
Peavey	PME 4000	Parametric EQ	Offers control of more than 11 octaves; bypass switches on each band.	(601) 483-5372	$349.99	181
	SDR 20/20	Multi-effects Processor	3 simultaneous effects; 20 kHz bandwidth; 44.1 kHz sample rate.		$699.99	
Quested	Q108	Studio Monitors	High end reference monitor uses integrated processing and amplification for precise control of driver components; custom designed biamplification circuitry and two 100 watt RMS amplifiers.	(071) 731-7434		182
QSC	EX Series	Amplifiers	Built-in limiter; 5-way binding posts outputs and XLR barrier strip inputs.	(714) 645-2540		183
RE Instruments	RE 8800	Sound Interface Unit	Encoding/decoding of up to 4 7.5 kHz speech channels.	(216) 871-7617		184
Roland	DM-80	Hard Disk Recording Sys.	Available in 4- or 8-tracks; expandable to 32 tracks; simultaneous recording on all tracks; built-in 24-bit digital mixer with 2-band digital EQ.	(213) 685-5141	$6995 (4-track)	185
	RSS	Roland Sound Space	Real time digitally-controlled processor; reproduces aural environment with spatial localization of sound over a conventional stereo system; no decoding required.		$44,500	
Rolls Corp.	RA 2100	Stereo Amplifier	100 watts/channel RMS; bridging switch.	(801) 562-5628		186

BRAND	MODEL	PRODUCT TYPE	NOTES	PHONE #	PRICE	LIT
Russian Dragon	RD-SA	Signal Measurement System	SignAllign Analysis; measures the time off-set between both delayed speaker systems and transducer components.	(512) 525-0719	$995	187
Sabine	FBX	Feedback Exterminator	Microprocessor controlled; uses 6-narrow-band graphic EQ.	(800) 626-7394		188
Saje	Memory	Live Console	All operating parameters are digitally controlled.	(33) 1 48 70 75 60		189
Samson	Concert Series II	Wireless System	Features dbx® Noise Reduction.	(516) 932-3810		190
Schoeps	KFM 6U	Sphere Microphone	Pick-ups are placed at 180° angle.	(212) 242-3737	$5795	191
Sennheiser	BF 530	Microphone	Supercardioid; internal shock suspension.	(203) 434-9190		192
Shure HTS	HTS 400SPA	Signal Processing Amp	2-channel power amp.; DMode™ switch for powering 2 subwoofers from one amp.	1-(800)-25-SHURE	$1395	193
Sonex/Ilbruck	PSP-1	ProSPEC Acoustical Foam	Used for lining compartments and enclosures that contain sources of excessive noise.	(804) 744-4824		194
Sony	C-800G/C-800	Microphones	Thermo-electric cooling system; vacuum tube; anti-vibration.	(201) 930-6432	$1590	195
	PCM-2300	Digital Audio Recorder	3 sampling frequencies; double encoded Reed Solomon Code error correction.			
	TCD-D10 Pro II	Portable DAT	20-segment peak level meters; self-diagnostics.		$3300	
Soundcraft	Europa	Console	Designed for sound reinforcement; 8 audio group masters. 8 VCA sub-group masters; 12 aux sends.	(818) 893-8411		—
	Spirit Monitor	Console	24-channel; 60mm fader controls; 3-band EQ.			
	Sapphyre	Console	Each input/output module has individual noise gates with a 4-band EQ design.			
Soundtracs	Megas Stage	Console	Channel mutes can be assigned to any of 6 mute groups, 6 aux sends and a direct aux send.	(44) 81 3993392		197
	Megas Studio	Console	Split console design; on-board MIDI computer can be interfaced with a sequencer.			

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—Dave Dion, *Engineer's Quarterly*, Feb/March '91

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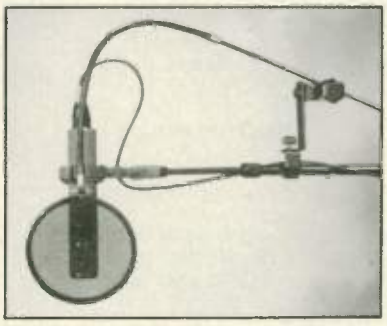
—George Petersen, *Mix Magazine*, April 1991



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CIRCLE 31 ON FREE INFO CARD

COMING NEXT ISSUE

EQ

- It's NAMM time and *EQ* will preview all that's worth seeing and hearing.
- Legendary super producer Phil ("Wall-of-Sound") Spector's landmark career retrospected (and retroSpectored) in a special tribute section.
- Checking in on bass wizard Stanley Clarke and his new independent label, Slamm Dunk.
- Peter Gabriel's sonic-cocoon Workroom at Real World in Bath.
- Everything worth knowing about compressors/limiters compressed into one section you'll want to hold onto (for dear life).
- Exclusive hands-on reviews of Opcode's Track Chart, DigiTech's Vocalist and QSC's Ex 1600 amp.

PLUS

Roger Nichols, Craig Anderton, Richie Moore and J.D. Sharp do their thing.

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CIRCLE 45 ON FREE INFO CARD

BRAND	MODEL	PRODUCT TYPE	NOTES	PHONE #	PRICE	LIT
Spectral Synthesis	AudioEngine	DAW	256 internal tracks; 26+ hours of recording; waveform editing.	(206) 487-2931		198
	AudioScope	Software Module	Performs real-time editing digital effects processing using the DSP processing of a SynthCARD.			
Stewart Electronics	PA-800	Power Amplifier	Bridgeable to mono; impedance optimization circuitry; short circuit protection; 9 pounds.	(916) 635-3011	$699	199
John Storyk Architectural	CART	Acoustic Ray Tester	Calculates and graphically displays acoustic ray behavior; can vary wall angles.	(914) 255-2255		200
Studer	D740	CD Recorder	Completely self-contained; universal playback capabilities.	(615) 254-5651	$12,950	201
	Dyaxis	Magneto-Optical Drive	600 MB; yields approximately 28 minutes of stereo recording per side.		$6995	
Symetrix	524E	Multi-Mode Crossover	Phase alignment btwn bands; individual band limiting; ind. band insert points.; user interchangeable frequency cards.	(206) 282-2555	$1095	202
	564E	Quad Expander Gate	Hipass and lopass filters; dual action gate and expander modes; key listen mode; control loop send and receive.		$989	
SynchroVoice	MidiVox	Professional Voice Controller	For MIDI compatibles; hands free; soft neck band with small gold foils electronically monitor vocal folds.	(201) 483-7416	TBA	203
TAC	SR6000	S.R. Console	VCA output and split auxiliaries; parametric EQ.	(818) 508-9788	$49,500	204
TAD/Pioneer	TL-1801	LF Transducer	800W; 18" woofer or subwoofer.	(213) 746-6337	$585	205
Tannoy	Contractor Series	Loudspeakers	Inductive Coupling Technology (ICT) transducers which are phase coherent and time aligned.	(519) 333-2700		206
Tascam	202 MKII	Dual Rec. Dubbing Deck	Allows 2 identical copies to be simultaneously made from an external master.	(213) 726-0303	$399	207
	ATS-500	Synchronizer	Will synchronize any tow machine's serial interface ports.		$799	
	CD-601/RC-601	CD System	Autocue; front-panel variable pitch		$1399	
	M7/MFA	Moving Faders	Package comes complete with all necessary computing power.		$50,000 (40 Ch)	
T.C. Electronic	M5000	Digital Signal Processor	True stereo DSP; expandable 24 bit high speed buss; SMPTE time code input standard.	(805) 373-1828	$3734	208
TDK	Pro SA Cobalt	Pancake Tape	Type II formulation; ideal for digital bin duplication.	(516) 625-0100		209
Tech 21	SansAmp	Tube Amp Emulator	For direct recording and live performances; offers complete tonal control of wide range of tube amplifier sounds.	(212) 315-1116	$295	210
3M	275	Digital Audio Mast. Tape	Offers lower drop-out rates and improved windability; compatible in all DASH, DMS and PD formats.	(612) 733-3477		211
Time Line	Micro Lynx	A/V Sync Control Sys.	Supports 2 transport plus MIDI; SMPTE time-code generator; full featured keyboard; expandable.	(619) 727-3300	$2495	212
TOA	ix-9000	Mixing System	18-bit linear pulse-code modulation with 64x oversampling; 8 programmable fader groups.	(800) 733-7088		213
UltraAnalog, Inc.	ADC20048-A	A/D Converter	Composed of the AFE 20048-A Analog Front End and the D20C10 Digital Decimation Filter.	(510) 657-227	$275	214
Vega	VX-20	Wireless Microphone System	Includes the R-27 camera-mounted receiver and either the T-25 bodypack or the T-28/29 handheld transmitters.	(800) 877-1771		215
Westlake Audio	BBPM-4	Self-Powered Monitor Sys	Dual 4-inch woofers; 150 watts per channel amp for low frequencies; 66 watts per channel high-frequency amp.	(805) 499-3686	$1985	217
Yamaha	PM4000	Live Production Console	24, 32, 40, 48 mono/4 stereo inputs; 8 mix busses plus stereo; 12 aux. busses; 8 VCA; 4-band full PEQ input channel meters; 8 mix matrices.	(714) 522-9011		218
	D2040	Digital System Controller	2-input/8-output programmable digital crossover; 2-band PEQ; comp/limiting delay for each output; 19-bit A/D; 20-bit D/A.		$3500	
	SY99	Synthesizer	Provides 2 digital stereo outputs in AES/EBU form and in Y2; offers 1, 2 or 4-element voice architecture.			
Zoom	9030	Effects Processor	47 effect programs which can be used up to 7 at a time; 99 user-programmable patches.	(415) 873-5885	$749	219

▲ Meyer Sound's USM-1 Ultra Stage monitor

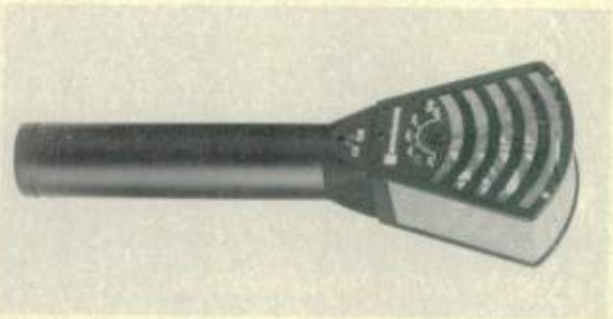
▼ Sony's PCM-2300 digital audio recorder

▲ QSC's Ex Series Amps

A Few AES '91 Hot Shots

▲ Studer's D740 compact disc recorder

beyerdynamic's MC833 stereo condenser mic ▶



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CIRCLE 55 ON FREE INFO CARD

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A highly effective output limiter is provided on each channel of the **Dynamite ²**.

This feature can be used to prevent consoles, recorders, mains speakers, and monitors from being overdriven.

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Racking 'Em Up

Putting together a class-act effects rack for under ten grand, with more than one close call

BY J. D. SHARP

YOU'D THINK that it'd be an easy assignment to put together a $10,000 effects rack, but it has proven more difficult than would be apparent, because there are so many excellent choices. The basic dilemma comes down to this: do you sink a big chunk of change into one almighty reverb/multi-effect, or instead go for the idea of "distributed processing" and acquire a series of effects to get the job done. Another way to pose the question is: "Are the big bad effects processors so different and so much better than the mid-priced competition?"

The answer, unfortunately, is yes and no. Yes, they are that much better and/or offer increased power and options. No, it's not the only way to get the job done. Since there's nothing worse than equivocation, I've come down on the side of getting one super processor and accompanying it with a couple of moderately priced effects.

CAUSE AND EFFECTS

So the most important single decision in putting together this deluxe rack is to select a heavy duty multi-effect that excels at reverb and keeps going. Here it comes down to the type of work you're doing. For a pop studio orientation it's hard to beat Roland's R880 Digital Reverb ($3995). Although Roland hasn't made a big deal about it, there's quite a bit of additional capability built in, including compression, parametric EQ, chorus and delay. And all this processing takes place purely in the digital domain. The two channels are totally independent and each channel has a stereo output, or both sides can be linked for functions such as stereo compression. The GC-8 Graphic Controller ($795) provides a large LCD window into the workings of the R880, and the degree of programmability and flexibility is almost overwhelming. You can literally rearrange the inputs, outputs, effects and mixers within the R880 using the control panel in an almost Mac-like environment. There's also the ability to delve underneath each parameter and mess with the very essence of each effect algorithm; you can go as shallow or as deep as you like. Finally the provision of AES-compatible digital as well as analog inputs and outputs means that the R880 will remain current for the foreseeable future. A ROM card full of patches by *EQ* columnist and noted engineer Roger Nichols doesn't do it any harm either!

On the other hand, if your thing is broadcast and film production, you might benefit more from the extensive powers of the Eventide H3000SE/B. This is the "full boat" version of the Ultra-Harmonizer, so it offers all the features of the Studio Enhanced and the Broadcast versions. On the broadcast side and for film/video production, Time Compression is of particular interest, while the Studio Enhanced ROM is just loaded with tasty effects ranging from gorgeous reverbs to intricate multitap delays. And, of course, Eventide's pitch shifting is second to none. If you're truly maniacal, you can add the Vai presets (a $100 ROM containing a selection of patches created by Steve Vai especially for guitarists) and Eventide's HS322 sampling board ($995), which provides a very quick way to store and edit chunks of audio. This is ideal for time shifting of both sung and spoken material, as well as providing a way to fly in vocals. If you want all of the above features, just ask for the kitchen sink model, which rolls SE/B/Vai and HS322 into one convenient part number ($4590).

Of course, if you're truly in the chips, just put both the R880 and the Ultra-Harmonizer on your shopping list, since their respective talents mesh nicely with very little duplication!

While in the digital domain, con-

Racketeers, top to bottom: Aphex Expressor, Roland R880, Eventide Ultra-Harmonizer, Korg A2

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sider Roland's E660 Digital Parametric EQ ($1995). This advanced device once again does its thing completely digitally, so there's no additional noise to worry about. The front panel contains all the knobs you need to completely program all four bands of one channel, and the two sides can automatically be linked, or treated as two separate mono units. High and low bands can be selected for shelving or peak/dip operation. A surprisingly useful extra is the inclusion of a digital hum canceler, which knocks out both the fundamental (that's 60 Hz here in the States) and all its harmonics as well. This is ideal for saving those tracks where the buzz from the Strat pickups is as loud as the signal you were trying to record. With all that the E660 is only a bit more expensive than a top-grade analog parametric. Both digital and analog I/O are featured.

A good gate is a necessity and now Drawmer's packaged four gates into just one rack.

I'M SO EXCITED

No self-respecting signal processing rack would be complete without some form of enhancer and exciter. Our rack would certainly include an Orban 290RX Adaptive Enhancement Processor ($1200), even though it's not yet a popular piece. Without quibbling over the technical details, it provides three different processes: harmonic restoration (generating even-order harmonics, similar to the Aphex process); spectral restoration (which uses a complex algorithm to vary the high frequency content, à la BBE); and single-ended noise reduction, which includes both an algorithmically controlled sliding filter and a downward expander. On top of this, the 290RX is a stereo unit; each channel can be used separately or the unit can operate as a linked stereo device. You could say it kills three birds with one stone, and so its list price ends up being quite reasonable.

PEARLY GATES

A good gate is a necessity, and few would argue against the quality of Drawmer's. Now they've packaged four gates into just one rack space to create the DS404 Quad Noise Gate ($1149). All the goodies that made Drawmer gates a standard in the first place have been included, like variable low- and high-pass filters that can make each gate frequency-selective, and ultra-fast response time. A new addition is a choice between "hard" and "soft" modes; the hard mode uses a selected attack time and a release contour optimized for drums and percussion, while the soft mode responds to the input signal with "programme adaptive" circuitry that continuously varies both attack time and ratio. It's about all the gate you'd ever need.

HOT OFF THE COMPRESSORS

Compressors are, alas, quite personal, so it's hard to make a recommendation without running afoul of the experience and preferences of others. If money is only slightly an object, we'd have to go with Drawmer's 1960 Vacuum Tube Compressor ($2699). The name pretty much says it all; this is a soft-knee type of compressor with very simple controls (three switchable attack and six release times) and an incredibly forgiving and warm sound. The stereo unit is endowed with both balanced mic and line inputs, so you can use it as your microphone preamp as well (48V phantom power is even provided). Coming down somewhat in the pricing stratosphere, we arrive at the Aphex Expressor ($495). This mono processor provides HFX high frequency expansion and correction for bass delay anomaly (seems to tighten up the bottom), as well as more mundane but desirable features such as selectable response (hard- or soft-knee characteristic) and a full complement of wide-ranging controls. The bottom line is that distortion and noise are low and fidelity is phenomenal. A pair of these is a very respectable way to go when it comes to dynamic control.

WHAT I REALLY WANT IS TO GO DIRECT

It seems that there's a trend to "go direct" or combine a direct processed signal with a miked amplifier when it comes to guitar these days, and there are any number of outstanding devices that make this possible. Picking the single ideal guitar processor is one of the most difficult decisions with so many viable candidates, so we'll cop out and mention three worthwhile performers. However, some of the ones left out (Alesis Quadraverb GT; DigiTech GSP-21 Pro and Twin Tube; Peavey ProFex; ADA MP-1; Rocktron Intellifex) could work just as well, and like so many things it truly comes down to a matter of taste and just what style of guitar you're trying to capture. Our choice for an all-tube, nonprogrammable unit is Soldano's SP77 Preamp ($799.95). This is a bare-bones dual channel unit with tone controls that are subtle in their action. The key here is that you turn it on, dial in the distortion you want, and it screams. So much for tube-style singing lead and crunch rhythm. A more versatile performer (but it doesn't get that TUBE sound!) is Korg's A2 ($1300). This easily programmed all-digital processor comes

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with four times as many presets as its little brother, the A3, and sounds simply dynamite. We've only heard a prototype of the third recommended unit, but by the time you read this it should be in full production; that's the A.R.T. SGX2000 Guitar Preamp ($829). It combines the best of both worlds, with both a programmable tube preamp and a full digital effects section, and extensive real-time MIDI control over the whole thing. It's hard to own just one of the above-mentioned units, but you'll just have to pick and choose!

PRO PROCESSORS

Finally there's need for at least one more digital effects processor, and in keeping with the upscale nature of this rack, we've concentrated on the middle end of the market, from about $800 on up to the $2000 range. Again, there are several choices you could make and be mighty happy with any of them. Korg's A1 ($1995) is not just a big A2; it uses a whole new digital processing engine, operating at 48 kHz, and offers incredible processing power and versatility, including the ability to generate seven effects simultaneously, plus all sorts of combinations of serial, parallel and series-parallel signal chains. The range of effects is outstanding, covering overdrive, rotary speaker, compression, pitch shifting, gating and more (a total of sixty different effects in all!) and both analog (XLR and 1/4-inch) and digital I/O are provided, so once again we can look to the future in confidence. Once you overcome the slightly obtuse operating system of the Zoom 9010 ($2149), you'll find a quad processor that once again can be configured in a wide variety of signal chains, including one mode where it operates as four independent mono effects.

continued on page 86

No self-respecting signal processing rack would be complete without some form of enhancer and exciter.

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Rumors Off the Wire

Wireless guitars are starting to cut the ties that bind in the recording studio

BY MICHAEL ROSEN

WHEN IT CAME time for me to produce the third album of Atlantic Recording artists Vicious Rumors, *Welcome to the Ball*, a few problems arose. First of all, the band likes to record all their tracks simultaneously — a problem that is compounded by the fact that they also like to be in the control room when they record so that they can hear themselves through the monitors.

It's enough to make any producer — myself included — cringe at the idea of having to run all of those cables, while keeping the band members from getting tangled up in the web they create. On top of that, we would also experience a loss in sound quality by running cables that were so long.

UNDER THE WIRE

The problem with long cables is that the capacitance they produce rolls off the high ends, changing the frequency response. It is only really noticeable in cables that exceed one hundred feet in length, but it exists in all cables. The capacitance acts like a filter, often cutting out valuable high end frequencies and affecting the overall sound.

Since the cause of the problem was the length and number of cables, the best solution would be to eliminate as many of them as possible. And the best way to accomplish this is by using wireless transmitters. The shortest cable, after all, is no cable at all.

Coincidentally, Vicious Rumors had been using wireless transmitters during their live performances and already enjoyed the freedom that the transmitters gave them on stage. There seemed to be no reason why they couldn't get the same freedom in the studio as they do on the road.

For that reason, I used Nady 650 systems for the rhythm and lead guitars, the same systems the guitarists use on the road. Although the bassist normally uses a Nady 201 in concert, I decided not to use it in the studio because it wasn't able to produce the deep tones as well as a hardwire, even with its high impedance input.

Nady's 650 VHF wireless system seems to work as well in the studio as on stage because it's equipped with an ultrasensitive true-diversity front end, which releases high range sounds without any drop-outs. The receiver also has compander circuitry (a compressor and expander used in tandem for noise reduction), which has been patented by Nady and which produces a natural sound with a 120 dB dynamic range. Its 20,000 Hz frequency response and high impedance input provided solid high-end frequencies.

With the 650s in the studio, we needed only one tie-line cable during the sessions, for the bassist. Headphone cables were not a problem since, except for the drummer, the band was listening through the control room monitors.

For the recording sessions, I used the same mics as always: a Shure SM-57, a Sennheiser 421, an E-Lan P51, a Telefunken and B&Ks. I set them up around the guitar amps just as I would during a wired recording — that is, my assistant moves them about the cabinet until the "sweet spot" is found. (I have found that the placement of the mics is actually more dependent on how new or old the guitar's heads are than on what type of connector you're using.)

FREE AT LAST

Mark McGee, lead guitarist, and Jeff Thorpe, rhythm guitarist, were skeptical at first about using the wireless technology in the recording of *Welcome to the Ball*, but both really

Living a Fantasy: Vicious Rumors unwired in Berkeley's Fantasy Studios

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WRH

The 650 wireless system

Using the wireless, Mark McGee sat beside me and played his solos as we heard them, clearly, through control room monitors.

enjoyed their newfound freedom from being tied down in the studio. McGee especially enjoyed the wireless advantage because he likes to work closely with me during overdubbing. Using the Nady wireless, he sat beside me and played his solos as we heard them, clearly, through control room monitors. And even though his amplifier was in the next room, the sound still came through with no hiss or coloration.

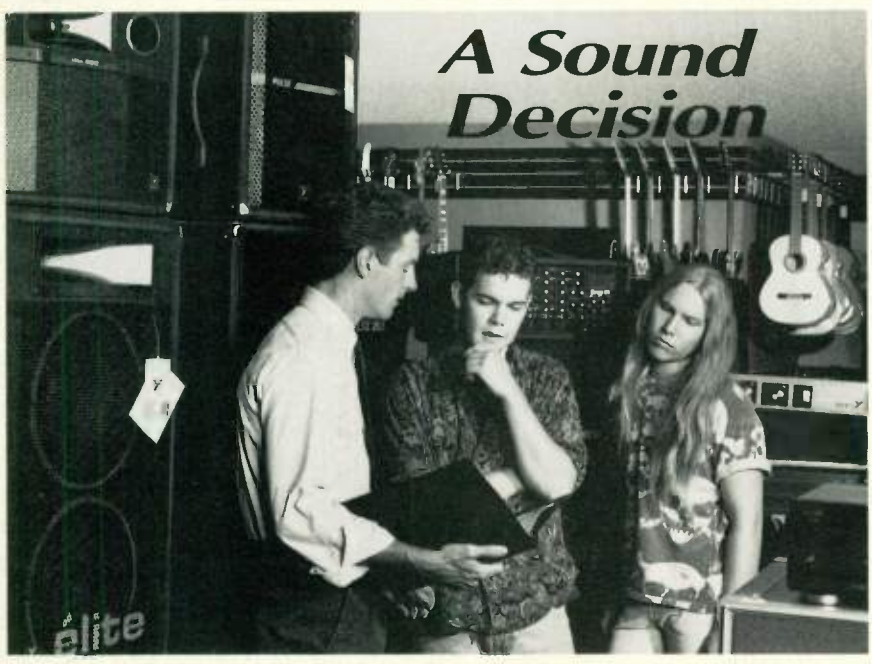
The only disadvantages of the wireless equipment was a slight loss of signal and, of course, the use of a lot of batteries. We usually went through a battery a day — which I suppose was not too bad seeing as each session was at least twelve hours long. Besides, the units used standard 9-volt batteries, which are both inexpensive and easy to find.

STRINGS ATTACHED

Each recording situation is different, and I wouldn't necessarily go out of my way to use wireless equipment again. However, I would also not shy away from it. The wireless guitars made Vicious Rumors' sessions go much smoother than they would have if everybody had to drag a hundred foot cable into the control room, but that doesn't make it right for all bands — or all instruments for that matter.

Overall, I feel that the wireless transmitters are easy to use, convenient and produce — in most cases — sound of equal quality to cables. I recommend using them to any producer who finds himself getting too wrapped up in his work. EQ

Michael Rosen produces many popular heavy metal acts, including Testament, Mordred and Reverend. He frequently records at Fantasy Studios in Berkeley, California.



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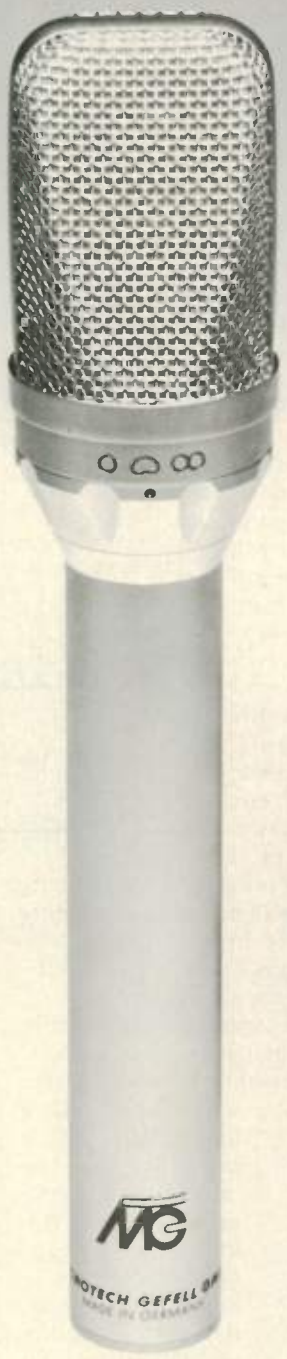

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CIRCLE 41 ON FREE INFO CARD

Here's Mud In Your Fi

Now you can clean up your act (cheaply) with this do-it-yourself mudguard

BY CHARLES R. FISCHER WITH CRAIG ANDERTON

Photo by Ed Aiona

THIS ISSUE, the workshop has a visitor: Charles Fischer, a San Francisco-based musician/consultant who's come up with a simple, inexpensive circuit that solves a common problem in today's MIDI studio—how to get a clean, airy ambience instead of a mess o' mud. The mudguard can even perk up vocals and make rhythm guitars cut better; perhaps best of all, you can put it together in an evening.

WHERE MUD COMES FROM

Multitimbral synthesizers and drum machines are great, but many of them do not offer individual outputs for each instrument or sound. As a result, if a keyboard "workstation" generates bass, keyboards, pads, etc., all those different sounds share one set of outputs. Ditto for the kick, snare, hi hats, etc. in a drum machine. Even if your axe does provide individual outputs, you may then run into the not-enough-mixer-inputs problem (unless, of course, you built the Sub-Mix master in the August 1991 *EQ*).

Separate outputs are desirable because different sounds require different processing. Consider reverb; when you throw a long reverb tail on a snare drum or vocal, it sounds great — but if the kick drum or bass goes through the same processing, it'll sound muddy and indistinct, and wreak havoc with your mix. Generally, except for special effects like the Kick Drum of Doom, it's best to keep low frequencies out of the reverb path. But how do you do that if your instruments don't all have separate outputs, or if you don't have enough mixer inputs or patch points to let you do anything with those outputs in the first place?

You have three choices: (1) forget the reverb, (2) pretend that a muddy sound is part of your style, or (3) build the mudguard — a single-IC circuit that filters out low frequencies before they get to the reverb. As a side benefit, you'll be able to pump more high frequency level into the reverb to improve the signal-to-noise ratio and smooth out the sound. What's more, the mudguard is a set-and-forget circuit; just set it up, and forget about muddy mixes. Now let's switch over to Charles and let him give the lowdown on the circuit.

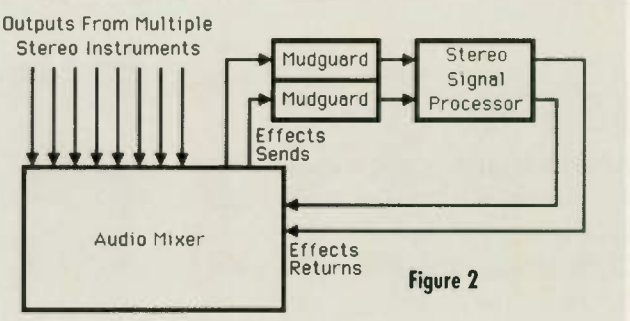


Figure 2

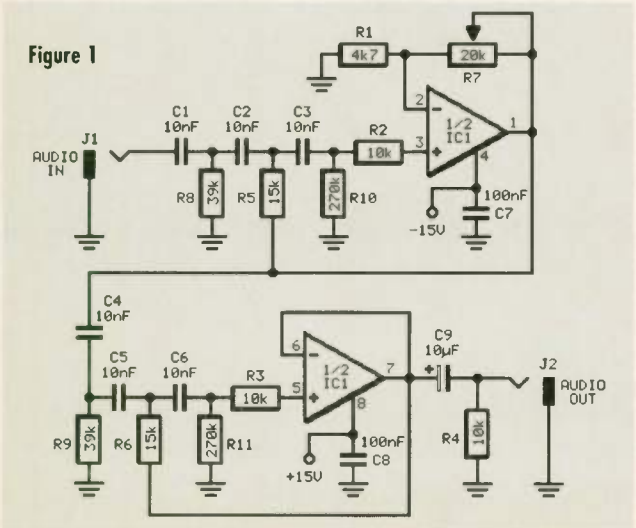
MUDGUARD SLINGING

A standard equalizer that offers a -12 to -15 dB cut doesn't cut it for this application, since the cutoff slope is too gentle — to take out the low bass sounds, you'd also remove a chunk of the lower midrange. The Mudguard (Figure 1) has a steep, -36 dB per octave slope, with a cutoff frequency of 300 Hz.

The circuit includes two 3-pole highpass filters; the only difference between them is that the first filter has a gain adjustment trimpot (R7). In most applications, keeping the gain low produces the most natural results. Turning up the gain adds a noticeable "bump" around 300 Hz. In some cases, this can help mask other frequencies above or below the cutoff frequency.

To optimize noise performance, the mudguard has a relatively low

Figure 1



Parts List

Radio Shack part numbers are indicated with #.

CAPACITORS (50 or more working volts)

C1-C6	10 nF (0.01µF), mylar or polystyrene
C7, C8	100nF (0.1µF), ceramic disc (#272-1069)
C9	10µF, tantalum or electrolytic (#272-1013)

RESISTORS (5 or 1 percent tolerance, metal film recommended, except for trimpots)

R1	4k7 or 4.7k
R2-R4	10k
R5, R6	15k
R7	20k trimpot
R8, R9	39k
R10, R11	270k

JACKS

J1, J2	1/4" mono phone jack (#274-252)

OTHER PARTS

IC1	NE5532, TL082 (#276-1715), TL072, etc. (see text)
Misc.	IC socket, perfboard, case, wire, power supply, etc.

input impedance. Line level signals, like what appears at a mixer's reverb sends, work fine; however, for use with high output impedance signals such as guitar pickups and some mics, add a buffer or preamp so that the mudguard doesn't load them down.

FINDING PARTS

The parts in this project are available from a variety of mail-order outlets such as Digi-Key (701 Brooks Ave. South, P.O. Box 677, Thief River Falls, MN 56701-0677; tel. 800-344-4539) and Mouser Electronics (call 800-346-6873 for the address of the nearest location). Some parts are available from Radio Shack, as noted in the parts list.

For professional results, use high-quality components: 1 percent metal-film resistors in place of the widely available carbon types, and precision mylar, polystyrene, or polypropylene caps instead of cheaper disc or monolithic caps for C1-C6. Cheap or wide-tolerance parts may affect the sharpness of the filter's cutoff, and the tuning will drift with temperature changes.

While IC1 can be almost any internally compensated dual op amp, use a quality pro audio-oriented part like the NE5532. The TL072 is nearly as good, and it's often easier to find. In addition, the TL082, LM353, and the RC4558 are direct pin-for-pin replacements, although they have higher distortion and noise levels than the others.

PUTTING IT TOGETHER

There are several mudguard construction options, depending on how you intend to use it. If it's going to be moved between gigs or rehearsals, build it into a small metal or plastic case. For permanent installations you could install it inside a specific effects processor or instrument, or you might want to build two (for stereo) into a single-height rack case.

The Mudguard requires a bipolar, regulated power supply between ±9 and ±18 volts, with ±15 volts recommended. Bypass caps C7 and C8 should be soldered as close as possible to the IC socket's pins.

Although the specified 300 Hz frequency seems optimum for reverb, you can alter this by changing C1—C6. Larger capacitors lower the frequency; smaller caps raise it. All caps should be the same value. One possible modification is to lower the frequency to around 100 or 150 Hz and use the mudguard as a "pop" filter for vocals.

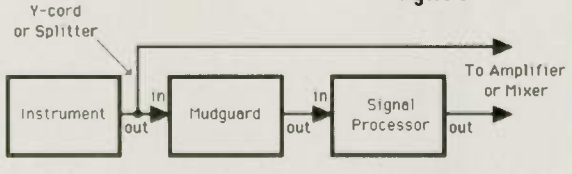
APPLICATIONS

Onstage: Many keyboard players play bass lines with the left hand, while comping or playing fills with the right. Unfortunately, adding reverb or delay muddies the bass lines — but not if you try the setup in Figure 2, which shows a typical live setup. You can now add all the processing you want to the keyboard, but the bass parts will be relatively unaffected.

In the studio, or multiple instruments onstage: The mudguard is very useful with mixers; patch it between the mixer's effects sends and the signal processor input (Figure 3). If you're lucky enough to own several effects, or

continued on page 86

Figure 3



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Catch-24

Tracking down a used 24-track recorder is like shopping for a new car — buyer be wary

BY RICHIE MOORE, PH.D

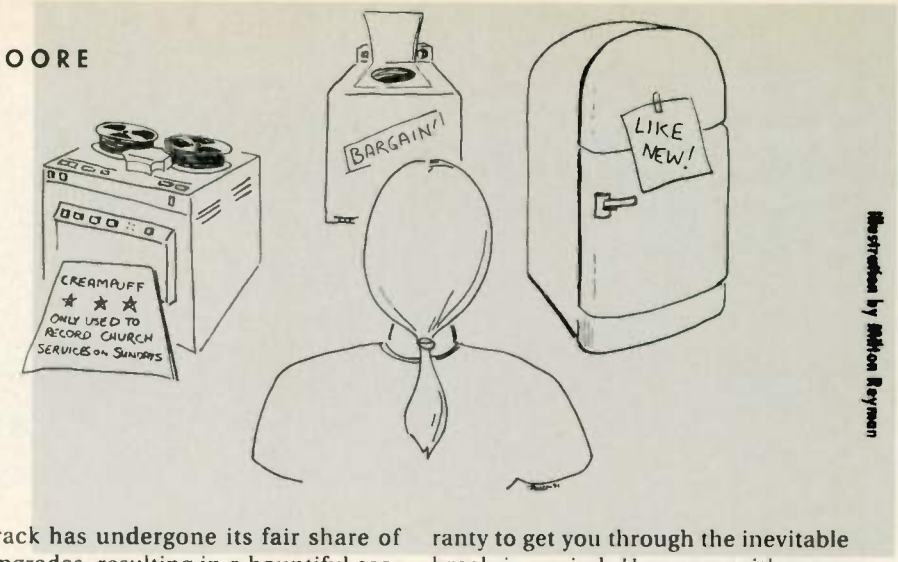

Illustration by Milton Reyman

THE 24-TRACK analog tape machine has been the professional studio mainstay for many years. Even up against digital multitracks with twice the track capacity, this format remains the industry standard. And with the introduction of Dolby SR it will likely remain so for years to come. However, even the 24 track has undergone its fair share of upgrades, resulting in a bountiful second-hand 24-track recorder marketplace filled with machines that can serve the project/personal studio owner well. Still, the big question remains: What kind of machine can I really afford?

Of course, if you *can* afford it, the ideal thing to do is buy a new machine. Some current models of 24 tracks are available brand new at about two-thirds the price that a comparable machine cost five years ago. This way you have current technology, and you have a manufacturer's warranty to get you through the inevitable break-in period. However, with some basic know-how and an eye for a bargain, you can locate a machine that's been burned in properly, and had all its upgrades and current modifications properly performed. Besides, someone else has already brought the machine through puberty and turned gray in the process.

THE COMPANY YOU KEEP

Choosing the brand of used 24 track based on price alone is not so easy. Based on price/performance/support, however, the choice is much easier. Based on my experience, the choice is even simpler. The brands of used 24 tracks on the market today are Ampex, Aces, 3M, MCI/Sony, Otari, Studer, Saturn, Tascam and Telefunken. (The Fostex 24 track is too new and, so far, I haven't seen a used one for sale.) I automatically narrow the field down to MCI/Sony, Otari, Studer and Tascam since Ampex and 3M have not manufactured tape machines for quite a few years. Besides the fact that they have their respective zealots, parts and support for these machines are getting more scarce all the time. Factory support barely exists. You can still get some parts from Ampex for their machines, but many parts have to come from independent dealers who have stocked obscure items. Of the other machines available, I've never seen an Aces, Saturn or a Telefunken machine outside of printed ads or an AES convention. I, personally, know very little about them.

MCI/Sony, Otari, Studer and Tascam are the only major manufacturers of 24-track machines available in the States that still offer full support for their used equipment. MCI, or MCI/Sony, machines such as the JH-16 and the JH-24 have not been made in years. Sony has parts for these

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machines available and the machines are real workhorses. Still, factory support is difficult at best, and getting a tech knowledgeable about these machines is getting harder. (I've even had problems with factory support on the new APR-24 series machines that are now in production.) Still, these machines can be acquired at a bargain for anywhere between $12K and $24K, depending on condition and options.

The only professional two-inch tape recorder from Tascam is the ATR-80. I liked this machine a lot when I reviewed it (*EQ* June 1990). The company always has a good selection of parts on hand, and the factory support is good. Unfortunately, used ATR-80s are hard to find and, thus, often run as much as $22K (including remote).

This brings us to the used machines I usually recommend, Otari and Studer. I base this on several factors. First off, these companies are well established. They have a large installed base of equipment and an excellent track record of manufacturing quality machines that maintain their resale value years later. They're sort of the Lexus and Mercedes-Benz of tape machines. Secondly, parts and service are no problem. They both have capable and friendly technical service departments. Both companies are extremely dedicated to keeping even their used machines up and running.

Otari maintains a large inventory of parts in stock in the Foster City, CA, main office, and its dealers around the country also keep good stock on hand. Not just parts for the new machines, mind you, but parts for machines that have long since been discontinued. I have nothing but praise for the women who run the Otari parts department. Not only do they supply replacement parts, Otari is constantly finding ways to improve and upgrade hardware and software on existing machines in the field. If you encounter a technical problem, Steve Smulian, Deborah and the entire technical staff can help you in detail over the phone.

Studer/Revox is another multitrack bargain hunter's gem. Studer maintains replacement parts in the main office in Nashville, New York, and Van Nuys, CA. The service folks really know their stuff and they treat a used machine or new machine purchase the same. My favorite Studer policy is return/exchange. If there's a problem in a card or assembly on the machine, you can get a loaner card or assembly from Studer to replace the defective one while it's being repaired. Or, you can keep the new part, return the defective part, and pay a small percentage of the replacement cost, which is usually less money than the cost of a technician to troubleshoot, purchase the parts, and repair. Dan, Robbie and Gayle in the Van Nuys office are really primo people to deal with when you need information or supplies. They know how much a working tape machine means to a studio.

WHAT TO LOOK FOR

Depending on the size of your control room, you should choose a machine that fits your requirements. On the small side, your best bets are the Otari MX-80, Studer A-80 MK III/Narrow Body or the Tascam ATR-80. If you have lots of room, or a machine room, the choices are the Otari MTR-90 II and the Studer A-800 and A-820.

I would advise you to go for the most current used model of machine that you can afford. An MTR-90 III has much more current hardware/software than a Series II. On Otari machines you should also look for the lot number of the machine. This comes after the serial number. An "N" lot machine is newer than a "K" lot machine. A Studer A-80 or A-800 Mark III or IV is more current than a Mark I/II. Newer revisions of the machines have more upgrades and modifications incorporated into the design. In many cases it means devices blow up less frequently. It means you have to spend less time and money after the purchase. Many changes to the different models also add longevity to the machine's use.

Otherwise, the most important areas to look at when purchasing a used machine are the heads, motors and total time in operation. As far as I'm concerned, it's incumbent on every seller to furnish a current head

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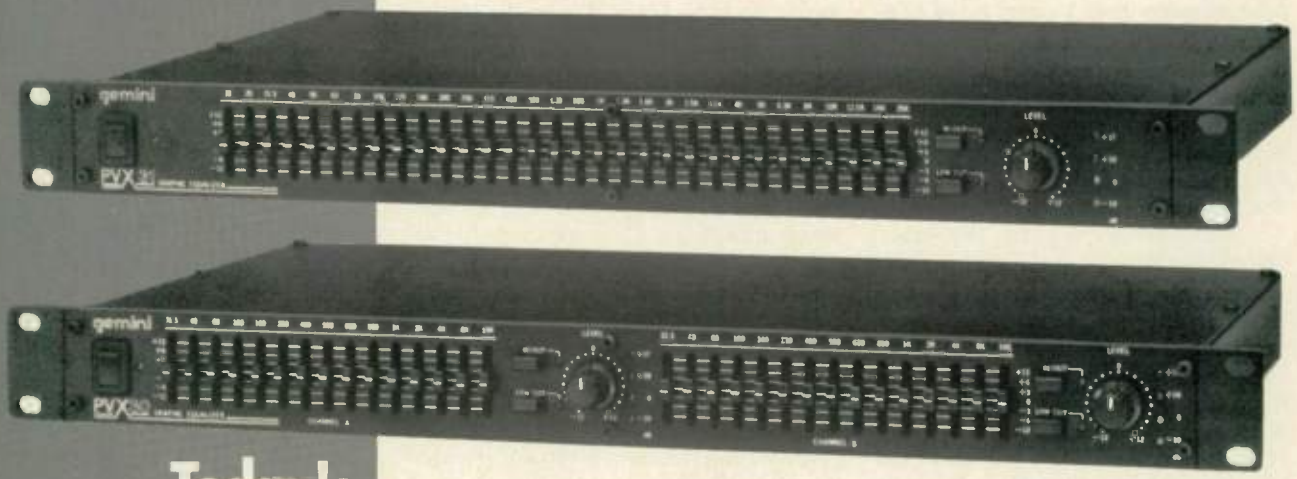

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report. The seller should have sent the heads to an independent and reputable refurbisher, like JRF Magnetics in New Jersey, or Saki Magnetics in California, for a full head condition evaluation. This way you know how much life is left in the heads. You should be able to call either company to confirm what the seller has stated. Otherwise, new heads could tack as much as $8K onto the final purchase price. Badly worn or damaged heads can be a sign of improper alignment or lack of qualified service.

The total time on a machine is detected by looking at the hour meter. The meters usually do not keep track of how many hours the machine has been turned on but how many hours the transport has been used. The new Otari MTR-100s tell you how many hours it has been powered up, and how many hours in fast forward, rewind and play. The hour meter also will give you an idea of how old the motors are. I have several clients with Studer A-800s with 12,000-plus hours on them. The spooling motors have never gone bad. I've found the same for Otari. Capstan motors do, however, need occasional replacement. If the surface of a metal or ceramic capstan is worn or too smooth, it does not pull tape satisfactorily. On a Studer A-80, a capstan needs to be replaced about every 3000 hours. On an A-800 it should be replaced about every 7500 hours. For the Otari MTR-90 you need to replace the two rollers that act as stabilizer and capstan when they get smooth. The MTR-90 is a pinch-roller-less design. It's not uncommon to replace pinch rollers.

Be sure to inspect the tape guides, which should be worn evenly. A roll of tape should be placed on the machine and shuttled and played. There should be no ripple in the tape or binding. It's possible for tape lifters to be so worn that they actually score the tape. This should be examined very carefully. And don't overlook the cosmetics; it can tell you a lot about a machine. How good a machine looks after several years says a lot about its care and maintenance. Also, open the machine up and check the dust level on the power supplies and component cards.

The last area to look at is the options provided. It appears silly to me, but some used machines are offered without remote or autolocator. Make sure to verify that the remote is part of the package. Some machines have transformers on the inputs and outputs; some do not. You should also make sure that the machine has a built in VSO, or can accept an external VSO so you can vary the speed. It's very important today that the machine can operate with a SMPTE synchronizer as a master and a slave. Call a dealer or the factory to find out what options are available to fit your needs.

TECHIE SUPPORT

If the machine you want is on the other side of the country, or just around the corner, hire a qualified technician familiar with the model to check it out. This is often expensive, but so is the investment you are about to make.

The best way to get a used tape machine is from a used equipment broker. There are quite a few around who advertise in recording industry journals, such as *EQ* and *Pro Sound News*. Shop around for a broker and get references as to how they handle business. Dave Hadler and the staff of Ocean Audio in Los Angeles are an excellent no-bull source for used gear.

Buying a used 24-track is a rewarding experience in your professional life. The method of purchase should also be done professionally. Be patient as you shop, and make sure all your questions are answered properly. Remember, as with any purchase price, if it sounds too good to be true, it probably is. EQ

Tracks of My Years

The prices vary from dealer to dealer, and so do the condition and options of the various machines. Still, the following is a representative sampling of current used 24-track machine prices on the market.

Ampex MM 1100	$12K to $14K
Ampex MM 1200	$15K to $19K
[illegible]-114	$[illegible] to $18K
MCI JH-24	$18K to $27K
Otari MTR-90 II	$25K to $34K
Otari MX-80	$22K to $24K
Studer A-80	$19K to $29K
Studer A-800	$25K to $50K
Studer A-820	$45K to $62K
Tascam ATR-80	$22k to $24K

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More Screen Time

The magical sequencing program Cubase finally comes to the Mac world

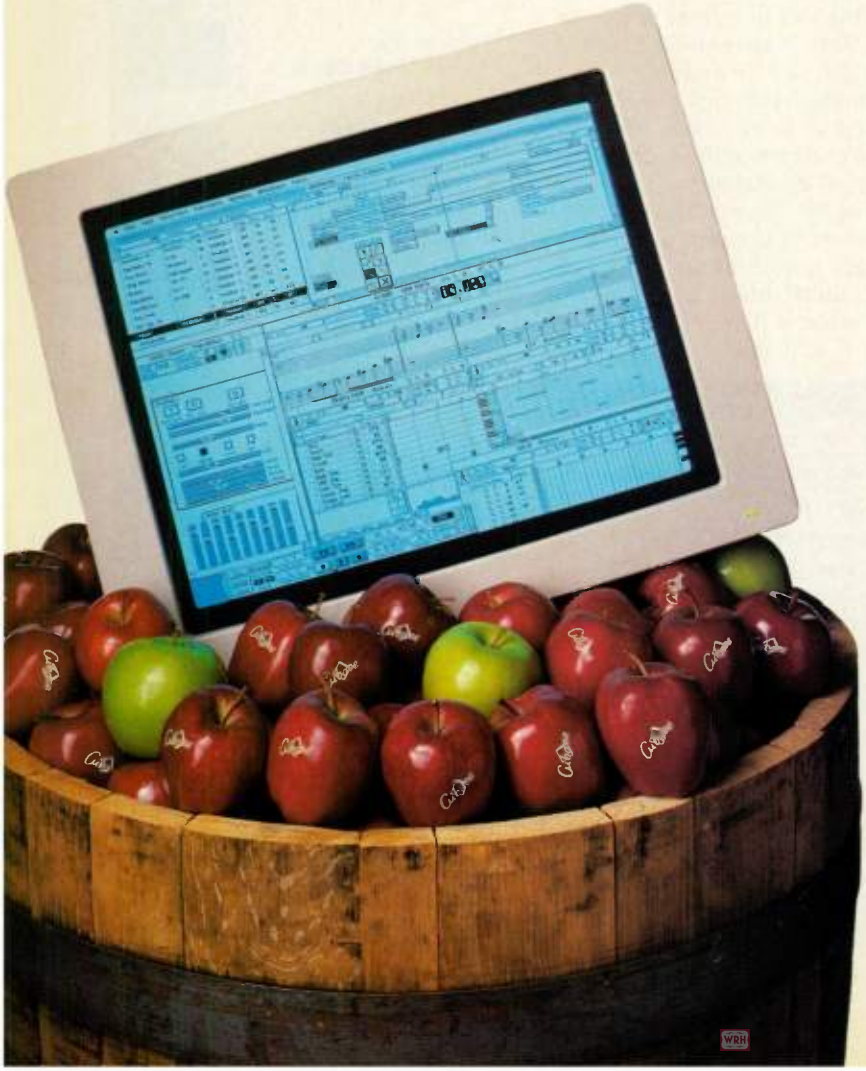
BY TIM TULLY

FOR YEARS, musicians who did their sequencing on a Macintosh could hear glowing tales of a fabulous sequencer program out of Germany that worked undreamt-of wonders. The only catch was that the sequencer — Cubase — ran on the Atari-ST, and if you only had a Mac, you were out of luck. But now at last the mountain has come to Mohammed, and Steinberg-Jones is offering Cubase 1.8, a new MIDI Manager-compatible version for the Mac. (Steinberg-Jones, 17700 Raymer St., Suite 1001, Northridge, CA 91325; tel. 818-993-4091; price, $495.)

Mac Cubase clearly springs from a point of view that's different from any of the older Mac programs, yet, equally clearly, it has adopted some of their conventions and techniques. If you've not found yourself completely simpatico with what's available so far, Cubase might be amenable to your style.

One caveat that bears mentioning up front is that Cubase uses a timing resolution of 192 pulses per quarter note (ppqn), as opposed to the 480 of Vision and Performer and 240 of Pro 4. The contention exists that this low a resolution is problematic, particularly for very tight, groove-oriented music. More specifically, between any two quarter notes in any Cubase sequence, there are only 192 points on which you can place any given note. Between eighth notes, there are 96 points, and sixteenth notes, 48. If your sequence plays at a tempo of 120 beats per second, these points are 2.604 milliseconds apart. By contrast, at 480 ppqn, they are 1.041 milliseconds apart. [As of press time, Steinberg has told us that they're doubling Cubase's resolution to 384 ppqn.]

If you feel you need the greater resolution, Cubase may not be the final answer for you. But every sequencer on the market has strengths along with its weaknesses, and Cubase is no exception. One of its unarguable powers is that you can perform any operation while the sequencer is playing, without affecting the playback timing. If real-time editing, or loading from or saving to disk are what you've wanted, they're here. What's more, the program's approach to editing definitely offers things no one else's does.



THE BIG PICTURE

Cubase opens to an Arrange window and the Transport bar. The latter contains the shuttle controls — play, record, rewind, fast forward — and about a dozen readouts that indicate song position, MIDI in/out, tempo, meter, punch-in and -out status and so forth.

You can record in real or step time, in either replace or overdub mode or while punching in. The Cycle feature lets you do various kinds of looped recording as well. One of the nice details of the program is that when you do punch-in recording, notes that extend over the punch-in point aren't truncated, but left as they were originally recorded.

The Arrange window provides your main view of a Cubase sequence (see screen graphic below), with which you can see and control an

overview of a sequence's administrative and musical data. The left side of the Arrange window provides rows and columns where you enter values for such set-up details as tracks, MIDI channel and mapping, serial port communication and initial program change number and MIDI volume. You can type in the names of your instruments and subsequently select the names from a pop-up menu to assign to any track. You can also save the list of instruments, but not a patch map for an individual instrument. Once you set up this information, you can drag a vertical bar to cover most or all of this pane, making more room for the graphical track overview pane on the right. This overview is where you do your arranging and also where Cubase begins to assert its individuality.

Each time you record a performance into Cubase, it's placed in a track as a "part." Each part sits in a track, and is represented by a namable horizontal bar. You can record multiple parts in any single track, and extend the beginning or end of a part by re-recording over it.

"Why bother?" you may ask. By dividing each track into parts, Cubase gives you an additional level of control between the track and the note level that can facilitate arranging a piece. Say, for example, you record two verses and a chorus, each as a separate part. You can extend, truncate, rejoin, rechannelize, move, cut, copy and paste any of those parts to any other point in the composition. You can merge two parts just by dragging one on top of another or splice one onto the end (or at any point before or after the end) of another. This can be a very fast and convenient way to rearrange parts or control drum instruments individually while playing them on the same track. If you want to move something smaller than a part, you can use the scissors tool to slice parts apart at a click, then drag copies anywhere you want. You can even make a "ghost copy" of a part, and move it, for example, to another track so it plays another instrument; any subsequent changes you make to the original part automatically appear in the ghost copy as well.

EDIT IT!

While the arrange window lets you manipulate parts, Cubase has four edit windows in which you edit the individual MIDI events in a part or track. In both the arrange and edit windows, Cubase's editing is flexible, powerful, intuitive and fast.

In all these windows, you select what you want to edit by clicking and dragging a rectangle, as you do in a graphics program, then using standard cut, copy and paste routines as

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well as some specialized and downright unique features. The mechanics of selecting are exceptionally flexible and transparent. In any window, you can select any number of either adjoining or discontiguous elements. Clicking on an individual note in an edit window selects it and plays it on a MIDI instrument as well. Selecting notes is further facilitated by the fact that touching any part of a note with the selection rectangle selects the note. Many other sequencers require you to cover a specific part of a note to select it, and you can miss when you're in a hurry and have to try again. I never thought of this as a problem until I got used to the Cubase scheme; now everything else feels awkward.

EDITING WINDOWS

Each edit window provides a different look at your data, maximized for particular kinds of performances and editing. The Key window is the most familiar, using the "piano roll" metaphor now common to other Mac sequencers. Notes are represented as bars on a grid on which time moves from left to right and pitch from low to high. The Grid window is an event list augmented by editable, graphic representations of notes and their velocities. The Drum window lets you set up your drum sounds by name, and uses diamond-shaped notes that make the creation and editing of drum tracks very intuitive. Lastly, the Score window uses a standard (if simplified) musical staff and notation that can be edited in the usual modes.

In addition to their individual ways of displaying notes and MIDI events, the top of each edit window sports a control section that offers a host of edit and information features. In all but the Grid window (whose event-list covers this function already), this includes a note information line. This is a bar in the control section which, as soon as you select a note, reads out its start and end times, duration, pitch, attack and release velocity and the MIDI channel number it came in on. Not only does having this feedback available as soon as you select a note speed your work, but the info line supplies editing functions as well. While most editing is done with the graphical representations of notes in the various windows, you can edit individual notes by clicking and dragging the alphanumerics in most of the infor-

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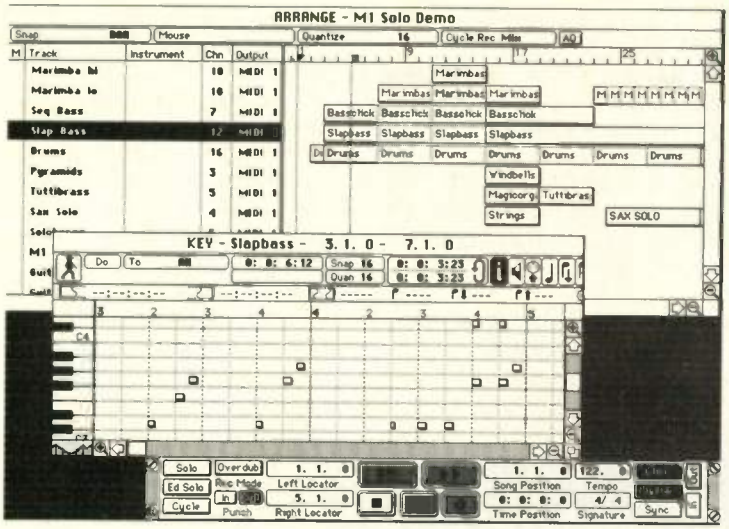

Cubase's arrange and edit windows, and its transport controls at the bottom of the screen.

mation line readouts as well.

ODDS AND ENDS

Perhaps one of Cubase's most useful aspects is its often unique editing. The Logical Editor is a good example. This function allows you to select notes or other MIDI events by logical conditions, and perform certain operations on the selection. The selection conditions specify events that are equal or unequal to, higher or lower than, or inside or outside a given range of values. A new feature also lets you select events by their position in a bar, something I find quite useful for adding accents to a phrase or part. Once you've selected events, you can set up an operation that adds, subtracts, multiplies or divides a whole range of event parameters by specified amounts. The parameters include pitch, length, controller value or position in a bar. Alternately, you can click on buttons that quantize the selection, delete it, copy or move it to another track or insert it into another part. Particularly if you tend to think in mathematical terms, the logical editor can quickly give you results that would require a lot of tedium otherwise.

The other unusual and mostly very cool features set is the way Cubase does quantizing. The sequencer has quantizing grids that go from 64th notes to whole notes, including the dotted and triplet versions of all the values in between. It can quantize notes as they're being recorded as well as after the fact, and the latter is where things get spiffy, but sometimes weird.

Two of the weird things are two quantize schemes explained rather mysteriously in the manual: Over Quantize and Analytic Quantize. When you Over Quantize a part, Cubase is supposed to detect phrasing that is consistently ahead of or behind a beat, and then quantize the part to retain the feel created by your off-the-beat phrasing. I set up a part where all the quarter notes were exactly four ticks behind the beat, then set three of them a few random ticks behind and in front of that. With the quantize grid set to sixteenth notes, Over Quantize simply pulled all the notes right onto the beat. Analytic Quantize is very briefly treated; the manual suggests using it on "complex input (with) mixed straight notes and triplets." Testing it was a dicey operation, particularly since I was unsure of what I was looking for, and I got mixed results.

The remaining quantizing algorithms are definitely useful. Match Quantize lets you use a phrase you've recorded whose rhythmic feel you'd like to act as the "grid" for quantizing other parts. This is a perfect way to get a number of parts to lock into a good groove. Even if your good groove is as short as one measure, you need only select the right cursor tool and place the part you like over the part to be quantized. Immediately, the notes in the entire target part will lock in to the metric placements of the "feel" part. You can even invoke a quantize value in this operation that lets notes in between the notes of the feel part go unquantized. This way, for example, if you wanted to lock just the downbeats of a fairly busy bass part to a simple four-on-the-floor kick drum, you can specify that only bass notes no farther than a specific distance from kick

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notes be affected. Only notes on the beat will be quantized and the rest remain unaffected. A problem I encountered was that the undo quantize command would only undo the first bar of a Match Quantize, though it worked as expected with the other quantizing options.

Similar to Match is Groove Quantize. Cubase comes with a number of editable "groove maps" that you can use like the match part in Match Quantize to quantize notes. A Groove map is a short phrase, containing notes you can put on any tick of the phrase. You can set up your own groove maps and save them for future use. Finally, Iterative Quantize is another useful tool that lets you move notes closer to a quantize grid in increments, and listen to the effect after each move.

MIDI EFFECTS PROCESSOR

The MIDI effects processor is a built-in delay unit that uses a panel of on-screen sliders to change the timing, velocity and pitch of the delayed sound. It sends a repeat of the note on message you or the sequencer plays to create an echo effect. Although the slider that was supposed to send ever lower velocity messages to create a natural-sounding volume decay didn't work too well.

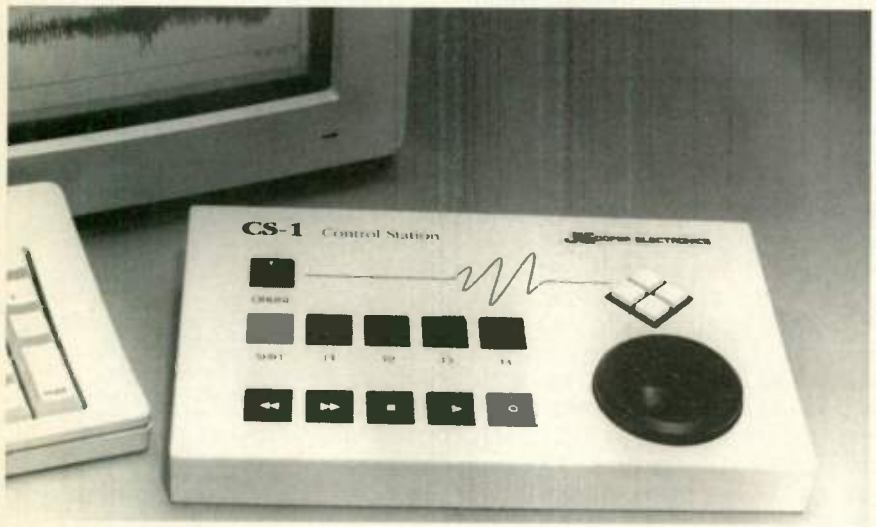
MANUAL OPERATION

Reading the manual often feels like being buttonholed by a German engineer while the shrimp is being served in the next room. It explains many things clearly and completely, but too often assumes you're reading it from front to back like a novel, alluding to functions without indicating how to access them or where they're documented (i.e., "Cycle is activated and deactivated by clicking on the cycle button on the transport bar . . ."). If you haven't already learned that function, you have to dig for it before you can do what you want. *The Official Cubase Handbook*, by Geoffrey Ryle is a very good addition to the Cubase manual, written with the user's point of view in mind. It is available from Steinberg-Jones and is a good investment (about $30) if you want additional help getting into Cubase.

WRAP

A few small points mar Mac Cubase's mostly useful and friendly functioning. In addition to the sporadic operation of the undo quantize command for instance, the scroll bar at the bottom of the arrange window would occasionally disappear, forcing a very slow trip to the beginning or end of a track. Cubase is also copy protected, for which it loses one round in its bout with me.

There's a lot of power in Cubase. The four edit windows use their different views of the data to help you visualize what's on a track and — particularly in the case of the drum window — to edit and even record it in ways not typically available in Mac sequencers. Its ability to sync to a live musician, the MIDI mixer and its interactive phrase synthesizer, which algorithmically modifies your input to create new phrases, are also useful. So too is its compatibility with MIDI Manager and new Sample Cell driver that effectively multiplies MIDI channels for Sample Cell owners. EQ



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CIRCLE 17 ON FREE INFO CARD

QUAD

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terns, using both 360 degree "azimuth" and "elevation" changes. The white-noise-type sources were very effectively perceived. In other pieces, it was the more subtle but equally appreciated possibility of sound placement that allowed the orchestration to "breathe" and kept sounds from trammeling each other.

When you move off center with the RSS, the localization details start to diminish, but an overall sense of spaciousness remains. It can paint a sonic soundscape with the whole room as the canvas, rather than put the space between the two speakers.

At one point, my engineer, Peter Kelsey, was troubled over the overall balance of left and right. Pointing to the back left, I said, "Why don't you put the timpani over there?" He replied, "Well, the low drum was there on the last piece." And I wondered who among our diligent audience would notice such a thing?

Certainly all of these subtleties are there for the noticing and to some degree it's the choice of the listener to focus, i.e., to listen actively or not. And although obvious gestures will certainly be noticed, being noticed is maybe not what it's all about. Rather, this process is a new ingredient that should be blended into the whole — at once critical and inseparable — like the blend of spices in a great sauce.

It's clear to me after using the RSS that it was a major player in the end result of *Hotel Luna* and I hope that this time around spatial processing meets with more understanding for its potential. It's still something that needs development — the incorporation of controllable reverbs, "Doppler" shifting, algorithms for "unmasking" a sound spectrum so that a pathway is clear for a traveling sound, and whatever special needs arise and grow out of the laboratory of producer/artist/engineer/filmmaker/architect of the Nineties. EQ

OCASEK

continued from page 38

on their playlist. That attracted the record companies and our underground days were over in a hurry. We made the first Cars album in London in twelve days and it only picked up speed from there.

That's why I'm still enthusiastic about making records with new groups for independent labels; it gives me a little of the old thrill. I've always wanted to keep the integrity part, and I think I've managed to do that. I've never done songs with five people to get a hit and I've never done commercials with my music, though there's been plenty of opportunity.

One of the great things about my basement studio is that it allows me to still make the record if the money isn't there to go into a commercial studio. I wouldn't bring everybody into the basement, though. I worked there with Alan Vega who I know real well, so that worked out. Mostly the basement setup is for my own writing, or if I want to get indulgent and finish some tracks by myself. I like to get the real creative stuff done down there. I don't want to walk into the commercial studio and wait for inspiration to hit.

In the next few years, though, I expect I'll be doing some very different things. From the new songs I already have written and from the way I'm thinking of going, it'll be a real left-hand turn for me. It's a turn no longer being signalled from inside the Cars, but I've still got my freedom of direction. EQ

CIRCLE 16 ON FREE INFO CARD

$10K

continued from page 68

(This is made possible by four inputs and four outputs.) A high impedance input on the front panel allows for easy access by guitarists, and although the list of available effects is less impressive than the A1, it does include all the goodies, like EQ, pitch shift, enhancer, noise gate, auto wah, distortion, amp simulator and more, along with the requisite list of delays, choruses and reverbs. If you can't afford a separate guitar processor and a bunch of reverbs, consider the 9010 because it can do so much. A third choice is Roland's RSP550 multi-effects processor ($1295), which uses 48 kHz processing and includes some effects missing on the other units, like quad MIDI-controlled pitch shifting and vocoding, along with very high quality reverberation, a gaggle of incredible choruses of every sort, and fascinating multitap digital delays.

With these magic boxes bolted firmly into your rack there is no sonic project too mighty to tackle. Signal processing of this sort, which was not so long ago the exclusive domain of the large-scale world-class studio, is now within reach of the personal project studio. EQ

ANDERTON

continued from page 75

use stereo effects a lot, you may need more than one mudguard.

Drum machines: To keep the kick drum and floor toms out of the reverb, use the same basic setup as Figure 2.

Pseudo-exciter: A less obvious mudguard application is to use it as an effect. The filter's output provides a noticeable treble boost, which make certain sounds stand out. Try the mudguard with vocal background parts, rhythm guitar (this is especially effective with R&B guitar parts), or with sounds that are masked behind other parts in a mix (electric piano, bells, etc.).

Imitation telephones: Just in case you need a telephone voice effect, the mudguard's sharp rolloff below 300 Hz can make your voice (or whatever) sound like it's coming over a phone line if you also use an EQ to roll off frequencies above 3 kHz or so. (Telephones have a fairly limited frequency response.)

Next time your mix or instrument gets stuck in the mud, you don't have to throw money at the problem by buying instruments with multiple outputs and mixers with more inputs — throw in a mudguard, and get ready to hear the difference. EQ

Charles R. Fischer *is the MIDI Editor for Keyboards Today magazine and a contributor to other publications, including Modern Electronics.* **Craig Anderton** *is West Coast Editor of EQ magazine and has played on, mixed or produced, to date, ten albums.*

NICHOLS

continued from page 98

I think the Donald Fagen album I've been working on will, by the time it gets done, have to be labeled AD-Ad-ddDaD-Ad-D-D. All of the microphones were analog, sorry to say, although some of the sounds were created digitally in samplers and synthesizers and transferred to the multitrack directly in the digital domain. The console for recording was analog most of the time, but we have combined digital outputs from sampling machines through digital consoles to the multitracks as well as pre-mixing tracks through digital mixers back to the multitrack. The multitracks were always digital, except that we used all of them at one time or another. Most of the time we could transfer data from one to the other in the digital domain, but every so often we would have to make the transfer of a track through the digital convertors so the signal was actually analog for 20 microseconds. During the mixing stages the console will probably be analog, although by the time we get ready to mix there may be only digital consoles. The mix machine will most definitely be digital. The mastering console will also be digital. We're going to start using the new labeling on our albums. If you have any additions or comments please let me know.

Sorry, I have to go now. Donald just said that he thought that the optical transfer between the two digital machines sounds better with the lights off in the control room. Maybe I should just call down to the corner deli for some hemlock soda. EQ

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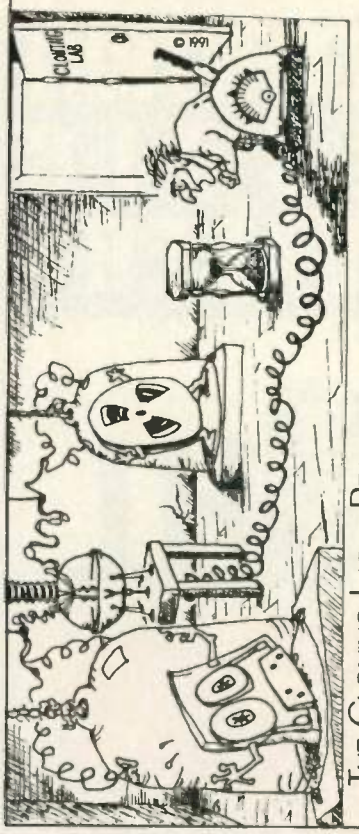

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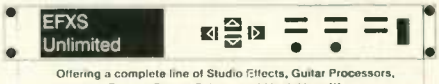

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dbx 363X Dual Gate

EQ LAB REPORT

MANUFACTURER: dbx, a division of AKG Acoustics, Inc., 1525 Alvarado St., San Leandro, CA 94577; tel. 415-351-3500

APPLICATION: Suggested uses include reducing leakage and/or background noise in microphones, guitar amps, keyboards, effects devices and idle tape tracks on mixdown.

SUMMARY: Through use and experimentation, the dbx 363X will gain popularity as people discover that, despite its size, it's a more than capable box. If you use gates a lot, and are thinking of adding another to your arsenal of tools, the 363X definitely fills the bill for performance, price and space considerations.

STRENGTH: Reacts cleanly and quickly to transients.

WEAKNESS: Lacks balanced inputs.

PRICE: $269 list **EQ FREE LIT. #** 241

DBX WAS ONE of the early pioneers of Voltage Controlled Amplifier (VCA) technology, which makes most noise gates and compressors work. dbx VCAs are used not only in their own signal processors but in many other manufacturers' products as well, including MIDI-based automation packages. They obviously have a handle on how to get the most out of a VCA and in this they have succeeded with the model 363X

FEATURES AND USAGE

The 363X is a half rack wide by one rack unit high. Two 363s can be mounted side-by-side, which adds up to four gates in a single rack space. Suggested uses for the 363X include reducing leakage and/or background noise in microphones, guitar amps, keyboards and effects devices. Other devices in this cost-effective/space-saving series include the 563X dynamic filter (single-ended noise reduction), 263X de-esser, 163X compressor and the 150X noise reduction unit. All units are shipped with a rack mount kit that includes a blank panel and the hardware for side-by-side mounting of two units.

Each channel of the 363X has "bypass," "key engage" and "key monitor" switches. The unit also has a front-panel "stereo couple" switch (how romantic!). All switches include LED indicators. Three additional LEDs for each channel indicate whether the gate is in "open," "hold" or "release" mode. The three adjustable controls are "threshold," "hold" and "release."

The 363X has an internal power supply with a selector switch for either 120 or 240 volts. The audio ports ("input," "key" and "output") are all unbalanced quarter-inch jacks. The input and key connectors have TRS (Tip-Ring-Sleeve) jacks with a floating "ring," which means you don't have to unbalance gear designed with active balanced outputs. This is an acceptable compromise, but I wish dbx had gone the distance and made these inputs balanced.

The hold control is a feature found on more expensive gates. It is "key" to creating the popular "gated room/reverb" effect on drums. Once the gate has been activated, the hold circuitry can be adjusted to keep the gate opened for up to three seconds. This feature creates much more dramatic effects than simply setting a longer release time, plus it can also help to minimize erratic triggering.

Due to space and cost considerations, no provision is made to adjust the "attack," "ratio" or "attenuation range." These parameters are inter-

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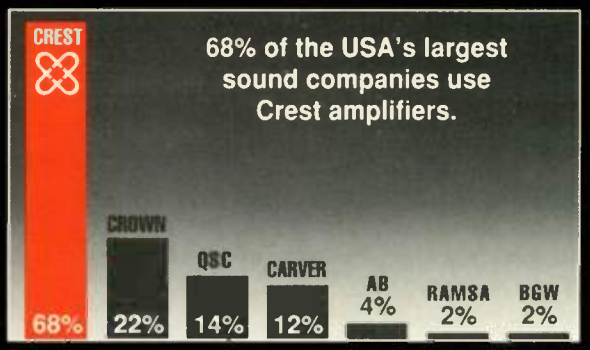

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nally fixed. The attack time, stated in the manual, is less than 100 microseconds. By comparative analysis, I found the ratio to be equivalent to 20 to 1. When the gate is closed the attenuation range is 90 dB.

REAL WORLD USAGE

A musician/producer recently asked me to help mix some live tracks. (With real drums and everythang!) During basic tracking, room mics had been placed on the drum kit to create a full ambient sound. However, once the other instruments and mix bus compression were added, the room tracks lost some of their intensity. Adding too much "room" can dilute the punch of the kick and snare, so, to restore power, I used the 363X to gate the room mics. In order to get the most powerful sound, I combined the kick and snare tracks and sent this signal to the "key input." (I did this through a group bus instead of wasting an effects send.) Pressing both the key engage (channel one) and stereo couple switches made channel two the slave to channel one. The 363X opened with kick or snare hits, adding meat to the mix without watering down the track.

At my studio, I used the 363X to create a gated reverb effect on a weak sounding snare. It was able to perform this task with ease. I also compared the 363X to a more sophisticated (read "expensive") device, just to see how similarly the two would respond to the same program material. I set up the "reference" gate so that it would respond as close to the 363X as possible. The difference was detectable, but very similar in terms of response time. The dbx gate always opened positively and consistently even on complex material. Sonically it was identical. I was most concerned about how the preset parameters might limit the ability to use the 363X, but found the unit well optimized for the common uses of a gate. In addition, the simplicity of the front panel makes the 363X very quick to use.

BLOOD AND GUTS

The 363X's internal construction is clean and solid. The I/O jacks are held in place by oversized solder pads, which should withstand multiple insertions better than average. The pots are secured not only by their electrical connections but also by case supports that are also soldered to oversized pads. The switches are held in place only by their electrical connections, but these are oversized as well.

The 363X is a unity gain device. That is, it adds no gain to the signal. It can handle professional signal levels up to +18 dBu in and out.

THE MANUAL

The 363X manual is thorough, with plenty of pictures to augment the detailed descriptions. Even the schematic is included, although you have to enlist the services of an electron microscope to read it. For service information, contact the company first. Since their acquisition by AKG, questions about all dbx, AKG and Orban products should be referred to customer service

The manual offered one suggested use that was a bit unclear: "Muting the mixdown inputs to the two track as an economical solution to automation." I interpreted this to mean "automated fade," which can be done simply by pressing the key engage switch with nothing connected to the key input. By setting the release time to the desired length I could get consistent, smooth fades. This can be an unusual, but useful effect, especially if your mixer has "dual mono" faders on the stereo bus. Another interpretation, would be as an actual noise gate to "chase the fade" on analog tapes before the noise floor becomes apparent.

Through use and experimentation the dbx 363X will gain popularity as people discover that, despite its size, it's a more than capable box. If you use gates a lot, and are thinking of adding another to your arsenal of tools, the 363X definitely fills the bill for performance, price and space considerations. It's a tool for the creative mind that can be squeezed into your life with a minimum of muss and fuss.

—Eddie Ciletti

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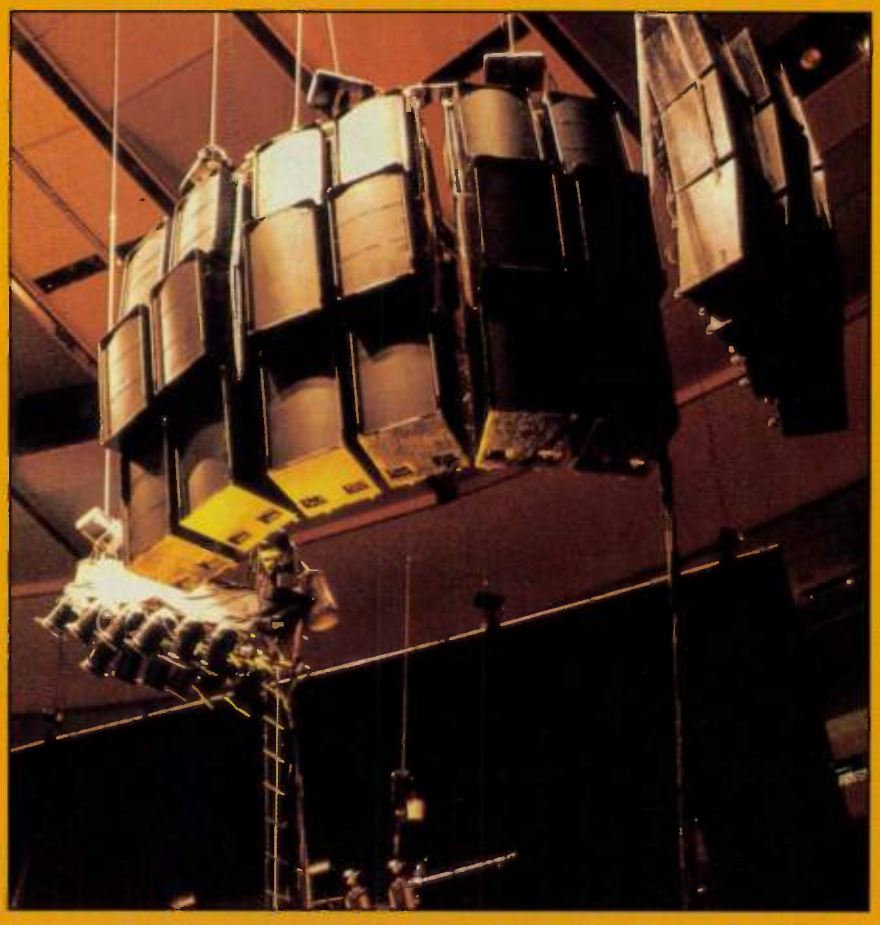

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CS-1 Control Station

EQ LAB REPORT

MANUFACTURER: JLCooper Electronics, 12500 Beatrice St., Los Angeles, CA 90292; tel. 213-306-4131

APPLICATION: There are three different CS-1 models. The Mac version is the most versatile and the most popular, and it's the one I got to test. It hooks into the computer's ADB (Apple Desktop Bus) port, and is designed to work alongside the computer's keyboard and mouse in manipulating programs.

SUMMARY: The CS-1 does a fine job of providing the Macintosh with a control surface that's optimized for music making, and that any engineer or audio (or video) editor will feel comfortable with immediately.

STRENGTH: Greatly facilitates audio editing, with an excellent feel.

WEAKNESS: The programming software is not as flexible as it could be.

PRICE: $499 **EQ FREE LIT. # 242**

ALTHOUGH WHAT'S inside today's computers makes them marvelous music makers with either MIDI or hard-disk digital audio, what's on the outside — the keyboards and mice — are hardly the best possible tools for manipulating sound. The tiny transport controls drawn on a screen feel finicky and clumsy to hands used to dealing with the beefy buttons of a tape deck. Grabbing eight faders for a fast fade is hard to do when the only tool you have is a mouse. Shuttling through an edit point can be tedious using a keypad that was designed for entering numbers into a spreadsheet.

Just as a MIDI musician needs at least one musical keyboard to enter data efficiently into a sequencer, an audio editor working with a computer-based system should ideally have the same specialized tools that he would have in a traditional studio. That's the philosophy behind the CS-1 Control Station, a computer add-on from JLCooper Electronics, the California company that's been making all sorts of clever "fill-in-the-gaps" gadgets for the music industry since the dawn of the MIDI era.

CHOOSE YOUR WEAPON

The CS-1 is a solid-feeling, 9-1/2 x 5-3/4 inch box that sits on a desktop, like a computer keyboard or mouse. It contains two rows of five heavy-duty pushbuttons, one extra button on top, a set of four smaller buttons in a diamond arrangement, and a continuous jog wheel just like you'd find on a tape deck, complete with finger indent.

There are actually three different CS-1 models. A MIDI version talks System Exclusive codes and is designed for use with Atari computers running Hybrid Arts' ADAP system (and, the manufacturer hopes, other software in the near future). An RS-232 (serial) version is for use with IBM PCs running Turtle Beach's 56K audio system, as well as various video-editing systems. A Macintosh version hooks into the computer's ADB (Apple Desktop Bus) port, and is designed to work alongside the computer's keyboard and mouse. The Mac version is the most versatile and the most popu-

lar, and it's the one I tested.

The CS-1 is designed to emulate a tape transport. The bottom five keys are labeled with standard icons for rewind, fast forward, stop, play and record. The upper keys are for custom functions and there's a shift key to double the unit's flexibility. The very top key is labeled "ONLINE," and has a very specific use, which we'll get to in a moment. There's also a jack for a footswitch, which you supply, for starting and stopping playback of whatever program you're using.

Installing the unit is a snap: it comes with a software disk, containing, among other things, a Macintosh "INIT" file that you copy into your System Folder that allows the Mac to recognize that the CS-1 is there. Then you use the supplied ADB cable to connect the box to your computer or keyboard. Cooper has thoughtfully provided two ADB jacks, so you can daisy-chain the keyboard or mouse through the CS-1.

GETTING AROUND

The device has four configuration memories, which are accessed by a simple combination of button pushes. Three of the memories are designed for specific programs: Digidesign's Sound Designer II 2.0, Mark of the Unicorn's Performer, and Opcode's Vision. The fourth memory is a "general purpose" mode in which the unit acts as a simple extension to the Apple keyboard, with the keys acting as "F keys," and the wheel moving the mouse. Two of the memories are fixed, but the other two (the ones in which the Performer and Vision configurations are stored initially) are reprogrammable by the user, using an optional CS-1 editor/librarian program ($49.95).

When used with Sound Designer, the CS-1 improves the feel of the program considerably, and makes moving around it a breeze. The transport buttons give the system the feel of a real tape recorder, and the wheel is a far superior way to jog through a file, looking for edit points, than is provided by the Mac's mouse, or even a trackball. The function buttons are

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used to mark edit in and out points, to put a selected Region into a Playlist, and to cycle through the program's various windows.

The shift key augments the action of the other buttons — for example, "shift-rewind" immediately goes to the beginning of the file. It also works with the function keys to determine the wheel's action, which can work in any of three modes: scroll (move through the whole file, but don't play anything), jog (the playback speed is directly related to the wheel speed) or shuttle (the playback speed and direction is determined by the relative position of the wheel).

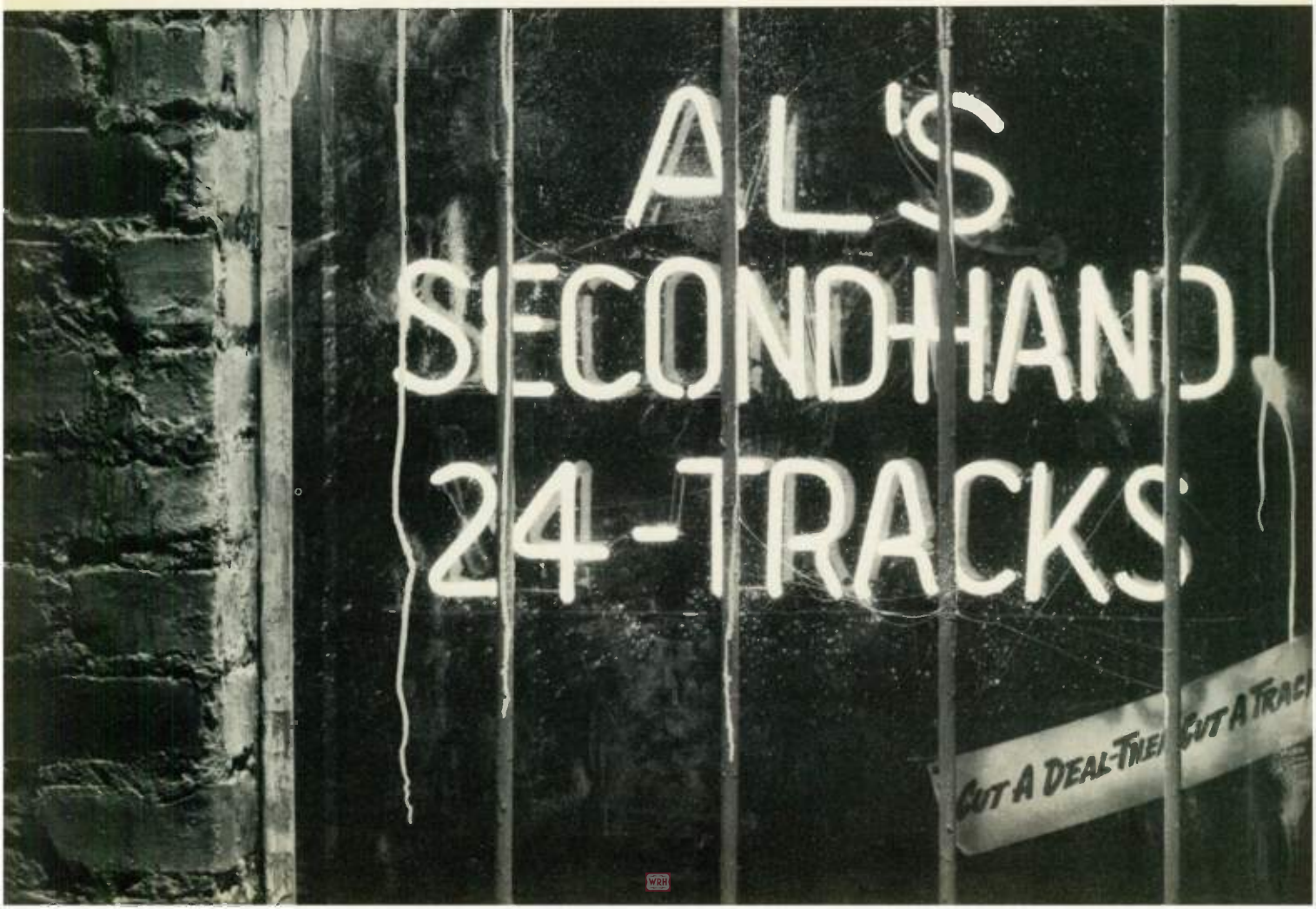
The diamond keys change the vertical and horizontal scale of the display, like the four-arrows icon in the program, and scroll the main window vertically or horizontally when shifted. The online button determines whether the program will sync to incoming MIDI timecode, or will run off its internal clock.

The CS-1 works with other varieties of the Sound Designer software, including Audiomedia and Sound Designer SK, although not every feature is functional.

The configuration for Vision is not quite as comprehensive as for Sound Designer, but it does add some nice features to the program. Tops on the list is that when the screen cursor is inside a graphic editing window of a track, moving the wheel "scrubs" the track, so you can hear it play, backwards or forwards, at whatever speed you like. The F keys are used for cut, copy, paste, and select all, and their shifted versions are for setting edit points and punch-in and -out times.

The Performer configuration has many of the same functions. The F keys are used for pause, wait for note, count-in and external sync, and are editing buttons when shifted. The wheel can be used for fast forward or rewind, or with the shift key, slow forward or rewind.

You can use the CS-1 with other programs as well, and you have two choices as to how to set it up. The optional editor/librarian software (which is supplied both as a standalone program and as a Desk Accessory, for those not using Multifinder) puts a picture of the CS-1 front panel on the screen and lets you assign individual Mac keys or key combinations (shift-, command-, option-, etc.) to each CS-1 button. It also lets you determine the direction the wheel will move the mouse (vertically or horizontally) and assign some special combinations to the wheel. Configurations designed this way can be



stored to disk or in one of the CS-1's two programmable memories.

OFF KEYS

The software has some problems, though. First of all, you can't have the CS-1 simulate anything other than a keystroke, so you can't, for example, have one of its buttons perform a click on an on-screen button. Second, unlike most programmable synthesizers, the CS-1 lacks an edit buffer, which means that the changes you make on the computer don't take effect until you download the entire set to the unit. The problem with this is that it's very easy to download the changes to the wrong configuration memory, and unless you happen to have that particular memory stored on disk, it's gone forever.

You can actually do much better with a macro-making utility such as CE Software's Quickeys. Use it with the CS-1's Macintosh Extended Keyboard configuration, which is in non-programmable memory. Using Quickeys, CS-1 keys can be assigned not only Macintosh keys and combinations, but also menu items, clicks on a particular spot on the screen or complex sequences of events. However, you can't do anything with the wheel other than have it move the mouse horizontally. The editor/librarian software, on the other hand, which will let you program the wheel, works very nicely in combination with Quickeys. For maximum flexibility you might want both.

The CS-1's transport buttons give the system the feel of a real tape recorder.

The CS-1 does a fine job of providing the Macintosh with a control surface that's optimized for music making, and that any engineer or audio (or video) editor will feel comfortable with immediately. If you're a serious Sound Tools or Audiomedia user, it should prove indispensable. If you use other music software, it's still worth checking out, as you may find it saves a considerable amount of time, not to mention wear and tear on your wrists. Best of all, JLCooper has just dropped the price of the device from $599 to $499, so it can now even be considered a bargain.

—Paul D. Lehrman

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CIRCLE 09 ON FREE INFO CARD

Big D

Photo by Ed Colver

A to D conversions are proving more troublesome on CD labels than in the studio

BY ROGER NICHOLS

Have you ever really figured out what the little "DDD" label on the CD booklet is supposed to mean? Well, originally the first *D* was to designate whether the original multitrack machine was digital D or analog A. The middle *D* was for mixdown to a digital machine, while an *A* in the middle was for mixdown to an analog machine. The final letter was for the process used to master the CD itself. The record companies thought that, since a CD is always digital, the last letter has to be *D*. Well, wrong again binary breath.

The last letter in the three-letter identifier is for the process through which the final mix goes on its way to the CD master. If you play back your digital tape through an analog mastering console on its way to the Sony 1630 CD mastering machine, then the last letter should be *A*. If you play back your digital tape in the digital domain through a digital console and then to the 1630, having never gone through an analog conversion, then the last letter should be *D*. Also, if you mixed to analog tape but mastered through a digital console, (converting to digital before the console instead of after), the last letter should be *D*.

With this method used correctly, the choices should be:

Multitrack Machine	Mix Machine	Mastering Console
A = Analog	A = Analog	A = Analog
D = Digital	D = Digital	D = Digital

This means that the recent Ricki Lee Jones album and the Michael Franks album that Walter Becker and I recorded should have been labeled DDA. We recorded the album on digital multitrack machines and mixed it to the Mitsubishi X-86HS at the 96 kHz sample rate. When it came time to master these albums we were faced with a choice. The digital output of the X-86HS is 48 kHz, not 96 kHz, thereby giving up the extra resolution available because of the higher sample rate. Using the analog output of the machine means that the audio passes through two extra conversions, once through the D-to-A convertors of the X-86HS and another through the A-to-D convertors of the Sony 1630.

We played the tapes back both ways, and came to the conclusion that the music sounded better when we used the analog outputs and the analog mastering console for any final adjustments. This method of producing albums (digital multitrack, digital mix machine and analog mastering console) would mean that we should have labeled the CDs DDA. The record company wouldn't do it. They said that since the CD was digital they were going to make it DDD. Oh, well, you can't win 'em all.

DDDDDD

So what are we going to do now that there are totally digital consoles? What will we do when there are digital microphones? If the three-letter code is for the benefit of the consumer who apparently cares about the digital-analog family tree of the recording process, then shouldn't we start including the extra letters at least as place holders for the new technology?

The chain should be: mics, recording console, multitrack, mixing console, mix machine, mastering console. This means that the Ricki Lee Jones album would be AADADA. The only two digital domain links in this chain would be the multitrack machine and the mix machine. Everything else was analog — the microphones, the recording console and the mixing console. Yamaha did some recordings of Michael Ruff using their DMR-8 digital eight track with built-in digital domain console. The only time any of the signals were analog was at the microphones. This album would be labeled ADDDDD. The console during both recording and mixing would be digital.

MINDING YOUR *A*'S AND *D*'S

The only thing left to figure out is what to do if mixed modes are used during an album. What happens if some tunes are recorded on analog machines and others are recorded on digital machines? How about mixing some tunes to digital and others to analog? Maybe some cuts sounded better playing back through the analog convertors of the digital machine while others were transferred through the digital mastering console. What happens when you lock up two multitracks, one digital and one analog? Lots of artists like to cut basic tracks on two-inch 16-track machines and then do all of the other recording digitally. Maybe the *A*'s and *D*'s could be different colors, depending on the mixture of analog or digital, or how about upper case versus lower case letters?

> Maybe the *A*'s and *D*'s could be different colors, or how about upper and lower case letters?

continued on page 86

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