

Cartley Peavey

MODERN

RECORDING

& MUSIC

FEBRUARY 1984 VOL. 10 NO. 2 \$1.95

THOMAS DOLBY

Beyond Fashion

01003448600
D. POMEROY
193 BALTIMIC ST
BROOKLYN

NY 11201

0284 8507

RECORDING TECHNIQUES:

Buyer's Guide to Low-Cost Equipment

LAB REPORT:

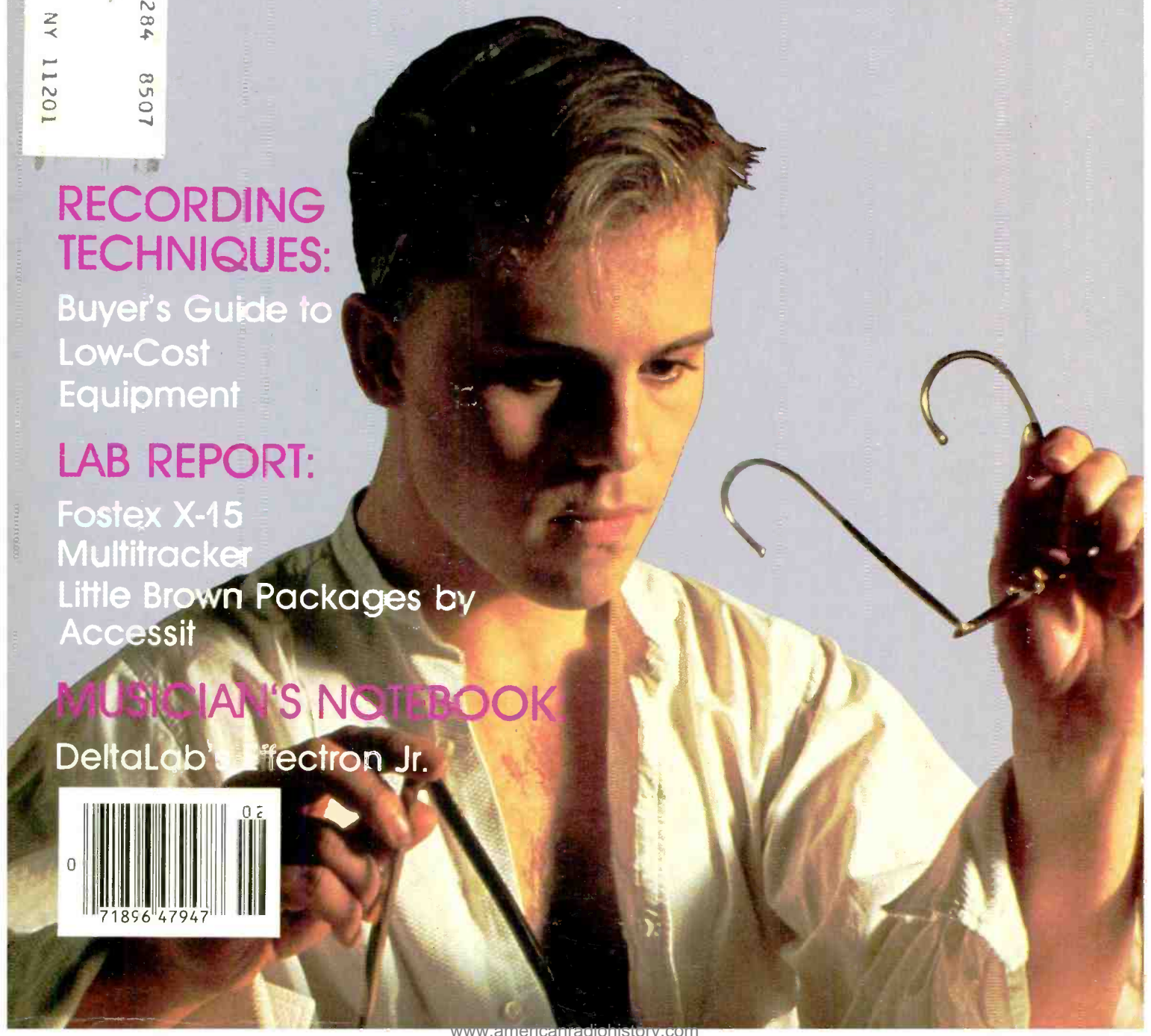
Fostex X-15 Multitracker
Little Brown Packages by Accessit

MUSICIAN'S NOTEBOOK

DeltaLab's Spectron Jr.



71856 47947



PRODUCTION VALUES.

Producing your music with professional results has never been so easy. Or so affordable. Introducing the Yamaha Producer Series multi-track Personal Studio System.

The heart of the system is the MT44 4-track cassette recorder. With it, you can record up to four channels at a time, or independently in any combination. Overdub with complete synchronization. Do ping-pong recording. And punch-in/punch-out recording with the MT44's full logic controls.

The $1\frac{7}{8}$ IPS tape speed lets you play pre-recorded tapes. And there's also Dolby* B and C noise reduction, zero play/zero stop, optional remote control and out-

standing specs.
For mixing, there's the built-in analog delay, 7-band

MM30 4x2 mixer with master graphic

Produced



Yamaha International Corporation, P.O. Box 6600, Buena Park, CA 90622. In Canada, Yamaha Canada Music Ltd., 135 Milner Ave., Scarborough, Ont. M1S 3R1.

Circle 10 on Reader Service Card



equalizer, and LED peak reading meters.

And the RB30 combines the MT44 and the MM30 in a system rack complete with patch bay and accessories compartment.

But there's more to the Producer Series than multi-track.

There's also the CS01 synthesizer, MA10 headphone

amp, MM10 portable mixer, MR10 drum machine, MS10 powered monitors, and the MH10 headphones. A full range of equipment to produce professional results at an affordable price.

No one else has it all together like the Yamaha Producer Series. Visit your Yamaha dealer for complete information and a demonstration. Or write us.



er Series TM



*Dolby is a registered trademark of Dolby Labs, Inc.



**“For two years
we’ve heard it all.”**

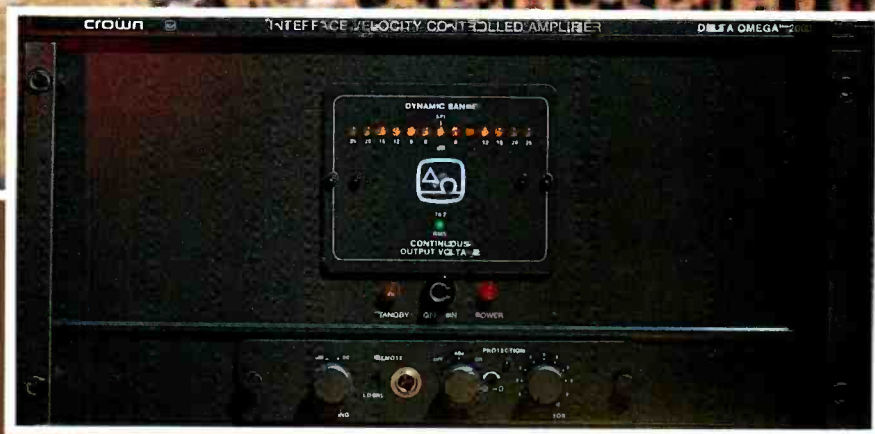


“Choosing the Delta Omega™ was a simple matter of knowing its capabilities.

This amplifier exercises unique voice coil control, employing a principal without precedent—delivering more punch, clarity and headroom than we’ve ever heard.

After two years with Delta Omega™ not a single acoustic detail has been missed. Only after you experience it will you know more than we could ever tell you.”

Tres Virgos Studio
San Rafael, CA



200 watts 9dB of true headroom (over a typical studio monitor amplifier)



CROWN

1718 W. Mishawaka Road, Elkhart, IN 46517
(219) 294-5571

Call or write for details

Circle 14 on Reader Service Card

www.americanradiohistory.com

MODERN RECORDING & MUSIC

FEBRUARY 1984
VOL. 10 NO. 2

FEATURES

SOUND IDEAS

12 RECORDING TECHNIQUES

by Bruce Bartlett

This month Mr. Bartlett responds to readers' questions on recording equipment. He describes some hook-ups for delay lines, and discusses semi-pro vs pro equipment use.

48 SO YOU WANNA BE A ROCK'N'ROLL STAR: PART IV

by Denny Anderson

Mr. Anderson continues his step by step description of recording a demo tape.

42 HARTLEY PEAVEY

by Amy Gordon

Hartley Peavey began his career building and selling one amp at a time. Today he is the proud (and we mean *proud*) owner of Peavey Electronics, and one of the top amplifier and sound reinforcement systems manufacturers in the world.

22 THOMAS DOLBY: BUOYED BY SCIENCE

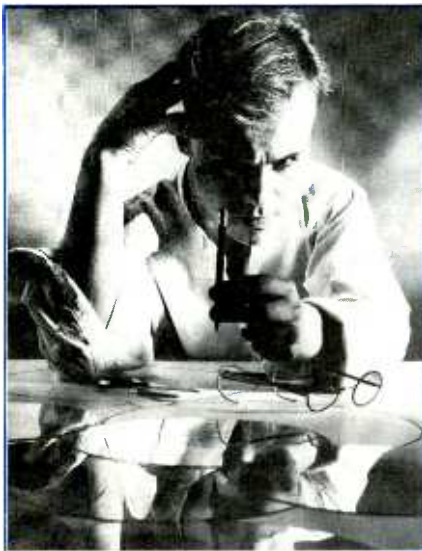
by Vicki Greenleaf

Thomas Dolby is a young composer, inventor and computer programmer who has brought a new high-tech sound to mainstream music. He surrounds himself both in the studio and on stage with machines, and even reprograms his synthesizer with a wave computer. With the release of his second album, Mr. Dolby continues his uncommercial approach to music.

36 BILLY IDOL

by Laura Fissingner

Billy Idol knows the sound that works and what he needs to get it. He must be doing something right, because with every album he releases, his popularity is rising. In this interview with Billy and sidebar by engineer Michael Frondelli, *MR&M* explores the qualities and techniques that went into the production of Billy Idol's second solo LP.



Thomas Dolby photos courtesy of Capitol Records



Billy Idol photos courtesy of A&J Music Management and The Howard Bloom Organization

MUSICIAN'S NOTEBOOK

by Craig Anderton

This month Mr. Anderton reviews some of the applications for the DeltaLab Effectron Jr. line.

SOUND ADVICE

by Susan Borey

In this introductory column Ms Borey does an overview of some of the important aspects of sound reinforcement that may or may not be giving you trouble.

AMBIENT SOUND

by Len Feldman

Mr. Feldman discusses three especially interesting papers that were presented at the Audio Engineering Society's 74th convention.

LAB REPORTS: LITTLE BROWN PACKAGES BY ACCESSIT

by Mark Goode

THE FOSTEX X-15 MULTITRACKER

by Larry Zide

DEPARTMENTS

LETTERS TO THE EDITOR

TALKBACK

The technical Q and A scene.

MARKETPLACE

What's new in sound and music.

¼ NOTES

New and noteworthy events in the recording industry.

& MUSIC

Reviews of albums by Genesis, Oregon, Doc Cheatham, Craig Harris, and others.

AD INDEX

Modern Recording & Music (ISSN 0273-8511) is published monthly by MR&M Publishing Corp., 1120 Old Country Rd., Plainville, NY 11803. Design and contents are copyright 1983 by MR&M Publishing Corp. and must not be reproduced in any manner except by permission of the publisher. Second class postage paid at Plainville, New York, and at additional mailing offices. Subscription rates: \$15.00 for 12 issues, \$26.00 for 24 issues. Add \$3.00 per year for subscriptions outside of U.S. Subscriptions must be paid in advance in U.S. funds. Postmaster: Send Form 35/9 to MR&M Publishing Corp., 1120 Old Country Rd., Plainville, NY 11803.



Dear Everyone:

This should be considered an open letter to the musical/audio equipment industry. It discusses a problem that exists between manufacturers, dealers, and consumers. Simply stated, marketing and sales methodologies have not kept pace with technological advancements, resulting in the unavailability of products.

Recent developments have resulted in many new and different products: digital drum machines, synthesizers and delays, guitar synthesizers, programmable controllers and effects, etc., etc. One characteristic of new technological developments is a high price. Most of these products are not affordable to the average (i.e., struggling) professional or semi-professional musician or engineer. Therefore, the demand for such products is relatively low. Understood. The problem is that the marketing and sales methods employed by the industry make the products unavailable—even to those who are willing and able to afford them.

Generally, musical/audio equipment dealers must purchase a product from a manufacturer before they can display or demonstrate it. If relative demand is low and relative price is high, most dealers won't carry a product. They don't want to take the chance of being stuck with a piece they can't sell. You can't blame them. This means, however, that even if you want and can afford an item, it's unavailable to you. Ordering new products sight-unseen, sound-unheard, is not an acceptable solution. Neither is having to travel to New York, where presumably your chances of finding something are better. So you simply do without.

Case in point: I'm in the market for a bass guitar. I want to consider a certain bass guitar synthesizer. If I can't find one to try out, I'll end up with a conventional one, locally available.

I don't live in East Sticksville, either. The Pittsburgh metropolitan area has a population of two million. And if that isn't bad enough, I've even observed this problem in larger, "more musical" population centers, such as the San Francisco area.

This situation does not have to exist. Other industries dealing in expensive, highly technical products have solved this problem. If manufacturers, dealers and consumers would each share part of the burden, I believe solutions could be found. Some specific changes in marketing methodologies that would help include:

1. Manufacturers should make demo cassettes available to consumers at a small cost. The exact conditions under which the tape was made should be specified. (Would a "standard" emerge?)
2. Manufacturers should make instruction manuals available to consumers at a small cost, refundable with product purchase.
3. Manufacturers should make units available to dealers for a small rental fee, perhaps refundable with purchase.
4. Dealers should make units available to consumers for a small rental fee, perhaps refundable with purchase.
5. Manufacturer reps should establish an in-store demonstration program, scheduled far enough in advance so that they can be announced in dealer flyers.

MARK WALDSTEIN
Editor

RICKI ZIDE
Managing Editor

LINDA CORTESE
Technical Editor

JOHN WORAM
Technical Advisor

CRAIG ANDERTON
BRUCE BARTLETT
RICK CHINN
LEN FELDMAN
VICKI GREENLEAF
STAN HYMAN
JAMES RUPERT
JEFF TAMARKIN
Contributing Editors

SUSAN BOREY
ELLEN ZOE GOLDEN
ROBERT HENSCHEN
GENE KALBACHER
JOE KLEE
ALLAN KOZINN
MICHAEL ROBERTS
STEVE ROW
Music Reviewers

KAREN COHN
Advertising Coordinator

KATHI LIPPE
Layout and Design

SUSAN MONAHAN
Circulation

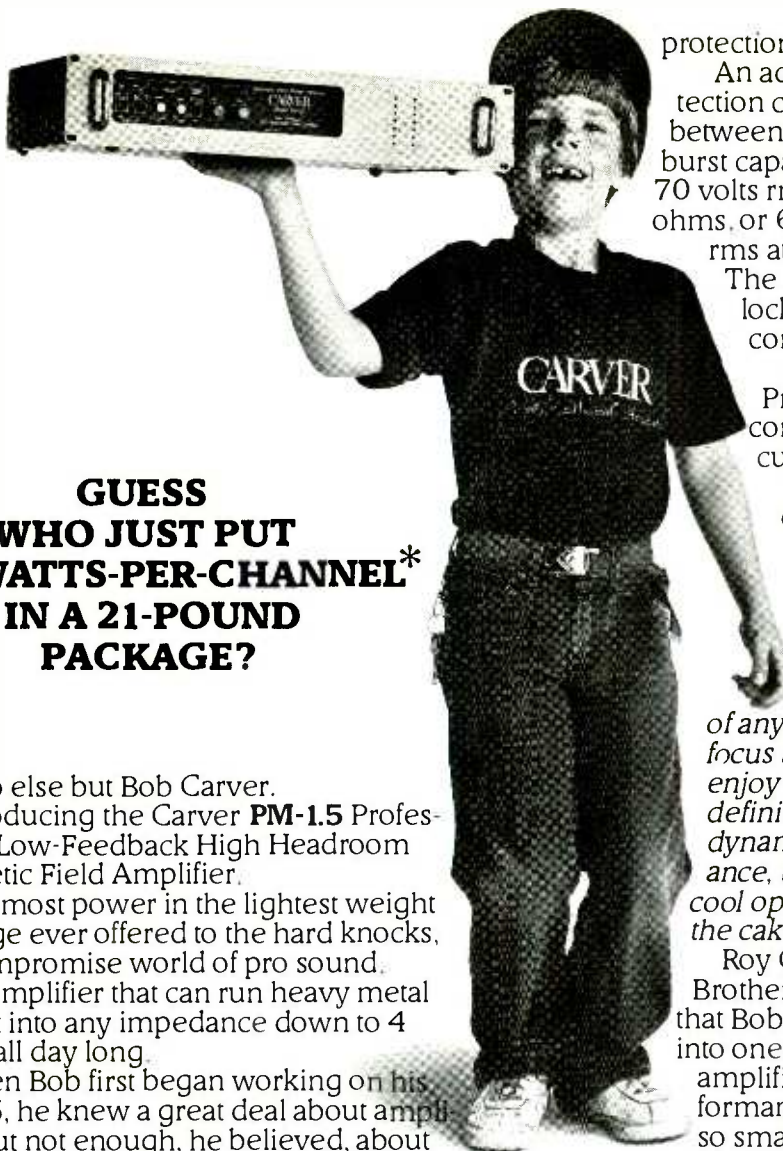
SPARTAN PHOTOTYPE CO.
Typographers

ELAINE ZIDE
Associate Publisher

LARRY ZIDE
Publisher

Editorial and Executive Offices
MR&M Publishing Corp.
1120 Old Country Road
Plainview, NY 11803
516 433-8530

Editorial contributions should be addressed to The Editor, Modern Recording & Music, 1120 Old Country Road, Plainview, N.Y. 11803. Unsolicited manuscripts will be treated with care and must be accompanied by return postage.



**GUESS
WHO JUST PUT
450 WATTS-PER-CHANNEL*
IN A 21-POUND
PACKAGE?**

Who else but Bob Carver. Introducing the Carver **PM-1.5** Professional Low-Feedback High Headroom Magnetic Field Amplifier. The most power in the lightest weight package ever offered to the hard knocks, no-compromise world of pro sound. An amplifier that can run heavy metal flat-out into any impedance down to 4 ohms all day long. When Bob first began working on his PM-1.5, he knew a great deal about amplifiers but not enough, he believed, about the night-in night-out requirements (and wish dreams) of the pro sound world. And so he spent much time consulting with a large number of sound reinforcement professionals, including the "pros' pro," Clair Brothers.

Clair Brothers asked for lower input ac line current, greater transformer thermal capacity, dual modes of precision balanced inputs with 1% resistors, back-to-front cooling with a fully proportional fan system that can just tick over at idle or blast 1000 ft/min. to keep output transistor temperatures constant. They wanted greater noise immunity and unbelievable long-term, high-power operation, as well as a 3/16" front panel with deep-recessed controls.

Others wanted rear rack-mounts, adjustable protection circuit thresholds, front panel selectable clipping eliminator, and even a sequential, soft-start power-up mode.

Now that the PM-1.5 has undergone thousands of lab test hours and seven months of hard road testing, Clair Brothers, Bob, and you get all that and more.

The PM-1.5 is designed to run balls-to-the-wall, even into 4 ohms day and night without compromising itself or your drivers. Because the PM-1.5 has three special adjustable speaker

protection circuits. An adjustable Short-Term Speaker Protection circuit adjusts dynamic headroom between 60 and 77 volts with a short term burst capability of 70 volts rms at 8 ohms, or 60 volts rms at 4 ohms.



Front-panel-adjustable protection circuits.

The circuit locks-in to the control setting after 0.5 seconds.

An adjustable Long-Term Speaker Protection circuit matches the time constant of the output shutdown circuit to your PA or monitor system.

Finally, the Clipping Eliminator detects clipping lasting longer than 30 milliseconds and attenuates the input signal just enough to pull the PM-1.5 out of clipping.

As for sound quality, consider this quote from **The Audio Critic Magazine**, "...the equal of any power amplifier in transparency, focus and smoothness. We especially enjoy hearing spatial detail, instrumental definition and completely natural dynamics. At this level of sonic performance, the astoundingly small size and cool operation become icing on the cake..."

Roy Clair and Ron Borthwick of Clair Brothers said it this way, "We are amazed that Bob was able to put the same wattage into one-fourth the volume of conventional amplifiers without sacrificing audio performance. It's hard to believe that an amp so small and lightweight can put out so much clean power. But it does!"

Whether you run a megawatt sound company, a struggling bar band, or a recording studio gearing up for digital, the PM-1.5 will pay you. In increased portability and reduced freight costs. In freedom from expensive blown drivers. In sheer sonic excellence.

Write for a detailed brochure today or give your local pro store no peace until they order you 21 pounds of pure power.

*Power: 8 ohms, 450 watts/chan. 20 Hz-20 kHz both channels driven with less than 0.1% THD. 4 ohms, 600 watts/chan. rms 20 Hz-20 kHz both channels driven with less than 0.1% THD. 16 ohms, 300 watts/chan. 20 Hz-20 kHz both channels driven with less than 0.1% THD. 2 ohms, 525 watts/chan. at clipping. 1 kHz, with less than 0.2% THD. Note: 2-ohm specification for information purposes only. Operation at 2 ohms is permissible but not recommended. **IM Distortion:** Less than 0.1% SMPTE. **Frequency Response:** 3 dB at 3 Hz - 3 dB at 80 kHz. **Damping:** 200 at 1 kHz. **Gain:** 26 dB. **Noise:** Better than 115 dB below 450W A-weighted. **Input:** Balanced to ground, XLR or phone. **Impedance:** 15k-ohm each leg, balanced to ground. **Bridging:** 1200W into 8 ohms, 1000W into 16 ohms, accessed through rear-panel recessed switch. **Dimensions:** 19 in wide, 3 1/2 in high, 10 1/4 in deep. Weight, 21 lbs.



CARVER

(206) 483-1202 P.O. Box 664 Woodinville, WA 98072

Circle 15 on Reader Service Card

Some of these techniques are presently being employed by some companies, but they are rare exceptions. They should be the rule. Naturally, my suggestions won't work for every type of device, but for most. Other methods need to be explored.

If the marketing/sales forces expect to sell the products of the '80s, they need to develop techniques that weren't around in the '60s. Until that time arrives, the manufacturers will lose money, the dealers will lose money, the musicians and engineers will lose creative tools, and the art will suffer.

—Michael R. Kristofic
Gibsonia, PA 15044

Reader Kristofic doesn't think he lives in "East Sticksville," but, unfortunately, unless you are in New York, Los Angeles, Nashville, or Chicago, you might as well be there—at least as far as music and music-store

competition is concerned. And, we suspect, if most manufacturers were to follow most of Mr. Kristofic's suggestions, the costs of implementing them would add considerably to the price of the product. Would that be right?

On quite another front: Many manufacturers actually do offer their dealers a lot of support that the dealers don't always take. For example, most reps get information on new products to dealers well in advance of the actual product. But a dealer doesn't want to spend money on a product he is not yet able to sell. He'd rather advertise what he's got in stock.

Another point: any dealer can rent equipment. That's up to the dealer alone. (In favor of the dealer, rentals are quite a hassle, and that dealer must be convinced that he can make some profit on it.)

What have those of you not in the "big" cities found? We'd like to know. How about those of you in those big cities? Is the situation different?

So, What's a 'Dingle'?

In going back through old issues of *Modern Recording*, I ran across a letter in the October 1979 issue concerning an inquiry about a "Dingle" microphone. Your answer was that the "Dingle was due to be revealed shortly..." Well, I must have missed it. Just what was this "Dingle"? Who put it out and why the mystery around it?

—George Sullivan
N. Brookfield, MA

The "Dingle" microphone was first mentioned by engineer Ken Klinger in Modern Recording's March 1979 feature: "A Session With Fleetwood Mac." It was an eighth-of-an-inch square, as thick as a sheet of paper, cost only \$7.86, and was used to record Fleetwood Mac's Rumours LP. At the time of the interview Mr. Klinger would not disclose the manufacturer—they wanted to keep the technique a secret.

Recently, we contacted Murray Silver, the author of the Fleetwood Mac article, to find out if anyone has ever let the cat out of the bag. What we found out is that the "Dingle" is simply a hearing aide, and that the engineers had bought a crate of them to string up all over the studio for the Fleetwood Mac session. They covered the walls with them, used them on acoustic guitars, pianos, and drums and created a sound that was supposed to be comparable to any Neumann mic. The rest, as they say, is history.

TURN PRO

Now you can record like a professional with Rocktron's advanced technology. Our System One (patent pending) is the most effective method of noise reduction available. Compare the unmatched quality to other systems. We've quietly eliminated the side effects of breathing/modulation noise and sound coloration. Our System One performance features are outstanding. Excellent distortion performance. Doubles dynamic range while eliminating tape hiss. An effective tape noise reduction of 40dB. No switching; simultaneous encode/decode. You just can't own a better noise reduction system.

See your Rocktron dealer or write for complete information.

Suggested Retail Prices

\$319 Model 120
2 Channels

\$469 Model 140
4 Channels

\$829 Model 180
8 Channels



Encode/Decode Noise Reduction
Model 140

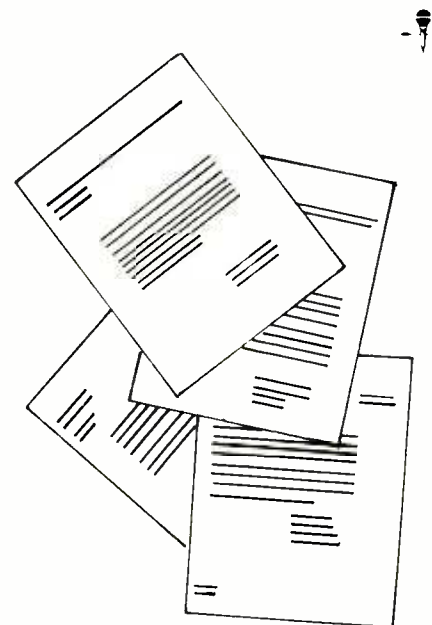
Send Inquiries to:

Rocktron Corporation
2146 Avon Industrial Drive
Auburn Heights, MI 40057
(313) 853-3055



ROCKTRON
ROCKTRON CORP.

Dealer Inquiries Welcome



The EV/Tapco Entertainer®

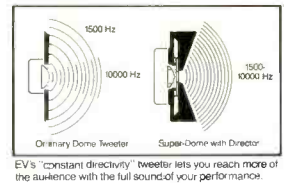
If you spend most of your playing time in different places, week after week, the EV/Tapco Entertainer is your un-bulky answer to great sound. Designed as a complete system, it consists of just three pieces: our 100M powered mixer and two 100S wide-range speakers. And it packs the features of more bulky, complex gear into the size and shape of three small suitcases.

When you reach your destination, you can be sure you'll reach the complete audience because of The Entertainer's "constant directivity" feature. Whether your audience is ten feet or sixty feet away—on axis or off to the side—The Entertainer's broad 100° coverage pattern delivers pure, accurate, pleasurable sound to every ear in the house. All the way to the outer limits.

The Entertainer's 12" low-frequency drivers deliver solid

bass, while the high-end potential of our Super Dome™ tweeters is hardly tapped even by the most demanding instruments.

What's more, the Entertainer offers unlimited versatility and convenience, which is proof that less is more.



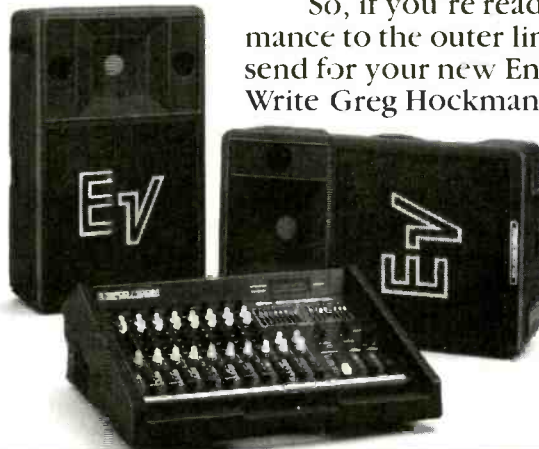
REACH THE OUTER LIMITS.

The entire system weighs less than 100 pounds and offers 100-watt per channel power, 10 inputs, three-band equaliza-

tion on each mike input, phantom powering, and many other "big system" features.

So, if you're ready to take your performance to the outer limits, see your EV dealer or send for your new Entertainer brochure.

Write Greg Hockman, Director of Marketing/Music Products, Electro-Voice, Inc., 600 Cecil St., Buchanan, MI 49107.



EV
Electro-Voice®
 SOUND IN ACTION™



Circle 17 on Reader Service Card

Talk Back

Scheming and Planning

I've recently gotten a band together, and, having an electronics degree, I am also our only technician. We have just purchased the equipment from another band. My question is: How can I obtain schematics and parts lists for this equipment? We presently have an Acoustic "Chairman of the Board" mixer, an Ampeg SVT Bass Amp, equipment from Marshall, BGW, Crown, Hammond, and a Leslie Cabinet.

I would also like to know where I can get plans for speaker cabinets and schematics for mixers, equalizers, reverbs, compressors, limiters, and other outboard equipment.

—Warren Bowen
Shelbyville, IN

We receive a lot of questions concerning plans, part lists, and schematics for equipment. The best advice we can offer is to contact the manufacturers or the representatives of the companies whose equipment you are interested in.

As for you, Warren, we've compiled a list of some of the manufacturers you mentioned in your letter for your convenience.

Acoustic Control Corp.
7949 Woodley Ave.
Van Nuys, CA 91406

Ampeg
c/o Music Technology, Inc.
105 Fifth Ave.
Garden City, NY 11040

BGW Systems, Inc.
13130 S. Yukon Ave.
Hawthorne, CA 90250

Crown International
1715 Mishawaka Rd.
Elkhart, IN 46517

Hammond Inds, Inc.
8000 Madison Pike
Madison, AL 35758

Marshall Electronics
1205 York Rd., Suite 14
Lutherville, MD 21093

For Speaker Cabinets:

JBL
8500 Balboa Blvd.
Northridge, CA 91321

Altec Lansing, Inc.
Box 3113
Anaheim, CA 92803

Well-Grounded Conversationalist

Bruce Bartlett presented some good reading in your October issue regarding grounding in the studio. I'm glad someone, somewhere addresses this topic.

After wrestling with studio grounding for several years within a three-studio plant which is interconnected to a five building complex, I would like to follow up on some of the items Bruce covered.

The single eight-foot ground rod driven into the soil may be woefully inadequate in many cases. Ground conductivity varies greatly from location to location. I have found it to be less than desirable in "downtown" locations where much masonry rubble may underly a building—particularly in the periphery around the exterior walls (where a ground rod is most likely to be driven.)

When our studio plant was installed we used a series of eight ground rods (driven in a large excavated hole in the concrete floor in order to reach real dirt). A solution of copper sulphate was then poured in prior to re-cementing the hole. An eight-inch copper strap was then connected to this ground and run (in an insulated pathway of plywood) to the studio common ground point. This ground was found to be inadequate. (I've

In A/B tests, this tiny condenser microphone equals *any* world-class professional microphone. *Any size, any price.*

Compare the Isomax II to any other microphone. Even though it measures only 5/16" x 5/8" and costs just \$149.95,* it equals **any** world-class microphone in signal purity.

And Isomax goes where other microphones cannot: Under guitar strings near the bridge, inside drums, inside pianos, clipped to horns and woodwinds, taped to amplifiers (up to 150 dB sound level!). Isomax opens up a whole new world of miking techniques—far too many to mention here. We've prepared information sheets on this subject which we will be happy to send to you free upon request. We'll also send an Isomax brochure with complete specifications. Call or write today.

* Pro net price for omnidirectional, Cardioid, Hypercardioid, and Bidirectional models: \$189.95

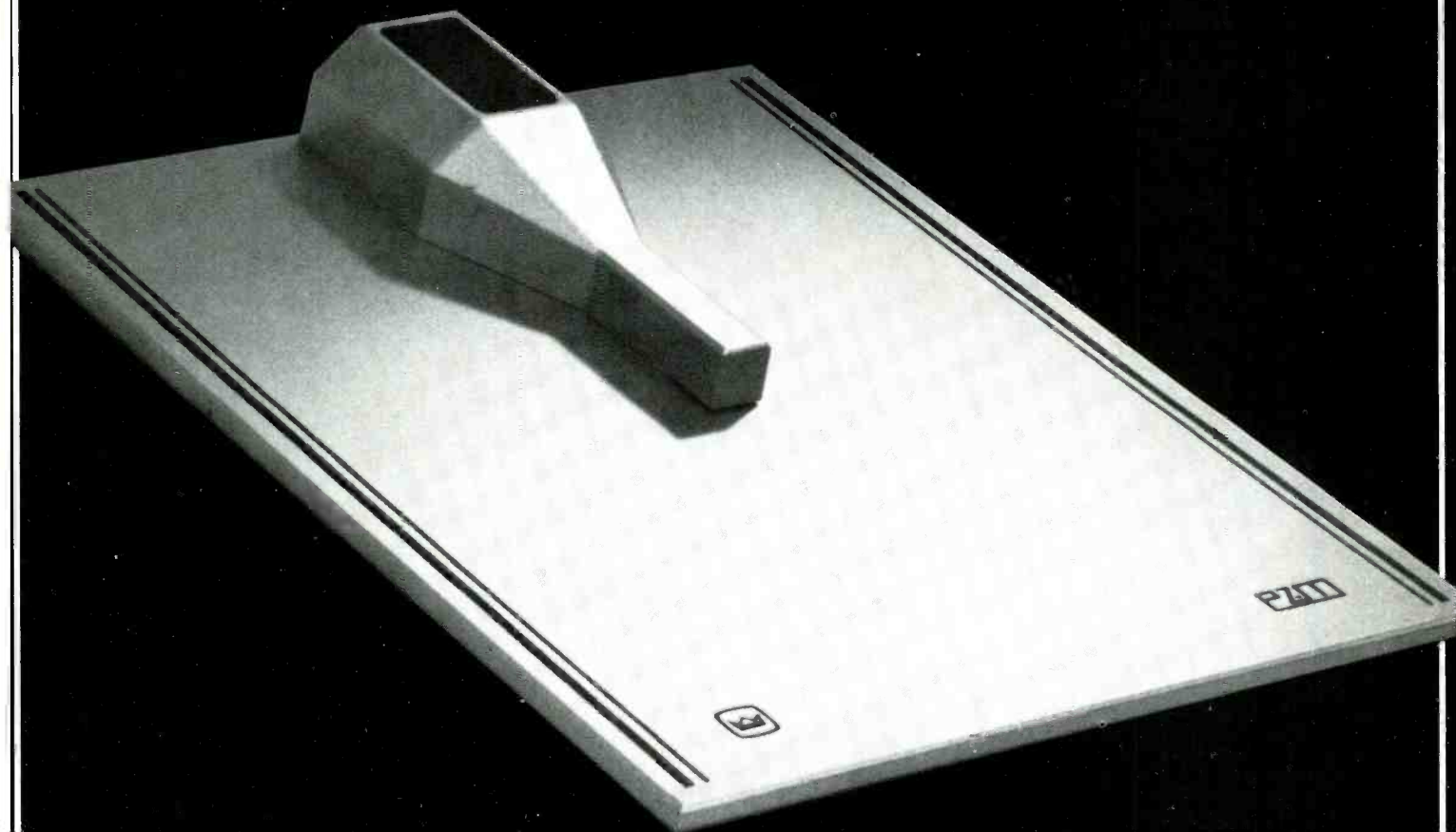
 COUNTRYMAN ASSOCIATES INC.
417 Stanford Ave., Redwood City, CA 94063 - (415) 364-9988



We Didn't Believe it Either.

Our introduction to the Pressure Zone Microphone® broke our previous record for skepticism. But the hardware converted us. Like Orville Wright's gas powered kite, it outperformed its appearance. The rest, as they say, is history. In the 3 years since we began production, sales

have mushroomed and the best recording studios use PZM®. So do a whole lot of other people on a whole lot of stages, church podiums, and conference room tables. Success has changed us. One of these days we'll probably start telling you we knew it would work all along.



CROWN

1718 W. Mishawaka Road, Elkhart, IN 46517
219 294-5571

Call or write for details

Circle 18 on Reader Service Card

since heard that copper sulphate needs some replenishing to be truly effective anyway.)

Next, a pair of #2/0 insulated cables was used to tie the studio common ground to the main power distribution ground at the service entrance. The strap to the driven-rod ground was disconnected. The direct-return power line ground proved superior—and I suspect it consists only of a coil of copper-weld wire on the bottom of the power pole. (Incidentally, our power outlet grounds are also carried individually to each breaker box to lend some measure of harmony to the system.)

The "Tree" method of grounding is used in our facility with tape machine grounds provided by a separate #10 wire. The harmony of the power outlet grounds is deemed necessary, however, since with some equipment walking from studio to studio, the three-wire power ground is often the only ground used as a practical matter.

Specific comments, now, on two of Bruce's items. First, where he states that separate ground wires be run to each power outlet (rather

than daisy-chaining the ground wires), it should be noted that the Code requires that the ground wire be at least the same wire gauge of the power-handling conductors (NEC 250-95). Thus it may be better to stick with #12 as the smallest size ground wire rather than #16 as mentioned (assuming 20A circuits and #12 distribution).

Second, the article indicates that unbalanced equipment should be grounded only through the cable shields. It is my opinion that this is asking signal (ground return) paths to carry A-C leakage currents from chassis to chassis or chassis to ground. I would suggest that the chassis ground path be separate and a lower impedance than any cable shield path. In other words, *never* use a cable shield to carry unwanted AC currents—especially in unbalanced equipment configurations. The safety issue is argument enough, and the unbalanced line levels are typically significantly lower (10 to 20 dB) than those found in balanced systems, and therefore more susceptible to induced hum.

Thanks, Bruce Bartlett and *Modern Recording & Music* for your excellent review on the subject and for the opportunity to comment.

—Mike Collett
Bonneville Productions
Salt Lake City, Utah

We received the following reply from Bruce Bartlett:

Thanks for your helpful advice, Mike. It's good to get additional information on this confusing subject, especially where safety is concerned.

Several of my references recommended a direct connection to earth ground rather than to the power company's ground. But the important thing is to try all the alternatives and use whatever works best.

My reference for the minimum ground-wire size (#16) was based on an article in the November '82 issue of *db* magazine ("Studio Powering and Grounding Techniques" by Thomas M. Hay). However, if #12 wire is required by code, that gauge should be used.

Regarding the separate safety ground for unbalanced equipment: If the chassis of unbalanced equipment are grounded via two paths (cable shields and safety grounds), multiple ground loops are set up, possibly causing hum. To minimize the hum pickup of these loops, run the safety-ground wire alongside (touching) the signal-cable jacket to minimize the loop area. Use an insulated #12 safety-ground wire between the chassis of each two interconnected components. Twist the signal cable around the ground wire and tape the two together.

If the equipment is rack-mounted, insulate the equipment from the rack and each other (by using nylon bolts and washers) to prevent ground loops.

In addition, you may want to put two power diodes back-to-back in line with each safety-ground wire. That way, the safety-ground wire is out of the circuit (preventing ground loops) unless a chassis becomes "hot."

Readers: Be sure to check your local electrical code before doing any AC power wiring, and have an electrician do the work if you're not familiar with power-wiring practices. Although studio power wiring meets code, the wiring may be non-standard. So confer with the electrician to make sure the ground wiring is done correctly.



The affordable
**Neumann
Collection**

You can now buy a genuine NEUMANN KM 84 Condenser Microphone for under \$750! That's what many electrets cost but NEUMANN is NOT an electret!

And the NEUMANN KM 84 routinely includes the features other manufacturers substitute for quality, like interchangeable capsules (omni, cardioid and cardioid with roll-off), capsule extension tubes, colored pop screens, elastic suspension and a wide range of accessories.

NEUMANN, *The Microphone Standard of the World*, designs microphones for studios that earn their living recording today's major talent. But whether you're a recording professional, sound contractor, church group, university or a serious home user, the KM 84 brings you superb NEUMANN quality at a very affordable price. Write today for our brochure and a list of our franchised dealers.

GOTHAM
AUDIO CORPORATION
741 Washington Street, New York, NY 10014 (212) 741-7411
West Coast Sales Office: (213) 841-1111

GA 101

JOURNEY

First, you have to hear yourself!

Now Journey depends on new ATM63 dynamic microphones for full control of their monitor and live concert sound. With better rejection of not just off-axis sound, but everything else on stage.

Even with a stack of Marshalls up close, the monitor mix is cleaner, with better separation than ever before.

Find out what Journey's Steve Perry, Jonathan Cain, Neal Schon, Ross Valory,

and Steve Smith heard on stage... and why monitor mixer Chris Tervit and producer/live mixer Kevin Elson insist on the ATM63. Now at leading music and sound specialists.

The ATM63

chosen by JOURNEY
because...

When you
sound right to yourself,
you sound great to everyone!



audio-technica®



Audio-Technica U.S., Inc., 1221 Commerce Dr. Stow, OH 44224 • (216) 686-2600

Circle 20 on Reader Service Card

www.americanradiohistory.com

Recording Techniques

Buyer's Guide to Low-Cost Equipment

This month we'll answer some readers' questions about recording equipment. In the process, we'll describe some hook-ups for delay units to achieve various effects, and ascertain whether semi-pro equipment is good enough to produce professional-quality recordings.

One reader sent us the following letter (paraphrased):

I am an aspiring DJ who is trying to build up a nice stereo system with a lot of special effects. Specifically, I've been looking at delay units and flangers. I've been told that, when hooked up to a stereo system, these components can create many special effects. In fact, several New York urban contemporary radio stations employ these special effects.

Is such a setup possible? If so, would my output be mono or stereo?

Answer: Yes, it's possible to connect delay units and flangers to a

stereo system, as long as you make or buy the appropriate adapter cables. For example, the hi-fi components will need RCA phono plugs and the effects units will need XLR, phono, or phone plugs.

Special effects are not normally used with a stereo system. That's because the purpose of a stereo system is to reproduce what's on the record, not to add new sounds. Still, there's no reason you can't add special effects and play with the sound. Since you're an aspiring DJ, you probably want to add these effects to your voice on your own recordings. In radio production spots, it's common to add flanging or echo to the announcer's voice.

The output can be mono or stereo, depending on how you connect the equipment. Suggested hook-ups for various results will be described later in this article.

Delay Terminology

First let's define several terms used with delay units. You may want

to review "Recording Techniques, Part 9" on signal processors (Dec. '82 issue).

A *delay unit* is a signal processor that accepts an input signal, holds it for a short time in an electronic memory, then plays it back. It uses either a digital delay line (DDL) or an analog "bucket brigade" circuit to delay the signal.

The delayed signal is combined with the undelayed signal so that two distinct sounds are heard—a signal and its repetition. If the unit has internal regeneration or *feedback*, the sound can be repeated over and over again.

Delay is the time interval between the input signal and its repetition at the output of the delay device. In many units, the delay is adjustable from 0 seconds up to the maximum delay the unit can provide. In general, the greater the maximum delay, the higher the price.

Depending on the delay, many effects can be produced, such as

HAVE A RECORDING STUDIO PROBLEM?

Call **DataLine**
(213) 651-4944

The Society of Professional Audio Recording Studios, a non-profit organization, offers SPARS members, and non-members referred by a SPARS member, a national telephone 'hot-line.'

Questions regarding any area of recording studio operations including business practices, audio engineering, and technical maintenance will be answered by SPARS-approved sources at no charge.

Want a problem solved? . . . call SPARS—(213) 651-4944



**Dedicated to Excellence Through
Innovation • Education • Communication**

SPARS Board of Directors and Consultants

Murray R. Allen
Universal Recording
Corporation, Chicago

Jerry Barnes
United Western Studios
Los Angeles

Charles Benanty
Soundworks Digital
Audio/Video Studios
New York

Larry Boden
JVC Cutting Center
Los Angeles

Bruce Botnick
Digital Magnetics
Los Angeles

Mack Emerman
Criteria Recording
Miami

Bob Lifin
Regent Sound
New York

Lenard Pearlman
Editel Chicago

John Rosen
Fanta Professional
Services, Nashville

Malcolm Pierce Rosenberg
Walow & Rosenberg
Philadelphia

Christopher Stone
Record Plant, Inc.
Los Angeles

Joseph D. Tarsia
Sigma Sound Studios
Philadelphia

David Teig
New York

John Woram
Woram Audio Associates
New York

flanging, doubling, chorus, echo, and multiple echo. Listed below are the effects of various delay settings (these delays are approximate):

0-20 milliseconds variable delay is called *flanging*. It's a sweeping comb filter that sounds hollow, swishing, and ethereal, like a jet plane passing overhead.

15-35 msec: *Doubling* or *Automatic Double Tracking*. This delay makes a single voice or instrument sound like two. If regeneration is used with this delay, the effect is called *chorus*, and sounds like many voices.

50-200 msec: *Slap* or *slap-echo*. A tape-echo effect commonly used in the 50's.

½ second: A fairly slow echo. (Tap two beats per second to hear the rate of a ½-second echo.)

1 second: A very slow echo. Seldom used. (Tap one beat per second to hear the effect.) A delay near one second was used on the vocals in "Us and Them" on Pink Floyd's *Dark Side of the Moon* LP.

4 seconds: This delay is used by guitarists to play melody lines with themselves. It also can be used

How to Build a Better Compact Professional Recorder

Follow this step-by-step guide to build your own high-performance professional recorder.



1. For your design team, hire the same engineers responsible for world's premier multi-track recorder, the STUDER A800.
2. Employ meticulous Swiss and German craftsmen for all fabrication and assembly.
3. Use solid aluminum alloy die-castings for chassis and headblock.
4. Use only professional-grade mechanical and electronic components.
5. Make your own audio heads to ensure the highest quality.
6. Include the following standard features: Balanced and floating + 4 inputs and outputs • Calibrate/uncalibrate switches • Self-sync • Tape dump • Edit mode • Full logic transport control • Servo controlled capstan motor • Front panel input and output mode switching • Universal power supply • Rack mount.
7. Provide the following options: Rugged, steel-legged console • Transport case • Monitor panel • Remote control • Vari-speed control • Balanced mike inputs

If you can do this for under \$2100*—by all means go ahead! But first, we suggest you consult with your Revox Professional Products dealer. He'll provide you with a ready-built PR99...so you can concentrate on building your reputation as an audio professional.

STUDER REVOX

Studer Revox America, Inc. • 1425 Elm Hill Pike • Nashville, TN 37210 • (615) 254-5651

*Manufacturer's suggested list price \$2095.00. Contact dealer for further pricing information

on live telephone talk shows to give the station engineer time to delete obscenities before they're broadcast. In that case, only the delayed signal is heard over the radio—not the original signal. If a telephone caller says a no-no, the radio engineer has four seconds to switch off the telephone signal before it goes over the air.

The *bandwidth* of the delay device is the frequency range or upper frequency limit of the delayed signal. A 12 kHz bandwidth is good, 16 kHz is excellent, and 20 kHz is icing on the cake.

The *signal-to-noise ratio* (S/N) is the difference in dB between the delayed signal's level and the noise level. In general, the longer the delay, the poorer the S/N ratio. A S/N ratio of 70 dB is considered fair for delay units; 80 dB is good, and 90 dB is very good (quiet).

In some units, the delayed signal can be inverted in polarity before it is combined with the undelayed signal. For delay settings that cause flanging, this *polarity inversion* results in *negative flanging*, in which there is bass cancellation as well as comb-filtering. It's a powerful effect.

With *regeneration* (also called *recirculation* or *feedback*), the delayed signal is fed back or recycled to the input, is re-delayed, and repeats over and over. If a delay unit has no internal regeneration, you can set it up externally by patching the delay unit's output into a mixing console input.

Many units automatically *sweep*, or vary the delay time over a limited range—especially in the flanging mode—to provide a “wavy” effect.

Delay Units

Here's a *partial* list of studio delay units costing under \$1000.00. Call or write the manufacturers for product information and the names of local dealers. The maximum delay available for each unit is mentioned in this list.

DeltaLab Echotron ADM-4096—Echo only. Delay range from 1/4 second to 4 seconds. 16 kHz bandwidth. \$699.

DeltaLab Effectron II Series—These units feature flanging, doubling, chorus, and echo with polarity inversion and regeneration. 16 kHz bandwidth, 90 dB S/N. Effectron II models:

- ADM-256—1/4 second; \$449.
- ADM-310—310 msec., programmable; \$599.
- ADM-512—1/2 second, programmable; \$799.
- ADM-1024—1 second; \$599.
- ADM-2048 (Super Time Line)—2 seconds, programmable; \$999.
- DeltaLab, 27 Industrial Ave., Chelmsford, MA 01821.
- LT Sound ECC (Echo Control Center)—20-240 msec. 12 kHz bandwidth; \$595. LT Sound, P.O. Box 338, Stone Mountain, Georgia 30086, phone 404/493-1258.
- Ibanez DM500—256 msec. 16 kHz bandwidth; \$349.
- Ibanez DM1000—900 msec., \$449.
- Ibanez DM2000—1 second. 16 kHz bandwidth; \$649.
- Ibanez HD1000 pitch shifter and delay unit. \$499.
- Ibanez, P.O. Box 886, Bensalem, PA 19020.
- Ibanez, 327 Broadway, Idaho Falls, Idaho 83401.
- Ibanez, 17421 B. East Gale Ave., City of Industry, CA 91748.

- ADA D640—640 msec. \$499.
- ADA D1280—1280 msec. \$699.
- ADA, 2316 Fourth St., Berkeley, CA 94710, phone 415/548-1311.
- MXR Digital Time Delay Model 175—328 msec., \$450.
- MXR Delay System II, Model 151-1—3.2 seconds.
- MXR Innovations Inc., 740 Driving Park Rd., Rochester, NY 14613, phone 716/254-2910.
- Audio-Digital TC2 Digital Delay—2 seconds. 16 kHz bandwidth, 90 dB dynamic range; under \$1100.
- Audio-Digital Inc., 84692 Sarvis Berry Rd., Eugene, OR 97405, phone 503/687-8412.
- Peavey Digital Effects Processor—1.3 seconds. 20 kHz bandwidth. Peavey Electronics Corp., 711 A Street, Meridian, Miss. 39301.
- Eventide CD254—254 msec. (internal adjustment, no regeneration), \$895. Eventide Clockworks Inc., 256 W. 54th St., New York, NY 10019, phone 212/581-9290.

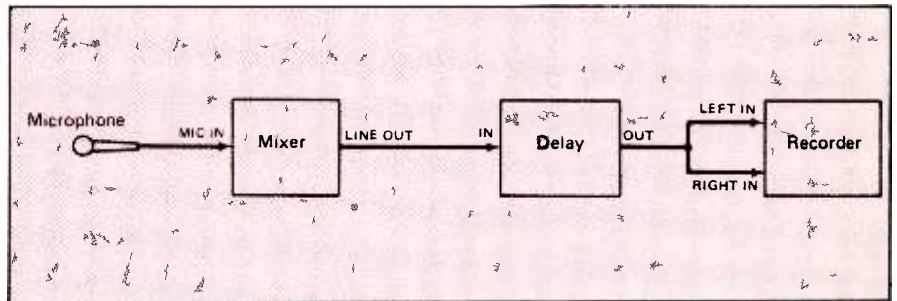


Figure 1. Adding delay effects to voice recordings.

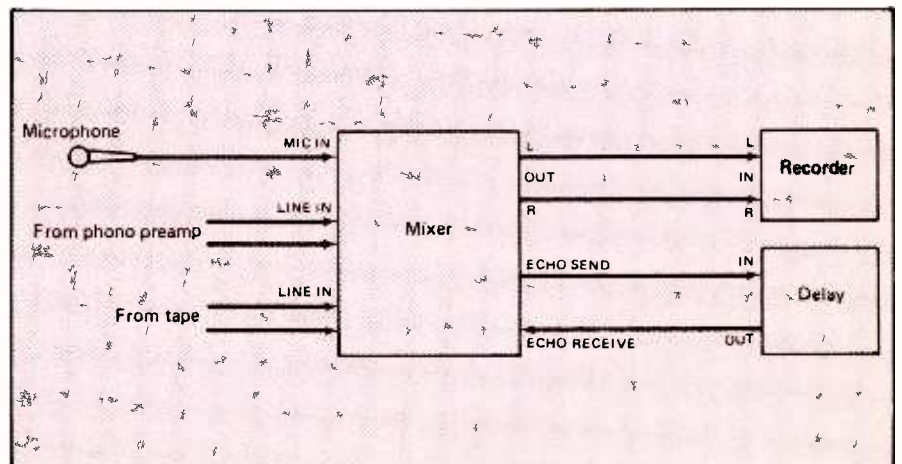


Figure 2. Adding delay effects to voice-only during a mix.

Lexicon PCM-41—.8 second, \$715.
 Lexicon PCM-42—2.4 seconds (4.8 seconds with expanded memory). 16 kHz or 6 kHz bandwidth, 90 dB dynamic range; \$1000.
 Lexicon FL 201 Instant Flanger. \$700.

Lexicon, 60 Turner St., Waltham, Mass. 02154, phone 617/891-6790.

DOD FX70 Flanger. \$99.95.

DOD R-875 Stereo Flanger/Doubler. \$299.95.

DOD Spectrum R-895 Flanger/Doubler/Chorus. \$349.95.

DOD R-885 Delay—500 msec., \$299.95.

DOD R-908 Digital Delay—900 msec., \$399.95.

DOD R-909 Digital Delay—450 msec., \$399.95.

DOD Electronics Corp., 2953 South 300 West, Salt Lake City, Utah 84115, phone 801/485-8534.

Delay Unit Setups

The units just mentioned are single-channel (mono) units, but some can provide simulated stereo. That is, they can spread out a mono sound source. Let's look at several ways to connect these devices to your stereo system.

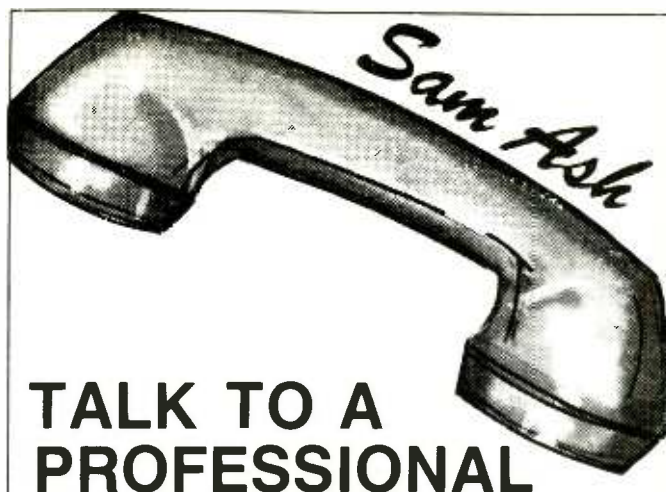
Suppose you want to add flanging, doubling, or echo to voice recordings. *Figure 1* shows a suggested setup. If you want your voice to come from the center in a stereo recording, use a "Y" cord between the delay unit output and your recorder inputs. This splits the signal equally to both channels and results in a "phantom image" of your voice centered between the playback speakers.

Now suppose you want to add delay effects to your voice but not to pre-recorded music. Say you're doing a voice-over, with your echoed voice heard over some un-echoed music in the background. You'll need a stereo mixer with an *echo bus* (also called *effects bus* or *aux bus*).

Figure 2 shows the setup. First, set the direct/delay mix control on the delay unit to the full "delay" position. Next, turn up the ECHO RECEIVE or EFFECTS RETURN control on your mixer, about halfway up. Add echo to your voice by turning up the ECHO SEND knob on your microphone input channel. Leave the music without echo by *not* turning up the echo send on the two music input channels.

You can add effects to records or tapes you play through your stereo system, as shown in *Figure 3*. To keep the stereo effects that are on your

FEBRUARY 1984



TALK TO A PROFESSIONAL

When you call Sam Ash, you talk to a professional - someone who knows his equipment and understands your needs; and you're dealing with the biggest in the business - a sixty year old company with a seven million dollar inventory. Get the best selection of factory - fresh quality brands at competitive prices.

So call Sam Ash and talk to the mail order professionals about your needs in instruments, amplifiers, sound and recording equipment.

800-645-3518

IN NEW YORK CITY: (212) 347-7757
 IN NY STATE: (800) 632-2322
 ON LONG ISLAND: (516) 485-2122
 TWX 510-222-1630 SAM ASH HEMP

Since 1924

Sam Ash

MUSIC STORES



124 Fulton Avenue, Hempstead, New York 11550

Circle 22 on Reader Service Card

QUALITY RELIABILITY VERSATILITY

The David Hafler Company has earned a reputation for producing state of the art power amplifiers at rock bottom prices. The Hafler DH-220 and DH-500 Amplifiers are well known for their sound quality, reliability and value.

Now, there's the P-500! The P-500 is a rugged, full-featured amplifier. It combines the circuit design and MOSFET output devices of the DH-500 with extra professional features; an automatic 3-speed fan, barrier strip, phone plug and XLR connectors, balanced or unbalanced inputs and gain controls, to name just a few. And like other Hafler products, the P-500 is available in fully or partially assembled form.

For a complete list of features and specifications, write to:

hafler

The David Hafler Company
 Dept. MF, 5910 Crescent Boulevard
 Pennsauken, New Jersey 08109



Circle 23 on Reader Service Card

15

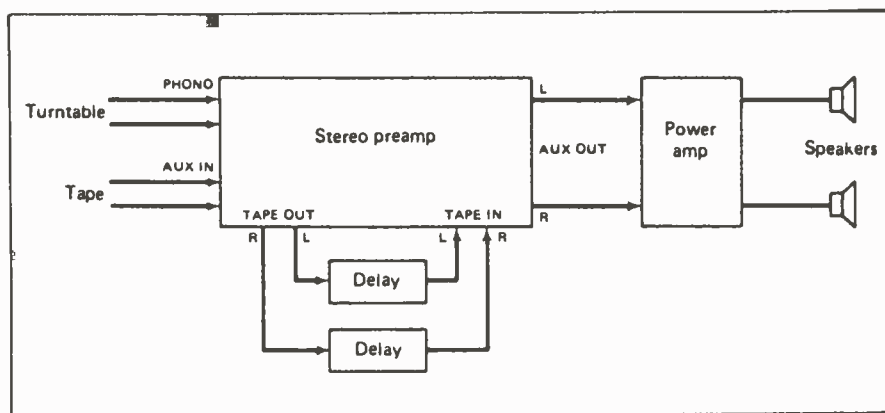


Figure 3. Adding delay effects to records or tapes.

boosted while others are cut, due to phase cancellations. In the right channel, the frequencies that were cut in the left channel are boosted, and vice versa. Thus, instruments may appear to come from the left or right speaker depending on each instrument's frequency range.

Some units provide an automatic sweep in the flanging and chorus mode. Combine this sweep with the setup just mentioned for a stereo chorus or modulated stereo effect.

It sounds beautiful on guitar or electric piano solos.

As before, you can plug the delay unit either into a power amp or a tape deck. If you play the tape in mono (both channels combined), you'll hear only the direct (undelayed) signal.

Delay units can also be used to recover ambience from stereo recordings. This means to extract the

records, you'll need two separate delay units set to the same delay and feedback settings. Push the TAPE MONITOR switch on your preamp or receiver to hear the effect.

Figure 4 shows one way to create simulated stereo using a single delay unit. Let's say you want to take a mono record and "spread it out" between your stereo speakers. Connect your preamp's left-channel output to your power amp left-channel input, as usual. Connect your preamp's right-channel output to the delay unit's input. Delay the signal about 10 milliseconds with no regeneration. Connect the delay unit's output to your power amp's right-channel input.

So, you'll have a direct or undelayed signal going to your left speaker, and an identical 10 msec delayed signal going to your right speaker. Turn your preamp's balance control partly toward the right until you hear the sound spread evenly between the speakers. All the instruments will sound diffuse and hard to localize, rather than pinpointed.

You can apply the same effect to your voice as follows:

- (1) Plug a microphone into a mixer.
- (2) Plug the mixer line-level output into a Y adapter.
- (3) Plug one of the Y adapter outputs into the left-channel input of your power amp.
- (4) Plug the other Y adapter output into the delay unit.
- (5) Plug the delay unit's output into the right-channel input of your power amp.

You can record the effect by plugging into your tape deck rather than your power amp. Note: If you play this simulated stereo tape in mono (both channels combined), you'll hear a very colored tone quality due to

phase cancellations of the direct and delayed signals.

Figure 5 shows another way to synthesize stereo. Some delay units have a "direct plus delay" output, and also a "direct minus delay" output. The "direct plus delay" output

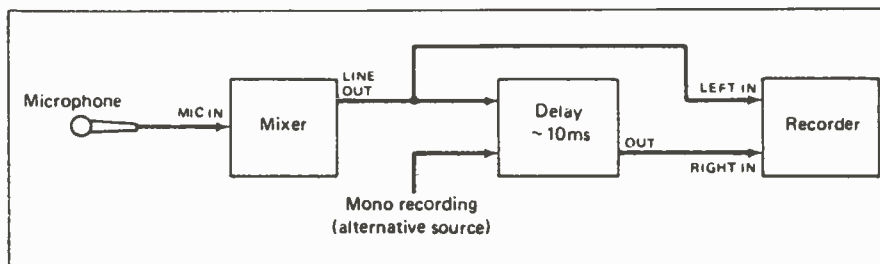


Figure 4. One way to achieve simulated stereo.

supplies a mono mix of the direct and delayed signals. The "direct minus delay" output is the same, except the delayed signal is inverted in polarity.

recorded concert-hall reverberation from records and spread it out around the listener.

When we listen to records on a stereo system, all the recorded

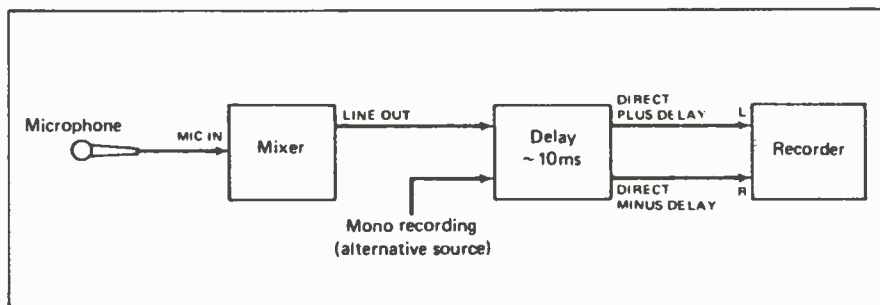


Figure 5. Another way to achieve simulated stereo.

Set the delay around 10 to 20 msec. Plug the direct plus delay signal into your power amp's left-channel input. Plug the direct minus delay signal into your power amp's right-channel input. You should hear simulated stereo.

How does it work? In the left channel, certain frequencies are

reverberation comes from up front between the playback speakers. But when we listen to live music in a concert hall, the hall ambience or reverberation surrounds us. The purpose of ambience recovery is to surround the listener with reverberation, to create a sense of being in the concert hall. In other words,

ambience recovery makes records sound spacious and room-filling.

Figure 6 shows a way to do this. You'll need another stereo power amp and another pair of speakers. The amplifier can be low power and the speakers can be cheap.

First, patch your stereo system together as usual. Then patch your preamp's "tape out" jacks to two separate delay units. Patch the delay units' outputs into the second power amp. Connect the second pair of speakers to the second power amp's outputs.

Next, place the additional speakers on either side of your listening position, several feet away. Measure

the distance from the main (front) speakers to your listening position. Also measure the distance from the side speakers to your listening position.

Set the delay according to this formula:

$$\text{DELAY} = (\text{DM} - \text{DS})/\text{C} + \text{T}$$

where:

DM = distance of main speakers to listener in feet

DS = distance of side speakers to listener in feet

C = the speed of sound, 1130 feet-per-second

T = 2.5 to 10 milliseconds.

The object is to delay the sound from the side speakers so that it arrives 2.5 to 10 msec after the sound arrives from the main speakers. For example, assume the main speakers are eight feet away and the side speakers are four feet away. Let T = 5.5 msec. The delay should be set at $(8 - 4)/1130 + 5.5 \text{ msec} = 3.5 \text{ msec} + 5.5 \text{ msec} = 9 \text{ msec}$.

Semi-Pro vs. Pro Equipment

Here's another letter (paraphrased for brevity):

Can the following equipment produce commercial-quality recordings, good enough to sell in record stores? Tascam M-50 mixer, Tascam 80-8 tape deck [now discontinued], Tascam 58 tape deck, Tascam 38 tape deck, dbx noise reduction, dbx 163 compressor/limiter, Rerox B77 mastering tape deck, Technics SVP-100 digital mastering tape deck, Effectron ADM-256, and reverb units under \$1000.

Are there any weak links in this list? Can I buy the lower-cost units and still make master-quality tapes?

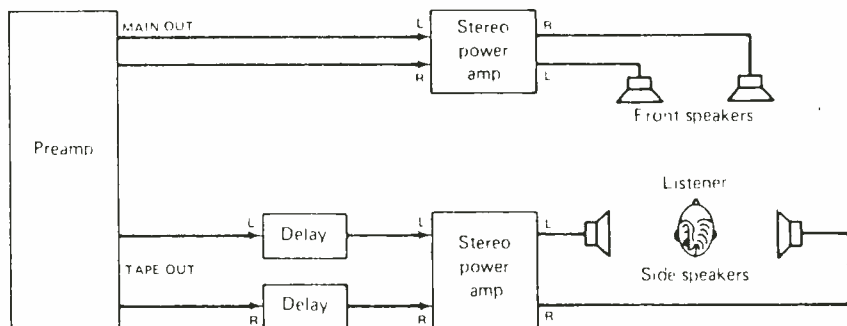
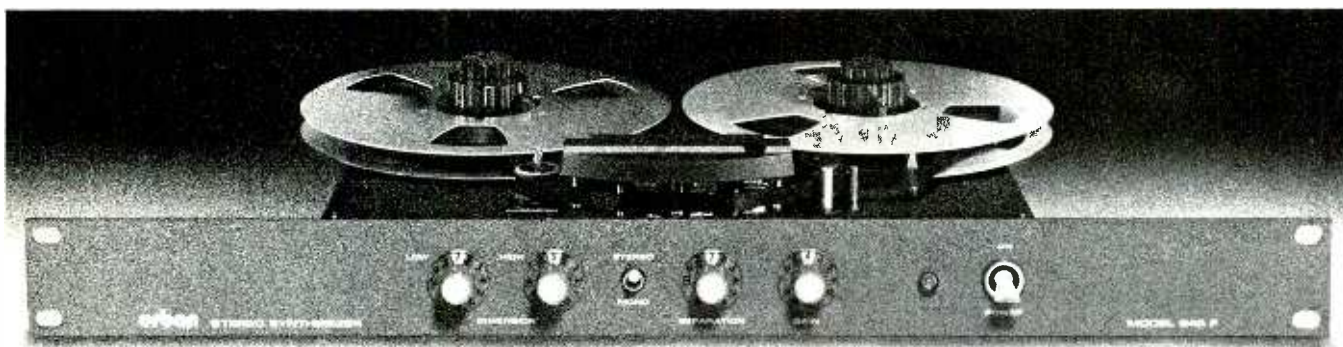


Figure 6. Ambience-extraction playback method.



Introducing the 5th (9th, 17th, or 25th) track.

Orban makes an amazing little device that greatly expands your multitrack capabilities. Our new 245F Stereo Synthesizer uses a patented technique for processing mono tracks into pseudo-stereo during mixdown. So you can save tracks by recording instruments like drums, strings, synthesizer, organ, horns, or electric guitar in mono, and then expanding them into convincing pseudo-stereo during the mix rather than taking two tracks.

The 245F is particularly useful in processing *intrinsically* mono sources—like many electric and electronic instruments. And unlike many other ambience-generating techniques, our stereo synthesis is completely mono-compatible: There's no phase cancellation or comb-filtering when the stereo channels are summed.

For \$399, you won't find a better, more cost-effective way to save tracks and get more on your master. Call or write for details.

orban Orban Associates Inc. 645 Bryant St. San Francisco, CA 94107 (415) 957-1067 Telex: 17-1480



Ask for our
44 PAGE CATALOG
 of
**PROFESSIONAL
 SOUND RECORDING
 & DUPLICATING SUPPLIES**

Recording Supply Div. of Polyline Corp
 1233 Rand Road, Des Plaines IL 60016
 (312) 298 - 5300

35

Circle 25 on Reader Service Card

**INTERESTED IN A SOUND CAREER
 IN THE
 \$10,000,000,000.
 RECORDING INDUSTRY?**

TREBAS INSTITUTE OF RECORDING ARTS
 will put you
ON THE RIGHT TRACK

in a 2 year professional training program in the
**RECORDING
 ARTS AND SCIENCES**

70 courses in
 • RECORD PRODUCING
 • SOUND ENGINEERING
 • MANAGEMENT

For courses starting October 1983
APPLY NOW!

For application and FREE brochure describing courses
 phone (416) 977-9797 or send coupon IMMEDIATELY to

MR 02 83

ADMISSIONS DIRECTOR
 TREBAS INSTITUTE
 225 Mutual Street
 Toronto, Ontario, Canada M5B 2B4

Name _____ Phone No. _____
 Address _____
 City _____ State _____ Zip _____

TREBAS INSTITUTE OF RECORDING ARTS

18 Circle 26 on Reader Service Card

Answer: Yes, the equipment you mentioned can be used to make quality records. That's assuming you use noise reduction, you're a good engineer, and you use good musicians, good microphones, mic'ing techniques, monitors, etc.

The weak link may be the reverb units selling under \$1000. Their decay time is non-adjustable. Still, the better units are useable for master-quality recordings. You can always upgrade later.

Let's describe some of the equipment you mentioned, as well as some other units:

8-track recorders using 1/2-in. tape. Manufacturer's specs @ 15 ips.:

Tascam 38. 68 dB S/N A-wtd., 40 Hz-22 kHz ± 3 dB record/reproduce response @ -10 VU, -10 dBV (.3 V RMS) input and output level, no SMPTE-compatible connector, \$2750.

Tascam 48. 68 dB S/N A-wtd., 40 Hz-22 kHz ± 2 dB record/reproduce response @ -10 VU, -10 dBV and +4 dBm levels, SMPTE-compatible connector, \$4495.

Tascam 58. 69 dB S/N A-wtd., 30 Hz-26 kHz ± 2 dB record/reproduce response @ -10 VU, -10 dBV and +4 dBm levels, SMPTE-compatible connector, \$5795. Tascam, 7733 Telegraph Rd., Montebello, CA 90640, phone 213/726-0303.

These Tascam units are similar in wow and flutter and distortion, and are fairly similar in features. The Model 38 is recommended for occasional use; Models 48 and 58 are more rugged and reliable for daily professional use.

Otari MX-5050-Mk III-8. 70 dB S/N A-wtd., 40 Hz-25 kHz ± 2 dB record/reproduce response @ -10 VU, -8 dBm and +4 dBm levels, SMPTE-compatible connector, \$5295 (March '83). Otari Corp., 2 Davis Drive, Belmont, CA 94002, phone 415/592-8311.

Low-cost mixing consoles. 12 in., 8 out: Tascam M-50, \$3495. Sound Workshop Logex 8, \$4250. Sound Workshop Professional Audio Products, Inc., 1324 Motor Parkway, Hauppauge, NY 11788, phone 516/582-6210.

Reverb units costing under \$1000. All the following devices use springs. They are mono (single channel) unless otherwise noted.

The decay time (reverberation time) is non-adjustable. Many of these manufacturers can also provide information on higher-priced models.

PAIA Electronics 6740 Reverb Kit, \$59. PAIA Electronics, 1020 W. Wilshire Blvd., Oklahoma City, OK 73116.

Furman Sound RV-1 Reverb, \$315. Furman Sound Inc., 30 Rich St., Greenbrae, CA 94904, phone 415/927-1225.

Tascam RS-20 Stereo Reverb, \$400. Tascam Production Products, 7733 Telegraph Rd., Montebello, CA 90640, phone 213/726-0303.

Orban 111B Dual Spring Reverb, stereo. Orban Associates, Inc., 645 Bryant St., San Francisco, CA 94107, phone 415/957-1067.

Master-Room XL-121, \$495. Master-Room XL-210, stereo, \$890. I was most impressed with the sound of this unit, but use your own judgment. MicMix Audio Products Inc., 2995 Ladybird Lane, Dallas, TX 75220, phone 214/352-3811.

Biamp Systems MR/140 Reverb, \$329. Biamp Systems Inc., P.O. Box 728, 11000 S.W. 11th St., Beaverton, OR 97075, phone 503/641-6767.

N.E.I. Model 351 Reverb System, \$349. N.E.I., 934 N.E. 25th Ave., Portland, OR 97232, phone 503/232-4445.

SCV RBS2 Stereo Reverb, \$925. SCV Inc., 414 N. Sparks St., Burbank, CA 91506, phone 213/761-9760.

DOD R-845 Reverb, \$229.95. DOD Electronics Corp., 2953 South 300 West, Salt Lake City, Utah 84115, phone 801/485-8534.

Also see the article "Making a Plate Reverb Unit" by Robert Buontempo in the May '83 issue of *MR&M*. It costs \$400 plus labor. And check out the article "Building a Hot Springs Reverb" by Craig Anderton, *MR&M*, Oct. '80.

Let's consider the choice between the Revox B77 analog recorder and the Technics SVP-100 digital recorder. While the digital unit out-

performs the analog one, the digital unit does not permit editing—you'll have to edit the multitrack tape rather than the 2-track master tape. If you plan to cut records from your digital master tape, you'll have to take the digital recorder to the record-cutting company to play it, because they probably don't have such a machine.

Dubbing From 4 to 8 Tracks

If I dub recordings made on a ¼-track Revox or a 4-track Teac at 7½ ips to an 8-track tape, will I still have a record-quality master tape?

Answer: Provided you use noise reduction with the 4-track and 8-track recordings, you should be able to make the dubs and still maintain acceptable quality. Still, for cleanest sound, it's best to avoid dubbing, 7½ ips tape speed, and ¼-track format. Dubbing increases noise by 3 dB, assuming both recorders have an identical signal-to-noise ratio. Using 7½ ips rather than 15 ips adds noise, as does using ¼ track instead of ½ track. Fortu-

nately, noise reduction units can keep the noise down.

Note: If your 4-track tapes are Dolby- or dbx-encoded, you should be able to copy directly from the 4-track to the 8-track tape without intervening noise reduction units. That is, copy the tape in encoded (compressed) form directly from one recorder to the other. Then play back the 8-track tape through the noise reduction unit in expanded (decoded) form. If you use Dolby, be sure to copy the Dolby tone for calibration.

Where do you draw the line between recordings that are master quality and those that are not? It's a matter of degree. There is no RIAA standard on sound quality for commercial recordings.

I've had records cut from tapes made on a Teac 3340 4-track recorder operating at 15 ips with no noise reduction. While the tapes were not as quiet as I would have liked, the records were considered acceptable for airplay. I've also had commercial-sounding records pressed from tapes made on a ½-track Revox A77 at 7½ ips with no noise reduction. The

signal-to-noise ratio of the master tape was about 58 dB, which I consider marginal. By far the greatest loss in quality occurred when the tape was transferred to disk.

In the future, when digital master recordings and compact digital discs are common, a master-quality tape will require a signal-to-noise ratio of 80 to 90 dB. If your dubbed tapes are that quiet (they should be with dbx), they'll be master-quality in the future.

On current records made with analog recorders, tape hiss is inaudible at moderate listening levels (say, 85 to 90 dB-SPL). Frequency response extends to 15 kHz or beyond; wow and flutter is inaudible. Artificial reverb sounds like a concert hall, not like a spring. If your recordings match this performance, they're master-quality.

Compare your tapes with commercial records. If your tapes are noisier or duller, or if your reverb sounds boingy or muddy, then your equipment needs to be upgraded to compete with pro studios. But remember: It's the song, not the sound, that sells the record.

THE AFFORDABLE APHEX AURAL EXCITER™ TYPE B



- Newest version of the Aural Exciter™ from ApheX – the **originators** of psychoacoustic enhancement.
- Uses the same principles as the more expensive Aural Exciters™ used on thousands of hit albums, concerts and movies, and on the air on hundreds of radio stations worldwide.
- Restores **natural** brightness and presence, makes your sound **real** again.
- Improves intelligibility; makes individual sounds distinct from one another.
- Increases perceived loudness without changing actual gain or EQ.
- Improves the acoustic performance of any environment.
- Synthesizes program related harmonics to generate a musical, **natural** sounding enhancement instead of unnatural effects such as EQ, echo, delay, flanging, phasing, notching, filtering, etc.
- Cost effective enhancement for **any** audio application, such as recording, PA., paging, tape duplicating (audio and video), club sound and communications. Possibly the single most dramatic improvement you can make to your audio system for less than \$500.
- Aural Excitement is a patented, proprietary process that cannot be duplicated in any way, except by another **genuine** Aural Exciter™ from ApheX Systems, LTD.



ApheX Systems Limited ■ 13340 Saticoy St. ■ N. Hollywood, California 91605 ■ (213) 765-2212 TWX: 910-321-5762

From the Publisher

If you see *Modern Recording & Music* each month, you know that changes are being made in both our appearance and our content. Just what are they, and where are they leading?

What they are is fairly obvious, we think: the changing physical appearance of both our cover to what you now see, and the still (slightly) changing interior stylings. All of this is being done to make *Modern Recording & Music* easier to read.

There have also been ongoing changes, even before the physical ones, to our editorial content. In 1976, when the first issue of *Modern Recording & Music* was published, our direction was clear. *Modern Recording*, as it was simply called then, was to be a journal for the musician whose interests and needs were becoming more technological. In other words, we were to be a recording and technical performing magazine.

Things have a way of drifting over the years, and the result here was a slow change toward more music coverage and less technical coverage.

Music coverage is important to you the working musician, and we will continue to offer it. But, in the last few months, *MR&M* has shifted back to placing the emphasis on the equipment needed to record and perform with in this modern technologically-minded age.

If you're still with me, what does all this mean? It means that if you are a working musician and/or a small recording studio, and you want to find out more about the modern recording and music producing technologies, *Modern Recording & Music* is the source to turn to.

Don't get the impression that these statements mean that things have been cast in stone and now you must go along with them. Not so! *Modern Recording & Music* wants to hear from you. We want to learn still more about what you want. You've always been able to write to us and get a response. This is not changing. We certainly hope you will continue to tell us what we are doing right, and what we might do wrong.

This is, and always will be, *your magazine*.

larry zide

T H E O B E R H E I M S Y S T E M

"Let me overturn a myth here—this is the greatest drum box for sound and programmability . . ."

Stewart Copeland
(The Police)
Melody Maker
June 18, 1983

"The system inspires creativity and experimentation on every level."

David Sancicus
May 27, 1983

"In truth, these three little boxes (DMX, DSX & OB-8) will do far more than we yet know how to make use of musically."

Jim Aikin
Keyboard/April 1983

"There's no other way to record a symphony by yourself . . ."

Sting (The Police)
Musician/June 1983

"The interface with the DSX exponentially enlarges the possibilities of what I can do."

Jeff Lorber
Obernotes/Fall 1982



OBERHEIM
ELECTRONICS, INC.
Some things are better than others.
2250 So. Barrington Ave.
Los Angeles, CA 90064

DX Digital
Drum Machine
\$1395.00
Suggested retail

DMX Digital
Drum Machine
\$2895.00
Suggested retail

DSX Digital
Polyphonic
Sequencer
\$1995.00
Suggested retail

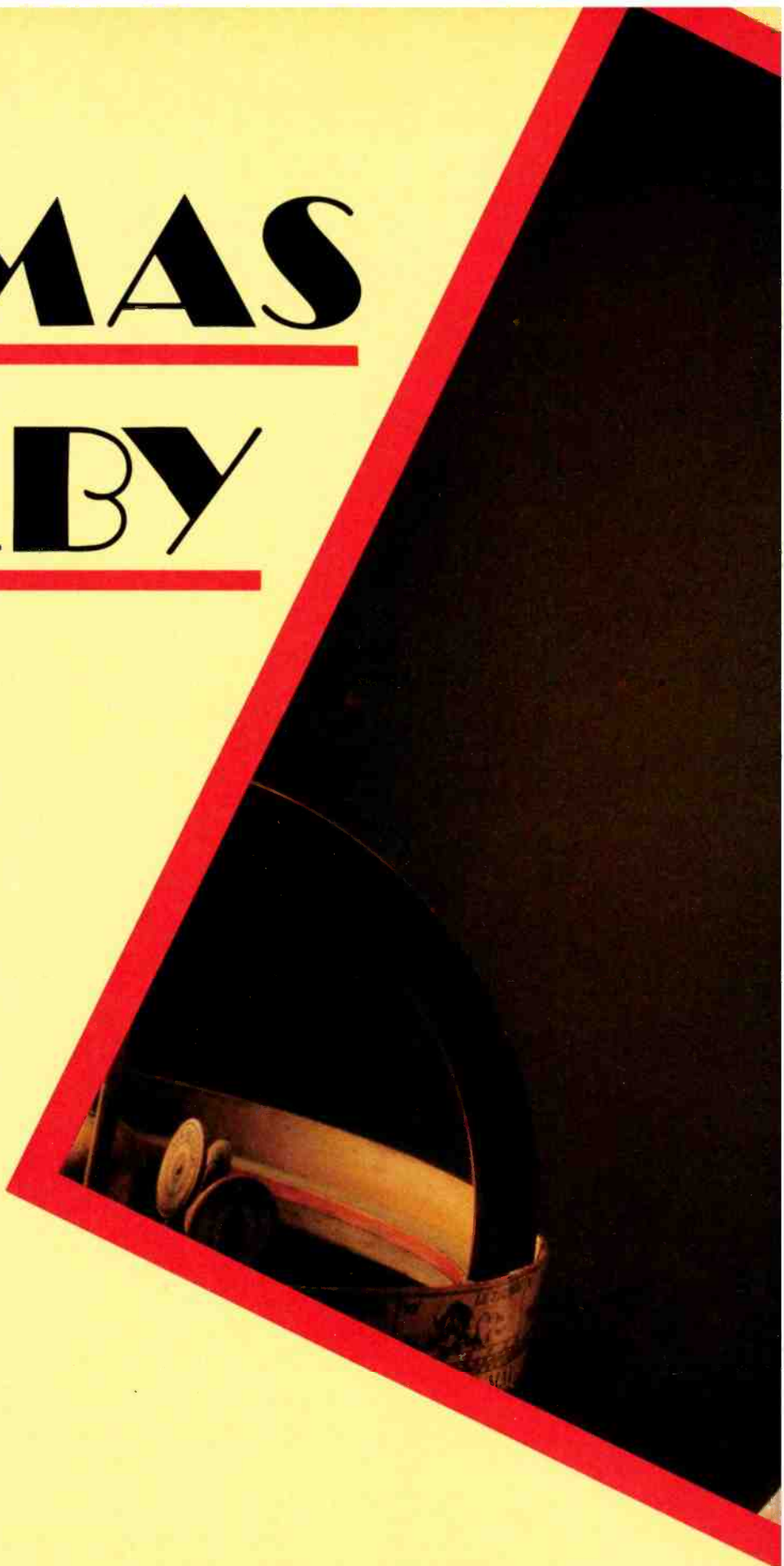
OB-8 Polyphonic
Programmable
Synthesizer
\$4395.00
Suggested retail

700 Professional
Stereo
Power Amplifier
\$895.00
Suggested retail

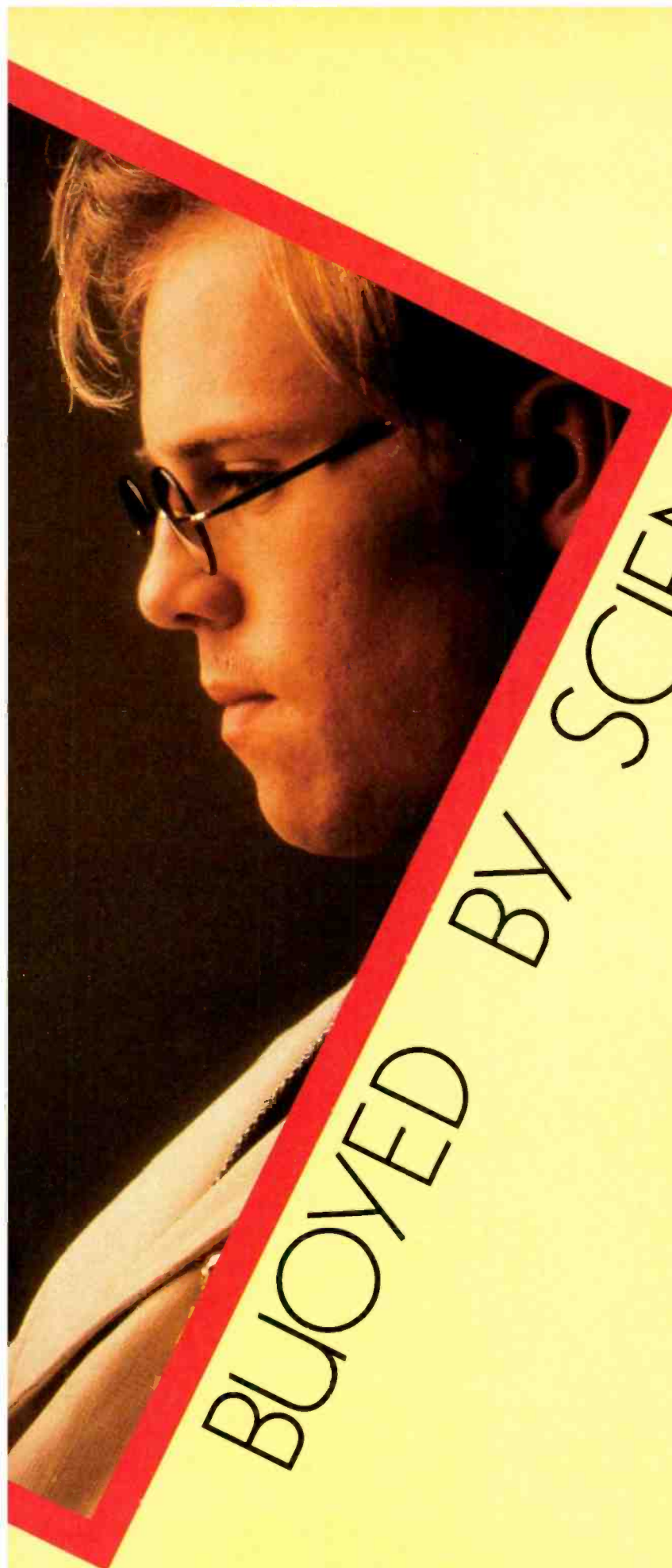
Circle 44 on Reader Service Card

THOMAS

DOLBY



vicki greenleaf



BUOYED BY SCIENCE

WHEN THOMAS DOLBY, barely 24-years-old, burst onto the American pop/rock music scene with the top-10 success of his debut album, *The Wireless Age* (Capitol), it was out of left field. Egypt to be exact.

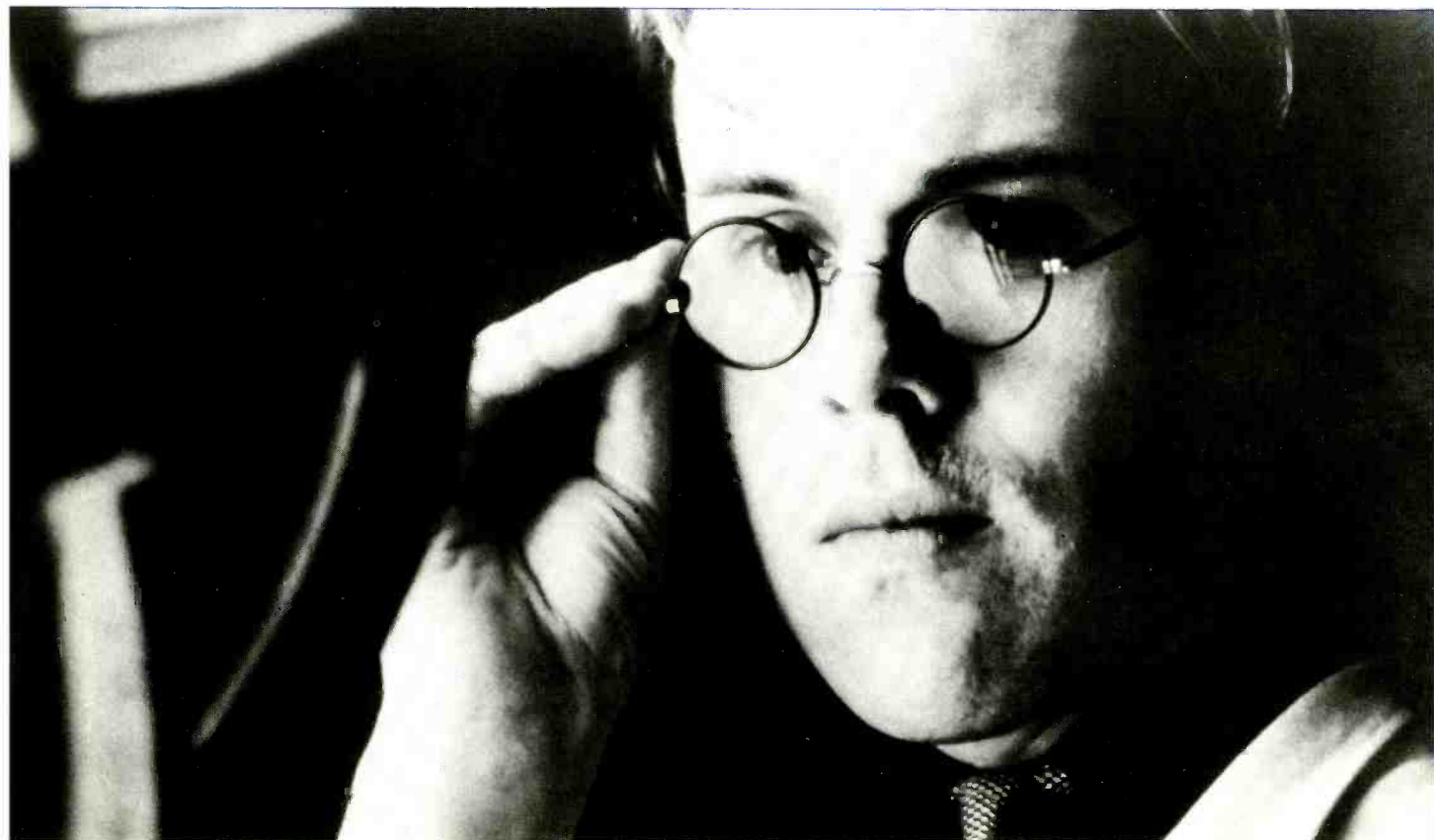
The young composer, inventor, computer programmer was born and raised in Cairo, where his father worked as an archaeologist. Heavily influenced by the English music scene, Dolby brought a new high-tech sound—both lyrically and musically—to mainstream music in the States, and topped the charts with his single, "She Blinded Me With Science."

The bespectacled man—unable to compete with the sex appeal of Sting of the Police or other musicians who find that part of their attraction to teenagers is their appearance—encouraged his reputation as an absent-minded professor, a tousled-haired scientist. Unconcerned with commerciality, Dolby went for musical content, ignoring current trends. Yet, despite that "handicap," a long-ignored need for change in American radio programming afforded commercial success nonetheless.

Dolby—who primarily works alone in the studio—surrounds himself with machines rather than session players. Unsatisfied with the predictability of some of the synthesizers he utilizes, he reprograms them with a PPG 340/380 Wave computer.

After a somewhat lengthy search for his room key at the exclusive Chateau Marmont Hotel in Los Angeles—supporting the rumor concerning his purported absentmindedness, despite his brilliance with computers and in the studio—Dolby joined *MR&M* for breakfast at a nearby restaurant where he took time to discuss music in general, his overnight success, his work with computers and a new album, *The Flat Earth* (Capitol).

Gripping his fork upside down in his left hand and prodding eggs benedict onto the instrument with a knife in his right hand—very much the proper Englishman—Dolby talked about the drastic differences between his premiere effort and his soon to be-released LP, both musically and lyrically.





THE WORLD'S FIRST PROFESSIONAL 4-TRACK CASSETTE MACHINE.

It had to happen. Everything we've ever learned about multi-track recording was tapped to design our 234 cassette format recorder/reproducer.

This rugged little 4-track has virtually all the features you'd expect to find on its big brothers with reels. We've even added some of the capabilities that made our Portastudio® a milestone in its own right.

You get microprocessor control and three motor Simul-sync® design. You get convenience, portability, and the ability to record eight sources in a single take. You get the flexibility to bounce tracks and add live sources at the same time.

All by itself, the 234 is a formidable recording tool. Combined with a mixer for EQ, cue and monitor mixes, solo and effects sends/returns, you've got a full blown 4-track production studio.

Face it. You put sound on tape for a reason. You want somebody to hear it. Most importantly, buy it. It's your life. We built the 234 to help you because you never get a second chance to make a first impression.

We know you want to find out more. See your TASCAM dealer or write TASCAM Production Products, 7733 Telegraph Road, Montebello, CA 90640, (213) 726-0303.

Copyright 1983—TEAC Corporation of America.

TASCAM
TEAC Production Products

DESIGNED BY POPULAR COMPLAINT.

Circle 28 on Reader Service Card

...we're not starting with the premise that using electronic instruments is inhuman. I don't agree with that. I've played in rock 'n' roll bands and let me tell you, after the second date of an 84-date tour, you're not going to play with an awful lot of humanity up there on stage. It's absolutely impossible. There's much more spontaneity when I'm on stage working with a bunch of machines than there was on some of the tours I was on.

Modern Recording & Music: At 24 years of age, were you surprised by the top-10 success of your first LP, *The Golden Age of Wireless*?

Thomas Dolby: It didn't surprise me. I have a lot in common with the people who are going to hear the record once it's out—whether it's in a club or on the radio—so if I like the record, I think everyone else will. But I'm not obsessed with commerciality. I don't really care about money... I don't care about money as long as I can live an exotic lifestyle and have all the things I want (laughs).

MR&M: What is it about your music that makes it popular?

TD: I think the timing is very good. After a long deadlock in American music programming, I think people are waking up. Radio programmers are principally the culprits, because I think they have underestimated their audiences and their audiences' willingness to accept something that's new and a bit different. I think they've suddenly woken up, due to paranoia more than anything else. The fact is that in England there has been far fewer boundaries and restrictions in popular music for some time. Possibly the reason my music is acceptable is that I'm more interested in the songs and the music than the style and fashion of the moment. I have to concede that I've grown up in the same era and been subject to the same conditioning as let's say the Human League or Flock of Seagulls or ABC or whoever, but at the moment I'm not interested in making music for that particular sync. I'm interested in making music that will still be listened to in a few years time, rather than thrown out at the end of the week with the dirty laundry.

MR&M: Can you classify your sound?

TD: Well, I really try not to classify it. I hate classification. I think there are two kinds of people, those who classify and those who don't. I *hate* those kind of people who classify. I have my influences of course, but a main obsession of mine is to sift out what has been conditioned into me. I think we're living in an age where the inclination is to be very passive, to sink back into an armchair and have your entertainment or work be spoon fed to you at a very fast rate and not really respond to it. I think that the only thing that's lazier than watching television is sleeping. I don't think there is any other activity that requires less personal involvement than watching TV.

MR&M: What is the difference between sitting back and listening to

MODERN RECORDING AND MUSIC

Carvin

The Professional's Choice

Join professionals like Alabama, Jefferson Starship, Roy Lark, Heart, Missing Persons, Pat Benatar, and Rush who depend on Carvin to get the sound and reliability they need!

With CARVIN you're buying the finest quality at the lowest prices! This is all made possible because of our factory direct marketing. Try it on the job for 10 days and if not convinced that it's better than gear selling for twice the price, we'll refund our money. Buy Direct and expect "Fast Action" mail order service. Use your Mastercard or Visa for convenience. Send for our FREE CARVIN 84 pg catalog today or include \$2 for First class mail, \$5 Foreign.

Factory Direct prices on Carvin Products as shown

- A R540-E Concert 90° Radial Horn w Pro Electro-Voice Driver — \$279
- B 1330-E Horn-loaded Bass Bottom w EVM-15L Electro-Voice Spk — \$279
- C 980-E Pro Radial Horn/Bass System w all Electro-Voice Spks — \$419
- D 750-M Pro 12" Stage Monitor w high powered MagnaLab spks — \$169
- E MX1644 Modular Recording board w 16ch x 4 sub groupings, L&R assign, 4 buss sends, 4 band EQ, four 9 band Graphics, Reverb — \$1895
- F DCA800 800W (bridged) Stereo Amp — \$549. DCA300 300W — \$399
- G DCM301 300W Amp w 9 Band EQ — \$369. DCM151 150W — \$299
- H EQ2029 29 Band 1/3 Octave Equalizer w Hi & Lo Pass Filters — \$279
- I XC1000 Stereo Electronic Crossover for Bi & Tri Amping — \$279
- J DC200 Solid body guitar — \$479. With Kahler tremolo — \$629
- K XV112E Tube X-Amp with EVM-12L — \$629. X-60 w Celestion — \$399
- L B215M MagnaLab 15" Bass Reflex — \$249. B215E w EVM-15L's — \$369
- M PB150 Bass Head w Compressor, Parametric, & Crossover — \$399
- N V412M Guitar speaker system with 4 G12M-70 Celestion spks — \$399
- O X100B British 100W X-Amp head — \$499. X60B X-Amp head — \$419

Write: CARVIN, Dept MR-54, 1155 Industrial Ave., Escondido, CA 92025

Circle 25 on Reader Service Card



Product Information
TOLL FREE
800-354-2235
Calif.
800-542-6070

FREE CATALOG
\$2 for First Class Mail

Name _____
Street _____
City _____
State _____
Zip _____

MR-54

music—in particular, your own work—and watching television?

TD: Well, I expect that there are people who listen to my music in that way. I'm not sure I mind very much if they don't buy the record. I wouldn't want them to come backstage. I would like to think that the reason people listen to my music, as opposed to other music—which I feel conforms more to that sort of TV mentality—is purely because it is demanding. Because my music is so demanding, I have to accept that it's probably also a commercial drawback. But it needs to be listened to. The lyrics need to be heard. Not because they're preaching, but because they operate in a way that is appealing to people who place their own interpretations on the imagery that's there in the music. That expends more energy than a lot of people are willing to exert.

MR&M: Is there a message in your music?

TD: No, I think my music is a collection of my observations. A lot of it has to do with communications. Just like "Radio Silence" from *The Golden Age of Wireless*. I think, generally, if a song has the word "radio" in it, it's because the band has been trying to find some way to get the record on radio. I may be guilty of that to an extent, but there is my particular fascination with wireless, like my fascination with any kind of technology, which is the long-term advance in technology. The guys who invented radio were in no way aware of the enormous power it was going to have in 1983. I don't think Alexander Bell realized at the time what a difference he would make to everyone's lives. I think 90 percent of the conversations that I hold are on the telephone. It's crazy, but I hardly ever see people.

MR&M: Does *The Flat Earth* continue in that vein?

TD: It's not a concept album, but the music and the artwork does carry through an observational theme. It's very, very different from *The Golden Age of Wireless*, however. It's really not to be described, but listened to.

MR&M: Can you name the songs?

TD: There are only seven songs, as opposed to ten, and they are titled: "Dissidence," "Screen Kiss," "The Flat Earth," "White City," "Mulu the Rain Forest," "I Scare Myself" and "Hyperactive."

MR&M: Does the album bear a musical similarity to your first effort?

TD: It's very different from *The*

Golden Age of Wireless. I think a few people will be surprised just how different. There is nothing that sounds anything like "She Blinded Me with Science." The vocal performances are much more prominent throughout the album. Obviously the songs are longer, because of the number [of them]. It is not as heavily laden with synthesizer, which is probably the main difference. There is synthesizer on it, but there is more emphasis on instrumentation and voice, more emphasis on bass line and drums.

MR&M: You produced the LP, but you used two very different engineers, Dan Lacksam and John "Mutt" Lange. What does that bring to your work?

TD: There is a real eclectic mixture of music on the album. I didn't follow that much of a pattern. One track will be dominated by synthesizer and computerized music and the next track will move toward a heavy metal vein. Most of the album was done in Brussels, Belgium, where I worked with Dan Lacksam in his studio. He was originally in a European band called Telex, which—historically—came after Kraftwerk and Tangerine Dream. In the English studios I worked with "Mutt" Lange. I've engineered on numerous albums Mutt has produced. He works with heavy metal groups such as AC/DC and Foreigner.

MR&M: Although you're known for working alone in the studio, you do have a few lesser-known musicians who work with you.

TD: There is more excitement and enthusiasm from less well-known musicians. They get involved in the project, rather than treat it like just another session; they contribute something, rather than just ask what you need and play it; they contribute something I can feed off. These guys have been with me for over a year; Kevin Armstrong on guitar, Matthew Seligman on bass and Cliff Brigden, who plays percussion and does a lot of the drum programming. Kevin was featured on almost every track on *Wireless* and Matthew played on "Science" and "Submarines." Also, Adele Bertei did background vocals. She's now signed to Geffen Records and has a single out at the moment called "Build Me A Bridge." I produced her album several months ago.

MR&M: Who have your influences been?

TD: All sorts of things, but certainly not pop singers. There is a

whole influx of English artists singing solo, who I've probably been categorized with. I have to respect them, because I think they're good at what they do. There's one thing that certainly separates this current English explosion from anything that's homegrown here in the states. The new groups that are coming in through England are more visually aware. They're far more aware of the media and the music business itself. They're not like the generations of musicians before them. It's hard to make it by having a good voice alone. You have to know how to respond to the camera, how to talk to the managing director of a record company, how to talk to a DJ on the air and all of those things.

MR&M: You mentioned visual awareness. How important is video to your work?

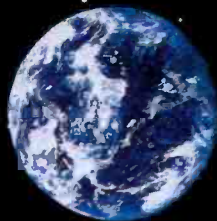
TD: It's absolutely important. It's not really an extension of the music, it's part of it. I tend to create the songs from a visual standpoint to start off with. So, when it comes to making the video, it's not so much an extension as a re-visualization of all the pictures that were in my head. The way I write is that I'm very often gripped by an atmosphere, one that I can't put my finger on at first without exploring a bit and finding ways to articulate it for myself and the people listening. For example, when you smell a smell and you're reminded of something in your childhood. But it doesn't necessarily have to be that, just that kind of feeling.

MR&M: Did you have formal music training?

TD: Well, my first musical experience was not a particularly spiritual one. I used to get out my mother's silver set and play percussion to the tune of the Shadows, which was my favorite group at the time. There weren't many others actually. I suppose I was always aware of the Beatles and the Beach Boys and so on. They became part of your frame of reference, but I don't think I would have rushed out and bought their albums. My first active part—working with other musicians—was when I was about 10 and I sang in a choir. I was the only kid in the class who could sing alto, which was like a harmony part to the lead line. We sang hymns and carols and things. I didn't have a particularly good voice, but I was the person who could actually hear those harmonies. I had a very sensitive music teacher who encouraged me and taught me a lot



OFFICIAL
WORLD EXPOSITION
SOUND



sunn

ANOTHER WORLD CLASS AUDIO PERFORMANCE BY SUNN

If you join the millions who visit the 1984 World's Fair in New Orleans, you'll hear what we mean.

Because Sunn has been selected as the official sound equipment for this year's world exposition.

To win this year's biggest audio honor, Sunn competed with all of the other major sound manufacturers, and the quality and depth of our total line was judged better in every respect. Rated, in fact, the best in the world.

Here's one excellent reason why: the new Sunn SPL 4424 mixing console. Certainly one of the most complete 4-out boards ever produced. It offers unmatched versatility for important "big event" applications, including live PA main mixing, monitor mixing and multi-track recording.

And though the SPL 4424 is unique in its ability, its quality is in fact typical of our full product line.

For example: All Sunn mixing console circuit boards are made of the highest quality fiberglass epoxy laminate. Unlike phenolic or inexpensive glass materials, which tend to break, our boards are tough enough to perform day-in and day-out in the most abusive sound-staging environments.

Sunn mechanical packaging is de-

signed and constructed to maintain alignment and strength of all electrical components. We use only rugged all steel chassis and supports, and the result is that no other audio equipment you can buy is better built for the "real world".

Finally, no other manufacturer controls assembly more precisely than Sunn. We use custom designed computer test equipment for pre-inspection and testing of all critical components. Furthermore, completed circuit boards are tested to individual component specifications in a rapid twelve seconds with Sunn's fully automated computer circuit analyzers. We insure specifications are exact by applying the same technology used by the microwave communications industry for testing marine navigation devices.

All of which means you can be confident that our hand-crafted products are just what the World's Fair has judged them to be: the best in the business for live audio.

Would you like to know more? Why not write and ask to see our latest product catalog. You'll see that Sunn is headed in some bold new directions. And that no matter how large or small your audio plans are, we have a system that will take you there with us.

SPL 44 Series Mixer Specifications (Transformer Balanced Inputs):

FREQUENCY RESPONSE (+0dB, -3dB)
Bal Inputs to Main Outputs: 20 Hz to 40kHz
Line Inputs to Main Outputs: 20 Hz to 50kHz

DISTORTION: Conditions: Gain @ -20dB, EQ flat, fader @ max. 7VRMS output into 600 ohms, Main Output.

TOTAL HARMONIC DISTORTION (THD)
Bal Input: 0.05% max, 50 Hz to 20kHz
0.1% max, 30Hz

Line Input: 0.03% max, 20Hz to 20kHz

INTERMODULATION DISTORTION (IMD)
Bal Input: 0.04% max, 20Hz to 20kHz

HUM AND NOISE: Signal to Noise Ratio (S/N) A-weighted, referenced to 10V output into 600 ohms.
Residual (all faders at min): 120dB
Main (Main fader at 0dB, other faders at min): 95dB
Main (Main fader at 0dB, one pre-amp at -20dB gain, EQ flat, fader max): 92dB

Equivalent Input Noise: (150 ohm source): -127dB

SLEW RATE: Greater than 6V/ μ sec

COMMON MODE REJECTION RATIO: (CMRR)
Bal Inputs: 80dB min at 1kHz
50dB min at 20kHz

EQUALIZATION:
Range: 15dB cut and boost, low, mid & high
Low: 100Hz or 250Hz shelving
Mid: 11 detent, selectable frequencies, 500Hz to 3.6kHz, bandpass filter.
High: 10kHz shelving

HIGH-PASS FILTER: Selectable 20Hz or 80Hz 12dB/octave, Butterworth

TALKBACK SYSTEM: (Directly compatible with today's standard intercom systems.)
Input/Output Impedance: 17.5K ohms
Output Level: 2V RMS max into 200 ohms
Gain: Talkback Mic Input to Talkback Output: 60dB max.

MAXIMUM OUTPUT LEVELS:
All unbalanced outputs:
8V RMS into 600 ohms
10V RMS into 10K ohms
All Balanced Outputs: 12.3V RMS into 600 ohms (+24dBm)

CROSSTALK (at 1kHz):
Between adjacent Submasters or Monitors: -65dB
Between adjacent Mains: -75dB
Between adjacent Pre-amps: -65dB



19350 SW 89th Avenue
Tualatin, Oregon 97206

Made in USA

Circle 30 on Reader Service Card

www.americanradiohistory.com



The Answer

Your Studio. The Fostex 250 Multitracker and 6301 Self-Powered Personal Monitors make a very affordable, highly efficient 4-track recording studio. It has everything you need to do the job. The sound is so compelling, the technology so advanced, you really have to hear it.

Your Music. The 250 is easy to understand and use all by yourself, so you can concentrate on the main point: your music. Plus, the whole package is very portable and road worthy. Take it wherever the music is.

Your Success. A good demo tape will help you to get a good deal. And with your own studio, you're in total control of your own music, where destiny lives. Visit a Fostex Personal Multitrack Dealer today, and start on the road to your own personal success. One track at a time.

Fostex
PERSONAL MULTITRACK

© Fostex Corporation of America
15431 Blackburn Avenue, Norwalk, CA 90650
(213) 921-1112 TELEX: 674918

of music theory. I don't actually read music, but I have my own system of notation, which is a combination of the kind of visual description of the sounds that I'm using, along with the notes that I'm playing. Nobody else really reads it. The guys who I play with and the guys who play in my band can follow it after a fashion. But then I'll mix it up and put in computer codes and stuff as well, so nobody really understands it.

MR&M: Growing up in Cairo, were there early musical influences?

TD: I got very interested in jazz piano. I never really had any formal training apart from that basic training in music theory. That was very important; it taught me enough to be able to analyze the music I heard, and to work it out in a way that I could relate to. I became very interested in jazz and my heroes were people like Bill Evans and Thelonious Monk. Perhaps those songs will come back in the future. I liked a few writers who crossed over a bit into jazz, notably Stevie Wonder and—oddly enough—Joni Mitchell, although she's regarded as "West Coast." But she has confessed to her jazz roots since the Woodstock days and I supposed that's one of the reasons I liked her music so much in the early days. I could sort of sense the jazz tone in her music and I found her lyrics very vivid, which I liked as well. I like Van Morrison, really odd diverse things.

MR&M: What boards do you use in the studio?

TD: Solid State Logic, which is practically state-of-the-art in the U.K. It just gives the facility, because it gives the total pieces of the record. Everything that happens in the mix, you can memorize in the computer disc. If you make a fundamental mistake, like in the vocal track—which is very easy to do when you've been working on a mix for 15 hours and on the same song for eight days—you can go back into the studio and have everything remain the same, but change the vocal.

MR&M: What synthesizers are you currently using?

TD: A Fairlight, a Jupiter 8 and a PPG 340/380 Wave.

MR&M: You're known for altering or rebuilding synthesizers to fit your needs.

TD: I always found a lot of the instruments very predictable and I wanted to find ways to start planning a few "accidents." That was why I

adapted some of my first synthesizers to meet my own needs. Of course with computers, it's easy, because the nature of the computer is that everybody programs it. An individual programs it to suit his own particular needs. I've used standard synthesizers since then and used computers to add some unpredictable elements.

MR&M: Can you detail those unpredictable elements?

TD: Well, without giving away trade secrets, that's very much part of working with other people in the studio apart from the machines. When I'm working with machines, it's very straightforward. You give one particular note two purposes so that as you're varying one parameter in sound, you're changing another. You can set something up with a long switch and long timing on it. Just like you can get anti-burglar devices which switch TVs on and off in your house. I adapted some of them to one particular parameter on the synthesizer, which breaks things up a bit. It's much more fun if every couple of hours something changes drastically. Those are the kind of things I mean. But also, when working with other people, I'm interested in getting their interpretations, although I have already envisioned a picture of what I want. So they stamp it with their own personality, rather than like another piece of equipment. What I generally do the moment they arrive is stick them straight in the studio, put headphones on them, run the track once and say, "Okay, okay, sing!" I generally keep the first thing they do, even if it is entirely unappropriate for that song. At times I even place bits and pieces of contributions in entirely different songs. I find it very difficult to throw anything away. I'm a real collector.

MR&M: So you bring in other musicians to humanize the high-tech sound of your music?

TD: First, we're not starting with the premise that using electronic instruments is inhuman. I don't agree with that. I've played in rock 'n' roll bands and let me tell you, after the second date of an 84-date tour, you're not going to play with an awful lot of humanity up there on stage. It's absolutely impossible. There's much more spontaneity when I'm on stage working with a bunch of machines than there was on some of the tours I was on.

MR&M: What is your approach to recording with synthesizers?

TD: I start with the drums, obvi-



INTELLIGENT WATTAGE.



The Peavey CS™ Series power amplifiers are well-known for their power and dependability, but not everyone realizes that each amp has a full complement of "intelligent" circuitry designed to meet the rigorous demands of today's sound reinforcement applications.

Both the CS-400™ and CS-800™ feature our crossover network configuration that provides totally modular crossover selection. With our optional PL crossover modules, the musician/soundman can pre-select optimized crossover points with built-in equalization. Bi-amping, even tri-amping, becomes as easy as plugging into the system.

There's also our exclusive DDT™ compression circuit that "senses" the onset of clipping and engages another special circuit that virtually eliminates the possibility of driving the amplifier into clipping.

Where the smart circuits end, the heavy-duty construction begins. Both the CS-400™ and CS-800™ feature massive cast front panels in fully rack-mountable packages built to give years of rugged, dependable service.

One look at the CS™ Series stereo power amps will convince any "thinking person." A glance at the price tag reveals the best part of all... the CS™ Series are affordable.

Get smart and check out the "intelligent" wattage your authorized Peavey Dealer has to offer.



PEAVEY ELECTRONICS CORPORATION
711 A Street / Meridian, MS 39301 / U.S.A.

Circle 32 on Reader Service Card

ously, although drums are something I often return to later in the mix. On "She Blinded Me With Science," the drums were actually layed down live by the computer. They were off tape, which means they saved a generation. I use my PPG computer as a sophisticated switching device. When it was originally designed, it switched Tangerine Dreams' light show on and off. So, it's just 16 switches and a very complicated sequencing software programming. So you can put in very complicated timings and switch things on and off, which is what you basically need to play an electronic drum—although you can do it by hitting a stick on a pad if that's the way you choose to physically make a sound. I'm not a drummer; I'm not coordinated in that way. If I can hear a drum pattern, hear a good one—I know a good groove when I hear it—I prefer to type it in, which is what I do. So, I would set up an electronic drum kit, whether it's an easier combination of digitally-stored drum sounds—things like high hats and cowbells are usually best if you want a realistic sound—or it's a regular pan. For random things, I'd rather just play it or get in touch with someone to play it. But if it's part of the pattern, I will use a digitally-stored sound.

MR&M: And after you've layed down the drum track?

TD: I don't generally use digital sounds for bass drum and snare, because I think I can make more individual sounds by setting them up electronically. That can be done by either synthesizer modules or by Simmons drums. Simmons are basically just modules that are synthesizers specifically designed for the purpose of creating drum sound as opposed to a musical sound. Because the PPG is an additional synth, I can sequence anything I want by playing it into the computer with the keyboards and adjusting the sound. I can use up to eight voices, but the sounds don't tend to go together very organically. It's rather like overdubbing the same voice lots and lots of times. That voice doesn't get any bigger. It gets smaller if anything. You need different voices because of the harmonic differences between the voices, and it's rather the same thing with the computer. If I use all eight voices at once, it doesn't really sound all that much bigger than two voices. So, I can sequence things way through the computer. Or I can use triggers from the computer to clock external sequences, like Roland or Oberheim

sequences. Thereby I can sequence any synthesizer I want or I can play it.

MR&M: What do you take on the road?

TD: I take all the stuff I just mentioned in order to keep everything in sync. The most recent thing I've been doing—because there are video projections as well—is to put down a code for the PPG computer on one track, one audio track of the automatic video tape, so that every song has its master video tape, which is logged into the machine. Hit play and the video will flash up and the soundtrack of the video will supply codes to the PPG, which is like the master tempo control for all of the music. Then, anything else that's running in sync with the PPG will be controlled from there.

MR&M: How did you come up with the concept?

TD: Just by trial and error, but I also worked out the only way of doing it. If there had been a way to feed a code into a video system and synchronize it, I would have done that. But as far as I know, none exist. The only way was to trigger all of the audio gear off the video gear.

MR&M: Are video and audio that closely linked?

TD: I haven't gotten to the stage yet of re-editing videos specifically. Although I have transferred a lot of acting material on the automatic, which I use in addition to the actual promos themselves. I have used a slide set-up, a carousel projector. I would dissolve between slides, but I found it to be mechanically iffy—because of the obsolete nature of the slide equipment. So, what I've done since then is put the slide on the automatic as well.

MR&M: Is it difficult to do a one-man show, as you have in the past?

TD: No, because I didn't set out to purely reproduce my recorded sounds. It would have been theoretically possible to do that, but I think you have to accept that the stage is a different sort of environment and different things apply. I don't think I could pull off arrangements as complex as my studio arrangements without the studio facilities to make it really work. You can't just write down lines on manuscript paper and expect somebody else to make the same sounds by purely reproducing the same arrangement, because the studio facilities really knit things together. So I arrange things differently for stage.

MR&M: You do a lot of work as a

producer/engineer. Foreigner—who you recently worked with—has such a different sound. What did your engineering lend to the group's music?

TD: I've worked with electronic bands who wanted specific sounds on their album. That's the most boring offer I could get. It's not terribly flattering to be asked to repeat what I've done for somebody else. The offers that do interest me are the ones from very diverse sources, specifically because when I'm working in a new situation with a new bunch of people, with music I'm not familiar with, it's not possible to merely draw from my vocabulary and repeat things that are known formulas. I have to look into myself and find new ways of expressing things. I find that very stimulating. It's a real antidote to the sort of isolation that is the tendency of the way I normally work. In the case of Foreigner, I helped them make an album that would get them some new fans, rather than just the same old guys buying their latest record. They may have sold that record to a lot of people who believed that synthesizers were soulless, heartless, whatever. Suddenly, kids heard their favorite band using a synthesizer player, some young kid from England. I also hope that I helped them to make a record that would make people with my kind of taste in music wake up to the fact that they're not without talent. It took something to get them to where they are, even if their particular style of music is not your cup of tea.

MR&M: Any particular track that represents that?

TD: I suppose "Waiting on a Girl Like You," because I knew what I was doing. That was the song, which—if any—would break them on the charts in England. The first thing they asked me when I arrived was, "What's happening in London?" I sensed that they felt really bitter and disappointed that they weren't accepted in their home country on any level, let alone on the level they're accepted here. In England, they're just another band. That was the song that really opened it up for them and that gave me immense satisfaction. I don't wish to endorse the domination of that kind of music. I don't think it's going to last very long. Things happen very slowly here in the States, but I've been surprised how quickly the radio situation is changing. It gives me hope that there may be some light at the end of the tunnel.

Everyone Says They're Better — We Prove It!



- Time Delay
- Reverberation
- Crossovers
- Tape Noise Reduction
- Compressor / Limiters
- Expanders
- Spectrum Analyzers
- Parametric EQ

Before you purchase another piece of signal processing gear for Studio or Performance use, you would be Wise to listen to our Demo Album. Instead of merely "Saying" we're Better, we Prove it in side by side comparisons with the competition. You really can pay Less and get a Better product through our factory direct sales!

We're out to set new standards for Quality and Performance as well as dollar value. We want you to choose us for our Quality more than our Prices. Our 15 day Satisfaction Guarantee and Two Year Warranty on our Crossovers, Time Delays, Reverberation, Compressor/Limiters, Expanders, Parametric EQ, and Tape Noise Reduction, allow you to purchase with Confidence.

The Demo Album is both fun and Educational. Examples are drawn from the master tapes of Top 40 Hits and show some of the most sophisticated effects ever devised. You will hear our phenomenal MICROPLATE[®] Reverb with over 18 KHz bandwidth in side by side comparisons with the \$7,000 EMT[®] Plate on percussion and vocals. No other spring reverb would dare attempt such a comparison! The cost is incredible too, under \$600 mono and \$1,200 in stereo!

Write or call for a free 24 page Brochure and Demo Album.

LT Sound, Dept. M-2, P.O. Box 338, Stone Mountain, GA 30086
TOLL FREE: 1-800-241-3005 - Ext. 6 In Georgia: (404) 493-1258

LT Sound

We Make A Better Product

DELTALAB STOPS THE HIGH PRICED DIGITAL REVOLUTION...

EFFECTRON® JR GOES TO THE PRICE/PERFORMANCE LIMIT.

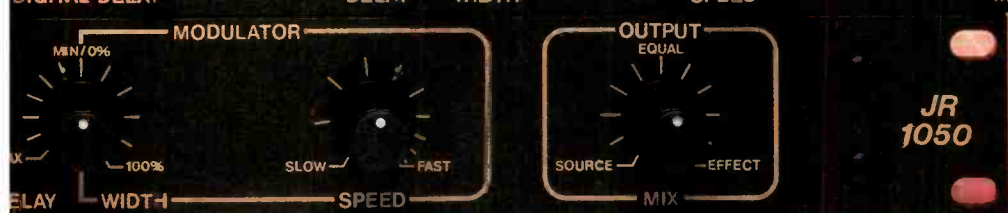


Just as DeltaLab's Effectron II continues to be the standard of excellence in digital delay, Effectron Jr is destined to become the undisputed standard of value.

Whether you want doubling, chorusing, positive/negative flanging, or infinite repeat, Effectron Jrs' 12 kHz bandwidth, quality circuitry, and quiet operation give the highest possible performance at the lowest possible cost.

Stop, listen, compare: When it comes to value without compromise, Effectron Jr is the only way to go.

Visit your local dealer and check it out!!!



Music & Electronics . . . Naturally!

laura fisinger

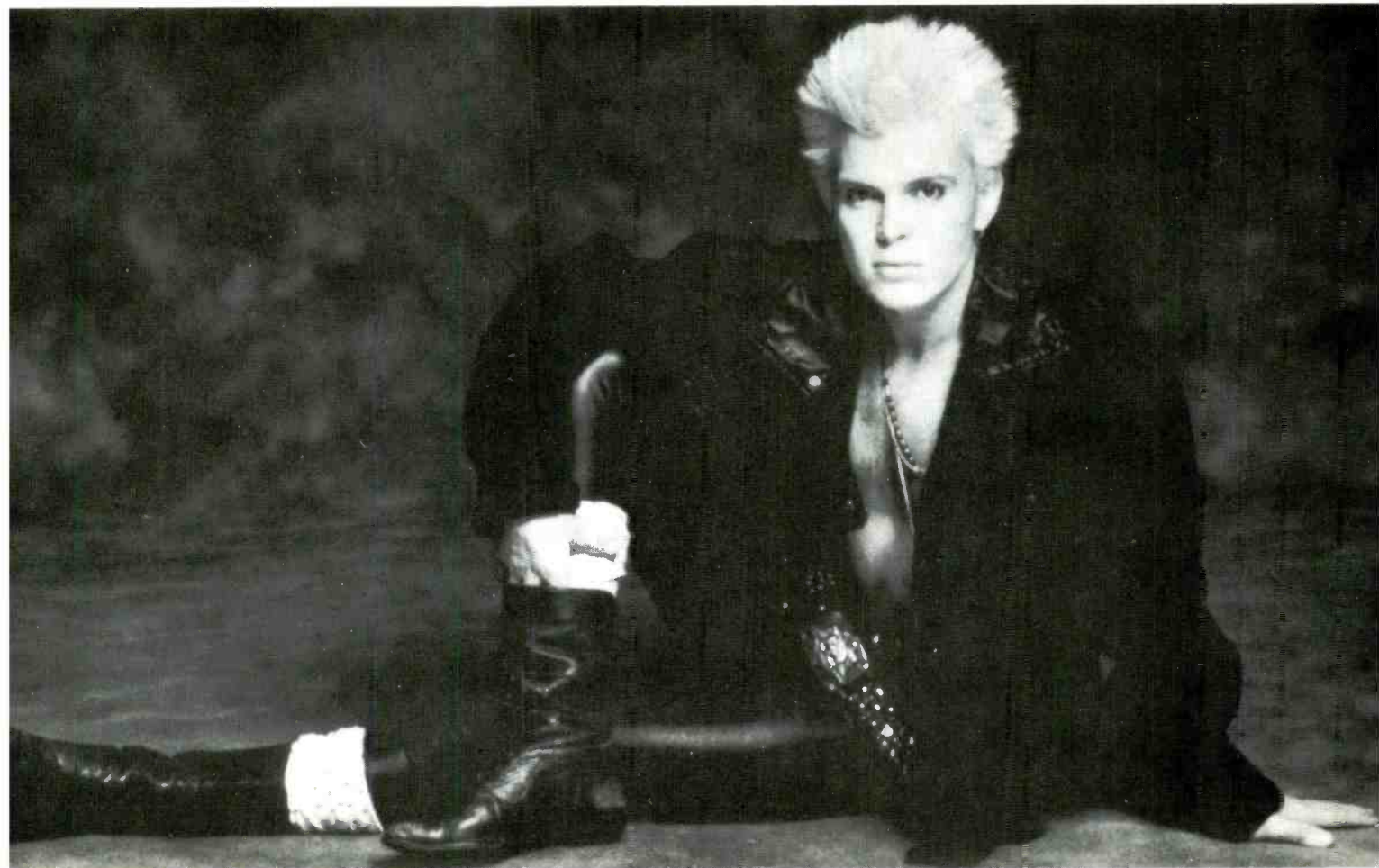
i

billy



DOOL

Billy Idol talks... and talks. He gestures, smiles, frowns, wiggles... and talks. In a world overflowing with machines, we've got a lot of pop stars who are better at engineering than at energizing; Billy Idol is a specialist in the latter. He's open, funny, stubborn, shrewd, extroverted, and incredibly in love with popular music. *Modern Recording* caught up with him at Electric Lady studios in New York, where he was in the middle of making his second solo LP, *Blue Highway*. We tried valiantly to pull technical talk from him, but it was difficult. As you'll see here, Billy Idol is not very interested in what goes on in a studio. What comes out of a studio is another matter.



Modern Recording & Music:

Let's start with some beefs. Do you have any about the recording process in general, or about your experiences in the studio in particular?

Billy Idol: It seems to me that a lot of complaints are small in comparison to getting the right to make a record in the first place. Anything after getting the chance is just sort of a niggly side to what you're doing. The biggest difficulty of doing anything, of course, is that you work with other people. That's the hardest part—you have to be able to acclimate yourself to them; you have to be able to appreciate them as much as they appreciate you. Different opinions and a lack of mutual appreciation divide groups, and I'm quite sure it often kills music...I think people problems are what cause all the other problems.

MR&M: Many artists seem to get lost in the machines, or at least absorbed in them to the point where people appear to be the least of their worries. There are a lot of musicians who'd disagree with you about the people being the pivotal problem.

BI: Nah. Machines can't really cause you problems. Studios can't cause you problems. They're zero gravity. They're nowhere. *People* [give the] machines character. If you've got bad people, it's your own fault. But there are times when you're working with good people who are going through a period of "weightlessness" in the studio—you have to be strong enough to be able to know whom to trust at what point in time.

MR&M: During the chaos of making a record, can you always be that sure of yourself?

BI: Your job is to get yourself *through* the machines and out to the people. Even if you're not sure what you want to do in the studio, you should be ready to make up your mind at any moment.

A lot of people are into technology in a slave kind of way. Technology is fantastic, but it's only different ways to make noises. If you don't have an idea of what to do with it from the start, then you're just going to be experimenting. I don't think that's using it for what it's supposed to do—which is to give you the sound you hear in your head. We use everything available, but only to make that sound we hear in our heads. I know I want big echo on my voice, for instance, so I use what I need to use to get it. I want to explore what I'm about as a studio artist, and I don't

want to get hung up on what everyone else is doing with gadgets or whatever. I don't want to be everyone else.

MR&M: Do you think some artists avoid machines because they just don't understand what options are available?

BI: Sure, but anybody can know what an echo machine does and how to use it. But what good is knowing that if your voice doesn't need echo? You've got to know *why* you want to use a machine. And many people don't.

MR&M: Ostensibly, a producer should know what *and* how *and* why.

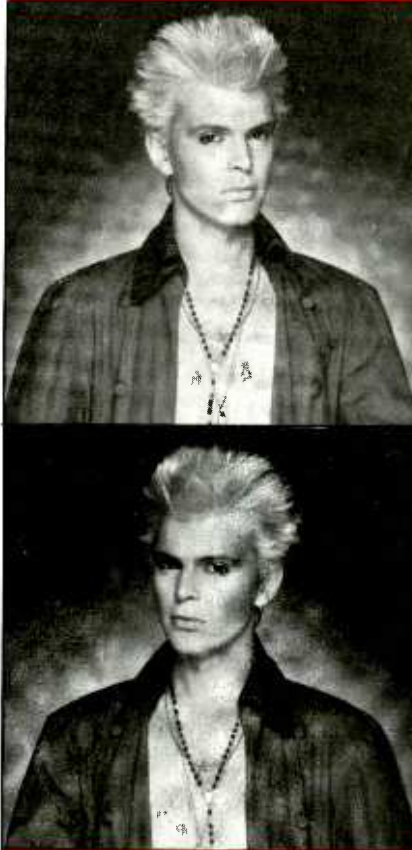
BI: But a producer isn't the whole of a record's personality, and if you don't have personalities, why bother? I like reggae artists. They're usually personalities, even though reggae is kind of a producer's trip. It's like it was in the 50s; they find personalities by giving loads of people one chance. Like the Tamla/Motown music, that was personality music. Diana Ross, for instance—they *knew* they needed her.

MR&M: You feel good about the new record so far?

BI: Yes. It's a lot more rock'n'roll than the last one, lots more guitars, lots more raw feel. I know it will come out with "slickness"—we've definitely been able to take our time and make sure it's good. But it's both more exciting and more simple than the last one. Taking "Dancing With Myself" as an example—that had a simple way of sounding but it wasn't cheap sounding. It sounded powerful and strong. The *intention* of the record is obvious. We only use bass drums and guitar as our foundation, but we make the most of it.

That foundation is a lot of what this new record is about. The first solo LP was more concerned with finding out where we might want to go in the future. This time I have much more of a strong relationship with the people around me. Now the band and I have a style of our own. On this album, everybody knows what they want to do. It's not a question of directing them, it's a question of *getting it out*.

It's harder this time in a way, because we're finding out that a player doing something right doesn't mean: it's gonna *sound* right. We've had more trouble with the playing this time because we're freer to focus on it. Like on "Blue Highway"—the drums in it are really simple in terms of what drummers have to do. But the



The Making of *Rebel Yell*

Michael Frondelli has been on the staff of Electric Lady since 1975, where he began working with Eddie Kramer, Mike Stone and other producer/engineers. His engineering credits include Kid Creole and the Coconuts, Irene Cara (produced by Giorgio Moroder), the Waitresses, the dB's and others. Recent projects include Billy Idol's new Chrysalis album, Rebel Yell, produced by Keith Forsey.

My involvement with Billy Idol began with the tracks "Blue Highway" and "Rebel Yell." The personnel included guitarist Steve Stevens, bassist Steve Webster and drummer Tommy Price; Keith Forsey composed the grooves and directed the vibe. All keyboards were the work of Judi Dozier, joined by Jack Waldman in duet performances.

Keith chose to work at Electric Lady primarily for its Westlake/Neve/Studer combination. Studio C has a spacious control room and an intimate studio. The control room is a hybrid Westlake room with TAD two-way monitors powered by Crowns. In addition, we had a pair of Yamaha NS-10Ms for near field two-way monitoring, powered by a Yamaha PL 2000. The console is a Neve 8068 with a three band EQ, low cut and high cut filters, with 32 in and 24 out; the recorder was a Studer A800.

The basics were cut with bass, guitar, drums, and Billy with a guide vocal. We recorded Steve Webster's bass direct with a Countryman FET DI; he has a hybrid Fender with EMG pickups, and a dbx 160 for compression. Overall, the EMGs have a flat response, especially with Steve's technique.

With Steve Stevens, the task was a bit more elaborate, with his Pauls, Kramer and Hamer; we recorded him direct in stereo with two Countryman FET DIs after his array of EFX. We used the Rockman IIB to cut the guide basics, along with a PCM 41 for delay and flanging, and Steve's custom-made pedal board. Steve constructed his own rack and pedal board with noiseless FET switching, totally shielded and grounded. Steve can set all his own

gains equally so there are no jumps in level while he is switching his EFX. He is extremely effective in creating incredible guitar sounds with his EFX as heard in "Daytime Drama's" sequencer solos, and "Blue Highway's" electroglide guitars). Steve has his own vintage custom 100-watt Marshall, which we used in conjunction with his EFX rack. We used various mic combinations with the Marshall, such as a Neumann U87 with a Sennheiser 421 or Shure SM 57—with an AKG C451 or C414 for ambience.

With the bass and guitar direct, Tommy Price had the room to himself. The kit was a Yamaha, with white "ambassador" heads, my particular favorites for their attack and tone. I used a Sennheiser 421 on the bass drum, an SM 57 on the snare, a Neumann U84 for the hi-hat, and Neumann U87s on the three toms, as well as on the left and right overheads. The outboard gear consisted of Kepex II gates for the bass drum and snare, with Pultec EQP 1A3s and MEQ 5s for EQ, to compliment the Neve.

During the basics, we would monitor the kit with the AMS Digital Reverb to vibe everyone up. This is an incredible device with variable room ambience, reverse, non-linear and plate effects. For doubling along with chorus and delay, we used the AMS dmx 15-80s. After we would complete a basic, I would set up delay times with Keith to quarter, eighth and sixteenth notes to set up for Billy's vocal performances.

All the keyboards were direct, using the Countryman. Judi used her Prophet V, an Oberheim OBX-A, and a JP-8—with some assistance from Jack Waldman and his Prophet V

and a PPG. We used a Publison and the AMS to record the synths with some spatial effects to create depth in the track.

Keith composed the grooves with the band using the LinnDrum. We used various combinations of both Tommy and the Linn on some of the tracks, using the Linn sync for triggering. Keith did an incredible job keeping the tempo steady and maintaining the raw feel of the band, inspired by Billy's vocals.

Throughout the basic guide vocals, I tried different combinations of mics and limiters with Billy. Billy has a deep resounding vocal quality with a wide dynamic range. We tried a U47, an 87, a 67 and an AKG C414 with a dbx 160. The 414 with the 160 became our choice for its clear top and fat bottom. The slow attack and the fast release of the 160 kept the compression from going over the top with maximum level to tape, with no distortion.

Billy Idol Discography

WITH GENERATION X:

Generation X (1978)
Valley Of The Dolls (1979)
Kiss Me Deadly (import—1980)

AS A SOLO ARTIST:

Don't Stop (1981)
Billy Idol (1982)
Rebel Yell (1983)

INSTITUTE OF AUDIO/VIDEO ENGINEERING

OFFERING DIPLOMA PROGRAMS IN:

RECORDING ENGINEERING (AUDIO & VIDEO)

Also Forming:

4 WEEK INTENSIVE WORKSHOPS IN RECORDING ENGINEERING

Two In-House State-Of-The-Art
24-Track Recording Studios

Faculty Members Are Leading
Recording Industry Professionals

Internship/Placement Assistance

Professional Working Environment

Write or Call for Brochure

INSTITUTE OF
AUDIO/VIDEO ENGINEERING
Dept. K, 1831 Hyperion Ave.
Hollywood, California, U.S.A. 90027
(213) 666-3003

Circle 48 on Reader Service Card

She's Winning Her Fight For Independence



Thousands of children like Stephanie...and adults, too... get the help they need from Easter Seals to carry on their fight for an independent life.

Your help is needed, too.

**Back a
Fighter
with
Easter Seals**
For people with disabilities



type of beat we use is one of the hardest dance beats to play in the world, like the one on "Dancing With Myself" or "White Wedding." When you hear it you hear *power*, you want to dance. So you torture yourself to get it right. The horrible thing is that it should sound easy on the record. The drummer kills himself over it.

MR&M: So Keith Forsey makes it easier for all of you?

BI: Keith and I both have the same vision, the same idea. It might be different in different areas, but it's basically the same thing. We know what we hinge the records on—we hinge them on personalities. We both think music doesn't have to be complicated in the sense of technical stuff or just being clever for the sake of being clever. If you have a producer telling you what to do, then why have personalities on the record. No slave music for me. I live in this society and make music for the people in it, and we're supposed to be a free-thinking people. My music is for people who are trying to think for themselves, and I want them to like my music because they like it, not because it is number three on the charts or they read about it in a magazine. Keith wants to make the same kind of music. And he's not really just a producer. He's part of the music-making process almost as much as anyone else.

MR&M: He co-wrote "Flashdance" and some of the other songs on the [*Flashdance* soundtrack] LP, right?

BI: Yep. He's also produced and written with Giorgio Moroder, and worked on projects by Donna Summer and Nina Hagen and Icehouse. He's written, produced, performed, you name it. So he intermingles with the rest of us in terms of jobs. He just happens to be controlling the machines a little more. You don't want all of us over at the 24-track, fiddling with the knobs. But just because he turns knobs doesn't mean you need him more than he needs you. That's when you make and control your own records—when they cannot do what you do *without you*. That's why I'm lucky—they can't get someone to make quite the noise I make (laughs), whether that's good or bad. If you've got personality, then you *are* the record.

MR&M: Keith started with you during the final Generation X album, right?

BI: Right. And he's a personality, so he's in the records' personality too.

MR&M: And your band?

BI: Absolutely. I think they know

they matter. I think that's kind of exciting in a day and age when music's become more and more manufactured. Relying on personalities bring moods into it. Lots of people hate to waste time—they want to make the record with the best sounds for the cheapest amounts, but they want to be *functional* about it. That's the point—some people have people in their groups just to make the noise. We don't want anyone who hasn't got personality—we don't want people-machines. One day I might feel like singing, the next two days I might not want to do anything at all, which can cost money and seemingly waste time. We often have other things that need doing that we can do during that time. But that's the exciting thing about doing your own music—you are relying on that inconsistency. You get the extremes that way, and doing my records you *need* the extremes.

MR&M: Some critics and listeners wouldn't think of Billy Idol records as extreme.

BI: It may not seem extreme to people because it doesn't seem weird or experimental. But when we did "White Wedding," we did a twenty-minute version, not twenty versions. Then we just picked out what was the best of a *very* extreme effort.

MR&M: Do you bring any talismen or have any rituals that help you relax in the studio?

BI: The only thing I try to do is keep up like always. If I'm late, I'm late; if I'm on time, I'm on time. Same if I'm up all night or whatever. The studio isn't my house and it isn't where I usually go, so I have to create a personality in the place. But you can't bring tons and tons of things with you and make it like your bedroom (laughs). So if I'm reading a real good horror book I'll bring it. If I get a little time, I read it so I don't get weirded out while I'm waiting around. Or I bring pictures to look at.

MR&M: What's the final payoff? What's the big thrill of studio work for you?

BI: I'm happy that my records are finally getting into the charts, but there are people who bought them before I was making the charts, when I was just a little guy in a little group playing the Marquee in England. And those people would come up and say "that song is great" or "that song you wrote means *everything* to me." I'll be damned if I'm gonna worry about my next album bombing! Not when I get that kind of support.

MICROPHONES!

At long last, all the questions you ever asked... all the problems you ever grappled with... are answered clearly and definitively!

The Microphone Handbook

In 256 fact-filled pages, liberally sprinkled with over 500 illuminating photographs, drawings and diagrams, John Eargle covers virtually every practical aspect of microphone design and usage.

Completely up to date, this vital new handbook is a must for any professional whose work involves microphones. Here are just a few of the topics that are thoroughly covered:

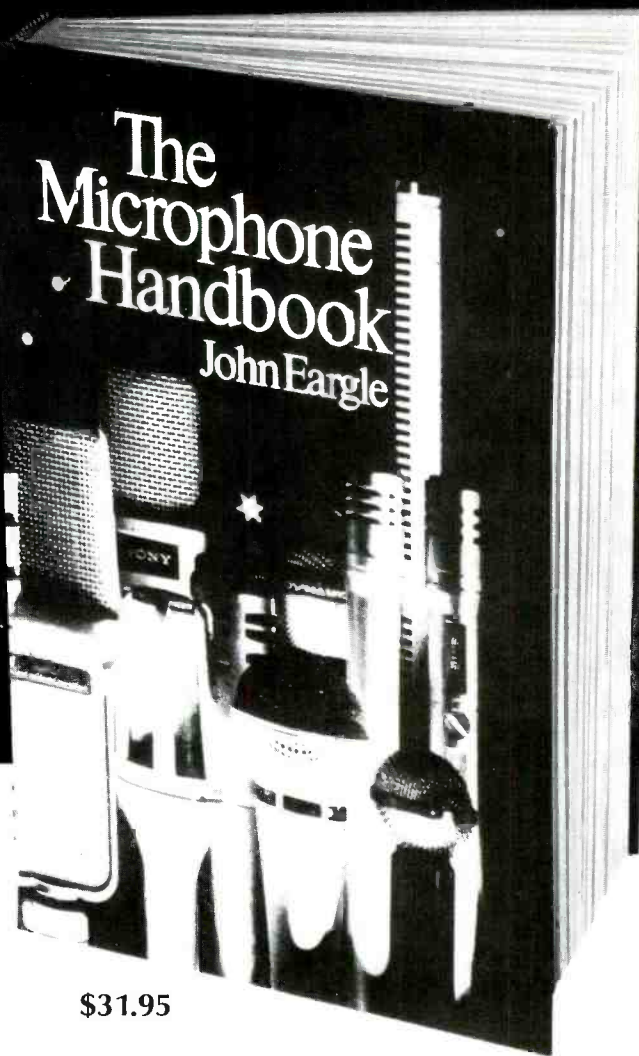
- Directional characteristics—the basic patterns.
- Using patterns effectively.
- Microphone sensitivity ratings.
- Remote powering of capacitors.
- Proximity and distance effects.
- Multi-microphone interference problems.
- Stereo microphone techniques.
- Speech and music reinforcement.
- Studio microphone techniques.
- Microphone accessories.
- And much, much more!

THE MICROPHONE HANDBOOK. You'll find yourself reaching for it every time a new or unusual problem crops up. Order your copy now!



JOHN EARGLE,

noted author, lecturer and audio expert, is vice-president, market planning for James B. Lansing Sound. He has also served as chief engineer with Mercury Records, and is a member of SMPTE, IEEE and AES, for which he served as president in 1974-75. Listed in *Engineers of Distinction*, he has over 30 published articles and record reviews to his credit, and is the author of another important book, *Sound Recording*.



\$31.95

ELAR PUBLISHING CO., INC.

1120 Old Country Road, Plainview, NY 11803

Yes! Please send _____ copies of **The Microphone Handbook** @ \$28.50 per copy. (New York State residents add appropriate sales tax.)

Payment enclosed.

Or charge my MasterCard Visa

Acct. # _____ Exp. Date _____

Name _____
(please print)

Address _____

City _____

State/Zip _____

Signature _____

Outside U.S.A. add \$2.00 for postage. Checks must be in U.S. funds drawn on a U.S. bank.

If you aren't completely satisfied, you may return your copy in good condition within 15 days for full refund or credit.

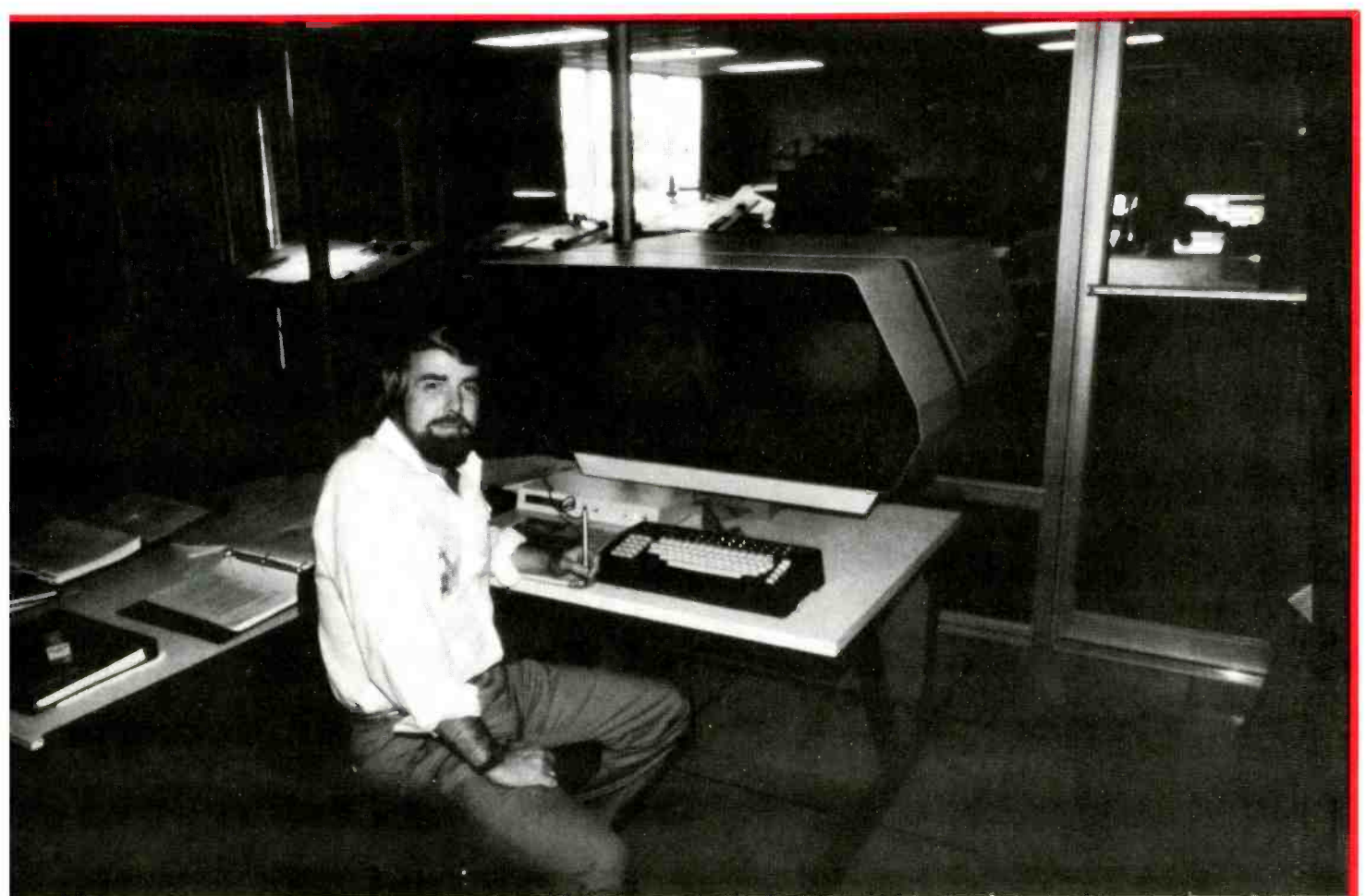
hartley peavey

amy gordon

Hartley Peavey doesn't dawdle. He calls himself a redneck, and says it the way other guys talk about being lucky, or having perfect pitch. A tall, blond, story-telling redneck he is, and not above calling himself a crazy one for having gotten into the music business in the first place, and for staying in his hometown in the second. That town is Meridian, Mississippi, a small city surrounded by fields and pastures smelling sweet and rolling along like a calm, green, rural dream.

Hartley grew up in Meridian, loving the music he heard as a kid, and fooling with televisions and guitar amps whenever he got the chance. A self-described failure as a musician, his home-built amps began to gain local fans and he started a musical career anyway, reaching the equivalent of platinum sales on his own terms eighteen years later.

The music he listened to was hugely varied; you can pick almost any kind of American music and find its roots somewhere in Mississippi. There's r&b, country, bluegrass, acoustic "Delta" blues, show music, gospel, and rock'n'roll as well. They've all crossbred at one time or another. When Hartley was first listening, in the fifties, music had gone electric. New ideas were popping up fast and no one could have predicted so many would last for so long. Bo Diddley was having his day, B.B. King was on the rise, Jimmie Rodgers (the Blue Yodeler) was already well known, and Elvis was breaking out from up north in Tupelo.



Meridian is a town with an unlikely sort of history, an unusual musical past, and a great deal of pride in that past. All that has helped Hartley to move against the tide of "conventional wisdom" and advice, which was to move his business to one of the two distant coasts. He began in Meridian, built his company with local labor, and stayed in the music business in Meridian. Now Peavy is not only the largest company in town (with 1100 employees), but is one of the top amplifier and sound reinforcement systems manufacturers in the world. His seven factory buildings sprawl just outside Meridian in a high-tech oasis—a big beehive of a place, yet somehow still southern and neighborly in spite of its size.

MR&M took a tour of the factory and got a glimpse of a vertically-structured business with a computer automation system that seemed extraordinarily extensive. (The business is vertical in the sense that it produces almost everything it can in the manufacturing process.) Circuit boards are designed, cut, silk-screened, perforated, layered with conductive material, and assembled at the same location. Speaker coils are formed, the speakers themselves are built, face plates are cut, speaker enclosures are assembled from wood, cut and finished in the factory. Most impressive though, is the R&D section, which experiments with instruments, materials, enclosures, and a great deal more.

The crown jewel of the Peavey factory is their new CAD/CAM computer system (CAD: Computer Aided Design; CAM: Computer Aided Manufacturing). Jere Hess, personnel manager, described it as the wave of the future, and explained its value in a business which must quickly respond to new design ideas. "I'd say within five years it [the computer system] will be a business necessity. It won't be 'nice to have,' you will have to have it. It's already the case really." When asked how the computer makes such a great difference, he replied that it doesn't eliminate human error, but confines it.

"For example...were we going to make a board an inch shorter (and it had to be that dimension in order to fit), the human measures it out, draws it, and for some reason he draws it $\frac{3}{4}$ of an inch. Well we run a production prototype, and lo and behold, it fits! Okay, let's go. They run...16,000 boards. Uh-oh, they don't fit. Alright, start adding up

the money, not the boards. The lost time, the people involved—all of this becomes a cost you can't pass on to the customer. You have to eat it."

The CAD/CAM system reduces this kind of human error, and, according to Jere, leaves the designers free to test modification ideas or completely new designs, before incurring the cost of a series of prototypes or a halt in production. A designer is provided with a three-dimensional drawing board, which allows him/her to draw a circuit board, the face plate, an entire amp or anything in between. It will also give the designer a view of say, an amp, as it appears fully assembled, and then will peel off layers of enclosure and circuitry down to a specific area of concern. The designer can modify or invent at will, and can see how the change will appear visually and in terms of its functional compatibility with the system, without having to redraw the entire system, and before going to a prototype.

When a prototype has been checked, the CAM side of the system takes over, and will generate a tape that can be fed into computer-controlled machinery in the factory. These machines do everything from cutting wood to sizing circuit boards. And they needn't be manually reset before each change in their routine. The CAD side produces a tape containing the information the CAM side needs to know. People running the machines simply feed in the tape and are free to concentrate on quality control or other parts of the process requiring a human touch.

The system comes with a "learn as you go" training system for designers (augmented by a five-day classroom seminar), and Peavey has had good luck using designers already in their R&D department. Jere Hess pointed out that their entire drafting department was being retrained to use the system.

"You've got to remember, Joe Blow can't do it, because you've got to have some drafting ability...to understand dimensions and all this sort of thing. So we're training our existing drafting department and we brought two circuit board designers—senior draftsmen. These guys are talented in that; now they will learn to operate this thing."

Hartley Peavey sees the system as his ticket to versatility and flexibility, two words often used now to describe what American industry needs to

compete in the international marketplace. The emerging antidote to our decreased competitiveness in these markets has to be our ability to "turn on a dime," as he puts it. We can no longer, it seems, afford to rely on high volume production, but must emphasize sensitivity to changes in market demands and *very* fast reaction time.

MR&M spoke with Hartley in his office at Peavy HQ, where he explained how a small town manufacturer has made a substantial mark in the music manufacturing business—without leaving home, and without selling out.

Hartley Peavey: The future of the business, to a very large degree, is going to go to those who are flexible enough to follow the market trends. Our business has always been somewhat like women's fashions...what's

A growth market.

The kids of today are the doctors and nurses, the engineers and scientists, the teachers and journalists, the leaders of tomorrow.

It will take your company's help to assure these children a first-rate college education because today colleges are having a hard time coping with the high costs of learning.

Please give to the college of your choice.

You'll be making an investment in the best growth market of America.

Send for our free booklet "Guidelines - How to Develop an Effective Program of Corporate Support for Higher Education" Write CFAE, 680 Fifth Avenue, New York, NY 10015.



Invest in the future of America.
Give to the college of your choice.

A PUBLIC SERVICE OF THE PUBLICATIONS AND INFORMATION BOARD OF THE AMERICAN EDUCATION COUNCIL ON COLLEGE SUPPORT FOR HIGHER EDUCATION

MODERN RECORDING & MUSIC

**The magazine
for**



Rindy and Mary Ross of Quarterflash. (Photo by Denny Anderson.)

**people
who create
music**

I wish to subscribe renew today
\$15.00 for 12 issues \$26.00 for 24 issues
 Check money order enclosed for the amount of \$_____

1120 Old Country Rd.
Plainview, NY 11803
(516) 433-6530

My account number is: Visa Mastercharge

Exp. Date ___/___/___

Name _____

Address _____

City _____ State _____ Zip _____

(Foreign subscribers add \$3
for each year. Foreign subscrip-
tions payable ONLY in U.S. funds
by international draft or money order.)

in today is out tomorrow. For instance, one of the big fads right now is tube amps. Two, three years ago, not many people were concerned; except maybe some of your real hard-core rock'n'roll people. But now, tube amps seem to be making a comeback. But the quality of vacuum tubes, in my opinion, is down. A lot of people are getting...uh, twelve and fifteen dollars for a little old vacuum tube that, you know, three years ago, would have cost *two* dollars. And it's the *same* damn tube! They're flowering it up and putting all this stuff on it....

Modern Recording & Music: So you really think it's just a fashion show?

HP: We're in a very stylish business, just like women's clothes. You got miniskirts now...hell, you had miniskirts back in the sixties. And that's just the way it is. Everything goes in cycles. Musicians are kinda funny though. A lot of 'em will go to great lengths to be bizarre—they'll put beads in their hair, they'll do any number of things. And yet, they're very traditional when it comes to their old 1953 Les Pauls... they're interesting folks.

MR&M: Were there musicians you worked with on design problems?

HP: Oh yeah. See, I have always believed that...I didn't build products for me, 'cause if I built a product for me, it would be somewhat different than what it usually is. I build it for *them*, I listen to what they say.

MR&M: What did they say when you were starting out? What kind of musicians were they?

HP: All kinds. You gotta understand one thing...a lot of people say, "Why in the hell would somebody put an electronic manufacturing, a musical electronics place in a bizarre place like Mississippi?" And that's a reasonable question. But have you ever thought about where every form of music that is American music, where it started? There is a strip of land about a hundred miles or so wide, starting at Memphis and going down to New Orleans, where every form of music that's American music *is*. And I'm talking about Dixie-land jazz, I'm talking about country music, I'm talking about rhythm and blues, I'm talking about rock'n'roll, every single form started right there. I can remember in this town here, we were right in the middle of the "blues belt," the gospel, "bible belt," we started all that. In fact, the guy who is generally considered to be the

father of country music, Jimmie Rodgers, and I don't mean the "Honeycomb" Jimmie Rodgers, I mean the old guy who was called the "Blue Yodeler." He was born and lived and died right here in Meridian, Miss. As a matter of fact, every year we have the Jimmy Rodgers festival. We have entertainers like Merle Haggard, and people of that stature come here to honor Jimmie Rodgers. The musical roots of America are right here, in Mississippi. And I talk to guys from California who know all the names, who know Muddy Waters, who know B.B. King and who never realize where those people came from. Right here! Right here in Mississippi!

I had the good fortune to learn the music business, literally, from the inside out. As opposed to from the outside in, 'cause see, from the very first time that I saw the light of day, until right now, my bread and butter's been in the music business. *Not* the used car business, *not* the dairy business, *not* the railroad car business, the damn music business.

MR&M: Who were the musicians?

HP: A lot of local guys, one of the guys who worked on amplifiers with me was a guy by the name of Sonny... he played in a little ol' band around here. Fact is, our materials manager back here, he sang in a little rock'n'roll band—it just happened to be the biggest rock'n'roll band in this particular part of town. I built amplifiers for a lot of the locals. At that time, in the late fifties and early sixties, in the late fifties especially, music had gone through a rather traumatic change. We had gone from the guys, the real founders of rock'n'roll, like Bo Diddley (by the way, he was born in Clarksdale, Miss.), B.B. King,...fact is, I've got every early record B.B. King ever made. See in those days a lot of the white kids listened to black music. I mean I've got Five Star Imperial records. I've seen a lot of guys come in, I show it to them and they go ga-ga over it. But in those days, we thought nothing of it.

Well, the New Orleans musicians were very, very influential on my musical career. I used to love, still do, the New Orleans beat, the New Orleans blues kind of musicians, and, matter of fact, we are working with one of the big wheels of that thing right now, the Neville Brothers. They front for the Rolling Stones all the time and the Rolling Stones are crazy about the Neville Brothers

'cause they are the original people. I remember one time, one of the most profound musical experiences I've ever had in my life...it was a guy by the name of Mac Rebennack, you know, Dr. John. Well, he was playing the guitar (he had a Rickenbacker guitar) in an old hall in downtown Meridian, and this was when B.B. King first came out with a song called "Sweet Sixteen." I swear, I was sitting there, and I had goosebumps all...all over me. You ever hear music so goddamn good you just got goosebumps? Well, see, I do that. 'Cause I'm into it.

MR&M: Tell me how Peavey, the Company, began.

HP: Well, my father went into the music business in 1936 with fifty dollars and a secondhand piano. A lot of naivete, a lot of hard work. He became a successful small town retailer, and I do mean, small. He put away eight thousand dollars for me to go to school. When I actually did go to school, though, he helped me out of his pocket. I worked at radio stations, I did all kinds of things, I played in a few bands—never was worth a damn as a musician, but I did build amplifiers for the bands I played in, and that's where I fell into this. So anyway, he put that eight thousand away for me.

My senior year, I was going to go to an interview and it was one of the container corporations, I don't remember—Continental Can or something, I don't know who it was. Anyway, I was sitting there and I had butterflies in my stomach. I was sitting there just lookin' in the mirror, and I said, "Well, you son of a...you ass, you don't want to do this." So I took my goddam tie off and I cancelled the interview. I got home and my dad said, "Well, how'd your interview go?" I said well...I didn't go. He said, "What? Well, what in the hell do you think you're going to do?" And I said, Dad, I'm gonna go into the amplifier business. He said, "you're outa your mind."...I said, well, hey...he said, "Well, lookit, you got eight thousand dollars. You can do any damn thing thing you want to. If you wanna buy a car, whatever you want to do, this is money that I saved for you, and you know it's yours. You can do whatever you want to." I said, Dad, I'm going in the amplifier business.

MR&M: What year was that?

HP: 1965. I graduated from Mississippi State in 1965. I took that eight thousand dollars and I went

in the amplifier business. The most stupid, naive, dumb move any human person probably ever has made. And for the first four or five years in business, my hours were nine to one...A.M. I went to work at nine, I quit at one. Seven days a week. Couldn't tell you whether it was Tuesday or Sunday, or anywhere in between.

MR&M: That was here?

HP: No, it started in the attic over my old man's store. Actually I built my first amplifiers in the basement of my parent's home. The groups I played with; we never had any money, so I always built the amplifiers. I mean, my dad didn't believe in big amplifiers *at all*. He thought rock 'n' roll and electric guitars were kind of a passing fad, so he was a big believer in acoustic guitars, never would do much electric. Biggest amplifier he'd ever stock was, you know, a little one. So I built *me* a big one! I saw Bo Diddley, I said, "Wow, I got to have a big one!" So I built one out of old television parts, and it was a piece of trash, okay? But I didn't know it at the time, I mean it was big and it was loud. One of my friends saw one of my amps and said, "Hey, build me one of them and I'll give you a few guitar lessons." Well, I built him an amp, he gave me a few guitar lessons, I think two, and that's the way it went.

The first guy that came to me that wanted to sell amplifiers for me, he wanted to come in and he said, "Hey, I can sell amplifiers." So I said I didn't have any money, 'cause what I used to do, I used to build one a week, I'd go out and sell it, then I'd come back and build another (I'd sell to a music store). See this guy came in... I didn't know it at the time, but the guy was living in the back of a station wagon! I mean, he had a sleeping bag, and old cracker wrappers and sardine cans and stuff in there...but the guy was living there. Anyway, he was the Don Quixote of the amplifier business, he took an amplifier that I had and went out and sold it...that was his travelling money, 'cause I didn't have any money to pay him. So he went out and he travelled and he brought me orders, and first thing you know, I hired another guy and another guy, and this was in 1966. In 1968, I built that first little building over there; it was a hundred feet long and thirty two feet deep. I never will forget, I borrowed \$17,500 to build that building, and I thought that was the goddam national debt!

So we built the damn thing. In fact, it's...if we go over there I'll show you the glue's still on the floors where we used to cover the cabinets.

MR&M: Were you still working in your dad's store?

HP: No, my dad sold out in 1960, so all that happened after. See, all this business started when the Beatles started, you know, the early sixties, '62, '63. This music business just went totally crazy. I mean the demand was just unbelievable. An analogy would be, back in the early days of television anybody that could make a box and put a picture tube in it—didn't make a difference what a piece of garbage it was—anybody that could make a box could sell it. And we had the same kind of thing in the sixties. Anybody who could make an amplifier (and believe me it's not hard to make an amplifier, you're looking at living proof of that!) *did* make one, and there was some of the worst crap around.

MR&M: What were the first ones that you made like?

HP: Ah, frankly they were crap.

MR&M: Tube amps, guitar amps?

HP: Oh, they were tube amps, and I...hell, one of the first amps I ever made, I made for a bass player and it kept blowing speakers. I couldn't figure out why, but of course in those days I didn't have an oscilloscope. Well the damn thing had an ultrasonic oscillation at about thirty kc which, of course, I couldn't hear. So every time I'd hook it up to a speaker, the damn speaker would last fifteen or twenty minutes and blow up. I was about to go crazy 'cause I couldn't figure out what was making it happen, but that's what it was. I found out later that even such well-known companies as Fender were having the same kind of problems.

I've had a lot of musicians come to me and say, "Yeah, well Peavey, I tried one of your amps back in '69 and to tell you the truth it sucked, it wasn't too good." "Well, hey," I said, "I can accept that 'cause, you know, playing music is your thing, making amps is my thing, and frankly I won't beat around the bush about it, my amplifiers weren't as good as I would have liked. But it was the best I knew how to build and compared to contemporary things during that period of time they were as good as any. But while we're talking about that Mr. Musician, let me ask you a question. How was your playing back then?" "Oh, well, I was just starting back then." I said, "Well wait a minute.

I can't have the same thing? I can't grow?"

I know the musician out there wants equipment, but he doesn't want to pay exorbitant prices. When I got in, one of my design goals was to make good products, and make 'em affordable, and I don't mean a good product for the price, I mean make the best possible product that I can make. And sell it at the best possible price.

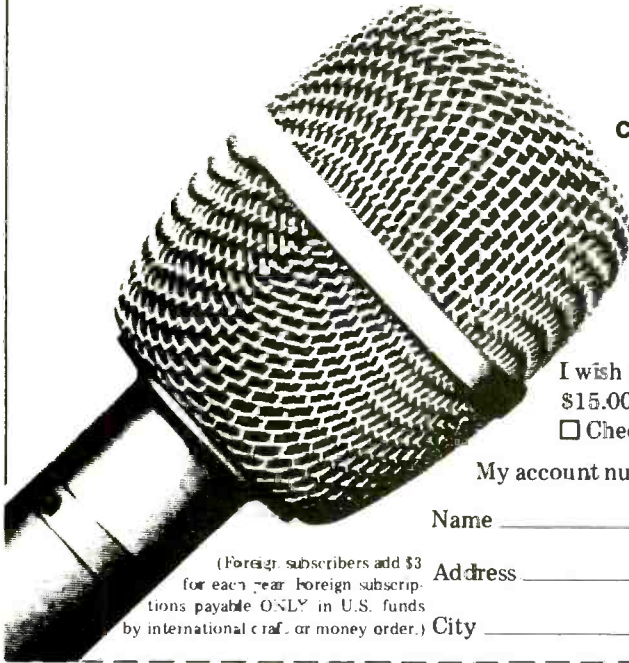
What most people do when they look at things, they don't realize what they're really paying for. The average person looks at a product, he's relating the price of the product with the quality of the product without ever figuring in the various factors involved in the pricing of a product. They're thinking about the quality of the materials, they're thinking about the workmanship, they're thinking about all that stuff, and, of course, all those things are important. But they have an almost childlike naivete about the factors of corporate or organizational efficiency. When you see a solid body guitar that could, did, sell for say, \$150, and that same guitar is now \$900, well, I'm sorry, something is amiss. The strange thing to me is that I know that we're shooting straight with the playing musician.

People come here and they see our factory. In the first place, Peavey is a different kind of company, because we're the only people in the industry that have regularly scheduled seminars for their dealers. We have a full-time staff of people out in the field, training not only our dealers, but consumers. We have five, six hundred people at these things. You know what I do at my seminar, I say, "I tell you what folks. I don't ask you to accept what I tell you, I ask you to do one thing, if I accomplish nothing else, while you're here this is what I want you to do, *I want you to think.*"

MR&M: Do you see any particular trends taking place in the industry?

HP: The nature of our business has gone...the circle is finally beginning to be completed. It's gone from single proprietorship, the entrepreneurial types who started the business, family businesses some people call it, into a conglomerated condition. And I believe the trend now is back the other way, 'cause the big conglomerates cannot move fast enough, cannot supply an ever-changing market. Some people *still* don't believe that our market is like women's fashions.

MODERN RECORDING & MUSIC



Because you are ... creatively involved in how sound is produced and reproduced, and are serious about creating and recreating music both live and recorded. **Modern Recording & Music can help you develop your talent. *Subscribe Now.***

011C

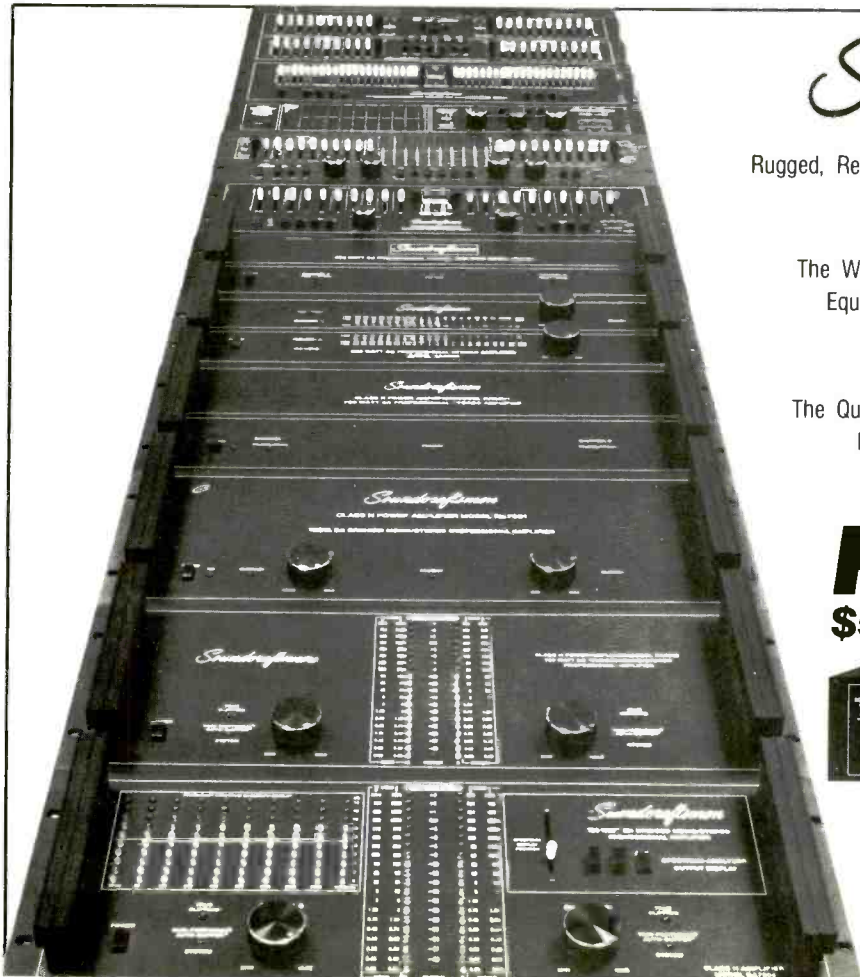
1120 Old Country Rd.
Plainview, NY 11803
(516) 433-6530

I wish to subscribe renew today and save \$16.00.
\$15.00 for 12 issues—Save \$8.40. \$26.00 for 24 issues—Save \$20.80.
 Check money order enclosed for the amount of \$_____

My account number is: Visa Mastercharge

Name _____ Exp. Date ___/___/___

(Foreign subscribers add \$3 for each year. Foreign subscriptions payable **ONLY** in U.S. funds by international a/craf. or money order.)
Address _____
City _____ State _____ Zip _____



Soundcraftsmen

MADE IN U.S.A.

Rugged, Reliable, High-Power Class H and MOSFET Amplifiers for Every Professional Application. ... From \$549.

The World's Most Accurate Real-Time Analyzers and Analyzer/Equalizers Featuring Soundcraftsmen's Exclusive Differential/Comparator® Circuitry for Incredible 0.1dB Accuracy! ... From \$499.

The Quietest, Lowest-Distortion Equalizers Available, Models for Live Music, Studios and Fixed-Installations, All Featuring Differential/Comparator®. ... From \$299.

FREE! WIN THIS \$549. AUTO-SCANALIZER



VISIT US AT NAMM #1005 TO ENTER FREE DRAWING!

If you're not attending NAMM, Call or Write for FREE TEST REPORTS, COMPLETE PRODUCT INFORMATION, and PRICES.

2200 So. Ritchey, Santa Ana, California 92705, U.S.A./Telephone (714) 556-6191

Circle 45 on Reader Service Card

So You Wanna Be a Rock'n'Roll Star: Part IV

denny andersen

Roll tape; here we go. This is where all your hard work in rehearsal starts paying off.

Recording the Basic Tracks

With basic tracks you're going for maximum tightness and energy. It's best to work fast, loose, and live at this stage—do a series of takes straight through rather than stopping at each little glitch. The idea here is to get the energy flowing; you want to avoid getting too hung up on small details. If you're well prepared, you should be able to come in and nail down the basic tracks while everyone's energy and spontaneity levels are still running high.

Since the basics are just a framework, you need to be careful about getting too cluttered at this early stage. Keep the finished product in mind as you listen to playback. Remember, you're only laying the foundation here; you'll be adding backgrounds, solos, and a lead vocal over this basic framework. Don't get carried away and fill up all the holes just yet. Your recording may sound a little stark at this stage, but that's the way it's supposed to be.

If you have enough tracks, you can record a scratch vocal (so named because you'll erase it later—it's only intended for a temporary reference). This will help you keep track of where you are in the arrangement as you do overdubs, and it gives everyone a clearer idea of what the finished product will sound like.

Background Sweetening

Once you're sure you've got the basics down for all the tunes you plan to record, you can begin overdubbing your background sweetening.

For the Quarterflash "Harden My Heart" demo, we laid down three background violin parts, each overdubbed separately, then ping-ponged them over to a single "string section" track (see Part III for our track assignments and ping-ponging strategy). We used a Neumann U-87 in omni-directional mode and mic'ed the violin from about six feet away. This gave us a nice natural blend of direct sound and reflected room sound—just right for background strings. Since we were overdubbing the violin in its own separate session, there was no problem with leakage from other instruments.

We didn't use background vocals on the "Harden My Heart" demo, but they're such a common form of sweetening that we should discuss them here. (We did add background vocals on the album version of the song, and we used them extensively on the demos for other tunes—most notably "Cruisin' with the Deuce" and "Critical Times.")

The key to professional-sounding background vocals is triple-tracking—laying down three tracks of the same vocal blend and combining them into a thick vocal chorus. We found the best approach was the old

"sing around the campfire" technique. We set up our Neumann in the center of the room, selected the omni-directional pick-up pattern, and gathered our background vocalists in a circle around it. We moved individual singers in or back slightly from the mic to create a balanced vocal blend, then recorded their three-part harmonizing on one track. We went back and repeated this process on a second and finally on a third track. This gave us three tracks, each containing the three-part vocal harmony—in effect, nine voices. When we combined these three tracks together onto a single track, we got an impressive wall-of-sound effect that really gave the background vocals (and the demo as a whole) a nice, professional thickness.

Triple-tracking like this works well for any background sweetening, be it vocals, strings, guitars, handclaps, or what have you. It's well worth the single generation you lose ping-ponging, especially if you're recording with dbx or other noise reduction.

Each time you ping-pong, be sure to mix the combined parts very carefully, keeping the final product in mind. Once you've moved on and erased your original tracks, you'll be stuck with this ping-ponged mix. You won't be able to go back and change the balance or the equalization of an individual part within the blend. If you can spare the time, it's a good idea to take a break after you ping-pong. Then come back and double-check your composite mix with fresh ears before you pass the point of no return and erase the original background tracks.

Final Overdubs

Ping-ponging the background parts frees up three reusable tracks. We'll use them for our final overdubs of the solo instruments and lead vocal.

In "Harden My Heart" the key solo instrument is Rindy's saxophone. The sax intro is our first hook; we wanted it to leap off the tape (or out of the radio) and grab the listener's attention immediately. Since Rindy's vocal and sax work was our main commercial strength, we wanted her opening sax entrance to blow the A&R people right out of their chairs. We needed a big sound; something unique, powerful, yet undeniably feminine—like Rindy's playing style itself.

We set up the Neumann U-87 to capture a clean, dry sax sound. This would be recorded on track 7 (also slated for the lead vocal) and punched out as she took a breath to begin the lead vocal. We set up our borrowed Electro-voice RE-20 right beside the Neumann, but ran it through a Biamp Quad Limiter and into a Roland RE301 Chorus Echo before it reached the tape. (We limited the signal heavily, then added lots of

reverb and a touch of chorus, plus echo with receding repeats timed to the tempo of the song in a 6/8 rhythm.) This “effects sax” would be recorded simultaneously on track 8. We would not punch this track out when the vocal began; the decaying echo and reverb would carry over slightly into the verse and help mask the vocal punch-in on track 7.

We hoped to be able to blend the dry sax track from the Neumann with the effects sax track to create a totally new kind of sax sound. We recorded a quick trial run just to get a random starting point. We planned to fine-tune the effects after we heard the test blend played back, but as it turned out, the first raw trial gave us exactly the sound we wanted. (Three cheers for serendipity!)

Next, the lead guitar track and guitar solos are overdubbed. In “Harden My Heart” the lead guitar plays all the way through the song, accentuating the chord changes and answering the vocal on the choruses. It takes a short solo after the sax break in the middle of the song, then toughens up into a distorted rock sound and works with the vocal to drive the song on to its conclusion. Marv used the same guitar and amp set-up he’d used earlier on the basic rhythm track, but he went for a brighter, punchier sound. We used quite a bit of limiting on all the guitar tracks. This is a common practice—it keeps the transient peaks under control and allows you to get a hotter signal on tape. We laid down the opening lead track, then punched the solo in separately. Finally, we set up a hard, overdriven tube sound for the ending and punched that in on the last chorus. We used the Neumann’s cardioid pick-up pattern for all the guitar parts.

Only one thing left to record now—the all-important lead vocal. This is the main focus of the listener’s attention, so it should be recorded very carefully. From a purely technical standpoint, vocals are relatively easy to record (we just set up the Neumann and ran flat), but the real challenge is capturing just the right performance. Human beings are incredibly sensitive to vocal expression; everybody’s a specialist at listening to the human voice. The average guy on the street may not know a Stratocaster from a Stradivarius, but he knows when a singer is getting through to him. You may have to do a number of takes and punch-ins to get a good finished track. Still, you don’t want to get so hung up on technical perfection that you lose the expressive emotional spark. This rule applies to your whole recording, but it’s especially important with the lead vocal. Go easy; give your vocalist the room to work comfortably and kindle his/her own spark in their own way.

Mixing

Now that you’ve got all the tracks down, you deserve a break. Take at least a day off and get away from your tape completely. Our next step will be the mixing session, and you’ll want to approach that objectively with fresh ears.

You’ll need a good deck to mix down onto, ideally one you’ll have easy access to later on. We originally rented an Otari MX5050 half-track for mixing sessions, but we soon switched to our own Teac 3440. It was readily available anytime we needed to make more dubs.

Accurate monitoring is a must, too, but it’s hard to achieve in a home studio. We set up our monitor speakers right in front of the board, close up. This

gives you more direct sound in relation to the room reflections. We’d spent enough time listening to commercial albums over this monitor system to know its idiosyncracies (it was actually pretty accurate), and by comparing our tracks to the familiar commercial albums as we went along, we could tell we were in the ballpark. Nevertheless, we checked our early mixes by arranging to listen to them over a flat system in a commercial studio, just to be safe.

We used the band’s twelve-channel (TAPCO C-12) PA board for mixing; this enabled us to split four of our eight tracks into simulated stereo pairs. What does this mean? Well, let’s take Marv’s lead guitar track, for example. We *could* just run the recorded guitar track through a single mixer channel and use the pan control to assign it a “spot” within the stereo panorama—full left, slightly left, center, or whatever—but this won’t give us a true stereo image. To get a true stereo image we would’ve had to record the guitar on two tracks, using two separate microphones carefully arrayed into a stereo pair, left and right. We can’t afford this luxury with only eight tracks, but we can cheat and get a similar effect. We can split the lead guitar track between two channels of our mixer, pan one hard left and one hard right; then we can subtly alter the EQ between these two channels to create a simulated stereo ambience for the guitar. Used tastefully and carefully, this technique gives you a much fuller, more realistic “stereo” image from your single recorded track.

We patched the Roland Chorus Echo into the board’s effects bus; we used it for subtle echo and reverb on the snare, lead vocal, and rhythm guitar. We used a Tapco stereo reverb unit patched through two of our four sub buses for primary stereo reverberation on the strings, lead vocal, sax, and guitars. The other two subs functioned as our stereo masters.

So much for our mixing set-up. Before you actually begin to run your mix, take a few minutes to review what the record company will be listening for. Try to regain your perspective. To you, your demo is a cherished creation, the results of hours of painstaking labor. You know every tiny detail by heart. No matter how hard you try, you will never really hear your tape objectively—you’re simply too close to it. Remember that the listening environment for your finished tape will *not* be a carefully controlled mixdown session; it will be a busy A&R person’s office. To them, your demo will just be another distraction in an already hectic business day—a day full of ringing telephones, buzzing intercoms, constant interruptions. Your listeners will have short attention spans and a lot on their minds. *You must grab their attention quickly and show them something they can sell.* If you’ve got “the right stuff,” it’s there lurking somewhere in your raw tracks. Your job in the mix is to capture it and get it out front, loud and clear. Remember to stay focused on your strengths. Hit your hooks; hit them early, hit them hard, and keep on hitting them until there’s no room for doubt—this tape is a hit looking for a place to happen.

In Part V we’ll talk about marketing your tape to the record companies; we’ll consider the option of pressing your demo and actually marketing your own record; we’ll discuss radio airplay for your demo, and finally we’ll take a brief look at a typical recording contract “deal.”

As promised, we are beginning a column solely devoted to sound reinforcement. The author, Susan Borey, is a sound-person currently based in Detroit. Involved with live sound and studio work, she has also served as audio engineer for "Waveforms," a weekly television series featuring alternative music.

Ms Borey wishes to thank Mark Oppat for technical advice in the preparation of this article.

Sound-people are some of the unsung heroes of show business. As an audio engineer, ironically, you are doing your best job when you are least noticed; when everything sounds crystal clear and in the right perspective, the audience takes for granted the knowledge and effort that went into the presentation. When responsible for the sound, *you* are as important as any member of the band onstage. We hope this will be a consoling thought when you're winding up cords or battling with heavy roadcases at 2:15 A.M. after watching the band skip out the door with their instruments under their arms.

With this article, *MR&M* would like to introduce a new column that, hopefully, will make your job a little easier. Whether you're a graduate of some prestigious audio engineering school or just slightly down the road from that first step when you repositioned a speaker box at your friend's band's practice space, you've probably got some questions about what you're doing. (If not, *you* should be writing this column.)

Obviously, there is an incredibly large (and ever-growing) amount of information on the subject of professional sound. In this brief overview we will go over some basic ideas that may inspire you to pick up a pen and communicate your own questions. We'd like to cover many levels of query, from basic questions that might serve as useful review for more advanced audio engineers, to real stumpers that might send us into head-scratching consternation; sorry, but no advice on your love life will be given. Our focus will be on club-style P.A., which will typically involve questions about doing sound in rooms that hold up to 1,500 people.

We'll begin our discussion with a consideration of several factors that come into play when you are assembling a system for club work.

Scale of Venue

The room you work in may range in

size from an intimate (100 persons) setting to a mammoth, barn-like showcase club. The shape of each room, and its resulting characteristics, will have certain effects on sound. To a large extent, your job involves making educated guesses about these effects in every situation you encounter. Taking into consideration the fact that you probably have a limited amount of equipment at your disposal, it's important to make the absolute most out of it. You'd be surprised at all the minor changes you could make that yield major differences in your results. Angling your horns more efficiently, for example, through a better understanding of directional characteristics, can make a world of differences, as can careful selection of crossover points. Learning how to gauge and assess the effect reverberation will have in a room will also help provide clues to optimal placement of speakers. Multi-level venues could require a zoned, or split, system that would use upper and lower speakers to cover the balcony and ground floor.

You will sometimes encounter oddly shaped rooms where, no matter how you aim your speakers, you can't cover the whole area evenly. In those cases you may have to add to your system or cheat some of the audience out of some sound.

Generally, you will want to know the shape (layout) and size of the venues you'll be working with in advance. Some sound-people keep a log book of the venues they work in often. The log book should have a page for each venue, with information like the manager's name, the phone number, the location and size of the load-in door, the stage size and headroom (watch for low ceilings), the mixing board location, and electrical notes including the location and number of outlets and breaker panel and the location of where the lights are powered from (since you don't want your system to contain dimmer buzz). A simple line drawing

of the club's layout would be helpful. If you have roadies who work before you, copies of this information in their hands will save everybody time.

Mobility

Depending initially on whether you're putting together a system for permanent installation in a club or amassing gear for a portable operation, ease of transport will take on a varying role of importance. One factor to take into consideration is how many people are going to help you move the stuff, which may help you decide between putting your amps into a rolling rack or individual cases.

If you have a fairly small portable system, a van (possibly with a trailer) will probably be your transportation. The next step up would be a small truck like a "step van" (bread truck) or an old bus with the seats removed. Finally, the best transportation is a good 18-24-ft. "box body" truck; these can come with either a ramp or a hydraulic lift gate.

Sound work often requires supreme amount of physical exertion. One sound man I know, in moments of exhaustion, describes his job as an audio engineer by saying "I load and unload." Whether it's you or hired hands who do the work, we hope you take measures to protect those bodies from any damage.

Financial Resources

Although generally you get what you pay for in audio equipment, like everything else for which this axiom applies, there is sometimes a questionable difference in detectable quality in relation to what you can spend.

Without compromising your quality one bit, you *can* cut costs. If you possess any carpentry or electrical skills, there is a point at which it may be more feasible to build, rather than buy some equipment. Your handiness and/or ability to learn about these things could also enable you to make your own minor repairs

on equipment. Tracing and eliminating shorts in cords by building a continuity tester, for example, could enable you to avoid trashing faulty cords. Another way to save money is to buy from discount houses in as large a quantity as possible. Getting microphone connectors from a distributor in quantities of 100 will save you up to 50 percent of the cost of buying 10 of them 10 separate times.

The Music

Another prime consideration is the type of music you are involved with presenting. A folk duo will have some different requirements than a heavy metal quartet. If you are working with one band all the time, you can design a system to specifically meet their needs. However, if you are working with several bands or artists, you must concern yourself with having a more flexible system.

The size of a group will determine, among other things, how tight the stage set-up will be and how many microphones you'll need. It's good to know beforehand exactly what you're in for with each job, but if you get into an emergency situation where you find yourself short of something, there are alternatives to throwing your hands up in despair. If you lose a channel on your board, for example, it's useful to know how to Y two mic inputs together. Or, in an even more gruesome situation, tips on how to mic a drum set with one or two mics might come in handy (we suggest placing one mic between the snare and high hat). Let's take a very brief look at the mainstays of equipment, the tools of your trade. Without delving into the worlds of connectors and cables or signal processing devices like crossovers and effects, we'll run through the basics of your gear.

Speakers. There are several ways to go about transforming electrical impulses into sound waves, and the speaker system you work with should utilize their different characteristics to fit your needs. The smoothness of direct radiator units, which can utilize reflex principles to reinforce bass reproduction, may be combined with the high efficiency and increased projectional ability of horn units. Your concern for mobility, cost, and efficiency will also help determine your arsenal of mains and monitors.

Power Amps. Like car engines, the size and type of power amps you

need will best be defined by the equipment you have to drive. There are many good amps on the market—well-respected old standards and young competitors with new, attractive features. Perhaps we can, without playing favorites, at least steer you in the general direction of your needs.

Mixing Board. This is what *you* perform on during the show. Although you haven't spent years playing scales on your board, your ears should be finely tuned to the subtle (or dynamic) effect that each knob, lever, and switch has on the sound.

Again, with many good boards on the market, your personal needs and resources will define the board(s) you end up with. Whether that turns out to be a 6-channel board with mono output, or a 24-channel, 8-sub stereo unit, perhaps we can help you get the most out of your board or answer questions about its optimal use.

Microphones. Testing 1, 2, 3. There are many different types of microphones available for a variety of uses, but it's safe to say that for club work you will be dealing almost exclusively with unpowered dynamic mics. Knowing your specific requirements and the application of each mic is crucial. Mic'ing a bass drum, for example, calls for a microphone with a large enough diaphragm to reproduce low end noise without distortion, and must durably handle high sound pressure levels.

Directional pattern is another important characteristic. Uni-directional mics, which reject or reduce the sound picked up at the sides and rear of the mic, are favorably applied where feedback from monitors or bleedthrough from other microphones may be a problem. Omni-directional mics pick up sound equally from all directions, and are useful when bleedthrough is not a problem or, in the case of mic'ing a drum set, can even be a useful characteristic.

Equalization. Very simply put, an equalizer is a device which enables you to control the volume of certain determinable segments of the sound spectrum. Different equalizers divide the sound spectrum in different ways; simple treble and bass tone controls divide it into two affectable parts. A graphic equalizer usually divides into 10, 15, or 31 parts, while other types of EQs, like parametrics and paragraphics, let you focus in on the exact point you wish to affect.

An equalizer is a pretty marvelous

tool, to say the least, in the hands of a capable operator.

AC Power. Not always as easy as plugging into the nearest outlet. I once stopped a fire in a backstage dressing room after someone plugged a practice amp into a handy outlet. It was labeled DC, but the musician who had tried to use it had assumed some former occupant just happened to scrawl their initials on the wall there. Anyway, we just might get into some practical theory about electricity in hopes that problems like ground loops, which can cause unwanted noise in your system, might be avoided.

A Word About Mixing

Here's where your job as a businessman, craftsman, beast of burden, etc., turns into being an artist. To a large extent *you*, in conjunction with the band you're mixing are responsible for how the audience receives whatever the group is trying to convey. You are the middleman in an artistic exchange, and hopefully you'll have a sense of responsibility that translates into doing your best in every situation, regardless of a number of factors that might affect your own level of inspiration. (The fact that you've only had four hours sleep in the past two days, or the band doesn't come close to your own personal taste in music leap to mind.)

If you work with one, or just a few groups, you could be in touch with the music as much as, if not more than, any member of the band. Do you know where, in the third song in the second set, the guitar player is about to jump into a magnificent solo which needs to be boosted at the board? Details like this can make the difference between good and great sound.

Once again we'd like to stress that any brief overview of a subject as complex as professional sound can only provide a very general and incomplete treatment. Your specific questions will allow us to provide more complete, detailed coverage of any aspect of this subject, so please send them in.

Ed. Note. Send any questions, comments, etc. to "Sound Advice" c/o Modern Recording & Music, 1120 Old Country Road, Plainview, NY 11803.

Musicians Notebook

Effectron Jr Applications



This issue's Musician's Notebook will be a bit different from the usual review-oriented column. Since I am now doing a fair amount of consulting for DeltaLab, I have decided to disqualify myself from reviewing any more of their products. However, the folks at *MR&M* really wanted some kind of article about the Effectron Jr line, so they asked if, instead of doing a review, I could write a more applications-oriented article. That seemed like a good idea to me, so here we go.

I do want to make some initial comments about the Effectron Jr, though, for those who may not be familiar with what this product line is all about. There are three Effectron Jr models, the JR 350 (maximum delay 350 milliseconds), the JR 700 (maximum delay 700 ms), and the JR 1050 (maximum delay 1050 ms). The list prices are \$239, \$269, and \$299 respectively. All three models include the same features: Input Level with level-setting LED; Feedback control (turn counter-clockwise from center detent for negative feedback, clockwise from center detent for positive feedback, center for no feedback); four different delay ranges, selected by pushing combinations of two push-button switches; input, bypass, output, and infinite repeat jacks (the latter works only on the longest delay range for each model), and an output mix control (counter-clockwise for source, center for equal mix, and clockwise for effect signal only).

Each model also has a modulation control and speed control. The modulation control (called Delay/Width, or D/W for short) is rather unusual. Turning counter-clockwise from the center detent point increases the delay time (maximum sweep is 4:1). Turning clockwise introduces modulation; that rate is set by the Speed control. There is no modulation at center, while at the full clockwise position the entire delay range is swept by the modulation section. Naturally, this type of control arrangement saves money. However, if you want to add subtle amounts of modulation, you can only do so at the top end of each range.

Speaking of ranges, here are the ranges for the three Effectron Jrs:

Range #	JR 350	JR 700	JR 1050
1	1.5-6ms	3-11 ms	4.5-18 ms
2	6-22 ms	11-44 ms	18-66 ms
3	22-88 ms	44-176 ms	66-264 ms
4	88-352 ms	176-704 ms	264-1056

The different ranges are useful for creating different types of effects. For example, range #3 on the JR 350 is ideal for slapback echo effects and doubling. Range #2 with the JR 700 and 1050 is good for chorusing, since you can introduce subtle amounts of modulation at the high end of the range (11 and 18 ms respectively, which are good initial delay times for chorusing).

Before we continue, I should add that if you're expecting the same performance as a standard Effectron II, you will probably be disappointed. The Jr has fewer patch points on the back, a somewhat less clean sound, and more limited modulation options. The Jr also lacks an output volume control and some other niceties of the Effectron; but while you have to give up some features, you don't have to give up as many bucks either. In fact, the Effectron Jr prices are low enough that many people will now have the financial slack to experiment with multiple delay lines. And since we've already covered how to get standard delay line effects such as flanging, chorusing, and echo in previous columns, I thought it was time to get into some more esoteric applications. So here are a few of my favorites, using the JR 350 and JR 700. (Note that as with the Effectron II, you cannot plug a guitar directly into the input; the Jr likes to be fed from a low impedance source, such as a guitar followed by a preamp, compressor, buffer board, phase shifter, or equivalent.)

Through-Zero Flanging. Digital delay lines are not very good for flanging because they don't cover a wide enough sweep range. (For dramatic flanging effects, you want a very wide sweep range—see the "Hyperflange + Chorus" article in the July 1983 issue of *MR&M* for more on the subject of flanging sweep range.) The main problem is that flanging should extend from no time delay at all (0 ms) to about 10 to 15

ms. However, delay lines cannot go continuously up to a 0 ms delay; the JR 350's shortest delay, for example, is 1.5 ms.

Now, if we consider that flanging is the result of equally mixing straight and delayed sounds, there's no reason why we can't delay the *straight* signal with a second delay. Suppose that this second delay line is set for 1.5 ms of delay. If the first delay line is a JR 350 that is also set for 1.5 ms of delay, then at the highest delay setting, *there will be no time difference between the straight and delayed paths*. This satisfies our requirement for zero time delay. Sweeping the JR 350 downward to 2 ms will create a 0.5 ms time delay between the two delay lines, sweeping further downward to 4 ms will create a 2.5 ms time delay between the two delays, and so on. Therefore, if we add a constant amount of delay with one delay line and sweep against this with a second delay line, we will get the sound of through-zero flanging (assuming that the levels of the two channels are fairly closely matched).

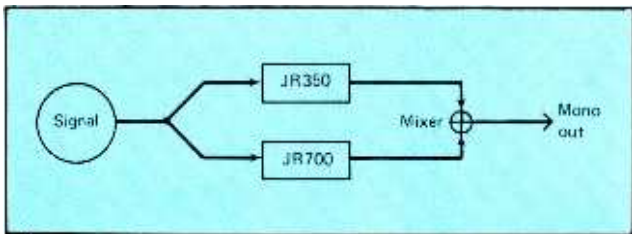


Figure 1. The basic patch for through-zero flanging.

Figure 1 shows the basic patch. Note that the outputs *must* be combined back into a mono signal. The knob settings for the two delay lines are related to the face of a clock—so straight up would be “12 o'clock,” whereas having the knob point to the right would be “3 o'clock.” “X” means that the control setting doesn't matter.

	Feed-back	Range	D/W	Speed	Output
JR 350	12:00	1.5-6ms	10:00	X	5:00
JR 700	12:00	3-11ms	5:00	8:00	5:00

Through-zero flanging sounds a lot more like tape flanging than what you're probably used to hearing from delay lines. A few tips: keep feedback to a minimum for best results, and fiddle with the JR 350 Delay/Width control until you get the best through-zero flanging sound.

Wide Sweep Range Through-Zero Flanging. You can use the same patch as in Figure 1, but change the control settings as shown below, for a different flanging sound.

	Feed-back	Range	D/W	Speed	Output
JR 350	12:00	1.5-6ms	2:00	8:00	5:00
JR 700	12:00	3-11ms	2:00	8:30	5:00

	Feed-back	Range	D/W	Speed	Output
JR 350	12:00	6-22ms	4:00	8:00	5:00
JR 700	12:00	3-11ms	9:00	X	5:00

In this case, the JR 700 has the fixed delay, and the JR 350 sweeps against it. This sweeps the flange over a wider range (from “0 ms” to about 16 ms) for a classic tape flanging sound.

This patch is also excellent for manually controlled

through-zero flanging. Leave the JR 700 settings as above, but vary the JR 350 Delay/Width control between center and fully counter-clockwise.

Pseudo-Randomized Flange Sweep. Sometimes that repetitive whoosh-whoosh-whoosh of a delay line LFO can sound just too mechanical—that's when randomization comes in handy. Unfortunately, you cannot easily produce a truly random sound, but with two delay lines you can at least improve matters somewhat.

Again, use the same kind of patch as shown in Figure 1 (input split to the two units, outputs summed into mono). This time, though, set the controls as follows:

	Feed-back	Range	D/W	Speed	Output
JR 350	12:00	1.5-6ms	2:00	8:00	5:00
JR 700	12:00	3-11ms	2:00	8:30	5:00

By setting the Speed controls for similar, but not identical, rates of speed, the sweep becomes more randomized. Experiment with the relationship between these two controls for best results. If you want to hear the two different sweeps clearly, turn up the positive feedback somewhat. This will allow you to adjust the sweeps more precisely.

Mono to Stereo to Hard Stereo Conversion. This is a stereo patch (see Figure 2) that is somewhat unusual: You can continuously change a signal from mono, to stereo with some center channel

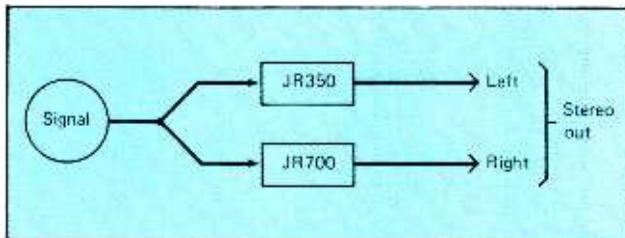


Figure 2. Patch for mono to stereo to “hard” stereo conversion.

information, to “hard” stereo with very little center channel information. Here are suggested control settings:

	Feed-back	Range	D/W	Speed	Output
JR 350	12:00	6-22ms	12:00	X	see below
JR 700	12:00	11-44ms	12:00	X	see below

Match the levels of the two channels of the stereo pair as closely as possible for best results. To change from mono to stereo, you will have to turn the two Output controls simultaneously. With both controls fully counter-clockwise, the sound will be mono. Turning both controls more clockwise by an equal amount spreads the image out into stereo; at the full clockwise position, the image is hard stereo with no center channel sound.

This patch allows for many variables, and there are a few cautions. First, when combined in mono the tonality may change; with longer delays, you may hear an objectionable slapback echo effect. Try

experimenting with the Delay/Width control until you obtain the most acceptable mono sound, consistent with a good stereo image. Also, try adding a slight bit of modulation for some interesting effects.

Psycho-Acoustic Panning. Here is a wild patch that is just amazing with held chords, drones, E-bow guitar, complex drum machine patterns, and the like. Use a stereo patch as in *Figure 2*, with the following control settings:

	Feed-back	Range	D/W	Speed	Output
JR 350	10:30	1.5-6ms	2:00	8:00	5:00
JR 700	10:30	3-11ms	2:00	8:30	5:00

This patch sounds *incredible* with headphones, so plug something electronic-sounding and sustaining into the JRs, and listen closely. The critical controls here are Delay/Width, Feedback, and Speed. Feedback should not be up so high that you hear any kind of metallic tonality. Delay/Width, if turned up too high, gives an uneven sweep effect; yet the greater the modulation, the more pronounced the panning effects. Try setting this control as clockwise as possible, consistent with a good sound. The Speed controls should be close to the same rate, but definitely not synchronized. If the panning effect is not apparent enough, try increasing the speed.

This patch also sounds good with feedback at a minimum, and with different amounts of modulation. Try processing a guitar with this effect—the chorusing effect is downright transcendent.

Room Ambience Simulator. No, this is not the same thing as a reverb, but something that gives the sound you associate with being in a small room. The DeltaLab technical staff turned me on to this patch, which was used previously in some very early DeltaLab products.

Figure 3 shows the details; it assumes you will be using some kind of mixer with the delay lines. What we're doing is picking up the reverb sends from the mixer, and instead of sending them to a stereo reverb, sending them to the inputs of the two delay lines. The delay line outputs feed two reverb returns at the mixer. Assuming that you have a stereo reverb bus, carefully turn up the reverb send controls on the two reverb return channels. (Yes, this will give feedback, but if adjusted carefully you will simply get more repeats, not runaway feedback.) Now cross-pan the two sends so that Delay A is "sending" into the reverb channel that feeds Delay B, and Delay B is sending into the reverb channel that feeds Delay A. For the best overall effect I would also recommend introducing some low frequency and high frequency rolloff.

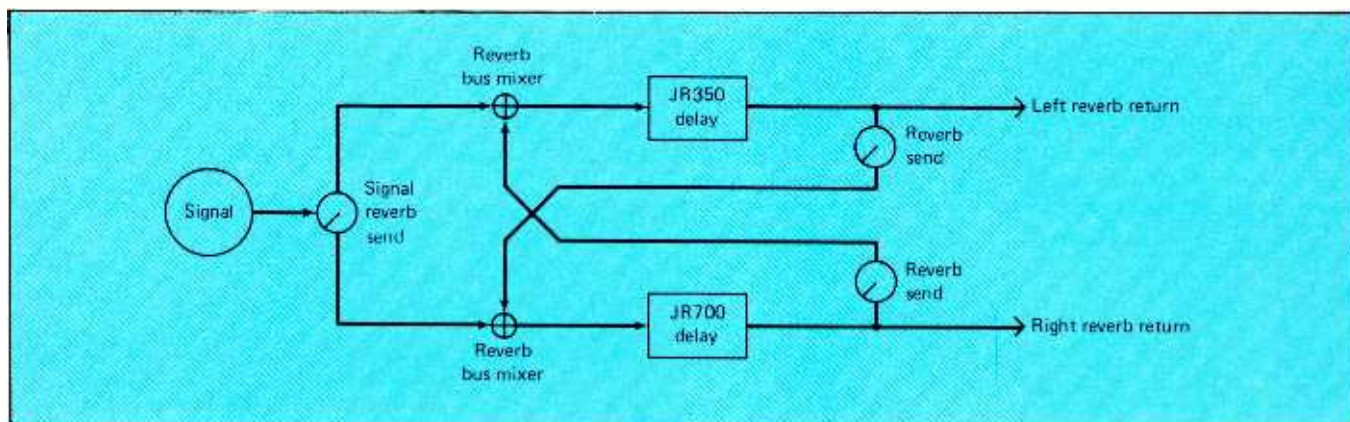


Figure 3. Patch for simulating room ambience.

Once you get the controls tweaked up just right, you will be rewarded with a sound that pans and swirls inside your head—quite something! Note that this panning has nothing to do with stereo amplitude placement, but rather, with phase and delay changes interacting psycho-acoustically.

Stereo Chorus That Doesn't Go Away in Mono. Most stereo choruses use synthesized stereo. As a result, if played back in mono the chorus effect disappears. With two delay lines, you can obtain a true stereo chorus effect that also sounds good when played back in mono.

This is another stereo patch (see *Figure 2*). Set the controls as follows:

	Feed-back	Range	D/W	Speed	Output
JR 350	1:00	6-22ms	1:00	8:30	12:00
JR 700	1:00	3-11ms	1:30	9:00	12:00

It's impossible to give suggested patch settings, so just settle in and do some experimentation. Try different delay settings; different positions of the reverb send panpots; adding some feedback at the delay lines themselves; changing the amount of the straight signal being sent to the reverb bus—in short, be creative! While fooling around with this patch, I got everything from the ultimate garage band stereo guitar sound to highly ambient electronic drum sounds. See what tickles your fancy.

As delay lines become more cost-effective, more people than ever before will be able to afford good-sounding chorusing, flanging, doubling, and echo effects...but multiple delay line experimentation will also become a lot more practical. I hope you find the above examples inspiring.

Updated Recording Studio Handbook

A must for every working professional... student... audio enthusiast

Features latest state-of-the art technology of creative sound recording.

21 Fact-Filled Chapters

- | | |
|--|---|
| <p>I. The Basics</p> <ol style="list-style-type: none"> 1. The Decibel 2. Sound <p>II. Transducers: Microphones and Loudspeakers</p> <ol style="list-style-type: none"> 3. Microphone Design 4. Microphone Technique 5. Loudspeakers <p>III. Signal Processing Devices</p> <ol style="list-style-type: none"> 6. Echo and Reverberation 7. Equalizers 8. Compressors, Limiters and Expanders 9. Flanging and Phasing <p>IV. Magnetic Recording</p> <ol style="list-style-type: none"> 10. Tape and Tape Recorder Fundamentals 11. Magnetic Recording Tape 12. The Tape Recorder <p>V. Noise and Noise Reduction</p> <ol style="list-style-type: none"> 13. Tape Recorder Alignment 14. Noise and Noise Reduction Principles | <ol style="list-style-type: none"> 15. Studio Noise Reduction Systems <p>VI. Recording Consoles</p> <ol style="list-style-type: none"> 16. The Modern Recording Studio Console <p>VII. Recording Techniques</p> <ol style="list-style-type: none"> 17. The Recording Session 18. The Mixdown Session <p>Three all-new Chapters</p> <ol style="list-style-type: none"> 19. The In-Line Recording Studio Console
(The I/O Module, The Basic In-line Recording Console, Signal flow details) 20. An Introduction to Digital Audio
(Digital Design, Digital Recording and Playback, Error Detection and Correction, Editing and Dupes) 21. Time Code Implementation
(The SMPTE Time Code, Time-Code Structure, Time-Code Hardware.) |
|--|---|



\$39.50

The *Recording Studio Handbook* is an indispensable guide with something in it for everybody. It covers the basics beautifully. It provides in-depth insight into common situations and problems encountered by the professional engineer. It offers clear, practical explanations on a proliferation of new devices. **And now it has been expanded with three all-new chapters . . . chapters on the in-line recording studio console, digital audio and time code implementation.**

Sixth printing of industry's "first" complete handbook
The *Recording Studio Handbook* has been so widely read that we've had to go into a sixth printing to keep up with demand (over 30,000 copies now in print). Because it contains a wealth of data on every major facet of recording technology, it is invaluable for anyone interested in the current state of the recording art. (It has been selected as a textbook by several universities for their audio training program.)

Highly Acclaimed
Naturally, we love our book. But don't take our word for it. Here's what others have to say:

"John Woram has filled a gaping hole in the audio literature. This is a very fine book . . . I recommend it highly." *High Fidelity*

"A very useful guide for anyone seriously concerned with the magnetic recording of sound." *Journal of the Audio Engineering Society*

15-Day Money-Back Guarantee

When you order *The Recording Studio Handbook* there's absolutely no risk involved. Check it out for 15 days. If you decide it doesn't measure up to your expectations, simply send it back and we'll gladly refund your money.

Easy to Order

You can enclose a check with your order or charge it to Master Charge or BankAmericard/Visa. Use the coupon below to order your copies of the new updated *Recording Studio Handbook* (\$39.50).

ELAR PUBLISHING COMPANY, INC.

1120 Old Country Road, Plainview, N.Y. 11803

Yes! Please send _____ copies of THE RECORDING STUDIO HANDBOOK. \$39.50. On 15-day approval.

Name _____

Address _____

City/State/Zip _____

Total payment enclosed \$ _____
(In N.Y.S. add appropriate sales tax)

Please charge my Master Charge
 BankAmericard/Visa

Account # _____ Exp. date _____

Signature _____
(changes not valid unless signed)

**Outside U.S.A. add \$2.00 for postage.
Checks must be in U.S. funds drawn on a U.S. bank.**

Ambient Sound

The 74th AES Convention

The Audio Engineering Society returned to New York after two years and, though the location of its 74th convention changed, the emphasis and format of the event remained much the same. I came away from the AES Convention with some sixty pre-prints of technical papers that were presented. Thus, if I report on all those that were of interest to me, I'd need all the pages of this issue of *MR&M*, and then some. I will limit this discussion, then, to just three papers that particularly appealed to me. This was an especially interesting AES, what with digital dominating the scene and with more technical papers presented than at any other previous AES event.

DASH Format Gains Support

Three major international companies and one subsidiary active in professional digital audio have gotten together to endorse a new, common format for stationary-head digital audio recording. The system, dubbed DASH (for Digital Audio Stationary Head), is being supported by Matsushita Electric Company Ltd., Sony Corporation, Willi Studer AG, and MCI (a division of Sony Corporation of America). Three scientists representing the three major companies involved presented a joint paper providing an overview of the DASH format. They were T. Kogure of Matsushita Electric Company, Dr. Toshi Doi of Sony Corporation, and Dr. Roger Lagadec of Willi Studer, AG. (It is interesting to note that Dr. Lagadec was involved in no fewer than five technical papers at this AES!)

Some of the technical details of the DASH system were summarized in this paper. The system is based on recording 16-bit digital audio samples and auxiliary information on separate, dedicated tracks. It is based upon the professional sampling rate of 48.0 kHz recommended by the AES and, alternatively, on the 44.1 kHz sampling rate related to the Compact Disc format. When a 48 kHz sampling rate is used, standard tape speeds are 76.2 cm/sec (30 ips), 38.1 cm/sec (15 ips) and 19.05 cm/sec (7½ ips). When the 44.1 kHz sampling rate is used, speeds are reduced somewhat to keep the same data density on the tape.

In the DASH format four auxiliary tracks are used in addition to those used for digital audio. These four tracks are used for a control track that includes recorder data addresses, for cueing purposes and for other possible applications.

Tape Tracks and Tape Density

The DASH format takes into account the possibility of increased use of thin-film tape heads which would allow track widths much narrower than those practically possible with conventional heads. Accordingly, two types of track configurations are specified.

For normal track density, ¼-inch tape will have four auxiliary tracks and eight digital audio tracks, while ½-inch tape will have four auxiliary tracks and 24 digital heads. For double track density systems (those that might use thin-film heads), ¼-inch tape would have four auxiliary tracks and 16 digital audio tracks, while ½-inch tape would have four auxiliary tracks and 48 digital audio tracks. The proposed track layout ensures that auxiliary tracks will be able to be read independently of track density. The layout also ensures that recorders with double density heads will be able to read single-density tapes, although some operations of digital audio editing may be limited if different track densities are used in recording and editing.

All types of electronic editing normally employed in analog recording work will be possible within the framework of the DASH system, thanks to the existence of a reference track (providing that a corresponding head configuration is used). These include such editing operations as spot erase, punch in recording and dubbing, as well as synchronous recording. In addition, razor blade or tape-cut editing will also be possible.

While these three major companies have reached agreement on the DASH format, world-wide standardization is still not assured, since other companies such as Mitsubishi and 3M continue to support their own, different systems. DASH and other systems are to be considered for world standardization by the IEC (International Electrotechnical Committee) at one of its forthcoming meetings.

The three companies sponsoring DASH also held a press conference during which they expressed the hope that their common recording format would become the basis for a universal format required by the recording industry.

Noise Reduction 'By The Numbers'—Digitally, That Is

Some eight months ago, during a visit to Willi Studer's factories on the outskirts of Zurich, Switzerland, I learned about some work being done by Dr. Roger Lagadec of that company that seemed almost unbelievable. At the time, those of us who witnessed and heard some of the early results of his efforts were sworn to secrecy because of pending patent protection. I have been champing at the bit ever since to be able to tell you about the project. Now I can, thanks to the fact that at this most recent AES Dr. Lagadec delivered a paper called, innocuously enough "Signal Enhancement Via Digital Signal Processing." What Dr. Lagadec and his staff have achieved is much more remarkable than the name of the paper would suggest. In effect, with his system, he can take a recording containing a fair amount of random background noise

(such as surface noise or tape hiss), process the recording through an elaborate digital/analog process which will be briefly described in a moment, and come up with a reconstructed recording devoid of the noise. Don't misunderstand. I am not talking about dynamic noise reduction, so-called auto-correlation circuits, or the like. I'm talking about actually separating the noise from the music by computer analysis which, in effect, learns by experience to differentiate between the two because of their different long-term characteristics.

In simple terms, here's how Lagadec has accomplished this feat. The task of separating noise from music is made easier by splitting the audio signal, which has first been digitized, into many narrow bands; specifically, 512 in the demonstration I heard. With such narrow band signals, it is much easier to determine that a given sustained signal within that band is noise, since *music* signals are not likely to appear continuously (or even for long, sustained periods) within such a narrow band (varying as they do in frequency content from moment to moment).

On the basis of short term power and noise analysis of these many narrow bands of digitized signal, a decision can be made whether to keep a given band in the re-mix or to eliminate it (if it contains only noise). High signal levels can remain unmodified, while low level signals sustained for sufficiently long intervals can be reduced in gain so as to reduce total noise in the re-mix, when the 512 individual signal bands are recombined. There is an opportunity to vary parameters depending upon the music program being dissected, since original signals can be analyzed in real time and slow speed.

While this system may sound relatively simple, the task of creating 512 phase-linear, complementary narrow band signals for processing prior to remerging was anything but simple. The results demonstrated during the presentation of this paper (and even months earlier, when I heard a private demonstration in Switzerland) were nothing short of incredible. The most important application that comes to my mind has to do with the mastering of new CD discs. Many of us have complained about the fact that a lot of CDs are being mastered from older, analog master tapes. While the musical performances preserved on these tapes may be excellent, there's no getting away from the fact that with record surface noise no longer a factor in these new discs, tape noise, as low as it is, is often clearly audible. Here, perhaps, is a digital technology that, working hand in hand with the new CD technology, can reprocess some of those precious (but noisy) master tapes so that they can be used to produce CD releases that don't suffer from tape noise or at least have such noise reduced to inconsequential levels. Dr. Lagadec proposes to do more work on this system, with the possibility of even attacking distortion and intermodulation distortion components present in older recordings in much the same way.

Can We Really Hear Phase Distortion?

Now that Compact Disc players and digital recording in general are a reality, the filters used in digital recording and playback of digital audio programs are reviving an old debate that's been going on in the audio industry for many years. The question involves our ability (or lack of ability) to detect phase

distortion or phase non-linearities. That question was addressed in a paper presented by D. Preis of Tufts University and P. J. Bloom of The Polytechnic of Central London, England. These two gentlemen reported experimental results on the audibility of phase distortion produced by minimum-phase 4 kHz and 15 kHz anti-aliasing filters. Several impulse response pairs of signals with identical amplitude and frequency content were compared by five listeners who used headphones for the tests. Group-delay distortion was doubled progressively until at least 67 percent mean, correct discrimination between the two types of signals was obtained. At 4 kHz, the phase distortion introduced by a cascade of two eighth-order Butterworth filter pairs was audible; so was that produced by a single pair of seventh-order elliptic filters. At 15 kHz, the cascade of up to four pairs of seventh-order elliptic filters introduced no perceptible effects.

The problem with all of this data, of course, is that, as the authors themselves admit in their concluding paragraphs, "other test signals such as speech and music were not used. No other methods of irradiation such as loudspeakers in non-reverberant or reverberant environments were tried. Most likely these are all important factors which would produce measurable shifts in perceptual thresholds, and they are, therefore, certainly worth investigating." Just as well that Messrs. Preis and Bloom did stop right there, or we audio folks would be deprived of one of our favorite subjects of debate. Otherwise, what would we talk about when things are slow in the studio or in the listening room?

TWENTY SECOND STRIP

MUSIFLEX microphone cable uses a conductive thermoplastic shield (with excellent shielding properties) terminated by a pre tinned drain wire. There is no braiding to unpick and prepare, so **MUSIFLEX** can be stripped and ready for soldering in less than 20 seconds.

MUSIFLEX is available in 11 colors.

MUSIFLEXTM
IS A REGISTERED
TRADE MARK OF
CONNECTRONICS

Also Available:

- * Foil-shielded multipair cable (from 1 pair to 31 pairs)
- * Overall shielded multi-core cables
- * Microphone cables
- * Speaker cables
- * Power cables

Connectronics

UNITED KINGDOM

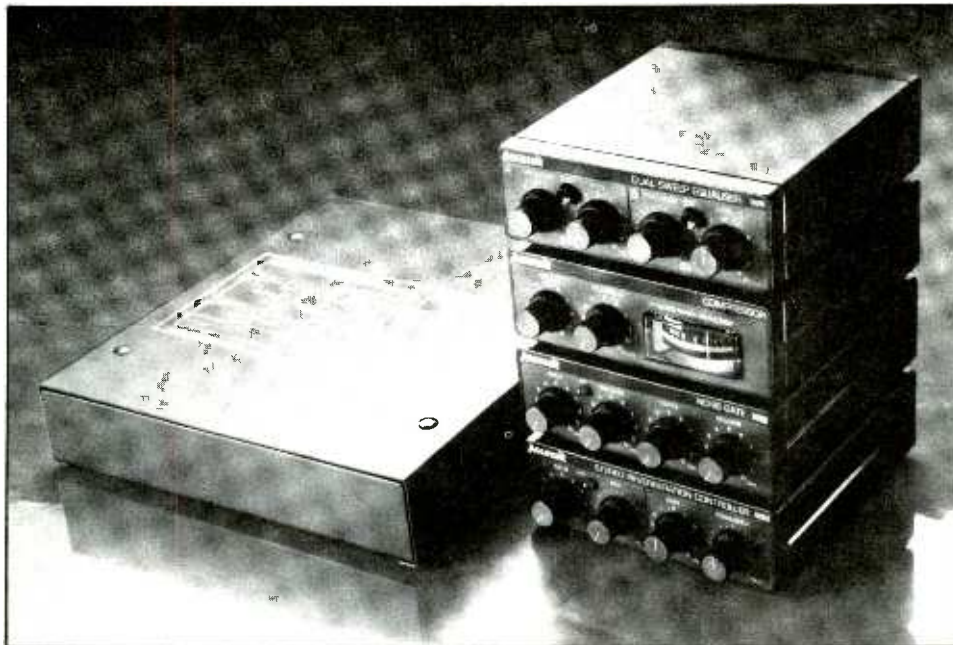
CONNECTRONICS LIMITED
20 Victoria Road
New Barnet Hertfordshire
EN4 9PF England
Telephone 01 449 3663
Telex 895512T SGA L G

UNITED STATES OF AMERICA

CONNECTRONICS CORPORATION
652 Glenbrook Road
Stamford CT 06906 U.S.A.
Telephone (203) 324 2889
Telex 643678

Lab Report

Little Brown Packages by Accessit



There wasn't much time. I had been forced to look for a ride, since I was expecting to pick up several pieces of equipment for this review and there is barely enough room in my sports car for the passengers. Yet when I reached my destination, I could only find one box, about one foot square and a couple of feet long. Because I was limited in research time, I decided that the one box would be enough to get me started. As I carried the unknown package to my father's rented car, much interest was expressed regarding its contents. My father was interested in seeing what I did for a living, and my fiancé (I always travel in groups of three) was interested in getting the project over with so we could get back to the wedding plans.

When we got the box home, we found an entire assortment of peripheral goodies—indeed a plethora of signal processing equipment. The packing list was a full page long:

- 1 Compressor/Limiter
- 1 Noise Gate
- 1 15 Watt Stereo Amplifier
- 1 Dual Sweep Equalizer
- 1 Stereo Spring Reverberation Unit
- 1 Reverb Control Unit
- 1 Headphone Splitter Box
- 1 Patchbay Connection Strip
- 1 24 volt Unregulated Power Supply
- 1 18 volt Regulated Power Supply
- Connecting Cables

It seemed to me an overly abundant supply of audio equipment to be stuffed into a single box, and, as it turned out, most of that box was the packaging for the individual units.

I immediately set to opening the smaller boxes. The units are all about 1.5 inches tall, about 5 inches wide,

and about 5.5 inches deep, except for the spring reverberation section and the headphone splitter box. The 24 volt unregulated power supply, made to power only one of the units at a time, doesn't conform to the sizes of the rest of the equipment either. All of the units come in their own little plastic baggies which also contain the (brief) information available on the equipment. No specifications are listed for the equipment in any of the literature, but the single page description for each unit gives a few lines of definition for what the device should do, how to connect it, and how to power it. The most useful thing that I found on the paper that comes with the individual items was the guarantee that consumes half of one side of the page. The guarantee is for three years parts and labor if all of the designated rules are followed.

Compressor

After opening the box containing the compressor, it was easy to see why all this equipment weighed so little. The case surrounding the components for the compressor, although attractively designed is made of plastic. In a unit designed for portability, weight is definitely a factor. Although this light weight increases its ability to be carried, it may reduce the survival rate on the journey. I dropped it several times (by accident?) with no severe and permanent damage—in fact, no marks at all.

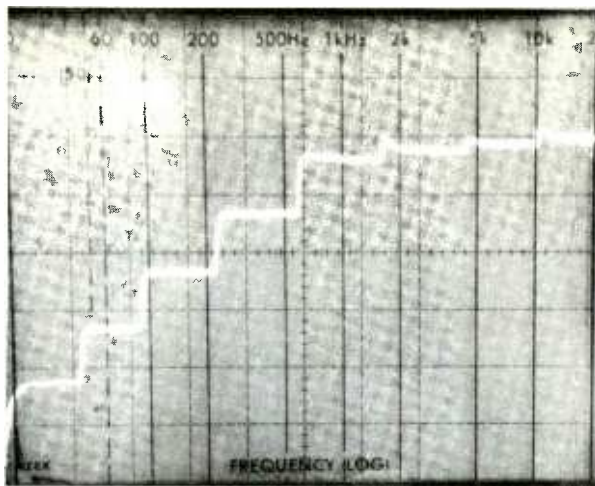
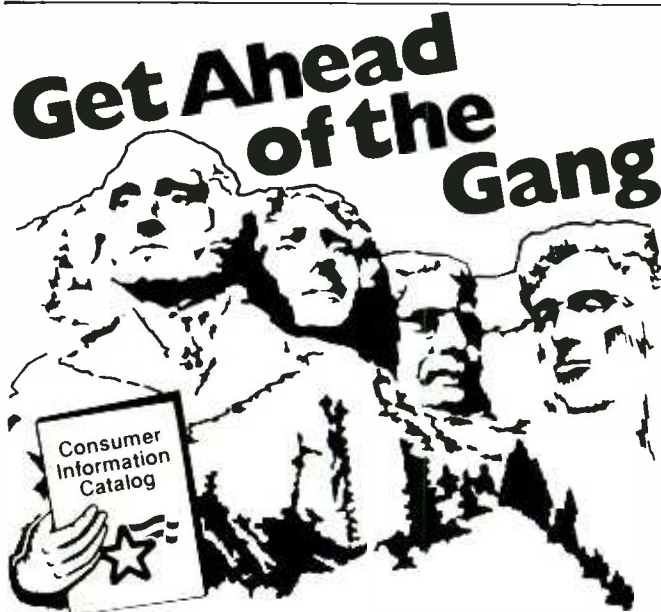


Figure 1. Action of compressor depends, in part, upon input gain control setting. In this 'scope photo, frequency designations should be ignored. Signal was a constant 1 kHz (spectrum analyzer was tuned to that fixed frequency across entire 'scope face). Vertical sensitivity is 10 dB per division. Note that for the first four 10 dB steps, there is virtually no compression, whereas for last three 10 dB steps at input, there is practically no increase in output. Attack time was fairly rapid. (Ed. note: All 'scope photos and interpretations are by Len Feldman.)



Face it. We could all use a little concrete advice now and then.

Whether you're making a monumental decision like a career change, or a more routine one like an oil change, the free Consumer Information Catalog can make it easier.

The Catalog is published quarterly by the Consumer Information Center of the U.S. General Services Administration to bring you the latest on government programs and a mountain of other information that you can use.

The Catalog lists more than 200 government booklets to help you . . . start a

business, find a job, plan your retirement, repair your home, or carve out a nutrition and exercise program to improve your profile. And many of these booklets are free.

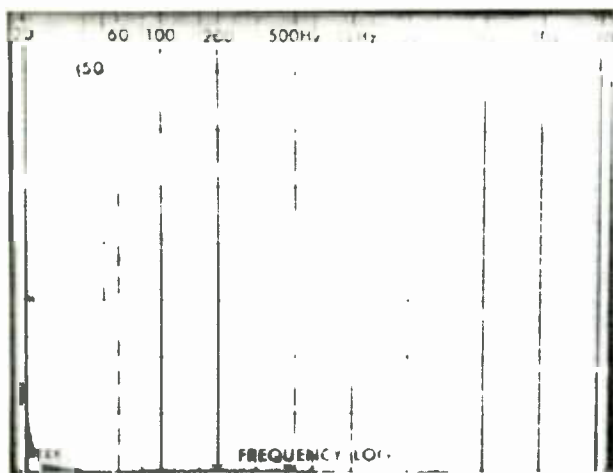
So order your Catalog today. Any way you look at it, you'll be head and shoulders above the crowd.

Just send your name and address on a postcard to:

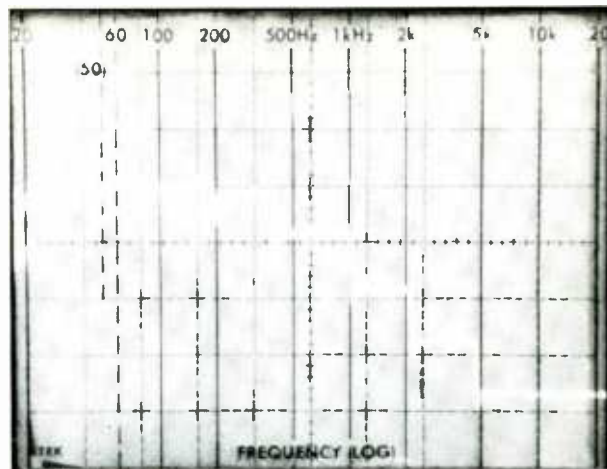
**Consumer Information Center
Dept. MR, Pueblo, Colorado 81009**

A public service of this publication and the Consumer Information Center of the U.S. General Services Administration





A



B

Figure 2. The release time of the compressor may be varied over a wide range. In 2A, the slowest release time was selected, in 2B, the fastest release time was chosen. Again, disregard frequency notations. Only a fixed 1 kHz test signal was used, with spectrum analyzer permanently set to that single frequency.

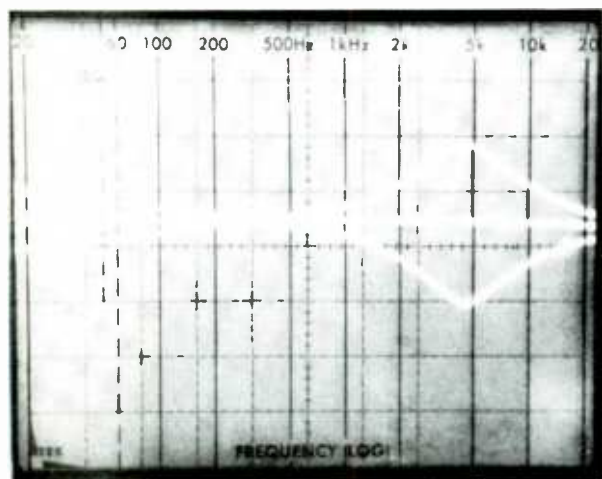
Controls give you the ability to change the input level and thus the threshold and the release time, but there is no control for output level. Therefore, the shape of the compression curve always looks the same at the output. A meter is also provided that reads gain reduction, but nowhere is there any indication as to the compression ratio except the brief description of the device which says that "...due to its high compression ratio..." I measured the ratio to be about 10:1 when all was said and done. The chart for the compression of this unit is defined in *Figures 1 and 2*. Although the input level may be changed, this basic shape of compression is forever superimposed on the output.

The inputs to the compressor are either mic or line level and the individual $\frac{1}{4}$ inch phone jacks can accept either high or low impedance devices. Outputs can be either mic level (-40 dbm) or line level (0 dbm). This

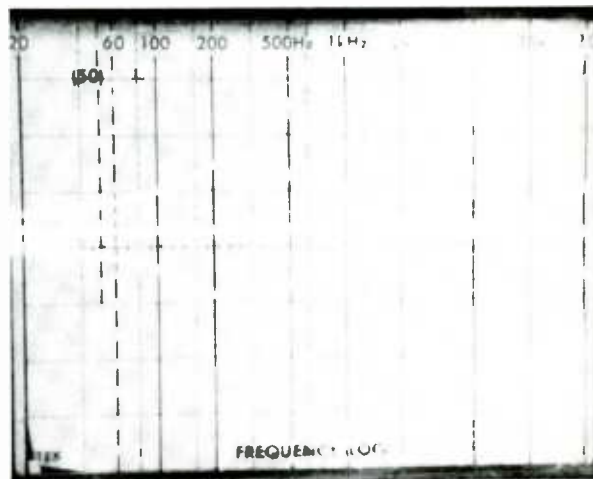
unit (like most of the others) is powered by either a 25 volt unregulated supply or an 18 volt regulated supply. The literature tells how these D.C. voltages can be attained by the power supplies available from Accessit or, alternatively, by battery power. The back of the unit is clearly marked so that other power supplies can be used besides the ones available for the unit.

Equalizer

The Dual Sweep Equalizer is of exactly the same make on the outside as the compressor with the exception that the meter has been replaced with two more knobs. The device represents two actual equalization sections that are normalled together unless both inputs are used—a nice touch. The addition of two small buttons on the front allows you to select between a high set of adjustments for center frequency



A



B

Figure 3. The range boost and cut, and the range of frequencies for each channel of the dual equalizer. In 3A, the switch is set for high frequency range, and vernier frequency control is set at maximum clockwise. In 3B, low range has been selected, and vernier control is set at maximum counterclockwise.

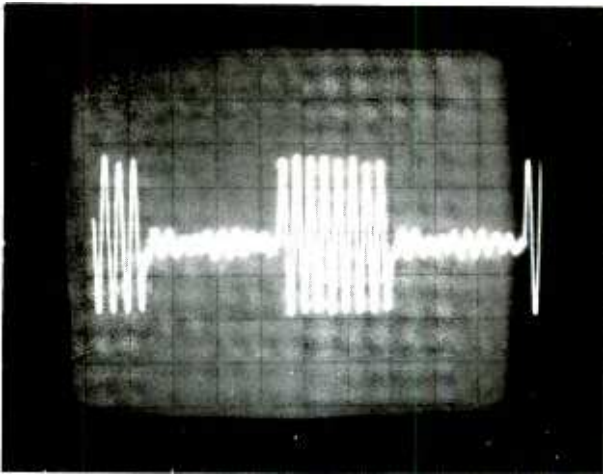


Figure 4. Action of reverberation unit, tone bursts at approximately 2 kHz were used so as to be able to observe "reflected" reverb signals generated by the electro-mechanical reverb unit itself (lower amplitude waveforms seen between actual input tone bursts).

or a low set of adjustments. As with the compressor, the power can be either the 24 volt supply or the 18 volt supply. As with the compressor, these are clearly marked on the back of the equalizer. The normalised connections are also clearly marked on the back panel. The input is high impedance and is designed to be run from -10 dbm to 0 dbm. The output is low impedance to allow sufficient drive for other devices. Again the literature gives no definite response information, but it seems that the device can cut or boost about 14 db with a fairly wide Q. (At 400 Hz and maximum boost, the half power points were at about 200 Hz and 600 Hz). The range of boost and cut is shown in *Figure 3*.

Noise Gate

The Noise Gate has the same exterior design as the rest of the units. Two inputs allow mic and line level signals at either low or high impedances, and the low impedance output will drive other equipment. An additional jack on the back allows independent access to the tripping circuitry. The front controls give the ability to change the release time, the depth of the attenuation, and the trip gain and input gain, which together can give you access to the threshold. An LED on the left indicates when the gate is gating, and an LED on the top right corner, as with most of these devices, indicates when the device is powered up. It is interesting to note that none of the units have individual power controls. They are turned on directly by the power supplies themselves.

Stereo Power Amp

The 15 Watt Stereo Power Amplifier is the only device not powered by the power supplies. It has the same basic outer design except for the fact that the inputs are on the front of the device and the outputs are on the back of the device. One of the disadvantages of this unit is that it has no volume control. This creates a problem while using this device in series with the other devices because none of the other units have *output* volume controls and this unit has no *input* volume controls. The compressor, for instance, will always

have the same volume in the post compression stages, since using this amplifier prevents you from controlling the input volume after the last device's output. Also, the top of the amplifier needs to be vented to allow heat to escape, so this unit should occupy the top spot in a stack. The top is covered by a grille that is taped to a plastic covering and is therefore not very durable. Perhaps screwing the top together would have prevented mine from coming apart.

Power Supply

The power supply for these devices will power four devices simultaneously with an eighteen volt regulated supply that is reputed to be very stable. It is totally devoid of controls save for a small LED in the top right hand corner to indicate that the device is plugged in.

A more efficient supply is available to power a single unit. It is a 24 volt unregulated supply and is one of the few devices not shaped like the others. It looks very much like a calculator supply, but has a panel on top that serves no purpose (at least none that I could discern). This is one of the only devices that came with absolutely no information at all. Even the box was unlabeled and it took me a matter of a few minutes to figure out what it was.

Stereo Reverb

The Stereo Reverberation Unit comes in two parts. The control unit has the same external design as the other units. A high impedance line level input is provided as well as left and right outputs. There is also a jack to provide interfacing to the spring itself (which is housed in the second unit). The power for the controlling unit is the same as the power for the other devices. Front panel control allows increases in input level; a corresponding overload LED is provided. The outputs can be mixed together with the original signal so that a mixer is not necessary, but the mix adjustment can be turned all the way to the "wet" position so that only the reverberation is returned and the mix can be done externally. An equalization section is provided with center frequencies from 150 Hz to 7.5 kHz. The equalization section cannot be bypassed, however, and is permanently in the signal path, although it can be set to a flat position. The usual LED in the top right hand corner indicates power to the unit. The action of the reverb unit is shown in *Figure 4*. An extension cord is thoughtfully provided with the unit to interface it with the spring housing.

The housing for the spring reverb is the most uniquely packaged item of the bunch. It is 1.75 inches high, about 9 inches wide and about 9.5 inches deep. Unlike the other units, this one comes in a metal case tightly screwed together. The only thing on the outside is the connection jack to the reverberation control unit. A block diagram of the logic is printed on the top to show the interface connections to the control unit. This is probably the most detailed information from a technical standpoint given anywhere for any of the devices.

Accessories

Also provided with the equipment are a few accessories, including a patchbay interface strip. This, quite successfully, confused me. The back of the patchbay has RCA connectors (female) so that other

brands of equipment can easily be connected to it with an RCA to RCA patch cord. If the Accessit units are connected to the back of the patchbay strip, many ¼-inch to RCA connectors would be needed. If a console or other peripheral equipment is patched to the back of the patchbay strip, connection can most likely be made with an RCA to RCA patch cord, a very common connection. The front of the patchbay could then be used to go directly to the Accessit units themselves, except for *one* problem: The patches to the Accessit units are in the back. If they are to be mounted in a rack with the patchbay strip, the rear of the units will be quite inaccessible most of the time. To top it off, the patch points for the 15 watt amplifier, unlike the rest of the equipment, has inputs in the front and outputs in the back, upsetting the whole scheme of things—even if you do get the rest of the system worked out.

The patchbay strip is about 3.5 inches high and the usual 19 inches wide. The board's points are accessible and well-labeled to accommodate changing the normalling connections without having to resolder the jacks themselves. Labels are also provided to label the inputs and outputs of the patchbay points, but some of the units to be patched (such as the compressor) have no corresponding labels, and no blank labels are provided.

Another accessory that is included is a headphone splitter box. The box is a very sturdy case made of ½-inch steel with eight 600 ohm headphone outputs and jacks to daisy-chain the boxes together. One of my friends happened by while I was looking at the equipment and remarked that with all eight outputs on one box, he didn't think his band would remain friends very long if they had to stand that close together for any length of time. It probably would have been better to have two boxes of four outputs than one of eight, but a few extension cords can solve that problem easily enough. The construction of the box is quite rugged and durable.

After unpacking all this equipment and looking it over for quite a while, I began to develop a curiosity about how things were stuffed inside these little boxes. Although the outsides may not stand up to World War III, the insides are solidly put together with quality components. What they don't have on the outside, they make up for on the inside. The PC boards are firmly mounted in their appropriate places by the sheer physical design of the case; they cannot move as long as the outside stays in one piece. The physical design of the case allows easy access to all of the electrical parts such that maintenance (should any be needed) would be very easy.

So, How Does It Work?

Since none of the items contained any technical information or specifications, I took the devices into the lab to see what they did with test signals. Of the devices that I checked, I found that the common frequency response was from 6 Hz to 111 kHz \pm 3 db (111 kHz was as high as I could measure). Signal to noise ratio for most of the devices was down around -90 dB, and the overall response was as good as could be expected.

One of the major uses highlighted by the literature was the ability to hook the system up to a guitar or

synthesizer or any other electrical instrument without having to use a direct box. The outputs could then be tied directly to an amplifier. Some of the units don't accept mic level signals, however, so the independent use of these units can be limiting since no preamp section is available to make up the difference. The units can be strung together in such a way that the first units have both mic and line level inputs, such as the compressor. The rest of the units can then be driven off of the line level output. In other words, the devices could be used in a live gig independent of the studio. The big problem that I found with this is that there is no way to bypass the unit once it is in the chain. In the above example, there is no way to prohibit the effects of the compressor except by turning the input volume down very low so as not to trigger compression. There is no foot pedal switch or even anywhere to connect one. It can be quite time-consuming in a live gig to have to disconnect a unit from the chain or even reset the controls. This eliminates the ability to change settings very quickly within a single song.

The units as they were provided to me came with little sticky feet that could be applied to prevent scuff marks on your furniture, but there was no method given for mounting them in the rack. Because the units are quite small, it would not be difficult to construct something yourself. They can be put three abreast in the standard rack mount width. Six units can be placed in a space the size of the patchbay strip. Mounting hardware is also available from Bendive, the company that makes the Accessit line.

The versatility of the Accessit units is quite nice, though in all of their applications there are a few problems. In a permanent studio set up, this problem of rack mounting is a big one, but a more subtle problem exists in the limit of the control that exists over each piece of equipment, i.e., output levels cannot be adjusted, there are no markings other than the extremes for equalization settings, and it would be of more benefit to me to be able to control the decay time of the reverb unit than to have an inescapable equalization section, especially when an equalization section is available in another unit.

When using the unit in a live performance situation, presets or at least bypass switches would be of some value and are not available. As far as mounting is concerned, even in a live performance it is doubtful that anyone would lay the units around, so some mounting is going to be necessary even then.

One area where the various items should serve very well, however, is in the box of miscellaneous goodies that accompanies almost any road gig. A couple of these systems would take up very little room, and could quickly and easily be adapted to almost any situation. They are good insurance against specific problems not expected or even anticipated. If you don't know when, where, or how you are going to need a certain piece of processing gear, then these are the ones you need.

Having played with the various pieces of equipment in the lab, it seems to me that the company's primary objective is to create an adaptable and convenient set of devices that are almost too simple to fail, so to speak. I was not at all disappointed with the quiet sound that I got. The compression and gating were smooth enough, although there is no control over the attack and decay times. The reverb sounded much like I expected it

would, but I missed the control over the decay time that I have grown accustomed to. The equalization was relatively gentle as far as the filter widths are concerned. Overall, I had good success with the units that I tried connecting together. The only problem was the devices that accepted only line level signals could not be used independent of the studio without a preamp, and, as strictly studio equipment, it lacked the versatility and control functions of some of the larger peripheral equipment. Though the control over the individual effects that I would expect of peripheral studio rack equipment is not available, a little

listening and tweaking of this knob or that produced most of the sounds expected from such a device.

If I had only one use in mind for the equipment, I could probably find equipment that would suit that one purpose better. If, however, the equipment is to serve several different functions, some perhaps not yet known, these various processing devices should serve their purpose quite adequately. As curtain time approaches and the guitar is compressed just the right amount because you happen to have one of these stashed in your grab bag, you may remember the saying that "precious things come in little packages."

Larry Zide

Fostex X-15 Multitracker



Can you have multitrack capability in a recorder for around \$500? The people at Fostex certainly think so, and their proof is the X-15 Multitracker. The X-15 is a four-channel cassette deck capable of doing demos and other multi-channel assemblies. And, since in its standard form it is battery operated (and even comes with a shoulder strap), it's made-to-order for road use.

It must be stated at the outset that the X-15 is actually a two-channel tape deck. Each of the two channels can be individually recorded, so mono or two-track can be recorded. Then, through internal switching, the recorded tracks can be bounced to another track. Thus, four tracks can be built up—to be later mixed down to stereo. This is all done internally through clever and uncomplicated switching.

Control Layout: The front panel (this would be the top facing you if shoulder-carried) contains two microphone phone jacks, and a stereo headphone jack with a gain control for headphone use only. A pitch control and two jacks labelled PUNCH IN and PUNCH OUT are also situated here (more on these features later).

If you turn the unit sideways, you find a lineup of eight phono jacks. These are the Channel A and B inputs and outputs (two inputs, two outputs), and four Tape Out jacks.

The main panel contains the cassette cover and well, with six easy-to-use pushbutton switches for cassette motion control. These are the standard forward and reverse, play and pause, and record controls. I left RECORD for last because, unlike most cassette decks, this record switch is not interlocked with the play button. That is, just as with open reel decks, you can be in the PLAY mode, and then punch into RECORD and out again—all without stopping the cassette.

Just to the left of this bank of controls lie two switches labelled RECORD TRACK CHANNEL A and RECORD TRACK CHANNEL B. These are safety-control interfaced with the record switch. Channel A can be switched to off (safe) or tracks 1 or 3, and channel B can be identically switched, but to tracks 2 or 4. To understand what these track designations mean, see *Figure 1* for the actual tape track configuration. Note that tracks 1 and 2 are in the same positions as the left and right channels of conventional cassette decks.

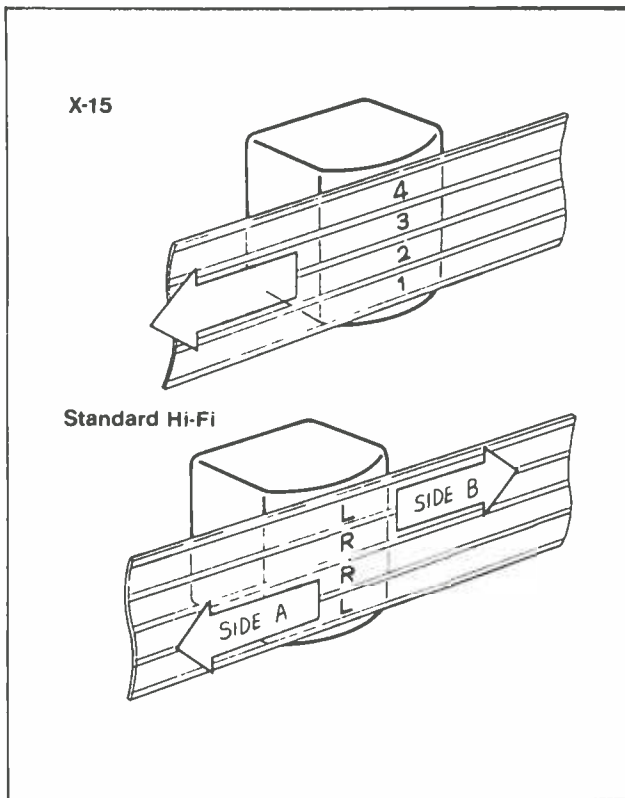


Figure 1. Track formats on the Fostex X-15. Note that tracks 1 and 2 conform to L and R on standard cassettes.

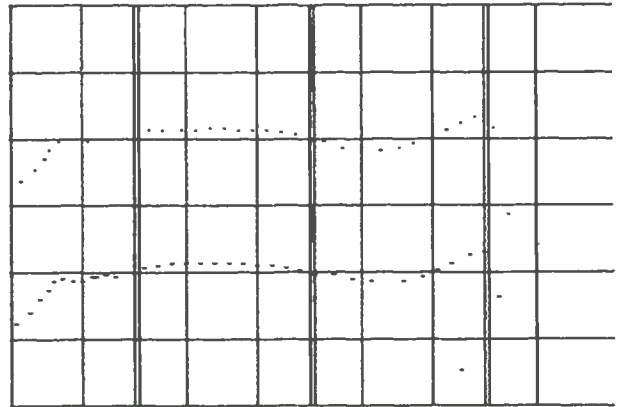
Thus the X-15 can be used to play any recorded standard cassettes.

Other main panel controls, just above the safety switches, consist of tone, bass, and treble, for channels A and B. At the left of this bank of controls you will see the two faders, with assignment switches above them that permit each fader to control mic or line inputs; in the "remix" position, they become A and B output faders. Between the faders are two rows of LED level indicators that show gain from -20 to +6-dB. At the top of the panel are the four rotary channel faders; directly below them, four respective pan pots. Each of the pan pots can position inputs or tape outputs for remix needs.

Power for the system comes from the rear of the unit. A battery pack containing ten C cells attaches there and directly powers the unit. The power pack itself is connected by two thumb screws, and makes electrical contact directly with the chassis. A power ON/OFF switch for the entire system is on the power rack as well. If battery portability is not desired, an optional (\$30.00) AC adapter is available. The adapter's output plugs into the rear of the X-15.

In sum, then, the X-15 is a musician's tool that can record up to four separate channels onto a cassette. It operates at standard cassette speed so is thus able to play, and even modify, cassettes recorded on other decks. Dolby B noise reduction is built into the record and play channels as a permanent feature. Note that the Dolby B feature cannot be defeated (should that be desired), so tapes made for this machine should be Dolby B encoded. Tapes made on the X-15, if they are to be played on other machines, should be set for Dolby B playback.

FR

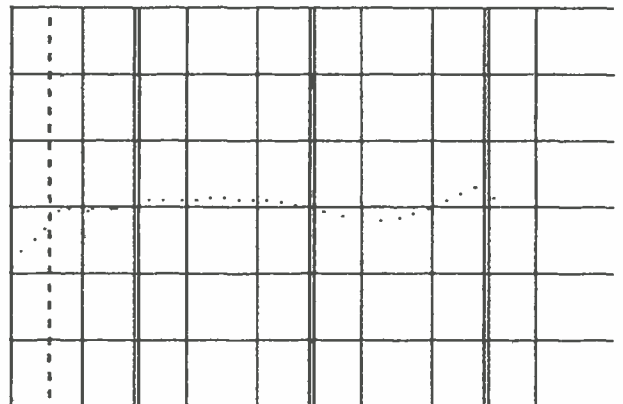


10dB/D L+00.1dB R+00.3dB 1.00kHz

Figure 2. Overall record/play for both channels; recorded at -10 dB below operating level. Scale is 10 dB per division.

The X-15 has full capacity to do punch in/punch out recording. If you are the operator/musician, you will appreciate the fact that for \$12.00 each, you can get two punch in/punch out foot controls that connect to the appropriate screw jacks on the front panel. You can also do track bouncing (ping-pong) and overdubbing all via controls on the unit. Finally, a finished four-track tape can be mixed to mono or stereo, again via the internal switching and controlling.

FR



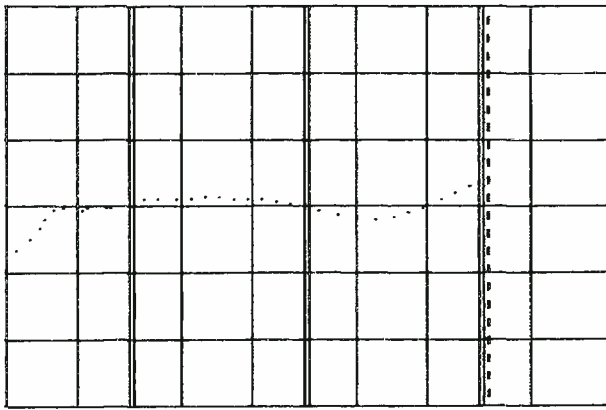
10dB/D R-01.9dB 033Hz

Figure 3. Overall record/play response, one channel only. Cursor is at 33 Hz, showing only -1.9 dB. Scale is 10 dB per division.

Test Results: Although Fostex supplied us with the AC adapter, our test results were done with a fresh supply of batteries. Spot checks of AC performance against the tested DC performance revealed no significant differences.

In the fine instruction book that accompanies the X-15, Fostex recommends the use of type II cassettes.

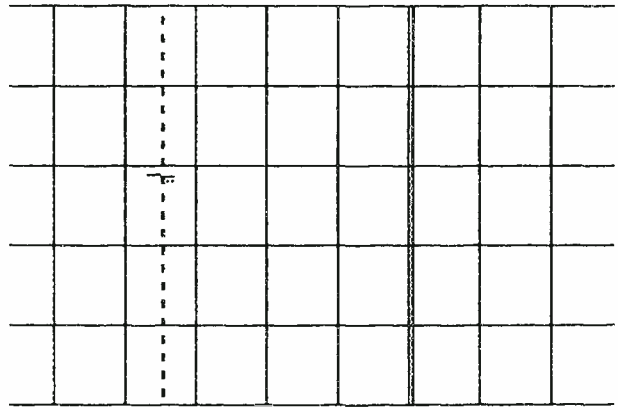
FR



10dB/D R+01.5dB 11.5kHz

Figure 4. Overall response, as in Figure 3. The cursor position shows response of -1.5 dB at 11.5 kHz. Scale is 10 dB per division.

D3 L 0.86% R 0.80%



10dB/D L-41.3dB R-41.9dB -17dB

Figure 5. Total harmonic distortion of both channels at 0 VU. Left channel shows 0.86 percent; right channel is at 0.80 percent.

These are tapes requiring high bias, 70 μ sec equalization. The tape used to test the unit was Maxell XL-IIIS C-90 tape. This is one of the tape-types suggested in the manual. Frequency response in combined record/play is shown in *Figure 2*. Analysis of these curves on our Sound Technology tester showed that actual response was 3 dB from 32 Hz to 12 kHz. If this is not quite what one should expect from a modern cassette deck, it is nevertheless satisfactory and within close tolerances of the manufacturer's own specifications for the X-15.

Other specifications tested for include distortion, signal-to-noise, flutter, and crosstalk. Each of these is detailed in the VITAL STATISTICS at the end of this report. Note that our Lab Measurement for each spec is significantly better than Fostex's claim.

Hands On Tests: Each of the facilities of the X-15 was tested under actual operation. Track ping-ponging should be limited to no more than two bounces before noise build-up begins to be noticeable. Punch

ins leave a click on the tape when the record circuit goes on, so take some care to do them where the click won't be noticed. Otherwise, future editing will be needed. Laying one track at a time, starting with rhythm and then adding vocal and then instruments, resulted in a final four-track tape that could be mixed to produce a high-quality demo tape.

Comments: The Fostex X-15 is exactly what it is advertised to be—a useful tool for the beginning musician who needs to make demo tapes and needs to get his feet wet with multi-channel recording techniques. For the approximately \$500.00 that you must lay out for this unit, you are getting a well-made and rugged unit that will get you through those early steps. If the X-15 doesn't quite give you what three to five thousand dollars can buy, it still manages to give a lot. And, it's priced right for what it does. High praise indeed to Fostex for this accomplishment.

FOSTEX X-15 MULTITRACKER: VITAL STATISTICS

SPECIFICATIONS

Frequency Response at -10 dB
below operating level.
Total Harmonic Distortion
Flutter and Wow
S/N
Crosstalk
Low Frequency Equalization
High Frequency Equalization
Dimensions
with battery pack
Weight
with battery pack
Suggested price with battery
pack
AC power supply
Mechanical foot switches

MANUFACTURER'S CLAIM

40 Hz-12.5 kHz 3 dB
1.5% at 1 kHz at 0 VU
0.1% peak, wt., IEC/ANSI
60 dB weighted
40 dB at 1 kHz
12 dB at 100 Hz
12 dB at 10 kHz
3 × 11½ × 7¾
3 × 11½ × 9
4.6 lbs
6.4 lbs
\$499.00
\$30.00
\$24.00 pair

LAB MEASUREMENT

33 Hz-12 kHz 3 dB
0.86% at 1 kHz at 0 VU
0.04% peak, wt., IEC/ANSI
64.9 dB weighted CCIR
63.6 dB at 1 kHz
+12.2 dB, -12.6 dB, 100 Hz
+12.1 dB, -12.6 dB, 10 kHz
confirmed
confirmed
confirmed
confirmed

Circle 46 on Reader Service Card



A Special Announcement to Purchasers of Yamaha DX Digital Synthesizers

The parent company of Yamaha International Corporation (a U.S. corporation) produces a number of products for worldwide distribution. However, products are carefully designed and engineered for the country in which they will be sold.

It has come to our attention that some DX7's and DX9's built for other countries are being imported to the U.S. and sold through non-authorized Yamaha retailers. The purchase and use of these units will present some serious problems to owners:

1. *Yamaha DX Keyboards distributed by Yamaha International Corporation* are manufactured to operate on the correct U.S. voltage. Others may operate on a different voltage, which could make the keyboard noisy or non-functional. Voltage converters may not provide a consistent enough voltage to allow the DX to be fully functional.
2. *Yamaha DX Keyboards distributed by Yamaha International Corporation* have obtained FCC and U.S. safety testing approvals (e.g., UL approved). Other units may not have these approvals. The

result could be severe RF interference to wireless microphones, televisions and other receiving electronics.

3. *Yamaha DX Keyboards distributed by Yamaha International Corporation* and sold through authorized Yamaha DX retailers are fully warranted. Others are warranted only in the country for which they were manufactured.
4. *Yamaha DX Keyboards distributed by Yamaha International Corporation* include a valuable accessory package at no additional cost: volume pedal, sustain pedal, owner's manual, music stand, demo cassette tape, instructional cassette tape. The DX 9 is also shipped with a cassette tape with 420 voices and a cassette interface. The DX 7 is shipped with two ROM cartridges (with 128 voices) and one RAM cartridge for storage of the buyer's own programmed voices. This complete accessory package is offered only through Yamaha International Corporation and its

authorized retailers.

5. Only owners of *Yamaha DX Keyboards distributed by Yamaha International Corporation* and sold through authorized Yamaha DX retailers will receive instruction and follow-up materials including an extensive American manual, subsequent manuals, information on software, etc.

You may quickly identify an authorized U.S. model of a DX 7 or DX 9 by looking at the back panel near the plug. Only authorized U.S. models will list voltage as "120 Volts." FCC and safety testing approval stickers will also be on the back panel.

The U.S. Federal Communications Commission requires all such equipment to be certified. Any retailer of uncertified equipment is subject to severe penalties. And any purchaser may be subject to forfeiture of the equipment.

If you have any questions about the authenticity of a Yamaha DX retailer or a DX keyboard, telephone:

Combo Division
Yamaha International
Corporation
(714) 522-9220

In the interest of continuing customer satisfaction, Yamaha International Corporation felt it necessary to bring this to your attention.



MAKING TRACKS

Columbia Records has added six new releases to their **Contemporary Masters Series**. The albums include newly discovered live recordings of **Miles Davis** and **Thelonious Monk**, along with sets by guitarist **Kenny Burrell** and trombonist **Al Grey**... **Luther Vandross** has released his new solo LP *Busy Body* for **Epic Records**. Luther produced the album himself... At the **Automatt: Jefferson Starship** is cutting tracks for an upcoming **RCA/Grunt** LP, with **Ron Nevison** producing and engineering. **Maureen Droney** is assisting. **Dream Syndicate** is mixing an upcoming **A&M Records** release, with **Sandy Pearlman** producing and **Paul Mandl** assisting... For the first time since 1978, **Kool & The Gang** will release an LP they produced themselves. The album is titled *In The Heart* and it is for **De-Lite/Polygram Records**... The **dB's** have entered **Bearsville Studios** to begin recording their first album for **Bearsville Records**. **Chris Butler** and the dB's will handle the production, with **Michael Frondelli** engineering. The album is scheduled for release in the spring of '84... **Elektra Records** and **Warner Special Products** have released a Compact Disc titled *The Digital Domain: A Demonstration*. The disc was produced by **Elliot Mazer**, who has worked with **Neil Young**, **The Band**, and **Linda Ronstadt**. The selections on this disc offer the listener different examples of digital recording: jet plane takeoffs, the human voice, pastoral settings, and unusual instruments. The disc also includes an extensive test section that can aid in the fine tuning of audio systems... **Blancmange** has just finished recording their new album for **Island Records**. The album was produced by **John Luongo**... At **Criteria Recording Studios: CBS International** artist **Julio Iglesias** was in the studio with producer **Ramon Arcusa** and engineer **Bob Castle**. Engineer **Richard Achor** of **Criteria Video Services** handled a dialogue looping job for **Universal Studios**. The project was a dialogue replacement for the television series "The Whiz Kids"... At **Disc Mastering Inc.**, **Randy Kling** recently engineered **The Kendalls'** new **Polygram** single, "Thank God For The Radio." The single was produced by **Blake Mevis**...

ON THE ROAD

Columbia recording artist **Herbie Hancock** will begin a cross-country tour in mid-December on the East Coast, then move West and eventually on to Europe in January. Hancock has assembled a diverse group of musicians especially for this tour... Australian rock group **Midnight Oil** has tentatively planned a tour for early 1984... **Island** recording artists **U2** are presently in Japan continuing their tour in support of the album *War*... Concert producer and distributor **Westwood One** and **Coca Cola** have renewed and expanded their "Superstar Concert Series." Launching the 26 concert series, which will be aired Saturday nights on over 400 radio stations, will be a special **Stevie Nicks** performance, scheduled for January 28. Most of the concerts will be recorded by Westwood One's mobile recording studios...



& MUSIC...



GENESIS: *Genesis*. [Produced by Genesis with Hugh Padgham; recorded at the Farm, Surrey, England by Hugh Padgham assisted by Geoff Callingham.] Atlantic 7 80116-1.

Performance: **Strong and exciting**
Recording: **Uninhibited**

During the 1970s, Genesis was a frontrunner in the progressive art music genre. With heavy emphasis on keyboards, these Englishmen helped introduce dreamy, rather long compositions to popular music. Although Genesis has toned down its art over the years (due to personnel changes and commercial restrictions), the remaining three members' penchant for uninhibited experimentation is evident in this recording.

In the early days, flowery keyboards were up front in the mix, together with the lead vocal. The keyboard was a bed of harmonies from where the compositions would get its drive. No more. Now the thrusting force is the maniacal drums of Phil Collins. Sometimes overbearing, but always welcome, the drums aren't as domineering as when Collins was its sole producer, i.e., his solo projects and work with the Swedish singer Frida. When Collins is allowed to freewheel on his set, all else in the mix seems either unimportant or smothered, as is the case of the mainly instrumental "Second Home by the Sea," where the skins ring freely, sometimes making Mike Rutherford's guitar obsolete.

The elasticity of the percussion is sometimes stymied, depending on the mood sought. On "Mamma," a steamy, dark-toned piece, the cymbals have been virtually erased in the aftermath, making them sound like hunks of metal being hit. However, the cymbals are remarkably resilient on "Silver Rainbow," a bright and cheery number.

This band likes to have its fun in the studio with little knick-knacks of noise mixed into the introductions and tail ends of the songs. These sparse nuggets of sound perk up the various tracks where they are found. Electric shocks of guitar are heard in the first few bars of "Home by the Sea," provoking the listener to ask what it is he/she has just heard. "Illegal Alien" with its gruff harmonies, is prefaced by the honking of cars during rush hour and what sounds like a fast forwarded tape.

All of this electronic trickery points to the band's infatuation with the synthesizer, which has pushed the guitar more and more into the background. The band does use guitar for filler in some of the instrumental breaks on top of the synths (as on "It's Gonna Get Better"), but then the guitar is ruddy and choppy.

Sometimes the trickery goes awry and the illusion created just goes "poof" and is forgotten. On "Illegal Alien," instead of using authentic trumpets and steel drums, Genesis opted to simulate the sounds by synthesizer. As when using a sugar substitute, it does the job, but leaves a bad aftertaste. The trumpets seem to buzz more than sing while the steel drums sound as if they are stuffed with steel wool. In this case, Genesis should have opted for the real thing.

Another interesting effect on this recording is the use of an "assembly line" type of crunch at the beginnings of two tracks. This sound is used effectively in both cases. On "Mama" it creates an eerie thumping with a twist of drollness. However, on "Silver Rainbow" the same effect is more colorfully flavored, giving an airy tone. This is a prime example of how a basic sound can be altered to fit in with the mood of a piece.

In all, this album is a sharply produced effort. Although a hugely

successful act, Genesis is not afraid to try new things. The synthesizer is used resourcefully and has a clean mark to it. Collins' vocals are emotion-packed, never boring. The slight echo used on his voice has a dramatic effect; and when it is allowed to reverberate at full force is particularly exciting.

martin basch

OREGON: *Oregon*. [Produced by Manfred Eicher; digitally recorded at Tonstudio Bauer, Ludwigsburg, Feb. 1983; engineered by Martin Wieland.] ECM 1258/Warner Bros. 23796-1 E.

Performance: **Worth the wait**
Recording: **Clear and bright**

Over the years, Ralph Towner, Paul McCandless, Collin Walcott, and Glen Moore, the multi-instrumentalists who comprise Oregon, have produced an outstanding and unique fusion of varied, even disparate musical elements. Towner's guitars, piano and French horn, McCandless' many horns, Walcott's sitar and percussion, and Moore's bass have enjoined precious compositions (often Towner's) with European classical, jazz and Indian influences to produce intelligent music of wide accessibility that defies categorization.

The release of *Oregon* is kind of a banner event for ECM Records. After numerous fine albums for Vanguard and a ditching from Elektra after another three gems, the group took a three-year recording break, allowing each member to devote more time to other settings. Enter ECM, which will enjoy not just more work from two of its most prominent soloists, Towner and Walcott, but will also add to its unsurpassed roster one of the freshest musical partnerships around.

Admirers of this label must already know, and if you don't, do heed the good word—the pairing of Oregon and ECM is a natural.



Although Oregon's music has never enjoyed a recording that soars to the heights this one does, producer Manfred Eicher and engineer Martin Wieland confronted new challenges in a band whose music has changed markedly since its last recording. Towner returned from his endeavors with a Prophet 5 synthesizer, the first electric instrument ever used by Oregon, and Walcott's considerable time with Don Cherry and Nana Vasconcelos in Codona, also an ECM group, left him with a whole new arsenal of rhythms as well as a propensity for inclusion of chant-like, wordless vocals where appropriate. Although Towner's electronics in particular take some getting used to, especially for long-time followers, nothing has been added to the Oregon conception in haste. Like it or not, the new directions here have obviously been long planned and carefully implemented. The thing is, unless you have heard Towner's recent *Blue Sun*, a beautiful solo album that could have prepared one for all this synthesizer work, there is no let-up; all eight tracks on *Oregon* employ the darned thing.

Meanwhile, in the control booth, familiar wizard Manfred Eicher and cohort Wieland prove for the umpteenth time that familiarity with a studio, knowledge of the musicians and their music, and no small store of sensitivity can result in a good recording. The digital process undoubtedly provides the polish.

The murmurs and backdrops laid down by the Prophet 5 had to be the one potential kink in this session that never materialized. A strikingly

nat hentoff

The Exhilarating Jazz Heritage: Doc Cheatham and Craig Harris

At 78, Doc Cheatham is almost as old as classical jazz. The ardent, crisply swinging trumpeter has been with McKinney's Cotton Pickers, Cab Calloway, Teddy Wilson, a number of Latin bands, Benny Goodman, and lots more. Still working regularly with unabated fire and grace, Cheatham is directly in the tradition of Louis Armstrong, but he has shaped his own voice within that gloriously assertive heritage.

It's A Good Life! (Parkwood Records, Box 174, Windsor Ontario, Canada N9A 4HO) was cut by Doc and what he calls his New York Quartet—the group that plays every week at Sweet Basil in Greenwich Village. The resilient, attentive rhythm section consists of pianist Chuck Folds, bassist Al Hall, and drummer Jackie Williams. There is also a vocalist—Mr. Cheatham himself. He has a limited range, and he relies, like Rex Harrison, on his interpretative rather than his technical vocal skills. The results are consistently attractive and unpretentiously good-humored.

Having been around for so many decades, Cheatham knows an abundance of tunes, and as usual, his repertory ranges widely—from “She's Funny That Way” to Duke Ellington's “Ring Dem Bells.”

The engineering is first-class, making it all sound as if you have a very well-placed table at Sweet Basil's. I also liked the notice on the liner expressing the hope that the buyer will urge friends to purchase their own copy rather than tape this one so that Doc isn't cheated of royalties.

Although trombonist Craig Harris is only 29—nearly a half century younger than Doc Cheatham—he too has in his sound and style practically the whole jazz lineage. Like more and more of the younger players, Harris has listened long and deep to those who have preceded him. At the

same time, he works on creating his own sound and his own autobiography in music. A powerful presence in a night club, Harris proves in his first album as a leader—*Craig Harris/Aboriginal Affairs* (India Navigation)—that he is just as compelling in a recording studio, when he has the freedom to speak his musical mind.

Harris has worked with, among others, Abdullah Ibrahim (Dollar Brand), Henry Threadgill, Jaki Byard, Cecil Taylor, and Muhal Richard Abrams. On this set, his colleagues include Ken McIntyre on reeds, drummer Andre Strobert, bassist and guitarist Alonzo Gardner, and Donald Smith in some of his most exhilarating piano on record. All the compositions are by Craig Harris, and all have been influenced by the time he spent in Australia while touring with Abdullah Ibrahim. He writes with the same clearly focused intensity—and fascination with soundscapes—that can be heard in his playing.

It is a very safe bet to herald Craig Harris as one of the sure masters of jazz trombone, a musician who will keep on growing because his intelligence and passionate curiosity won't let him stop. The recorded sound is an accurate reflection of the subtleties (dynamically and texturally) of Harris's music. Listen with special care to the didgeridoo, an Australian aboriginal instrument, on “Awakening Ancestors.”

DOC CHEATHAM: *It's a Good Life!* [Hugh Leal, producer; John Kilgore, engineer.] Parkwood Records 101.

CRAIG HARRIS: *Aboriginal Affairs.* [Bob Cummins, producer; Tim Benedict, engineer.] India Navigation IN 1060.

different sound in this band the synthesizer is, but with nods to Towner, Eicher and Wieland, a problem or an overbearance it is not.

One other new direction worth noting: If this record is any indication, Towner's composing contributions to Oregon may not total what they used to; one tune apiece are credited to Towner and McCandless, two to Moore and four to Oregon. There is no way to know where those last four themes originate, but somehow it doesn't much matter. What is important here is that four artists of phenomenal talent are creating new music reflective of increased skill, creativity, and maturation on the parts of all of them. Oregon's conspicuous absence has strengthened it, and debuting for ECM is the most fitting way possible to display that strength amply.

michael fishman

CHARLIE HADEN: *The Ballad of the Fallen*. [Produced by Manfred Eicher; digitally recorded at Tonstudio Bauer, Ludwigsburg, Nov. 1982; engineered by Martin Wieland.] ECM 1248/Warner Bros. 23794-1 E.



Performance: **Masterful**
Recording: **Masterful**

Charlie Haden is one of the most thoroughly compelling artists playing music today. The extent to which he pours himself completely into every project he undertakes has contributed greatly to some of the outstanding records of recent years. Jane Ira Bloom, the late Hampton Hawes, Pat Metheny, Christian Escoude and Old and New Dreams have all recorded wonderful albums with Haden's crucial input. But while he has fast become the favorite sideman and duet partner of many, Haden has, with much deserved ceremony, resurrected a band under his own leadership that last recorded in 1969 for Impulse Records. That band, the Liberation Music Orchestra, attempts to bring about an awareness of political, often revolutionary movements through its music. In 1969, the introductory record aroused much controversy. Today, the musical community has hailed the return of Haden's Orchestra as a welcome voice. For avid listeners and audio buffs, this new anthology offers a unique musical experience that

happily has been properly reproduced using the digital recording process.

Haden's singular expressions are channeled through songs native to the troubled cultures he pinpoints, along with a few originals using characteristic melodies and harmonies. Within these songs, some of our greatest musician-improvisers are given room to stretch, providing many tracks with striking and fiery juxtapositions between orchestration and open playing. Arranger-pianist Carla Bley's charts for trumpeters Don Cherry and Michael Mantler, saxophonists Dewey Redman, Jim Pepper and Steve Slagle, trombonist Gary Valente, French horn player Sharon Freeman, tuba player Jack Jeffers, guitarist Mick Goodrick, and drummer Paul Motian are extravagant forums allowing many potential combinations of open-jazz ensembles in one instant, and one cohesive world-folk band the next. The results are uplifting, penetrating, and always purposeful. Bley's arranging and the intonations of the individual players create a range of mood

swings befitting the solemn nature of the album's title and theme.

Committing all this wonder to record has been accomplished clearly and accurately. Producer and label principal Manfred Eicher embraced this project and recorded it in an honest nature appropriate for a well-intentioned, socially relevant (make no mistake) album which stands alone in its conception.

While most albums demand attention on two levels, the music and the recording, this album commands attention for a third—its focus on several horrible stories that happen to be true. The merit due the recording process here is that once complete, it readily takes a passive back seat to both the music and the events which the music calls attention to. Haden felt that these stories needed telling; his record company agreed, and granted him uncluttered space to tell them. Not to mention chilling copy and graphics on the cover. Much praise is due this classic album.

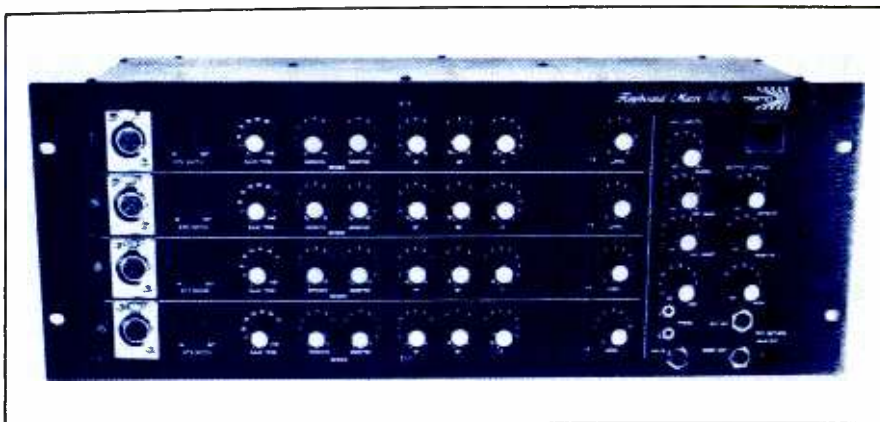
michael fishman

The Market Place

what's new in sound and music

BIAMP KEYBOARD MIXER

Biamp Systems' new Model 44 Keyboard Mixer is a moderately priced, compact four-channel board featuring low noise, high slew rates, and low distortion without overload. Although designed primarily to help the keyboard artist achieve problem-free sound mixing and monitoring, the 44 also incorporates a high quality microphone mixer for sound reinforcement. When combined with Biamp's new limiter/noise gates, equalizers, and amplifiers, the 44 forms the core of a versatile and moderately priced system with the live performance capabilities required by the keyboard artist. Each of the four channels on the 44 has two high-gain instrument inputs (designed to prevent overload) and a microphone input. A special Rhodes input on channel four is specifically designed to balance the complete scale range without use of an external graphic equalizer. All channels



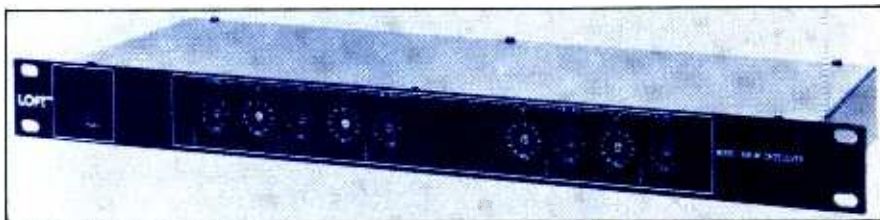
feature master effect send, independent effects patch in/out jacks, monitor send, three-band equalization, output level, and input overload LED. The returns section includes auxiliary input level to main, effects return to monitor, effects return to main, and tape inputs to

main/monitor. The monitor system is wired post-EQ, pre-level, for use as both keyboard and microphone monitor mix. Outputs are main level, master monitor level, and master effects level.

Circle 36 on Reader Service Card

LOFT 5-WAY MONO CROSSOVER

Loft's new Model 405-M Crossover is an 18 dB per-octave, five-way, mono version. It features adjustable crossover controls recessed in the front panel of low (20-400 Hz), low/mid (100 Hz-2 kHz), high/mid (600 Hz to 12 kHz), and high (1.2 kHz to 24 kHz) points. These crossover points allow the 405-M to be used as a three- or four-way mono crossover. The front panel also includes individual output controls, a power switch with LED indicator, and peak signal indicators for each frequency band. Rear panel signal



connections are via 1/4-inch phone jacks (standard) or XLR connectors (optional). The 405-M is an all-steel rack-mount unit that occupies 1 3/4-inch of rack space, and comes stan-

dard for 115 VAC, 60 Hz operation (220/230 VAC, 50 Hz is optional). Suggested retail price is \$599.00.

Circle 37 on Reader Service Card

MARSHALL CHANNEL— SWITCHING COMBOS

Marshall's new channel switching combo amplifiers (distributed by Unicord), models 4211 and 4212, have been added to the JCM 800 line. The two new models offer entirely redesigned channel-switching pre-amp circuits to provide the player with the classic Marshall rock style, as well as a clean and warm tube-type sound for other types of music. The newly re-designed amplifier section provides a much richer tone without losing the smooth over-drive characteristics common to Marshall tube amplifiers. In addition to an improved sound that is fatter and more musical, the 4211 and 4212 combos feature updated treble and presence controls that provide greater tonal variation and less interaction with the tone network. The amplifiers feature two Celestion 12-inch speakers working in tandem with the new tube circuit, which also features a new variable presence control in the master section. Both amplifiers provide two entirely independent preset sounds through separate channels that can be instantly accessed via a foot-



switch. The remote footswitch insures quiet, click-free operation. The 4211 provides 100 watts of power while the 4212 offers 50 watts. Additional features include a quiet and effective reverb circuit for a spacious,

hall-like echo effect; a separate effects loop; and a frequency-matched direct line output for optimum performance in the studio.

Circle 38 on Reader Service Card

FENDER VOCAL MICS

Fender's new D-Series vocal mics consist of three models: the high performance D-2, retailing at \$137.00; the D-1 economy model, priced at \$70.00, and the slim-line D-3, designed for both stage and broadcast applications at \$149.00. All feature a durable satin gunmetal finish, easily replaceable filter balls, and Fender's one year Road Hazard™ warranty, which provides for free repair or replacement of the microphone, should it fail for any reason.

Circle 39 on Reader Service Card



KORG POLYPHONIC SYNTHESIZER

The new Korg Poly 800, distributed by Unicord, is a professional digitally programmable 8-voice polyphonic synthesizer with many sounds and features that fits into a compact 13 lb. package. The Poly 800 delivers a wide variety of today's sounds and textures, such as fat brass sounds, expressive strings, distinctive lead line sounds, and realistic piano, organ, and clav patches. The Poly 800's "layering" mode provides two different sounds for each key/note to obtain thicker textures and more complex voicings. The Poly 800's 64 programs can be instantaneously accessed via its Digital Access Control System (DACS). Full edit capability allows instant temporary or permanent changes to any program during performance or transportation of programs from one location to another. 50-parameter high resolution control provides fine-tuning of each patch. The Poly 800's envelope generators utilize six individual envelope parameters (Attack, Delay, Slope, Break Point, Sustain, and Release). This feature is a significant improvement over common ADSR-type envelopes, because it allows more expressive control. Individual patches can be saved in the unit's memory and loaded to tape in 14 seconds. Programs can even be rearranged into a specific order and recalled in live performance via a



footswitch. The Poly 800's Noise Generator has individual articulation circuitry that lends added realism to sounds (such as flute and other wind instruments) and dramatic special effects. An on-board programmable Stereo Chorus adds extra depth and richness to individual sounds. A built-in polyphonic sequencer allows the user to create a wide variety of rhythms and chord patterns that can be stored or dumped to tape. The user can also play over patterns generated by the sequencer. A three-function (spring loaded) joystick controls pitch bend, vibrato, and filter modulation. The Poly 800

also comes equipped with the MIDI interface, which provides external link-up to other MIDI-equipped synthesizers or computers as a means of expanding sound and performance capabilities. The fact that the Poly 800 fits into a small package lends itself to being easily transportable to any job. Both AC and battery powered, the Poly 800 is also equipped with a headphone jack for private practice anywhere. The keyboardist can also attach a strap to the Poly 800 and wear it for freedom of movement in live performance.

Circle 40 on Reader Service Card

CONTROLLER FOR LEXICON REVERB SYSTEM

Lexicon's new Alphanumeric Remote Controller (LARC) adds control power and operator convenience to the 224X Digital Reverb System. The LARC is an option on new 224X systems and is easily retrofitted to existing installations. A 48-character alphanumeric display guides and prompts users in applying the full range of capabilities of the 224X and speeds mastery of the system, even by inexperienced operators. Registers for user-created programs in the 224X can store up to 36 setups that

can be off-loaded to a cassette by the LARC and reloaded in less than one minute. This feature allows relocatable setups and programs to be transported to any location with a LARC-equipped 224X. Once loaded into the 224X, registers are displayed alphanumerically on the LARC upon demand. Diagnostic routines are supplied, and the LARC may be operated up to 1000 feet away from the mother chassis.

Circle 41 on Reader Service Card



SHURE LAVALIER CONDENSER MIC

Shure Brothers' new SM83-CN omnidirectional, lavalier condenser microphone has been specially designed to provide quality sound reproduction in professional broadcasting and sound reinforcement applications. One problem addressed in the design of the SM83-CN design is the "chest resonance" phenomenon often encountered in using lavalier microphones. The SM83-CN's wide frequency response has been specially tailored to compensate for this problem with an electronically created dip at 730 Hz and an acoustically generated high frequency boost above 3 kHz. The result is natural sound without "boominess" or excessive brightness. In addition, the SM83-CN's controlled low frequency rolloff substantially reduces clothing, handling, and room noise. These sonic characteristics are made possible through the use of a specially developed amplifier supplied with the unit. This compact, lightweight amplifier measures 3¼-in. by 1⅝-in. by 29/32-in. and can easily clip onto the user's belt or fit into a coat

pocket. It may be powered by a standard 9-volt battery or by simplex power from an external source (such as Shure Models PS1 and PS1E2), or any microphone power supply providing 5 to 52 VDC simplex voltage. The Shure SM83-CN is supplied with a unique system of hardware that permits a wide variety of unobtrusive mounting techniques. Four mounting clips are provided: a single-mount tie-bar (for mounting two microphones simultaneously), and two multi-purpose mounting clips that may be connected to a lanyard, or sewn, pinned, or taped onto clothing. The microphone cable may be completely hidden behind neckties, sweaters, or other clothing. Other features include low noise, minimal RF and magnetic hum susceptibility, a field-replaceable cable that utilizes steel conductors for strength, a dark, non-reflective finish, a foam wind-screen for outdoor use, and rugged construction for durability and reliability.

Circle 42 on Reader Service Card



AUDIOCRAFT POWER AMPS

Audiocraft now offers five new additions to its ultra-low on-board guitar preamp line—the Power Preamps. They consist of the Rocker (RCK-1), the Bass/EQ (BEQ-1), the Treble/EQ (TEQ-1), the Module (MOD-1), and the Stratocaster Power Amp (STR-1). Like the Standard (STD-1), all the above units feature a bypass mode and boost mode on the three-position mini toggle switch. The third position has a variety of options depending on which of the models you choose: The Rocker delivers 12 to 20 dB variable boost, the Bass/EQ delivers midrange boost (treble boost when used on Bass), and the Treble/EQ delivers treble boost. The Stratocaster Power Preamp is a standard power preamp mounted on a flat output jack, available in chrome or bass. Finally, there's the Module (MOD-1), de-

signed for custom installations. All units are professionally designed to fit easily on board virtually any guitar or bass. The special design of the Power Preamps eliminate treble rolloff caused by guitar cables, resulting in greater clarity and definition of the instrument. The Power Preamps expand the range of existing volume and tone controls while improving the noise performance of your instrument, even when using signal processors and long cords. They are backed by a two-year warranty and come complete with wiring instructions. The list price for the units are as follows: the RCK-1, BEQ-1, and TEQ-1 are each \$67.95, the STR-1 is \$69.95, and the MOD-1 is \$59.95. Each unit requires one 9-volt battery.

Circle 43 on Reader Service Card



Classified

Classified

- PRODUCTS
- EQUIPMENT
- SERVICES

Classified Rates

\$1.00 per word.

Minimum \$25.00.

Copy must be received at Modern Recording & Music, 1120 Old Country Road, Plainview, NY

11803 by the 15th day of the 2nd month prior

to cover date (for example, the April

issue closes February 15th). Payment must

accompany order.

Phone numbers count as 1 word. Zip codes are free.

DISPLAY ADVERTISING

\$40.00 per column inch.

THE RECORDING BOOK THAT IS ROCKING THE MUSIC INDUSTRY

"Practical Techniques for the Recording Engineer" by Sherman Keene is endorsed by major Colleges, Universities, Recording Schools, Studios, Musicians and our Correspondence Students around the world. Recommended by reviewers of the MIX, Re/P, Guitar Player and other top publications. THE BOOK: hard cover, 380 pages, 28 chapters (4 on computer assisted mixing), illustrations. \$29.75 (\$31.69 in Calif.) plus \$2.50 shipping.

THE CORRESPONDENCE COURSE: certificate course using two textbooks, corrected and graded homework, unlimited dialog with the author via cassette, Basic, Intermediate and Advanced levels.

THE CURRICULUM: for schools only, Teacher's manual (lesson plans for two textbooks, charts, suggested session content), Student's Workbook, Final Exams.

FOR INFORMATION OR TO ORDER contact:

**S.K.P.
P.O. Box 2519-C
Sedona, AZ 86336
(602) 282-1258**

Order by phone using Visa or MasterCard by calling (805) 969-6639.

UHER, Sennheiser, Sony, AKG, Beyer, E-V. Send SSAE, Model, Quantity. **CARPENTER SOUND, BOX 1321, MEADVILLE, PA 16335-0821.**

SPECIAL! New Pentagon C-342 Cassette Duplicator. Factory sealed carton. 75) C-60's/hour. With CW-3 Rewinder. List Price—\$2400.00. First \$1850.00 takes. Call **Absolute Recording (219) 293-2717.**

YOUR OWN RECORDING SCHOOL/STUDIO

National audio educational franchises now available for private ownership! Operate fully equipped school/studio in your community. State approved courses developed over a 14 year period. Turnkey business including studio construction, equipment, pretraining, marketing, advertising, grand opening and ongoing assistance. Low initial investment! **Dawn Audio, 756 Main St., Farmingdale, NY 11735. (516) 454-8999.**

Advertiser's Index

R.S. #	Page #
Aphex	19
Audio-Technica	11
Carver	5
Carvin	27
Connectronics	57
Countryman	8
Crown	2, 9
DOD	Cover 4
DeltaLab	34-35
Electro-Voice	7
Fostex	30
Gotham	10
Hafler	15
LT Sound	33
Orban	17
Oberheim	21
PAIA	51
Peavey	31
Polyline	18
Rocktron	6
Sam Ash	15
Soundcraft	Cover 3
Soundcraftsmen	47
Studer Revox	13
Sunn	29
Tascam div. of Teac Corp.	25
Trebas	18
Yamaha	Cover 2, 1

FREE your copy of yesterday's prices on the industry's leading Pro Audio and Stage Lighting Equipment and Accessories Mixers, amps, equalizers, mics, lights, dimmers, lamps, gel and much more. Check our prices before you buy. All-Pro Audio and Lighting P.O. Box 3992 Centredale, RI 02911 Big Savings from the Smallest State

BLANK AUDIO AND VIDEO CASSETTES direct from manufacturer, below wholesale, any length cassettes: 4 different qualities to choose from, AMPEX and AGFA mastertape—from 1/4-inch to 2-inch. Cassette duplication also available. VHS T-120's \$6.00. Brochure. **Andol Audio Products, Inc., Dept. MR, 42-12 14th Ave., Brooklyn, NY 11219. Toll free 1-800-221-6578. NY residents (212) 435-7322, ext. 2.**

TANGENT 3216-A 24 CHANNEL CONSOLE \$12,000. FACTORY PATCHBAY, PRODUCER'S DESK, PEDESTAL PURCHASED NEW 1979. **TWELVE OAKS STUDIO, ATLANTA, GEORGIA (404) 435-2220.**

Fantastic easy to hold long lasting guitar picks. Players send \$10, Dealers \$30. Indicate preferred stiffness. **NO SLIP PICK CO., 727 N. Lake, Aurora, IL 60506.**

GUITARS/FREE DISCOUNT CATALOG: Martin, Ovation, Guild, Dobro, Fostex Multitrack, mandolins, banjos, accessories. Mandolin Bros., 629-MR Forest, Staten Island, NY 10310. (212) 981-3226. Visit our showroom.



SUBSCRIBER SERVICE **CHANGE OF ADDRESS**

Planning to move? Please let us know six weeks in advance so you won't miss a single issue of **MODERN RECORDING**.

Attach old label and print new address in space provided. Also include your mailing label whenever you write concerning your subscription to insure prompt service on your inquiry.

MODERN RECORDING
1120 Old Country Road
Plainview, NY 11803

Attach
Label
Here

▼ New Address Here ▼

Please print

Name _____

Address _____

City _____ State _____

Date _____ Zip _____

"After all, I'm a songwriter, not an engineer."



Songwriters and engineers are not only equipped with very different kinds of talent, they need different kinds of equipment to bring those talents out.

No one is more aware of this fact than Steve Kipner. He's one of the most successful songwriters in the country. You'll find his words and melodies behind many of the industry's top recording artists. Like Olivia Newton John's "Physical", "Heart Attack" and her newest hit "Twist of Fate." Other contributions include songs for Sheena Easton, Dolly Parton, America, and Laura Branigan.

And behind Steve Kipner you'll find Soundcraft's 400B console. Because to create the sound that both audiences and artists respond to, Steve prefers the console that responds to him.

Steve chose the 400B for reasons that are as solid as gold. "I spend long hours in my home studio, and I never know when the creative spirit is going to strike, even at 3 AM. I spend time at this console laying down tracks, not patching and repatching, or fooling around with a lot of confusing controls. The Series 400B does

what I want it to do and lets me do it easily. The quality of the sound is equal to expensive commercial studio sessions, plus I've got the comfort and control of my home environment. After all, I'm a songwriter not an engineer."

It's easy to see why Steve chose the 400B. But of course, at Soundcraft we do more than build the kind of consoles that bring out the best in recording artists and songwriters. We also provide a full line of quality mixers to bring out the artist in the engineer.

Soundcraft The Songwriter's Choice

Soundcraft Electronics 1517 20th Street, Santa Monica, CA 90404
(213) 453-4591 Telex: 664-923

Soundcraft Electronics Canada, Inc. 1444 Hymus Blvd., Dorval,
Quebec, H9P 1J6 (514) 685-1610 Telex: 05-822582

Soundcraft Electronics Limited 5-8 Grand Sutton Street, London,
EC1VOBX, England Telephone: 01-251-3631 Telex: 21198

Circle 11 on Reader Service Card

www.americanradiohistory.com

DIGITAL DELAY DIGITAL CHORUS DIGITAL FLANGER



The new 900 series Digital Delay systems from DOD can do much more than just echo effects. ONLY with DOD do you truly get all three delay functions in one unit. The DOD R-908, R-909, and R-910 all have sweep widths of 10 to 1; this allows each unit to flange and chorus like no other digital delay system.

R-908 Digital Delay: PCM (900 ms.-30-8KHZ)
R-909 Digital Delay: PCM (450 ms.-30-15KHZ)
R-910 Digital Delay: PCM (1900 ms.-30-15KHZ)

*When comparing digital delay systems, check the specifications—you will find that the effect specialists at DOD have developed the only full function digital delay systems available today.

*Note: Most other digital delays have sweep widths of less than 6 to 1.

DOD

DOD Electronics, Manufactured in the U.S.A.
2953 South 300 West, Salt Lake City, Utah 84115
Telephone (801) 485-8534

Circle 12 on Reader Service Card

www.americanradiohistory.com