

PROFILE:
David Letterman Band

K 47947
\$1.95

MODERN RECORDING & MUSIC

SEPTEMBER 1983
VOL. 9 NO. 8



In Concert
With King
Sunny
Ade

LAB REPORT &
HANDS ON:
Tascam 234 Syncaset

Building the Hyperflange Part II

RECORDING TECHNIQUES

NEW PRODUCTS
RECORD REVIEWS



THE FINE LINE

In the world of digital signal processors there is a fine line between processors that are "loaded" with features and those that are truly useful processing tools. Carefully designed signal processors have features and functions that are designed to work with each other logically and efficiently. This makes the digital processor easier to understand, to control, and ultimately to integrate into live musical situations.

It is this fine line that separates Ibanez digital signal processors from the competition. Each Ibanez digital processor—from the low-cost, full-function DM500 to the top-of-the-line DM2000—stands on its own as a strong, logical and useful processing system. And each is engineered to be the most cost effective processor in its class. So cross over that fine line to Ibanez digital signal processors—they're on your horizon.

DM1000 DIGITAL DELAY: 900 millisecond, full-function delay with infinite hold. **\$449.**

HD1000 HARMONICS/DELAY: Pitch shift more than one octave (up and down) plus digital delay. **\$499.**

DM500 DIGITAL DELAY: 256 millisecond, 16KHz bandwidth full function delay. **\$349.**

DM2000 DIGITAL DELAY: Over one second of delay at 16KHz bandwidth, with digital readout. **\$649.**

TOMORROW'S INNOVATIONS
Ibanez



For a full color catalog send \$2.00 to: Ibanez, dept. MR • P.O. Box 886, Bensalem, PA 19020
 17421 "B" East Gale Ave., City of Industry, CA 91748 • P.O. Box 2009, Idaho Falls, ID 83401
 In Canada: 6969 Trans Canada Highway, Suite 105, St.-Laurent, Quebec, Canada H4T1V8
 Circle 10 on Reader Service Card

THE FEATURES

KING SUNNY ADE AND THE AFRICAN BEATS

By Susan Borey

26

Popular for many years on the Nigerian charts, this real prince is making JuJu a worldwide rhythm. Since JuJu sounds different from Western music, the recording procedure is also different.

PROFILE: THE WORLD'S SMALLEST TELEVISION BAND

By Cheech Iero

32

The musicians for "Late Night With David Letterman" are a small band with a big sound. Here, they talk to *MR&M* about how they achieve such a good "live" sound for their television audience.

RECORDING TECHNIQUES, PART 15

By Bruce Bartlett

38

In this installment, Mr. Bartlett reveals varied techniques used in creating interesting and colorful effects.

STUDIO NOTEBOOK #15

By James F. Rupert

42

If you're an aspiring studio owner who does not want to build a studio in your basement or garage, be sure to read this column. Find out the best way to use your money, as well as all the things you should watch for when buying business property.

BUILDING THE "HYPERFLANGE + CHORUS," PART II

By Craig Anderton

56

Part II of Mr. Anderton's article describes the basics of building the H + C and how it works.

THE BEATLES: RELEASES BY MOBILE FIDELITY AND OTHERS

By Allan Kozinn

61

Twenty years have passed since the Fab Four from England released their first single. In honor of the occasion, Mobile Fidelity Sound Labs have released a set containing the fourteen original Beatle LPs. Allan Kozinn, famed Beatle-maniac, has written *the* definitive review of this album set.

THE STAPLES

LETTERS TO THE EDITOR

2

TALKBACK

Experts' answers to your questions.

6

THE PRODUCT SCENE

20

The new and the notable with items from Rane, Audio + Design, Shure and others.

AMBIENT SOUND

By Len Feldman

44

Mr. Feldman has returned from a European tour of Philips Company and Polygram Records. In this column, he describes the processes involved in producing CD discs.

LAB REPORT

By Len Feldman

46

Tascam's 234 Syncaset.

HANDS-ON REPORT

By John Woram

53

Tascam's 234 Syncaset.

GROOVE VIEWS

Reviews of albums by the Police, the Kinks, Marianne Faithful, Michel LeGrand, Jim Galloway and others.

67

ADVERTISER'S INDEX

72



Cover Photo: Courtesy of Island Records
Inside Sunny Ade Photos: Leni Sinclair
David Letterman Band Photos: Cheech Iero

JOHN WORAM
Editor

RICKI ZIDE
Managing Editor

MARK WALDSTEIN
Associate Editor

LINDA CORTESE
Technical Editor

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
516-433-6530

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.

LETTERS TO THE EDITOR

Call Out the (Sound) Reinforcement

I'd like to make a suggestion about your magazine. How about extending your pages to include something about sound reinforcement? There are so many mushrooming bands in the nation (at least one thousand in the Detroit area, with 500 officially listed in the local band directory), and a lot of these have very little knowledge of the sound reinforcement field. Electro-Voice partially fills the gap with its PA Bible publications, but as they appropriately stated, they are not getting into the publishing business. But the market is there, and you have the format, so why not use it?

My real reason for writing is a simple old-fashioned complaint. On several occasions, I have gotten cheated by not getting all my issues of *MR&M*. I can forgive one missing issue per year, but this is becoming a regular occurrence now. Consequently, I would appreciate your intervention on my behalf.

Mark Togan
Detroit, MI

You better stay out of the publishing business, Electro-Voice, or we'll start making microphones! (Just kidding, E-V.) As for sound reinforcement, it's rapidly becoming a big business, and we'd like to hear from others who are interested in reading more about it here in MR&M. If there's enough interest, we'd be glad to oblige.

We'd also like to hear from subscribers who regularly miss copies of MR&M. Believe it or not, our marvelous mailing machine doesn't play favorites, and doesn't have anything against you, Mark. It faithfully sends out 4,500 pounds of magazine each month, and along the way, a few of them get—as they say—"lost in the mail." If loss is a frequent occurrence in a certain area, that gives us some sort of clue, which we can take to the Post Office. No guarantees (have you ever tried to deal with the Post Office?), but we'll see what we can do. As for the occasional missing magazine, notify us promptly and we'll try to get a replacement copy on its way to you.



MODERN **RECORDING** & MUSIC

RECORDING TECHNIQUES

AAAA AA AAA AAAA

LAB REPORTS:

A AAA AA
AAA AAAA AAAA

MUSICIAN'S

NOTEBOOK:

BB BBBB BBBB



TALK BACK

Pot Has No Effect

I own a Teac 80-8 tape recorder and am having problems adjusting the high frequency record level. The pot Teac suggests (R 108 Record EQ for freq. 10 KHz-15 kHz) has no effect on these frequencies. I have read somewhere that a component on the Record/Reproduce P.C. board can be changed so that this adjustment becomes effective. I would like some more information on this if it is possible.

—Mike Tarbett
Miami, Florida

We received the following response from Teac:

The equalized recording amplifier in the 80-8 is a fairly straightforward op amp design with frequency selective feedback. As stated in our service manual, the record equalization trim pot (R 108) adjusts the circuit for the frequency at which the equalizer will peak; the peak adjust (R 109) controls the level of this peak.

These adjustments are to be made after the record bias and level have been made and are intended as a fine adjustment for any frequency response variations noted during the

recording calibration. They do not have a large effect on the final frequency response curve of the deck. The most significant adjustment for frequency response is the bias setting.

Therefore, we suggest that you follow the alignment procedure in the order stated in the Service or Owner's manual to properly align your deck. You should use the aforementioned trim pots for fine adjustment within a limited effective range for linearity in the high-frequency response of the record amplifier. You should not rely on these adjustments to correct problems that are caused by other sources such as worn heads, misaligned tape path, incorrect bias level, etc.

—Merlyn Morgan
National Service Coordinator
Teac Corp. of America

HOLDS UP ON THE ROAD

TYPE 85 FET DIRECT BOX



COUNTRYMAN ASSOCIATES INC.

424 STANFORD AVE. - REDWOOD CITY, CA. - 94063 - PHONE 415-354-9886

Power Ploys

I have a modest "bedroom" studio setup using a Tascam 38 deck and a Tascam 5 B board. Almost all of my recording has been limited to overdubbing of keyboard tracks with a drum machine. To this point I have had at most two musicians playing at any given time and haven't had any particular problems with cue mixes. Now I have decided to expand my sessions to include additional musicians and I am fortunate to have acquired several Teac Model 1s that will give me the capability of having separate cue mixes for individual players. My question concerns the most efficient and inexpensive manner to power the separate headphones mixes. Do most people power such separate cue mixes in a home studio setup with integrated stereo amps that are cheap to pick up, or do they build a sepa-

The EV/Tapco Entertainer®

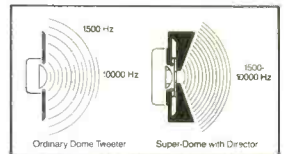
If you spend most of your playing time in different places, week after week, the EV/Tapco Entertainer is your un-bulky answer to great sound. Designed as a complete system, it consists of just three pieces: our 100M powered mixer and two 100S wide-range speakers. And it packs the features of more bulky,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



EV's "constant directivity" tweeter lets you reach more of the audience with the full sound of your performance.

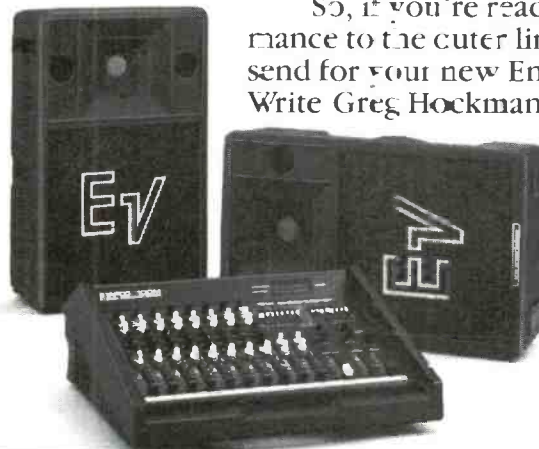
The entire system weighs less than 100 pounds and offers 100-watt per channel power, 10 inputs, three-band equaliza-

REACH THE OUTER LIMITS.

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 13 on Reader Service Card

rate headphone system? I've got a couple of old Kenwood amps that might be used, but I suspect that might not be the best way to go. How about some hints on the subject? Almost all of the materials I've seen concentrate on the control room monitor system without discussing the best way to put together a studio cue mix system.

—Mark A. Johnson
Roland Park, KS

Again, Teac and Merlyn Morgan to the rescue:

The Model 5 B has two headphone outputs. You have two more headphone outputs for each Model 1. If you need more mixes for your musicians than can be provided by the combination of outputs from your Model 5 B and "several" Model 1s, you can use an integrated stereo amp to drive additional headphones. This has some extra benefit in that the tone controls can be used to sweeten the cue send to the individual musicians tastes.

You know, of course, that your integrated amps can each accommodate more than one headphone by matching their output impedances to the multiple headphone loads by using the simple formula

of adding headphone impedances in series and/or dividing the product by the sum of impedances in a parallel connection.

An alternate method for multiple headphone cue mix would be to invest in our new Tascam MH 40, which provides for a four headphone load each. With each additional MH 40 in cascade, you have another four headphones in action.

You could also construct or buy small headphone driver amps so that each headphone station has its own output, but this may turn out to be time-consuming and somewhat expensive.

Our best wishes for success in your expanded venture beyond the "bedroom" stage, and our thanks for your dedication to Tascam equipment.

—Merlyn Morgan
National Service Coordinator
Teac Corp. of America

The X, Y, Z's of the Model 38
I just bought a Tascam model 38, and I'm liking it more and more with each passing day. It's also the only half-inch 8-track I can afford! Comparing the 38's suggested

retail price of \$2,750 with others from \$5,000 to \$10,000, I wonder if the 38 is a long-range machine?

Will the heads wear out in X years, after Y hours of use? If so, how long would you give it? I hope these questions don't sound suicidal. I'm confident that whatever the 38's life span, I will more than get my money's worth out of it.

—Bill Wells
Aberdeen, Washington

Yes, the heads will wear out in X years, after Y hours of use—just as they will on every other machine that's out there. However, the model 38's X and Y values are no less than those for any other machine, provided you take good care of it. Even when the heads eventually do wear out, the machine's life span is by no means over. Heads can be re-lapped or replaced, long before the entire machine dies of old age. As for the specific values for X and Y, these depend on so many variables that it's impossible to plug in a specific set of numbers. Suffice to say that the model 38 will probably still be up and running long after recording technology has turned it into a museum piece.

FURMAN REVERB:

"Easily set up, good sound, no hassles..."



"...It (The Furman Sound RV-1) was put into a rack in a recording studio with at least a half a dozen other reverb units, all of which were more expensive, three of which ranged in price from \$10,000 to \$20,000. All I asked was that every time the RV-1 was used the engineer put a slash on a piece of paper. When I went back to check it out (about a month later) they told me they threw the piece of paper away because it was full of marks. That's about the best recommendation that I can think of."

-Mike Shea, International Musician and Recording World, October 1982.



FURMAN SOUND, INC.
30 Rich Street
Greenbrae, CA 94904
(415) 927-1225

To young servicemen and women, USO is Family!



Look What USO is doing today for them!

Information on every conceivable problem, crisis aid, classes, cultural events, travel help, recreation, holiday programs and community projects.



the three most important letters in helping others

Support USO through the United Way, OCF, or local USO campaign.

Now you control how much better you'll sound!

Wait until you hear how good you sound with a new Audio-Technica AT831 picking up your guitar, mandolin, violin, or other acoustic instrument. And, if you think all ultra-miniature mikes are about alike, read on.

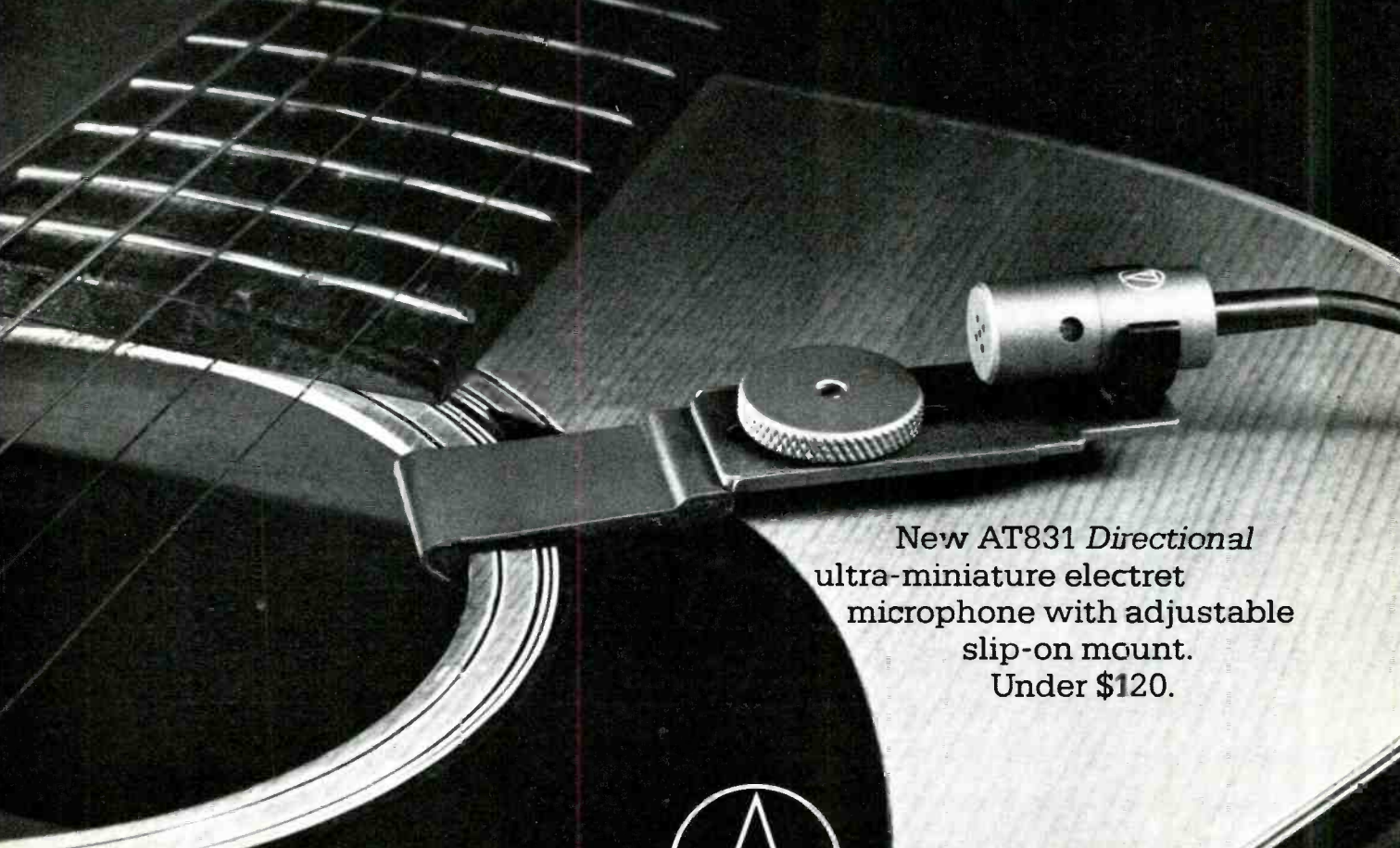
The AT831 is a *cardioid* (directional pickup) microphone. Which means it picks up more of you and less of the stage noise around you. It also means better feedback control, even when you're playing pop. It's a more intimate sound, well

balanced and smooth, with just enough presence to clarify without harshness. And the sound stays constant no matter how or where you move.

There's a major bonus only with the AT831. Want a "fatter," fuller sound? Just slide it closer to the strings on its adjustable mount. Want a "leaner" sound? Simply slide the AT831 further away. The felt-covered slip-on mount holds with gentle pressure, so there's nothing to mar the finish of your instrument.

Or you can use the traditional "tie clasp" mount to put the AT831 almost anywhere you can imagine (even on a tie, if you're into that)! And with eight feet of super-flexible cable between microphone and battery module, your freedom to move is assured.

Better sound and more convenience...just what you've come to expect from Audio-Technica. Find out more at your nearest dealer, or write for our latest catalog. Your audience will love you for it!



New AT831 *Directional*
ultra-miniature electret
microphone with adjustable
slip-on mount.
Under \$120.

audio-technica®

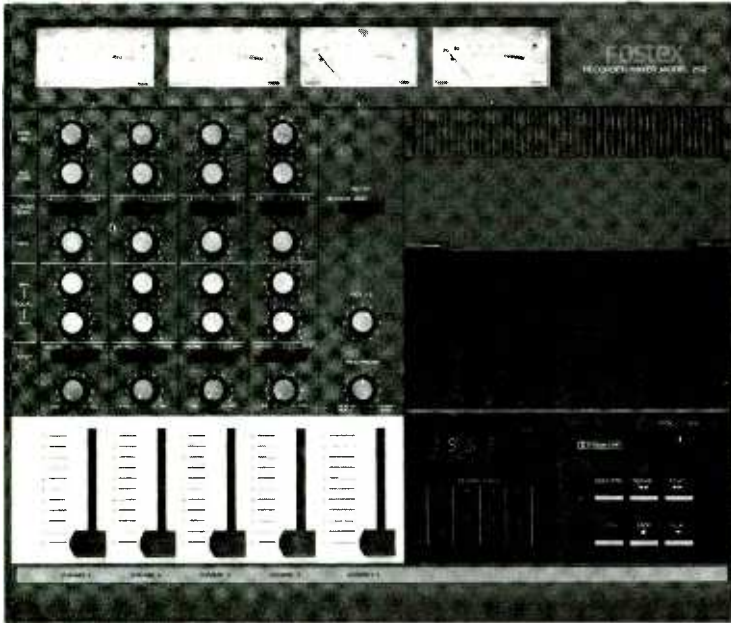


AUDIO-TECHNICA U.S., INC., 1221 Commerce Dr., Stow, OH 44224 216/686-2600

Circle 15 on Reader Service Card

www.americanradiohistory.com

The Fostex 250 Multitracker.



User Friendly.

If you're a player, you don't need to take time away from your music in order to make your demo tapes.

You don't need someone else to run the recording gear, either.

Not if you have a Fostex 250 Multitracker.

An independent test* comparing multitrack cassette recorder/mixers found the 250 Multitracker to be the easiest to understand and use.

We call it user friendly, to borrow an appropriate computer term. But find out for yourself.

Just visit your nearest Fostex dealer (also friendly) and get your copy of a comparison booklet we've prepared.

Feature for feature, function for function, sound for sound, you can't do better than become another friendly user of the Fostex 250 Multitracker.

Fostex
PERSONAL MULTITRACK

To find the name of your nearest Fostex dealer, call or write
Fostex Corporation of America, 15431 Blackburn Avenue,
Norwalk, CA 90650 (213) 921-1112

*Source: *INTERNATIONAL MUSICIAN AND RECORDING WORLD*, December, 1982

Circle 16 on Reader Service Card

If they can make it here, they'll make it anywhere.



When's the last time you saw "digging a well" on someone's résumé? Working in the Peace Corps is not your average everyday job.

Whatever it takes to be Peace Corps volunteers, it's a way of working that develops a resourcefulness and a degree of self-reliance that volunteers use long after they've come home. Anyplace they work. On any job they're given.

Hire a former Peace Corps volunteer, and put that experience to work on your "toughest job." Call Peace Corps toll-free, 800-424-8580 (ext. 76) to tell them about job possibilities for returned volunteers. Or if you know of those who might like to volunteer, use the same phone number (ext. 93) to put their experience to work where it can do a world of good.

Peace Corps

The toughest job
you'll ever love.



A Public Service of This Publication

MODERN RECORDING & MUSIC



**ALBATROSS
RECORDS, INC.**

3500 Albatross Ave.
Suite SPJ
Rockford, MI 40404
311-555-3200

August 1, 1982

Mr. Stephen West
4 Crestwood Lane
Acton, MA 01720

Dear Mr. West:

Thank you for your interest in Albatross Records. Unfortunately, after listening to your demonstration tape, we have decided that your talents do not fit in with our needs at the present time.

Enclosed please find the tape which is being returned to you.

Thank you again; we wish you and your group success in the future.

Sincerely yours,

Dean Noble
Dean Noble
Artist and Repertoire Director

Enclosure

DN:EP

“Thank you for your interest in Albatross Records. Unfortunately...”

Few things in this world are as irritating as a polite rejection letter.

But maybe one of these days someone will like your demo tape. And instead of a form letter, you'll get a phone call.

At dbx, we know it's the quality of your music that will make you successful. But we can't help thinking that the quality of your tape recording will play a part, too. After all, how will they know how good you sound if the tape doesn't really capture your sound?

So we have a suggestion: dbx tape noise reduction.

For a modest investment, you can add a dbx professional component to your tape system and start sending in demos that sound like the real thing.

Because dbx doesn't just reduce noise. We eliminate it. You can record, mix-down and overdub, again

and again, without any build-up of tape hiss. Each generation sounds just as clean as the first. And you'll end up with a final mix that sounds better than you've ever scounded on tape before.

Now of course, we can't guarantee that this will make you a hit.

But it will sure make you sound like one.

Visit your authorized dbx professional dealer for a look at our full line of equipment. Or call or write dbx, Incorporated, Professional Products Division, 71 Chapel Street, Box 100C, Newton, MA 02195 U.S.A.

Tel. (617) 964-3210.
Telex: 92-2522.

dbx® Professional
Signal
Processing

MUSICAL

NEWSICALS

DRUM COMPUTERS

E-mu System's Drumulator digital drum computer allows the creation of complete rhythm tracks with the digitally recorded sounds of real drums and percussion instruments. The Drumulator's sounds include bass drum, snare, rim, three toms, clave', hand claps, cowbell, open and closed hi hat, and ride cymbal (which can be replaced with an optional crash cymbal). The computer makes possible the programming of rhythm patterns in any time signatures with programmable correction of timing errors in playing. These patterns can then be combined into complete



E-MU Drumulator songs with programmable control of levels, repeats, and tempo (including programmed tempo changes within a song). The machine contains a programmable mixer that allows storage

and instant recall of a different mix for each song that is created. These mixes can also be programmed to change in the middle of a song. The programmable accent facility gives access to a regular and an accented version of every sound, the accent level being independently user-settable for each drum, cymbal, and percussion instrument. These accent levels can be programmed differently for each song and, like the mix, stored in memory for instant recall. Other features include the ability to sync to tape or other sequencers, external triggering of drum sounds, individual channel outputs, fast cassette interface for storing sequences, programmable trigger output, and a built-in computer interface. Accessories include a touch sensitive drum pad programmer and two different computer composition systems, one of which will print out percussion parts in standard music notation. The Drumulator's suggested retail price is \$995.00.

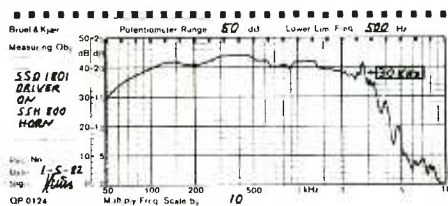
Circle 34 on Reader Service Card



setting new standards for excellence and value in Sound

RENKUS-HEINZ PROFESSIONAL SSD1801 EXTENDED RANGE COMPRESSION DRIVER

Now! A 1" throat driver for high power handling with crystal-clear performance to 25 KHz



Unequalized response 4' on axis in anechoic environment



Another **R-H** driver, offering a unique combination of extended frequency range, full power handling capability and clean natural tone quality. Compact, efficient, affordable—in a class by itself—here is an ideal professional all-purpose driver.

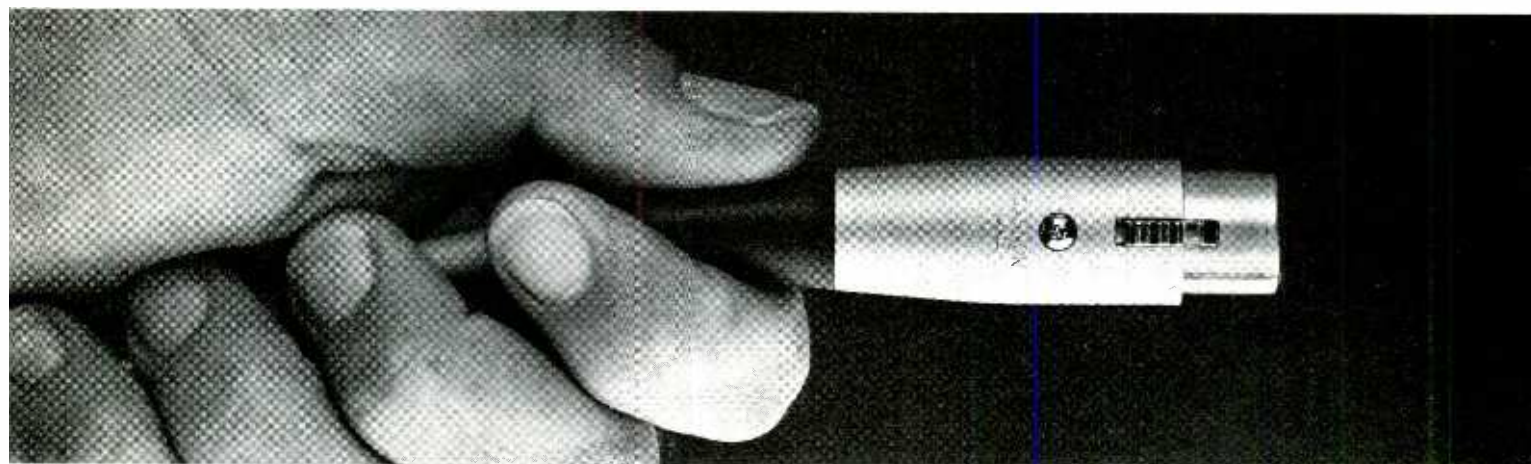
ASK YOUR DEALER FOR A DEMO OR WRITE US



RENKUS-HEINZ, INC. • DRIVERS • HORNS • SPEAKER SYSTEMS
17851AB Sky Park Circle • Irvine CA 92714 • (714) 540-3154

MXR Innovations' new drum computer, Model 185, features 12 real drum sounds (recorded in the studio and saved digitally). Each of the 12 voices has its own output level control and separate output jack. Recording capacity of the unit is 100 patterns with up to 99 click track beats each, and 100 songs. Seven accuracy levels are available, from $\frac{1}{8}$ notes to $\frac{1}{32}$ triplets, and built-in error correction places the programmed drum sound on the nearest note according to the accuracy level selected. Any time signature can be programmed in by setting the pattern length and accuracy level. Tempo is adjustable from approximately 40 beats-per-minute to 250 beats-per-minute, with LED readout to aid in adjustments. Just set the pattern length and accuracy levels required, adjust the tempo using the built-in click track,

Protect your investment with a cannon.



An audio connector by any other name is simply not an ITT Cannon audio connector. Which is precisely why so many audio engineers continue to specify Cannon[®] connectors for use with their audio equipment.

The XLR, the new XLB and XLA series are small, rugged, quick-disconnect connectors designed for use in audio/video and other low level circuit applications where reliability, quiet operation, elimination of mechanical interference and ease of use are necessary. Four different plug styles are available.

The EP connector is ideally suited to applications where extreme ruggedness and versatility are required. The new AP connector is a

Audio Connectors from Cannon



popular choice for heavy duty audio applications and is interchangeable and intermateable with the EP series. Both the EP and AP series may be used where as few as 3, or as many as 18, contacts are required.

The APLNE and AXLNE are specifically designed to handle the special needs of mains and other power supply applications.

For more information, please contact International Products Marketing Manager, ITT Cannon, a division of International Telephone and Telegraph Corporation, 10550 Talbert Avenue, Fountain Valley, CA 92708, (714) 964-7400.

CANNON ITT
The Global Connection

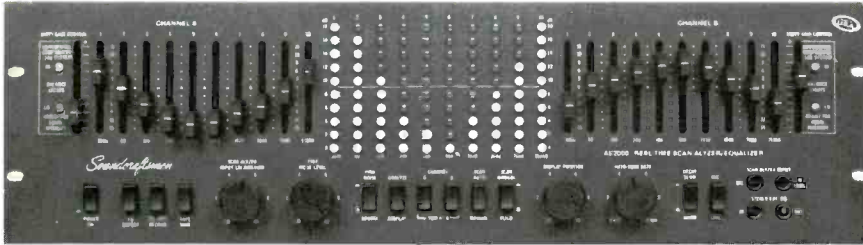
Circle 18 on Reader Service Card

Soundcraftsmen

MADE IN U.S.A.

QUOTABLE QUOTES FROM THE INDUSTRY'S EXPERTS:

SOUNDCRAFTSMEN AE2000 AUTO-SCAN-ALYZER

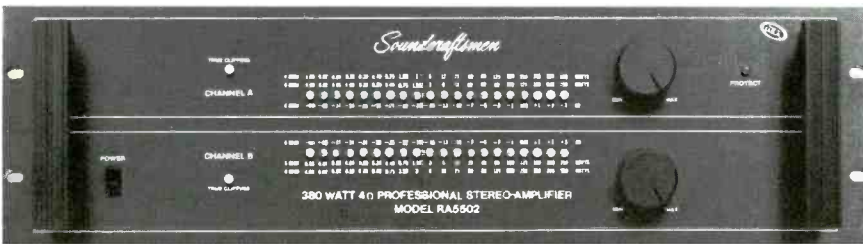


"Soundcraftsmen has developed a system known as a 'Differential Comparator' that delivered accuracy of settings of as little as $\pm 0.1\text{dB!}$ "

"The Soundcraftsmen AE2000 is one of the finest instruments for any of these tasks that I have had the pleasure of using."

Soundcraftsmen Differential/Comparator® RTA/Equalizersfrom \$499.

SOUNDCRAFTSMEN RA5502 POWER MOSFET AMPLIFIER



"...exceptional dynamic headroom. The 8- and 4-ohm maximum outputs were, respectively, 225 and 370 watts... and into 2 ohms was 468 watts."

"We were also impressed by the ruggedness... and freedom from the all-too-common self-destructive tendencies of high-power amplifiers."

Soundcraftsmen Professional Dual-Channel Amplifiersfrom \$549.

SOUNDCRAFTSMEN TG3044 DUAL-CHANNEL THIRD-OCTAVE EQUALIZER



"...a unit aimed at the studio engineer and performer..."

"All of the published specifications for the TG3044 were met or bettered in tests. Especially notable was the device's extremely low distortion..."

Soundcraftsmen Differential/Comparator® Graphic Equalizersfrom \$299.

FREE! Complete Test Reports...
Specifications and Prices...

WRITE OR PHONE FOR FAST ACTION, OR CIRCLE READER CARD #.

SOUNDCRAFTSMEN INC., 2200 So. Ritchey, Santa Ana, CA 92705 PHONE: (714) 556-6193

and depress the appropriate drum voice key. Real-time programming eliminates step-programming. The click track automatically emphasizes the first beat of the selected pattern length, so multiple drum tracks can be laid down accurately, one over the other. Either an individual occurrence of a particular voice may be erased, or all occurrences of that voice in a given pattern. Pattern



MXR Model 185

lengths can be extended or shortened by pressing a few buttons. A group of patterns may be strung together electronically to produce a complete song. The recorded patterns or songs can be outputted to any high quality reel-to-reel tape recorder or direct to a mixing console. A verify function allows taped pattern or song information to be checked for accuracy through the computer without actually recording it in the computer. On playback, both tempo and pitch can be adjusted, and a human feel can be induced by using any of the four levels of Shift (sometimes called "swing" or "shuffle"). This feature offsets the drum voices slightly, positioning them either just before or just after the primary rhythm beat selected by the accuracy control. Other features include pre-panned stereo outputs, a tape/sync interface, the ability to control tempo from an external source, external voice expansion, and external TTL-level trigger inputs for all drum voices plus Accent, making the drum computer interfaceable with other small computers. Power-fail memory protection for the CMOS, RAM, and ROM memories is built-in, making the drum computer transportable. Programmed patterns and songs will remain in memory for up to 10 years, powered by internal lithium batteries. The unit measures 3¼-in. high by 17½-in. wide by 10½-in. deep, and weighs 11½ lbs. It has a suggested retail price of \$1,250.00.

Circle 35 on Reader Service Card

20 reasons why the QSC Model 1400 should cost more. And why it doesn't.

Until now, designing a premium professional amplifier was seemingly a set procedure. All that was needed to introduce a new product was a new feature, a hot new component, more power, or perhaps some complicated circuit gimmickry designed to impress others with "technical superiority."

The results were almost always the same: very little improvement in real-world performance or reliability accompanied by a hefty increase in price.

But we at QSC decided that you deserved more than that.

So we went back to square one, taking a hard look at professional amplifier design and construction basics. We found a lot of room for improvement. Time and technology had changed things. Approaches that had been taken for granted

for years were out of date. They needed re-evaluation...and a breath of fresh air.

With that in mind, we designed Series One. A line of amps that include a host of features (including many advancements gained from our revolutionary Series Three amplifiers) and the finest in high quality/high performance components. We examined existing construction and assembly methods and re-engineered them to be much more efficient.

The result is almost unbelievable. Take the Model 1400 for example. It's equal to or better than any premium power amp on the market in terms of features, performance, reliability, or quality of components. In terms of price, it could command a comparable price tag. But the same rethinking that made the Model 1400 technologically superior also made it less expensive. How much less? Like we said, it's almost unbelievable: only \$698.00*.

In all modesty, we feel that we've created a whole new price-class of premium power amplifiers. A look at the features we've outlined here will give you some indication of the technology that makes the QSC Model 1400 uniquely superior. Ironically, many are the same features that make it so affordable.

To find out more about the 1400, see your QSC Audio Products dealer. After all, can you afford not to?

1. Power

A hefty 200 watts per channel @ 8 ohms, 300 watts per channel @ 4 ohms, 20-20kHz, both channels driven.

2. Lightweight, Compact Size

Advanced design reduces weight to a mere 27 lbs.

3. Flow-Through Cooling

High-turbulence heatsink thermally coupled to faceplate dramatically reduces weight. Two-speed fan with back-to-front airflow also helps keep rack cool.

4. Case-Grounded Output Transistors

Provide a 25% improvement in thermal transfer increasing reliability through reduction of thermal cycling fatigue and insulation breakdown.

PREMIUM COMPONENTS

5. Large SOA, High Speed, Mesa Output Transistors

Renowned for their ruggedness and audiophile sound.

6. 5532 Op-Amp Front End

High speed, low-noise, and low-distortion op-amp designed explicitly for high-performance audio.

7. High-Density, Low ESR Filter Capacitors

The very latest in advanced foil technology, reduces size and weight while improving performance.

8. FR-4 Fiberglass PCB's

High quality circuit boards.

9. Single Piece 14-Gauge Steel Chassis with Integral Rack Mounts

Thicker than normal for extra strength, no welds to crack or screws to loosen.

10. Full Complementary Output Circuit

For optimum performance and power.

11. Independent DC and Sub-Audio Speaker Protection

Circuit design inherently protects speaker from DC or sub-audio

surges due to output failure. Acts independently on each channel.

12. Dual Power Supplies

Split power transformer with separate rectifiers and filters. Provides better channel separation and improved reliability.

13. Patented Output Averaging™ Short-Circuit Protection

Provides superior short circuit protection without the audio degradation found in VI limiting.

14. Thumpless Turn-On, Turn-Off

Input muting relay provides turn-on delay and instant turn-off to protect sensitive drivers and speakers.

15. Active Balanced Inputs

For superior audio performance while reducing cable-induced hum.

COMPREHENSIVE INTERFACE PANEL

16. Octal Input Socket

Accepts active and passive input modules such as comp/limiters, crossovers, and transformers.

17. ¼ RTS, XLR, and Barrier Inputs

No need for adapters.

18. Mono-Bridging and Input Programming Switches

Maximum flexibility without jumpers or patch cards.

19. Optional 70-Volt Output Transformers

Mount right on the back for use in distributed systems.

20. 2 Years Parts and Labor Warranty

A quality product backed by an extended warranty.

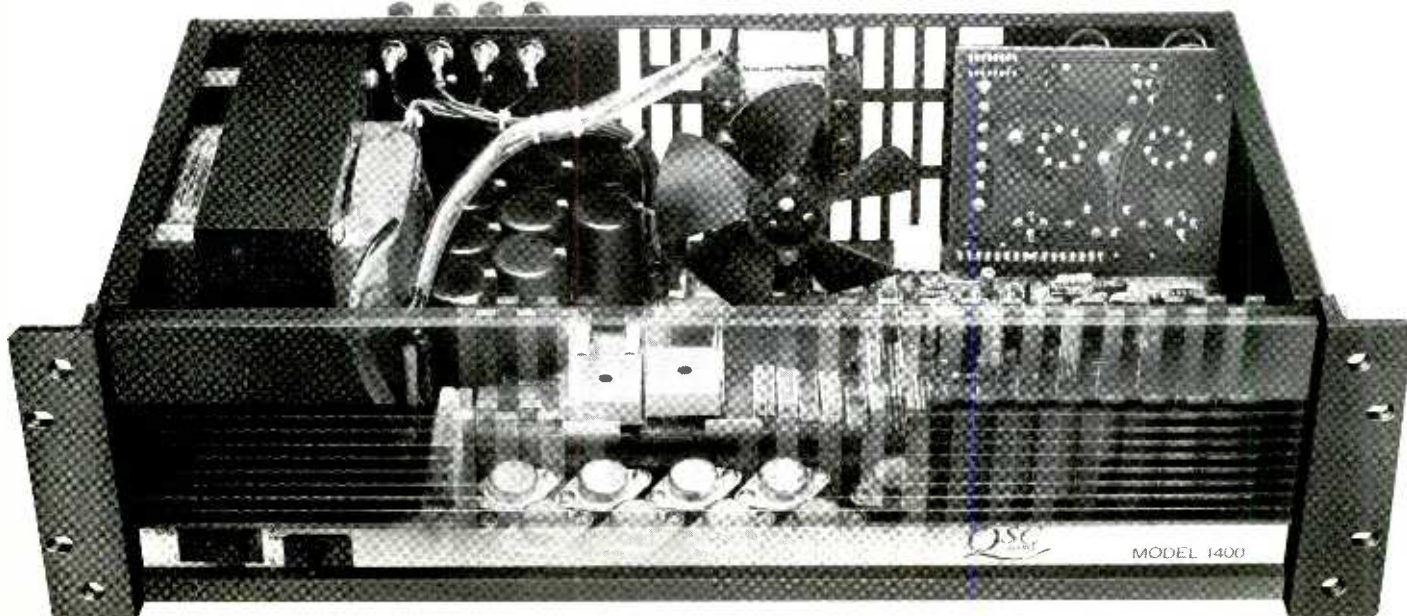
*Manufacturer's suggested retail price

QSC
AUDIO

QSC Audio Products
1926 Placentia Avenue
Costa Mesa, CA 92627

Write for details and specifications on these and other products

CANADA: SF MARKETING, INC., 312 Benjamin Hudson, Montreal, Quebec, Canada H4N1L4
INTERNATIONAL: E AND E INSTRUMENTS INTERNATIONAL, INC., 23011 Moulton Parkway, Building F7, Laguna Hills, CA 92653



Circle 19 on Reader Service Card

Oberheim Electronics' DX, a new low-cost addition to their line of digital drum machines, uses digital recordings of real drums stored in computer memory and features complete programmability of rhythms, time signatures, sequence lengths, and tempos in both real-time and single-step modes. The voices include bass drum and snare drum with three dynamic levels, open, closed, and accented hi-hat, three tom-toms, long crash symbol with dynamics, shaker, and hand-claps. The DX has separate outputs for each voice, a

capacity for 2000 notes. Clocking functions allow the DX to synchronize with the rest of the Oberheim music system. In addition, the DX contains battery backup for retention of memory with power off, as well as cassette interface for off-line storage of sequences. The suggested retail price of the DX is \$1,395.00.

Circle 36 on Reader Service Card

AMPLIFIERS

Roland's new Cube Chorus Amplifiers combine the effects of its distinctive Chorus effect and well-known Cube amps to create a new kind of hybrid amplifier that can be used on its own, or with a normal Cube amp for brand new effects. The Cube Chorus amps come in 40-watt and 60-watt models, and are furnished with a special Chorus/Reverb Output jack that works in tandem with two effect switches to route the internal Chorus and Reverb effects in various ways, such as to another Cube amp (or many other amps) on an opposite side of the stage. Other features include a 2-input (Normal/Overdrive) system fully adjustable to the instrument played, separately controlled



Roland Cube Chorus Amplifier

Overdrive, Volume, and Master Volume controls, Bass, Middle, and Treble Equalization controls, Reverb, and Chorus. Many output and remote switching jacks are provided on the back panel to increase live performance applications. The Cube Chorus (CH-40) has a 10-inch speaker, 40 watts of power, and measures 12.6-in. wide by 14.8-in. high by 8.2-in. deep, weighs 23.1 lbs., and retails for \$375.00. The Cube Chorus 60 (CH-60) has a 12-inch speaker, 60 watts of power, measures 14.8-in. wide by 17.1-in. high by 9.4-in. deep, weighs 27.5 lbs., and retails for \$480.00.

Circle 37 on Reader Service Card

Ampeg's latest addition to their existing series of tube amplifiers, the V35C, highlights features such as switchable equalizers, mid-boost, selectable impedance, detailed construction, and conservative power ratings. Other features include remote switching of each channel and reverb (a three-way foot controller with LED indicators is included), dual in-line full length reverb, Pre/Post Volume control



Ampeg V35C
MODERN RECORDING & MUSIC



The Oberheim DX

seven-channel stereo/mono mixer, and an external trigger input that can be programmed to play any combination of drums. It features 100 sequences, as well as 50 songs that enable the programming of entire compositions, and a memory

For better
sound,
try this

on your
PZM[®]

—For more ideas on how to use PZM microphones,
write for your free copy of PZM APPLICATION NOTES.



CROWN[®]

1718 W. Mishawaka Road, Elkhart, IN 46517.

Circle 20 on Reader Service Card

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
1. The Decibel
2. Sound</p> <p>II. Transducers: Microphones and Loudspeakers
3. Microphone Design
4. Microphone Technique
5. Loudspeakers</p> <p>III. Signal Processing Devices
6. Echo and Reverberation
7. Equalizers
8. Compressors, Limiters and Expanders
9. Flanging and Phasing</p> <p>IV. Magnetic Recording
10. Tape and Tape Recorder Fundamentals
11. Magnetic Recording Tape
12. The Tape Recorder</p> <p>V. Noise and Noise Reduction
13. Tape Recorder Alignment
14. Noise and Noise Reduction Principles</p> | <p>15. Studio Noise Reduction Systems</p> <p>VI. Recording Consoles
16. The Modern Recording Studio Console</p> <p>VII. Recording Techniques
17. The Recording Session
18. The Mixdown Session</p> <p>Three all-new chapters
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, Digital Playback, Error Detection and Correction, Editing, etc.)
21. Time Code Implementation
(The SMPTE Time Code, Time-Code Structure, Time-Code Hardware.)</p> |
|---|---|



\$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 _____

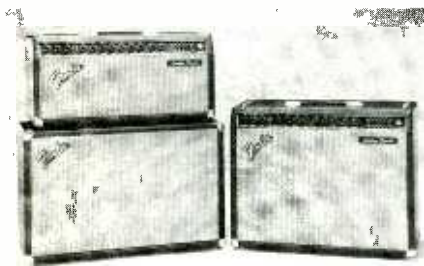
Signature _____
(changes not valid unless signed)

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

(separate from Master Volume control), output stages that utilize Industrial Grade 6550A power triodes, G-1265 Celestion Speakers, removable casters, dual voice pre-amp design to develop the two primary voicing standards most used, and travelling portability.

Circle 38 on Reader Service Card

The London Reverb series is the latest and most advanced in Fender's amp repertoire. Contributing to the versatility of this series of amps is its tone control setup, which includes a four-band active equalizer in the lead channel, along with passive Bass, Treble, Bright, and Mid-boost controls in the normal channel. In addition, a separate 5-band graphic equalizer is included, which may be



London Reverb Amp

pre-programmed into either or both channels. Other features of the 100-watt unit include an effects loop (also programmable for either or both channels) with adjustable send and return levels, and separate Preamp-Out and Power Amp-In patch points. The four-way footswitch (reverb, channel selection, equalizer, and effects) utilizes Fender's new noiseless switching technology, and features illuminated function indicators which are duplicated on the amp's front panel. The London Reverb is offered in a selection of configurations. Self-contained units are available with one 12-in. or two 10-in. speakers, and there's a separate Top version to be used with any speaker of four ohms or greater. High performance EVM speakers are also available as an option.

Circle 39 on Reader Service Card

KEYBOARD INSTRUMENTS

The Roadrunner 3 is Crumar's latest version of the original slab piano. It features three piano voices (acoustic, clavichord, and harpsichord) that can be played with clarity alone or together. Each voice spans



Roadrunner 3

the 61-note keyboard and can be played along with a specially designed two-octave bass circuit that can be fed through a separate amplifier to give a stereo effect. This instrument has its own independent output from the piano sounds when desired. Each voice can be channeled through a built-in phaser with speed-control to give a "fatted" sound for variety. The unit has an accessible wide-range tuning knob, pitch and volume control, and comes complete with music rack and sustain pedal. An optional stand is also available.

Circle 40 on Reader Service Card

KEYBOARD ACCESSORIES

Yamaha Specialty Products is now marketing the new Mini-Printer MP-1, an instrument that combines a portable, electronic keyboard with a computerized music printout system. The compact MP-1 contains a minia-



It proves its worth.

While others have introduced more expensive reverbs that don't sound like they're worth it, or lower-cost units that don't deliver quality, Orban's 111B Dual Spring Reverb continues to prove its worth.

Why? Because the Orban 111B offers good, clean sound that most studios and production rooms demand at a fair price. Our proprietary "floating threshold peak limiter" protects the springs from being overdriven on transients. So the 111B doesn't sound "twangy"—just bright and clean, with a sound that complements tracks instead of muddying them. And flexible EQ lets you contour the echo return for any application.

So check out the 111B Dual Spring Reverb: A proven performer with the right sound at a fair price.

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

4 SECONDS OF TIME... FOR \$699



THE ECHOTRON FROM DELTALAB

The ECHOTRON™ is designed for DeltaLab's consumers who have requested a solid state digital delay loop with long delay capability.

The delay range is from 256ms (1/4 sec) to 4096ms (4 sec) all at full bandwidth (16KHZ), allowing you to produce "short" to extremely "long" high quality echoes.

The unit also offers Infinite Repeat capabilities for storing sound digitally, without any signal degradation. Sound on sound can be added by using the feedback control, in conjunction with the Infinite Repeat, allowing you to produce over four seconds of repetitive high quality audio digitally. You can even sync your favorite drum machine to it. This is simply amazing !!!

All for a retail price of \$699.00. * Visit your dealer today and check it out !!!



Manufacturer's
Suggested Retail

Music & Electronics . . . Naturally!

www.americanradiohistory.com

ture ballpoint pen that prints out melody lines on a 2½-in. wide paper roll. It prints in a variety of keys, as well as producing staves, time signatures, rhythm and chord names, and up to three sharps and flats. The keyboard's "Easy Print" function obtains a refined printed score by pressing a button. The melody and chord sequence memory function



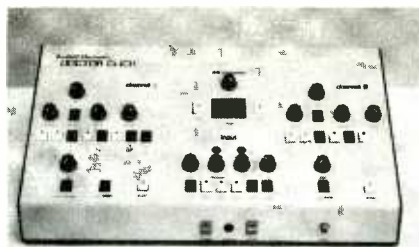
Yamaha MP-1

allows two-channel recording and playback. The MP-1 also compensates for the player's irregular note lengths by "rounding off" the notes, which results in perfect music score print-outs. It features ten realistic instrument voices, easy-play auto bass chord, arpeggio, ten lively rhythms, and a convenient transposer with pitch control for tuning in with other instruments and vocalists. There is also a "Duet" function that plays a harmonizing note with each melody note. The Portasound Mini-Printer is portable and weighs only four pounds. Its dimensions are 1⅞-in. high, 27¾-in. wide, and 6½-in. deep. It can be powered off household current, internal batteries, or an automobile cigarette lighter. Options for the Mini-Printer include stereo headphones, expression pedal, power adapter, extra printout tapes, and extra ballpoint pen styli. The MP-1 is available at retail outlets for under \$1000.00.

Circle 41 on Reader Service Card

MUSICAL INSTRUMENT ACCESSORIES

Garfield Electronics has recently introduced the Doctor Click rhythm controller, a device that synchronizes sequencer timing, drum machine timing, and synthesizer VCF, VCA, and VCO modulation. It can read click tracks, live drum tracks, and all of the sync codes used by Roland, Oberheim, and Linn. From any one of these drive sources, the Doctor Click will provide the appropriate interface for practically any sequencer, drum machine, and synthesizer made. Since it will sync to a live drummer, it allows the recording artist to cut the initial tracks and



Garfield Electronics Doctor Click

then sync the computerized overdubs to his timing, instead of vice versa. In addition, the Doctor Click's metronome provides both beats-per-minute for musicians, and frame-per-beat for filmmakers, using a .001 percent crystal.

Circle 42 on Reader Service Card

The KMX-8, Unicord and Korg's new eight-channel stereo mixer, was designed to be used with keyboards, microphones, guitars, and line-level sources. Each channel includes a gain control with LED overload indicator, pan pot, and volume fader and effect send controls that can be routed to two effects. Master controls



Unicord KMX-8

include Bass, Treble, Effect A, Effect B, Right Master Fader, Left Master Fader, and headphone level controls. Impedance is automatically adjusted from 10 kilohms to 500 kilohms to match the impedance source. Two VU meters provide visual indication of the output level. The mixer has a frequency response of 20 Hz to 20 kHz and a signal-to-noise ratio of -110 dB. An optional rack mount adapter is available.

Circle 43 on Reader Service Card

EXR Corporation's new psychoacoustic footpedal is said to be the first of its kind. The EXR Projector Model SP111 features three functions in a rugged cast aluminum footpedal: 1) an EXR Exciter psychoacoustic processor which allows the instrument to be projected into the

foreground without cranking the volume or adjusting the equalization. 2) with the touch of a footswitch, the SP111 becomes an advanced volume pedal with a fully adjustable EXR Process Pre-Set; 3) a built-in full frequency direct box with a continuously variable input/output of up to 40 dB gain and XLR connector



EXR Projector Model SP111

output. A 12-segment, three-color bar graph and four function LEDs allow easy visual monitoring. The suggested retail price of the EXR Projector Model SP111 is \$299.00.

Circle 44 on Reader Service Card

VIOLINS

The Winfield-Thomas electric violin is a cutaway model with two pickups, built-in volume and tone controls, and an extended fingerboard. It has a laminated hardwood neck and a unique open scroll, and is designed to be played through an amplifier. The materials used in the



Winfield-Thomas Electric Violin

Winfield-Thomas include violin-makers' traditional maple and spruce, plus artistic hardwoods such as African Paduak. Ebony fittings are standard, but a variety of custom options in finish, materials, and electronic features are available.

Circle 45 on Reader Service Card

Carvin

The Professional's Choice

Professional Groups like: Pat Benatar, Roy Clark, Heart, Jefferson Starship, Marshall Tucker, Pink Floyd, The Scorpions and Frank Zappa choose Carvin because they feel it's the best!

At Carvin you're not only buying the best, but our "Pro Net" prices are attractive because you're buying Direct from us. Send \$1 for your 1983 80 page Color Catalog. Send \$2 to RUSH by 1st Class mail, \$5 for foreign countries. For product information, Call Toll-Free 800-854-2235 (Calif. 800-542-6070) Master Charge & Visa accepted.

Direct Pro Net Prices on all Carvin Products as shown

- A R540-M Concert 90° Radial Horn — Pro Net \$269 List \$495
- B 1330-M Horn-loaded Bass System — \$239 List \$395
- C 980-M Pro Radial Horn/Bass System — \$349 List \$695
- D 750-M Pro Stage Monitor — \$169 List \$295
- E MX1202 12 Ch Stereo Recording Board — \$1195 List \$2555
- F DCA800 800W (bridged) Stereo Power Amp — \$599 List \$1095
- G DCM301 300W Monitor Amp w 9 band EQ — \$349 List \$695
- H EQ2029 29 Band 1/3 Octave Equalizer — \$259 List \$495
- I XC1000 Stereo Electronic Crossover — \$269 List \$495
- J DC200 Koa Guitar with Gold Plating — \$570 List \$1140
- K XB112 All-Tube 1-12" "X" amp w Celestion — start at \$449
- L B215-M Dual 15" MagraLab Bass Enclosure — \$249 List \$495
- M PB150 Bass Head w Compressor & Parametric — \$399 List \$795
- N V412-M Lead Stack w 4 12" Celestion spks — \$399 List \$795
- O X100-B British 100W "X" Amp head — \$579 List \$1195

JBL speakers optional on most models.

Write: CARVIN, Dept. MR-43, 1155 Industrial Ave., Escondido, CA 92025



1983 CATALOG
 \$1 for Bulk Mail \$2 for First Class Mail

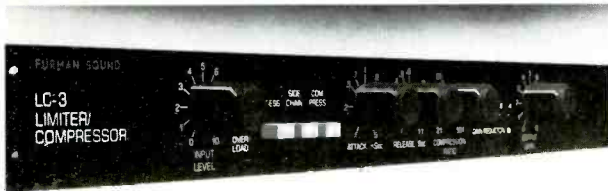
Circle 22 on Reader Service Card

Name _____ Street _____ City _____ State _____ Zip _____ MR-43

THE **PRODUCT** SCENE



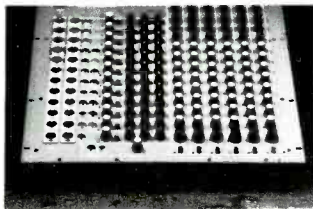
LIMITER/COMPRESSOR



Furman Sound's latest product, the LC-3 Limiter/Compressor, offers continuously adjustable attack, release, and compression ratio controls; side-chain and de-ess modes of operation; an easy-to-read LED-style meter displaying gain reduction, and separate input and output level controls. The input control automatically adjusts the gain of the input stage, maximizing the signal-to-noise ratio. This, in addition to carefully tailored bias currents through the VCA, results in extremely low noise and low distortion at all levels and with all amounts of gain reduction. The LC-3 is designed for applications ranging from broadcast production installations to general purpose recording studio and instrument use.

Circle 46 on Reader Service Card

MONITOR MIXING CONSOLE

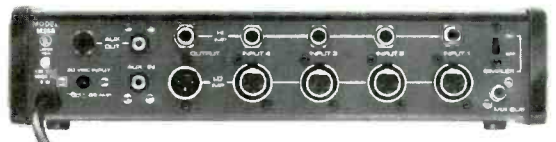


Rane Corporation's MM 12 Monitor Mixing Console is an ultra-compact 12-input/6-output mixer outfitted with such features as three-way input equalizer, mic output patching, two-stage parametric output equalizer, stacking inputs, send/receive loops, and submixing. The output-oriented layout design results in ease of operation, making it an easy transition for stage monitor mixing. The MM 12 is 21-in. high, 19-in. wide, 2¼-in. deep, and has an all-steel chassis. It is rack-mountable with an optional road case. The MM 12 lists for \$1299.00.

Circle 47 on Reader Service Card



MICROPHONE MIXER



Shure Brothers' M268 Microphone Mixer has been designed to effectively act as a submixer for musical groups. It allows musicians to expand the capabilities of their mixing boards by providing up to eight additional microphone inputs. It is suited for a drummer who needs multiple microphone set-ups but doesn't have enough inputs on his mixing board to accommodate them or for electronic keyboard players needing a high-impedance output for on-stage amplifiers and a low impedance output to feed the main board. The M268 accommodates low-impedance and high-impedance microphones. Each of the unit's microphone/instrument channels features two jacks: a ¼-inch phone jack (for high-impedance microphones) and a standard three-socket jack (for low-impedance microphones). It also includes an auxiliary input channel for tape recorders or other high-level accessories. Other features include individual feedback-type gain controls for all five input channels, a master volume control, simplex (phantom) power for condenser microphones, a mix-bus for simple mixer interconnection, and an automatic muting circuit to prevent speaker damage during turn-on and turn-off. The M268's complement of outputs includes a high-impedance, ¼-inch phone jack; a low-impedance, professional three-socket jack; an auxiliary phono pin jack, and an auxiliary ¼-inch phone jack.

Circle 48 on Reader Service Card

DOD Electronics announces a new line of high quality signal processing equipment. . . .

The DOD Pro Products Group



The all new DOD Professional Products Group contains the ten most needed pieces of equipment necessary for professional signal processing, from digital to analog delay units, fifteen to thirty-one band graphic equalizers and much, much more.

Each product in the DOD Pro Products Group has been designed with the professional in mind. All DOD products have user-friendly controls and status indicators for quick and easy operation. Each product contains the latest circuit technology for performance and reliability, and all DOD products are manufactured and tested in America.

Check out the new DOD Pro Products Group at your local DOD dealer and see why DOD continues to be the leader in cost-effective quality equipment.

DOD

For more information
call or write:
DOD Electronics Corp.
2953 South 300 West
Salt Lake City, Utah
(901) 483-8534

LOW FREQUENCY LOUDSPEAKER



McCauley's 6246 15-inch low frequency loudspeaker incorporates a stiff, composite cone along with double spider supports and McCauley's M Roll Suspension. A 4-inch aluminum voice coil former, an edge wound coil and copper/beryllium lead wires are used, all fixed with high heat tolerant epoxies. A 17 pound magnet assembly is bolted on, allowing for field basket replacement. McCauley's 6246 Loudspeaker is capable of an 800 watt program. It is available in five models for varied applications: the 6344 (high efficiency 15), 50 Hz to 2500 Hz; the 6345 (high efficiency lead instrument), 50 Hz to 3500 Hz; the 6244 (medium efficiency, extended low), 30 Hz to 1000 Hz; the 6246 (low frequency), 40 Hz to 1500 Hz, and the 6247 (medium efficiency bass instrument), 40 Hz to 2000 Hz.

Circle 49 on Reader Service Card

FEEDFORWARD LIMITER DELAY LINE



Audio + Design's D60 Dual Mono/Stereo Feedforward Limiter Delay Line is an option designed for use with the recently introduced F601 Super-Dynamic Limiter. It consists of the delay path and a master control VCA providing control voltage for the limiter. The F601 Super-Dynamic Limiter has greater than 100 dB dynamic range. Maximum modulation of the system without fear of overload is possible, while ensuring that low-level signal is well clear of the digital distortion range. The Super-Dynamic is already in use by several satellite networks as well as many studios and disc-cutting facilities. The cost of these units is \$990.00 for the F601-R Mono unit, \$1490.00 for the F601-RS Dual Mono/Stereo unit, and \$560.00 for the D60 Delay Line option.

Circle 50 on Reader Service Card

ADC'S PORTABLE SIX CHANNEL MIXER



The Model MX6 Sound Shaper Mixer, Audio Dynamic Corp.'s first portable recording mixer, is a six-channel mixer featuring an echo and echo volume control, panpot control, and low-cut filter for each channel. It has four modes of input for voice or instrument recording: Phone, mic, mic (att 20 dB), and line selector. It has a built-in test tone of 440 Hz, left and right output VU meters, as well as a master fader, high or low stereo output and headphone jack with level control. The portable mixer operates on "C" size batteries (not included) or with an optional AD-15 AC adapter. The mixer retails for \$599.95; the adapter is available for \$49.95.

Circle 51 on Reader Service Card

NEW FREQUENCY DIVIDING SYSTEM



Professional Audio Systems' TOC™ 23 Frequency Dividing System is designed to correct loudspeaker time offset by providing an active delay that creates an identical acoustic source for the low-, mid-, and high-frequency components. By correcting time offset, accuracy of transient sound can be achieved. A few of the many standard features include special filters for flat group delay through the crossover points, equal group delay in all outputs in both two-way and three-way modes, adjustable time offset correction in low and midrange outputs, subsonic and supersonic filters, limiters on input and high-frequency output, and high-frequency equalization for constant coverage horns. The TOC™ 23 lists for \$595.00.

Circle 52 on Reader Service Card

AUDIOPRO 16-S

16 CHANNEL PROFESSIONAL MIXING CONSOLE

CLIP 2' 36
18
MIC GAIN 12 -48
60

EQ
6 0 6
HI - -
15 15

HI MID
6 0 6
15 15

MID
6 0 6
15 15

TUNE
500 1.5
150 3.0
Hz KHz

LO
6 0 6
15 15

ACTIVITY
CHAN. ON
ENDS 4 5 6
3 7

EFX 1
2 8
1 9
0 10

EFX 2
2 8
1 9
0 10

MON. 1
2 8
1 9
0 10

EFFECTS 1

CLIP 4 5 6
3 7
OUT 2 8
1 9
0 10

PATCH
CLIP 4 5 6
3 7
RTN. 2 8
1 9
0 10

EQ
6 0 6
HI - -
15 15

HI
6 0 6
15 15

LO
6 0 6
15 15

SEND 4 5 6
3 7
MON. 1 2 8
1 9
0 10

EFFECTS 2

CLIP 4 5 6
3 7
OUT 2 8
1 9
0 10

PATCH
CLIP 4 5 6
3 7
RTN. 2 8
1 9
0 10

EQ
6 0 6
HI - -
15 15

HI
6 0 6
15 15

LO
6 0 6
15 15

SEND 4 5 6
3 7
MON. 1 2 8
1 9
0 10

MONITOR 1

CLIP 5 6
4 7
BUSS LEVEL 3 8
2 9
1 10

EQ
6 0 6
HI - -
15 15

HI MID
6 0 6
15 15

LO MID
6 0 6
15 15

TUNE
500 1.5
150 3.0
Hz KHz

LO
6 0 6
15 15

MONITOR 2

CLIP 5 6
4 7
BUSS LEVEL 3 8
2 9
1 10

EQ
6 0 6
HI - -
15 15

HI MID
6 0 6
15 15

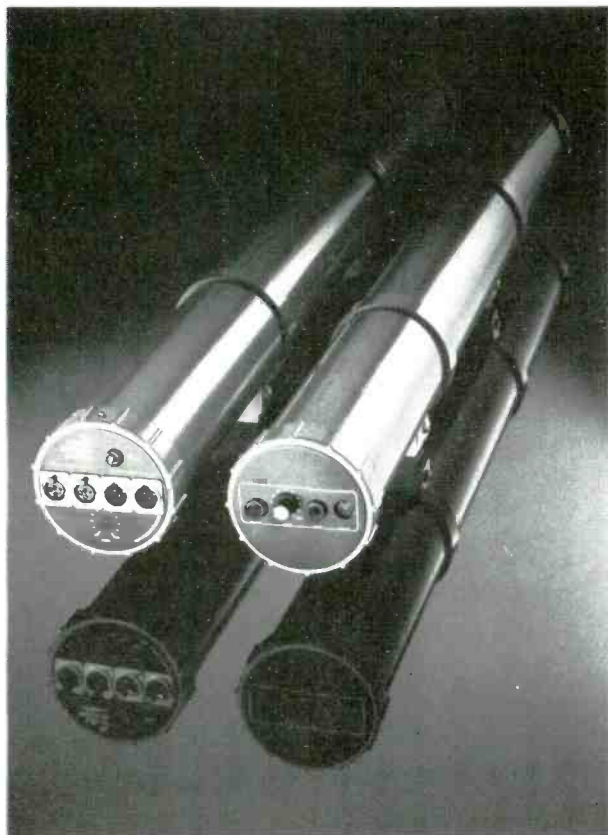
LO MID
6 0 6
15 15

TUNE
500 1.5
150 3.0
Hz KHz

LO
6 0 6
15 15

Circle 25 on Reader Service Card

THE GREAT BRITISH SPRING



Connectronics Corporation is introducing the Great British Spring, an unusually styled Stereo Spring Reverberation unit. Twelve springs, closely matched to complement each other, are employed in the design to produce a full, smooth flutter-free effect. Varying lengths, mass, and coil diameters ensure wide diffusion of the reverberant energy. Extended response at high frequencies provides a pleasingly transparent effect. Each unit is supplied with its own frequency response printout, which is made in the final testing stage.

Three units form the range of Great British Springs: Unbalanced with ¼-inch stereo jack inputs and outputs, unbalanced with XLR connectors, and balanced with XLR connectors. Over seventy of the balanced XLR versions were recently purchased by a major British broadcasting corporation for use in each of their local radio stations. Prices range from \$495.00 for the unbalanced jack input/output version to \$687.50 for the balanced XLR version.

Circle 53 on Reader Service Card

HIGH POWER MONITOR/PA SYSTEM



The new Model 937 Musical Sound Loudspeaker System from Altec Lansing is designed to function as a high-level on-stage monitor, as well as a compact, full-range PA speaker. The system features Altec's patented Mantaray® Constant Directivity Horn, a newly developed linear response 12-inch low frequency driver and a computer designed, Thiele-Small enclosure.

The precision-controlled directivity of the Mantaray Horn, along with the ability of the Model 937 to function as a floor monitor of a stand-mounted system, gives the new system a broad range of coverage patterns for a variety of performance needs.

The vented enclosure delivers 115 dB long-term maximum acoustic output, with power handling to 150 watts. The system measures 16¼-in. deep, 24-in. high, and 18-in. wide.

Circle 54 on Reader Service Card



INTRODUCING EFFECTRON II FROM DELTALAB

**LOW COST,
FULL BANDWIDTH,
HIGH PERFORMANCE,
DIGITAL DELAY.**

The EFFECTRON™ II is an enhanced EFFECTRON. We have added many features per our customers suggestions. These features depend on Model and include increased flanging range, external infinite repeat, increased input range, stereo output and even lower prices!

The EFFECTRON II series is still the only low cost, full bandwidth (16KHZ), high performance line of digital delay processors. Visit your local dealer and check it out !!! Listen and Compare . . .



ADM-1024
Full
Second Delay
\$599*

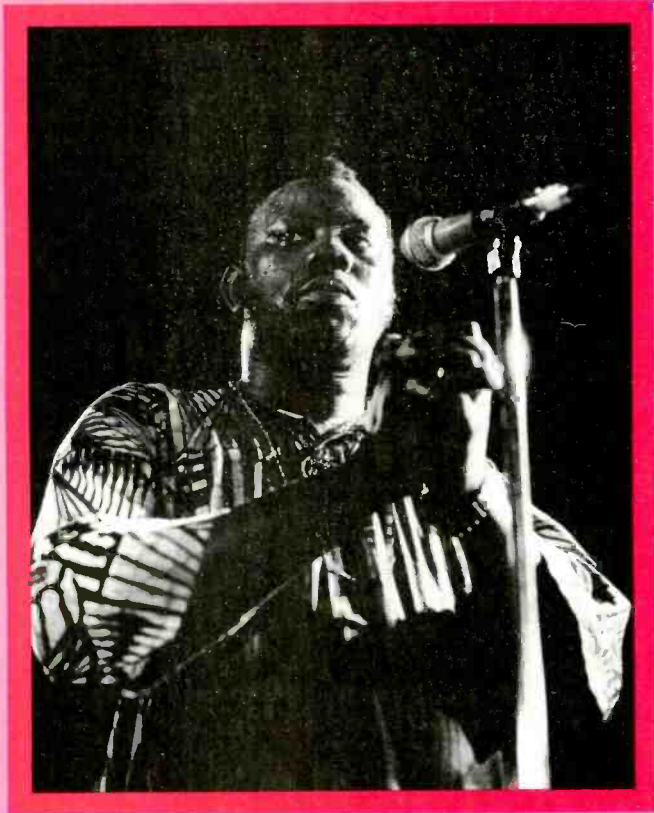
ADM-64
Flanger/Doubler
\$299*

ADM-256
1/4 Second Delay
\$449*

 **DeltaLab**

Music & Electronics . . . Naturally!

*Manufacturer's Suggested Retail



از از



King Sunny Ade

Although just now catching on in America, influencing beat-conscious new wave, rock and funk artists, the supremely danceable JuJu music has reigned as the premier popular music of the Yoruba, one of Nigeria's largest tribes, for quite some time.

represented and combined with musical ideas from all over the world, with the presence of rhythm remaining the nucleus of every cell.

JuJu Music may sound a bit disconcerting to the novice listener plunged headfirst into the intricate wealth of



And JuJu's most renowned innovator, with constant hits on the Nigerian pop charts (and with forty albums to his credit), is King Sunny Ade.

Actually a prince in a traditional ruling family, Sunny Ade recently signed with Island, the record company instrumental in making reggae one of the Third World's most profitable exports. His music is now being marketed worldwide, with positive response from an American public who is delighted to get closer to the source of their recent "rediscovery" of rhythm.

The African Beats, Sunny Ade's band, is comprised of eight percussionists, six vocalists, five guitarists and a keyboard player, and is basically the same ensemble that King Sunny takes on the road. On the recent 1983 Winter Tour, the band played to sold-out houses across the United States and Canada. Enthusiastic crowds, attentively tuned to the 21-piece ensemble, found it hard to sit still, feeling the pull of the African ideal of music's highest potential: as a vehicle for dance.

King Sunny Ade's first American release, *JuJu Music*, is an introductory sampler of his talents as composer, arranger, singer and guitarist. On it, Yoruba tradition is

polyrhythms that characterize the seven songs on the album. King Sunny's voice glides sleekly through the songs, personifying the strong sense of flow apparent in most African music.

To most of us reared on a strict diet of Western popular music, the guitars on *JuJu Music* may appear to dominate, an aural illusion that can be dispersed by a patient shift in listening perspective. Heard as one component of equal stature in the mix, the guitar sound gives way to the intricate and extensive reach of the drums, which create the true framework of the music.

Apprehending the right sound for this music, and translating it to vinyl, calls for a different approach on the part of the album's producer and engineer. *Modern Recording & Music* caught up with King Sunny Ade's entourage in Detroit, where the group was resting for a few days after visiting Mardi Gras in New Orleans, prior to their performance at the City Club. The 29-member party included Martin Meissonnier and Katrin Lesevre, a young French team who respectively produced and engineered *JuJu Music*, and were handling the band's live sound on the road.

The friendly, cosmopolitan group was housed at the Leland Hotel, where the Nigerians, largely dissatisfied with American food, cooked in their rooms. Very palatable, exotic smells wafted through the hallway as I spoke with Martin, Katrin and the amiable Mr. Ade about the task of correctly presenting JuJu music to a wide audience.

Curious about the processes that led them to working with King Sunny Ade and the African Beats, I asked Martin and Katrin about their backgrounds in sound and non-Western music.

"I had been working in Paris, involved as producer on many different kinds of projects," Martin told me. "I worked with Indian, Turkish and Japanese music, as well as African. In France, you see, we are much more familiar with non-Western music, especially African."

Katrin Lesevre's career began as a vocalist, which gave her a helpful perspective into the needs of a performer.

"I was involved with sound reinforcement for a few years before I actually starting working with recording. I went to Los Angeles and spent time training at a recording/engineering school, and then," she sighed, "life took me to Nigeria."

In the equatorial country on Africa's west coast that is home for more than 200 million people, Katrin began working in a small recording studio in Togo. In 1980, she met Sunny Ade in Lagos, the Nigerian capital city that houses the Ariya, a nightclub owned by Mr. Ade. (Signs posted inside the Ariya indicate that the dancing goes on until dawn.)

"Someone told me to go see him because he was one of the only people using a big P.A. system," she recalled. "We talked for hours that night."

A year later she began working with Mr. Ade, around the time that Martin came into the picture. In Lagos at that time working for Fela Anikulapo Kuti, the Nigerian artist who pioneered Afro-Beat and mingled heavy politics with his music, Martin dropped into the Ariya one night in June, 1981, to see Sunny Ade.

"I went there with the intention of working with him," he said. Yet this did not come to pass until after Martin helped organize and conduct Fela's second European tour, on which Katrin also worked. Soon after King Sunny was signed to Island, Katrin and Martin, at Sunny Ade's request, ended up in Lomé, capital of the West African state of Togo, to record *Juju Music*.

Initially, the team was faced with the dilemma of using the confines and limitations of the studio to capture the feel of a kind of music that is very dependent on unity and simultaneous interplay of all its musical components.

"It had to sound African—it had to be united in that certain way," Sunny Ade insisted. "If for any reason it sounded different, it would not be true African music," he added with a disapproving shake of his head.

In most African music, where rhythm, melody and harmony are inseparable, if a song is judged at all, it's not by one outstanding element but by how it all fits together. Making it all fit together just right, without the capability of isolating

most of the instruments, was one of the first hurdles that Martin and Katrin had to clear.

"You must artfully compromise between the modern way of recording and the traditional way," Martin explained.

Traditionally, music of this type is recorded with all the instruments together, generally in one or two rooms, making for a decided lack of separation, an ability to make precise tone adjustments, and an overall quality that cannot compete with recording industry standards that are continually being raised by increasingly creative use of technological improvements.

"We needed to find the biggest studio available," Martin began.

They chose the Studio de la Nouvelle Marche in Lomé, which is equipped with a 3M 24-track recorder and the French-made Aufour 30-channel mixing board.

"We had the capacity to isolate five different sections of the musicians there," continued Martin. "They were 1) King Sunny Ade, 2) the six background vocals, 3) the rhythm talking drum, 4) the five guitars, and 5) the balance of the rhythm (as opposed to lead) percussion."

"In most Western music," Katrin interjected, "the trap set drums and perhaps bass or guitar are recorded first, and considered the basis. The other parts are then added on, with the vocals coming last. But in African music, the voice is what everyone else is following, and it must go down first. The songs, on the whole, reflect very spiritual concepts expressed in the traditional Yoruba way, using proverbs and images. The music moves along with what the vocals are expressing."

Recorded along with the lead and background vocals is the instrument that carries one of the most important roles in shaping the sound of JuJu music—the talking drum. It is capable of wide pitch and tone variation by a player's subtle changes in striking it and applying pressure to leather bands along its sides.

"If you listen to the talking drum," continued Katrin, "you will see that it is not playing. It is really talking."

Able to reproduce all the nuances of a spoken language, it is traditionally used to transmit intricate messages. On *Juju Music*, which features lead, second and third talking drums, the lead talking

Compress/Limit/De-Ess and Noise Gate/Key/Duck

-Two Channels/Push Button Stereo/Independent Tracking-



The CLX-2 is the most versatile two channel compressor/limiter/expander you have ever seen. We use the BEST Voltage Controlled Amplifier available; the EGC-101 and the latest Feed Forward design technology to produce the most natural and musical sounding compression and noise gating obtainable at any price. Knee type compression switchable in or out.

Write for a 24 page brochure on our full product line and a demo record.

Send \$1 to: **LT Sound**, Dept. MRX, PO Box 338,
Stone Mountain, GA 30086 Phone: (404) 493-1258

drum usually overdubbed a solo after the other percussion was layered on.

Laid down with the vocals and the rhythm talking drum are the guitars, Fender Stratocasters, played through Fender Twins with JBLs. Playing together like a string section of an orchestra, they are sub-mixed and fed directly into the board. Sunny Ade's guitar (he uses either a Fender Telecaster or a Washburn) is both mic'd at his amp (also a Twin) and fed direct.

Katrin mentioned one more instrument that is crucial to the recording at this point. "The maracas must go down here too; they are very important to the rhythm," she said.

At all stages of the recording, the entire band is present. "Everyone is there from the beginning, to get the feeling of a song," said Katrin, adding, "even if they are not needed to play that day."

The rest of the percussion instruments are then added, the congas, bongos and shekere (a gourd rattle) working together to merge into place with the other elements. The last percussive instrument to be added, in direct contrast to the Western recording technique, is the trap set drums, which are barely detectable on *Juju Music* and serve a minor role.

The very last track added is the keyboard; a Prophet 5 was used on the album. Although electric guitars

were introduced into the storehouse of traditional Yoruba instruments by musical masters like I.K. Dairo and Tunde Nightengale in the 1950s, Sunny Ade is responsible for bringing the synthesizer into the world of JuJu. On *Juju Music*, it is sparingly applied. Sometimes, it zooms eerily through a song with techno-pop finesse, lending an outer-space feel to the decidedly earthy groundwork. In other places, it provides atmospheric sounds, tweets and trills that copy the sounds of nature. I asked King Sunny, who seems very concerned about retaining tradition in his music, about his use of the synthesizer.

"Well, there are just so many sounds in Africa," he said, extending



King Sunny in concert.

his arms in a gesture of plenty. "If you can use something that can sound like most of them, I think that is good."

Despite the large number of pieces in the band and the complexity of the music, *Juju Music* has a remarkable lightness and clarity, and sounds less cluttered than many three-piece rock bands. I asked Martin how he could make such a densely woven fabric float so lightly on the breeze.

"You must first be committed to recording every element as well as possible," he said. "The role of the engineer is very crucial. Also, the tracks on *Juju Music* are recorded very dry. There is enough complexity there without adding anything. Especially important is the lack of white noise, which can be very filling," he added, describing the common technique of adding to or replacing the actual sound of the snare drum with white noise.

On the latest King Sunny Ade album, recently recorded in New York with an as yet unscheduled release date, Martin took a slightly different approach.

"The new album will be more danceable. There will be no trap set, however, but there will be a doubled bass drum sound from a Linn drum computer," he explained.

I turned to the subject of mixing the band live, an exciting challenge for any sound person.

"It's a heavy job, for sure," smiled Katrin, "but it's really no big problem. The band is very cool, very accommodating, and Sunny is wonderful to work with."

Seven amps are required for the guitars and keyboard, and they are run directly into the 32-channel board necessary for mixing a 21-piece band. The rest of the pieces are acoustic and are mic'ed separately, using 2 mic's on the congas and 3 on the trap set.

"We like to use 28 channels for the instruments and four for effects," Katrin explained. "Onstage, Sunny uses a flanger and a six-band equalizer on his guitar."

"As for monitors," she continued, "we like to use a 24-channel system. We can get by with 16, because some of the instruments carry very well onstage. The monitors are mainly for the vocals, talking drums, guitars and the maracas. If we were limited to a very small monitor system, it would be important to get at least both of the talking drums and the maracas."

After observing a sound check, which took a surprisingly short

amount of time, I asked Katrin to describe her procedure.

"The best way is to do the percussion first. Then I add the vocals. The guitars don't really need a check at this point, because their sound always changes. You see, the vocals and percussion remain at one level during a performance. The guitarists are always switching pickups and the variances on volume, so I continually adjust them during a show."

Katrin then summed up her approach to mixing the African Beats: "The most important thing is to feel the music, to know what the band wants to transmit. They have a special way of communicating. In most Western music, the musicians keep track of where they are by counting a certain number of beats or bars. That's not the Yoruban way. King Sunny has a certain way of playing, making very subtle changes, that signals the other instruments to change. The musicians know the technical side, whether they are playing in 4/4 or 7/8, but that is not what they use to communicate. To mix them properly, you only need to absorb this and be aware of what's going on."

The band generally performs for at least several hours, with some shows lasting four or five hours. I wondered if Katrin found it tiring to apply non-stop concentration for so long. She laughed.

"In Nigeria, the band regularly plays from 10 p.m. to 6 a.m."

Martin Meissonnier and Katrin Lesevre seem genuinely happy to be involved with a project as complex and demanding as King Sunny Ade and the African Beats. Mr. Ade, excusing himself from our discussion to work on lyrics, seemed equally pleased with their involvement.

"If there's anything else you want to know, just ask Martin and Katrin," he said. "They know everything."

Continually impressed by the smoothness, lack of tension, and positive attitude with which this large outfit conducted its activities, I thought of an African concept called "*baalim*"—literally, "coolness." It reflects patience and collectedness of mind. Totally apparent in the flowing music of the African Beats, it sounds like a useful attribute for any audio engineer, especially when a project calls for an innovative approach, an excess of patience, and an extra burst of energy.



Joyous fan at King Sunny Ade concert in Detroit, Feb., 1983.





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 it's big brothers with reels. We've even added some of the capabilities that made our Portastudio® a milestone in it's 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.

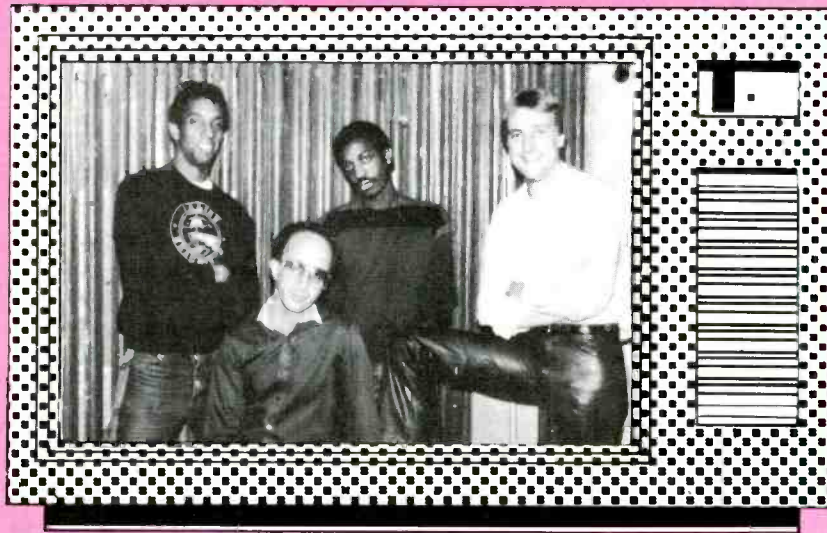
TASCAM
TEAC Production Products

DESIGNED BY POPULAR COMPLAINT.

Circle 26 on Reader Service Card

The World's Smallest Television Band

cheech iero

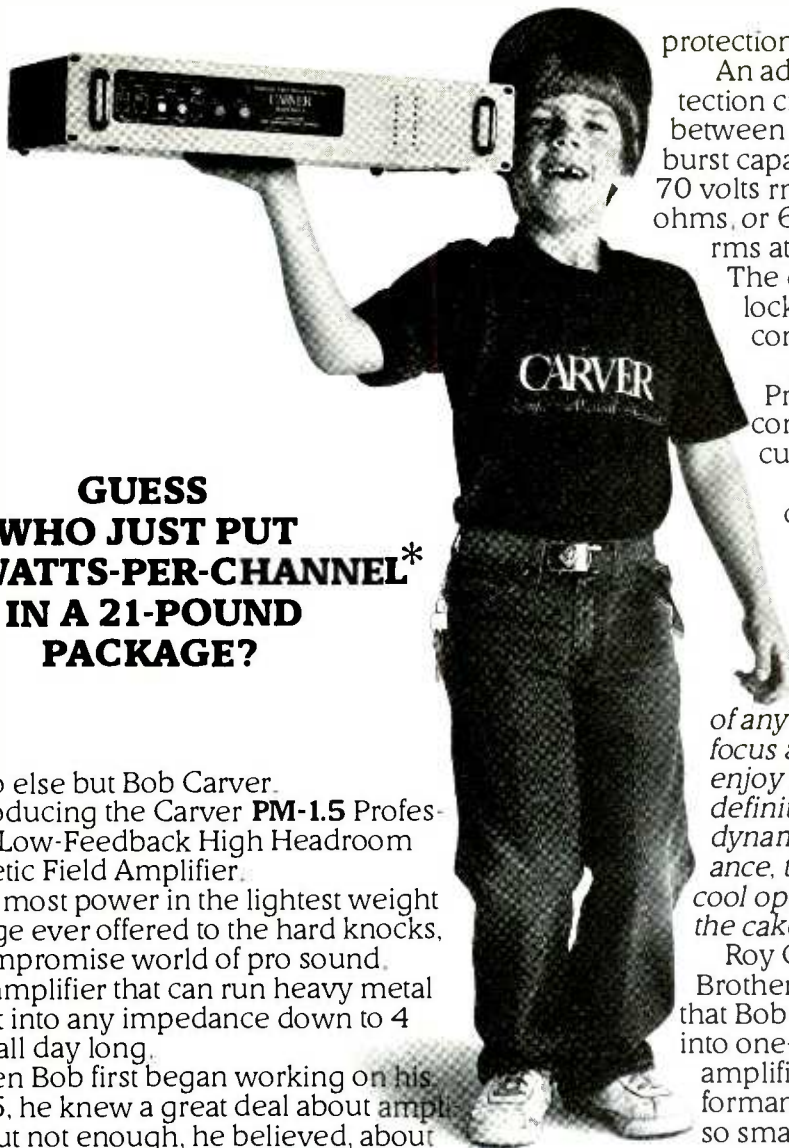


With only a week of preparation before its debut, the band for the Late Night with David Letterman television show had not been selected. Paul Shaffer had just been named the program's musical director after several meetings with the show's producer Barry Sand. "We met three or four times," Shaffer said as he relaxed in his dressing room after a taping of the show. "He was checking out other people as well. Finally he broke down and gave me the job. By the time he broke down, it was a week before air time." Originally, because of the budget, the show was to hire only three musicians. "That was all they could afford," admitted Shaffer. "I had to negotiate them up to four pieces." "I believe we are the smallest band in television!" added drummer Steve Jordan. Small in number of band members perhaps, but big in quality. Their unmistakable sound is a unique blend of fine musicianship and hip nostalgia. Their break tunes range from old Motown standards to Rolling Stone favorites, with some bizarre current choices thrown in. "I wanted to have versatile musicians," Shaffer recalled, "and I also had an idea to play oldies and stuff for our break tunes. They knew all the material that I was familiar with. Besides, these three guys played together in a band called The 24th Street Band." "Actually," interjected bassist Will Lee, "Paul produced us!" Coincidentally, Shaffer was hired to co-produce

the band's album, which was only released in Japan. "Our musical format has expanded," Shaffer said. "My intention was to do R&B standards, obscure R&B things and original tunes within an R&B instrumental group. But the other guys have certain things that they want to play, too. They wanted to play the Beatle stuff that we do. Basically, the Black guys influenced me into playing more white music with the group than I had originally intended."

In addition to conducting the band, Shaffer is the composer of the show's opening theme song. "I was looking for a late night kind of hip groove," explained Shaffer. "Steve Jordan also had a very important suggestion when he came over to watch me write it. He solved one problem I had when he told me a particular part of the song was too long, that I should go right into the next selection—which was the right thing to do." "The real killer part came after we had played it on the air a couple of times. The modulation was hip!" said guitarist Hiram Bullock as he eased back in his seat. "I love to watch people write," said Jordan, "especially Paul, because he does all his best writing in his pajamas."

Pam Gibson is a significant factor in capturing the live sound of the Late Night musicians. A veteran of NBC's *Today Show* and *Tomorrow Show*, Pam continues to experiment with various microphones to obtain the



**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 1/16 in deep. Weight: 21 lbs.



CARVER

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

Circle 32 on Reader Service Card

“Doing jingles, you are in the missionary position. After you’ve developed an attitude that you can deal with it, you go in and play, and try to give the best execution as possible because you are a professional studio musician…”

precise blend and quality of the music for the air mix that the television audience hears at home. “I don’t use the same microphones all the time,” confessed Pam. “Right now I happen to be using a Shure SM 57 on Steve Jordan’s snare and one on his hi hat. The overhead is a Sennheiser 451, the 8” x 12” rack and the 14” x 14” floortoms are Sennheiser 421s, and the kick is an RE 20. I was using a 421, but Steve Jordan has a very different sounding drum kit

from what most people are used to. He tunes his Yamaha set rather high, so that is the reason I switched to the RE 20. I get a good bass response with that mic. The placement of microphones is very important because it is so loud and television studios aren’t like recording studios; we don’t have baffling. I have worked with plexiglas baffling before on *The Tomorrow Show*, but it’s a hard surface and it does all sorts of weird things. You tend to get strange after-

ringing sounds. It’s not like gobos in the recording studio. Therefore, it is crucial to close-mic everything on the drums. I also used a delay tape going into an echo chamber and that’s what I use on the snare, which was made by Rob McSweeney from Eames Drums.

“I take Will Lee direct into the direct box. You really have to compress Will’s bass amp. He is a very heavy bass player, so you need tons of compression on him.” A veteran of many a session, Will Lee uses a vintage 1981 Fender jazz bass. Says Lee, “I’ve got a Starz Guitars pre-amp in it and custom work by Roger Sadowski. I don’t use special effects on the show. The amplifier is a Polytone 104 and I feel it suffices.” “Paul’s OBX-a is also direct,” added Gibson, “and I use two PZMs in his Yamaha grand piano. There’s a low and a high PZM. They’re both PZM 130s. I’ve taped them under the lid, because the lid is closed. The Hammond B3 organ has a leslie with it, and the leslie which you do not see on camera is backstage. That’s another thing which I change around a lot. But for right now, I have a Shure



Engineer Pam Gibson using a 36-channel Neve console.

SM 59 on the top and an RE 20 on the bottom. The reason I'm using those mics is because they are 'close mics'; they do not tend to pick up the rest of the band. Different people use different kinds of microphones for leslies, but that is what I'm using at the present time.

"With Hiram, I'm mic'ing his Roland 120 amp, because he uses all kinds of different effects depending on what he has used in a recording studio somewhere else that day. He'll use volume pedals, an MXR, a filter, maybe a chorus thing. Everyday I go out there to check and see what he has. He enjoys playing around with different things. I come off his amp with two Shure SM 57s because it is a stereo cabinet." Bullock uses a Fender Stratocaster with a 1961 neck and a 1963 body. The guitar has Humbucking pickups on the bridge and bridge pickups. "It's the first guitar I ever bought," says Bullock. "It's not customized; I bought it like that when I was sixteen. I'm using Ibanez tube screamers, and sometimes use a little overdrive and a digital delay."

Using a 36 channel Neve console, Pam's mix is the air mix that you hear at home. Located in the rear of the studio behind the audience is Glen Arbor, Pam's colleague of twelve years. From there, he attends the house mix for the audience. A third mix is conducted on the floor for the four separate Electro-Voice FM 12 monitors the musicians use. Each player layer has his own separate mix with equalization on each, according to their specifications.

When asked how the quality of the music was affected being sent through the viewer's small television speakers, Pam Gibson's response was, "First of all, you don't have the bandwidth you have on your home stereo. But let's talk about dynamic range to start with. There's a big difference between your home stereo and a three-inch speaker. I don't have left, right perspective either. I don't have stereo, so I can't create side to side action. It's nice, however, to have only four musicians because it keeps it as uncluttered as possible. Otherwise you don't have a chance; by the time it gets home it's mud!" Paul Shaffer added, "The compressor on the transmitter compresses all the sound as it is going out. You know that certain frequencies are being squashed. It goes out over the air differently than you are hearing it. And you have a situation

"...you have a situation where the engineer gets only one crack at it. It's like one pass. It's as though you have to mix a record and you just turn the tape on and go with it, and you don't know what the levels are going to be."

where the engineer gets only one crack at it. It's like one pass. It's as though you have to mix a record and you just turn the tape on and go with it, and you don't know what the levels are going to be. Pam doesn't get a chance to roll back from the top and start again once she gets everything set. She just has to work with what she hears."

When asked about his approach to a televised playing situation, Will Lee responded, "It's more like playing a live gig. Paul has put together a band of musicians who actually like

to play with one another." "This show is different—it's innovative," said Steve Jordan, "so your personality comes through." Hiram Bullock explained, "The hardest part for me is to stop playing when we come back from the commercials. Because it is happening enough that, at least for me, I get really immersed in the music. I feel like I'm really playing. It is the reason why I play music in its most profound sense. Playing as often as I do in the recording studio, I very rarely get that kind of personal immediate feedback, and it makes

HC 6 Headphone Console

What you have been searching for is here. A rack-mountable, stereo, 6-channel, 100-watt, 16:1 dynamic range, 100% solid state, multi-level master control console, probably hoped for. We designed in a separate input for each of the six stages, which individually bypasses the master stereo inputs. We also put in an extra set of outputs, on the front panel, for easy-access control room cueing and patching. A lot of performance for an innocent-looking single rack-space headphone amplifier.

And only \$349 list price.

RANE CORPORATION

6510 21st St SW
Mountlake Terrace, WA 98149
(206) 774-7309

Stop in at your local Rane dealer for a demo.

me feel good about playing. It makes you want to play better. Live...I just wig out! Live, you're playing for the people out there so the major value system is to have a good time in the room. With jingles and record dates, it depends on who the date is for. If it's a good date, you're actually trying to make music in the studio. If it's a bad date, you're trying to convince them that it's happening." "Doing jingles, you are in the missionary position. After you've developed an attitude that you can deal with it, you go in and play, and try to give the best execution as possible because you are a professional studio musician when you are there." Steve Jordan dead-

municate with sign language. But on this particular show it's the kind of thing where you must be willing to be flexible and ready to go in an instant. And you can't take it too seriously because there's another show tomorrow. You go in and try not to let it happen again. People are telling us we sound pretty good—compared to what you generally hear on a TV variety show, that is. But the truth is in a lot of the cases we're just scrambling, which creates a live spontaneous feeling. The emphasis isn't really on control. We do not have the control over all the technical variables like you do in the recording studio. We just have to go for it."

same oldies of our youth. So the oldies are now sort of a new language with which I can communicate to my contemporaries, because we are still loyal, as everyone is, to the music that we grew up with."

Because of the popularity of the show and the tremendous exposure it offers the musicians, there have been the inevitable offers, in addition to the television show. Shaffer, however, feels the most important thing is to keep the band together. "We play four times a week," he explained, "and we want to be able to hit each show with as much enthusiasm as possible. I don't want to do anything extra to interfere with the main thing we have to do, which is the television show. Also, we each have other things that we do, be it studio work or our own projects, and that's important to everybody. So I feel, let them do that, and we'll convene once a day to do this. I really do try to keep this as loose as possible. That's why I'm willing to play any song anyone in the band wants to do. I didn't stick to my original format at all. Just as long as we're having fun. The band has the potential to do a lot of things. Things have worked out so far by doing the most natural thing possible. That's all. We have to continue learning new songs. It's difficult to keep up. It's just like a lounge group—we're playing in a bar, except we have a slightly larger audience. But pretty much the same crowd comes into this bar night after night and hears the same songs. We've got to keep fresh learning new tunes. It reminds me of when you would get the chart in the old days to see what songs you were going to learn that week."

Shaffer has stated that he is mentally prepared to go back to playing night clubs in Canada. When questioned about that statement, he replied, "I mean that in this business you can't assume that just because you are now working in New York that it is always going to be the case. I think all Canadians that get to the United States and start working in show business have a fear that they will be sent back to Canada and forced to work in the field that they were in back then. For me it was working in rock groups in the lounges. Yet, it wouldn't be bad. I can see doing it...get a nice little show group together, a couple of girls, choreography. I could do it. And you must be prepared to go back, because you never know in this business."

"...in this business you can't assume that just because you are now working in New York that it is always going to be the case. I think all Canadians that get to the United States and start working in show business have a fear that they will be sent back to Canada..."

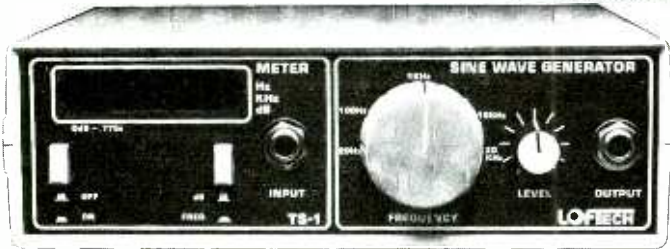
panned. "So you do want to give your all, but at the same time you are not totally into what you are doing. But you don't want to create a bad attitude." "The variable is," said Shaffer, "you are hearing guys who really enjoy playing. You don't hear that very much." Will Lee began imitating *The Tonight Show* theme by singing "Baa dat dad daa da...I can't wait to get out of here." All four agreed that it makes them feel good when they get a positive response to their music from a member of the technical crew. For it is the tech people who make the show run smoothly, even though the band quite often has to cope with last minute things, like backing up an act and going on the air with absolutely no rehearsal. Shaffer explained it like this, "Sometimes they have to make last minute decisions and occasionally they don't get to me on the headphones and they com-

It is certainly no secret that the show receives countless letters each week, and the mailbag abounds with correspondence to the band. "It is wonderful to feel that immediate communication with some audience out there," Shaffer remarked. "For instance, we'll play a certain tune on TV one night and the very next day people will speak to me on the street and say, 'Weren't you playing such and such a song on TV last night? It was so great when you guys played that.' I really feel that I'm playing a lot of the same tunes that I played with the Fabulous Fugitives (the first rock band Shaffer formed in high school) back in Thunder Bay, Ontario, Canada. I finally got a band who plays them great!" When asked about the existence of a cult following for the band, Shaffer said, "Well, we're right at a time where we are the 30ish age group and we relate to the



At Last

TEST EQUIPMENT... THAT'S AFFORDABLE



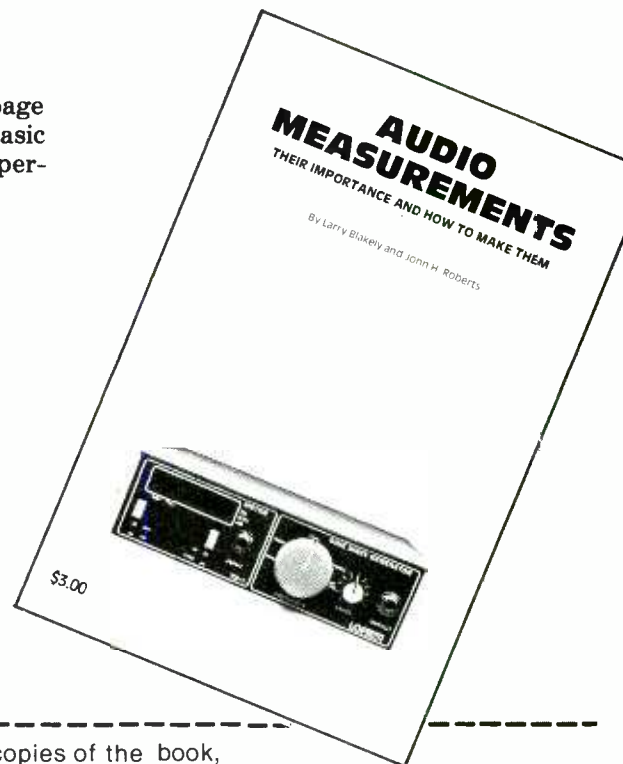
It is virtually impossible to accurately calibrate and operate any type of recording or sound reinforcement system without the use of basic audio test equipment. The LofTech TS-1 combines a high quality signal generator, dB meter and frequency counter in a single, low cost, easy to use unit.

In Addition

LofTech has made available, an 87 page book that explains in detail, many of the basic needs for test equipment, and how you can easily perform measurements and alignments.

Some of the subjects covered in this book are:

- Measuring frequency response
 - Confirming signal to noise ratios
 - Console and tape recorder level adjustments
 - Measuring equipment and system nominal operating levels
 - Measuring the stereo buss and pan-pots
 - Alignment of tape recorders
 - Setting up or verifying performance of electronic or low level crossovers
 - Measuring the system resonance and impedance of loudspeaker systems
 - Verifying the level of microphone input overload (clip) indicators
- And much, much, more



LOFTECH

Manufactured by:
Phoenix Audio Laboratory, Inc.
1 Elm Street
Lancaster, CT 06040
(860) 649-1199

International Representation:
J C AUDIO MARKETING
280 Mill St. Extension
Lancaster, Ma. 01523
(617) 365-2130
Telex 951546

Canadian Representation:
CVA SOUND
106 Chartier Ave.
Montreal, Quebec H9P-1H2
(514) 631-5787

Please send me _____ copies of the book, "Audio Measurements, Their Importance and How To Make Them", by Larry Blakely and John Roberts.

Please send literature on the TS-1 (at no cost to me)

Enclose a personal check or money order for the appropriate amount and mail to Phoenix Audio Laboratory, 91 Elm Street, Manchester, CT 06040, USA

Name _____
Address _____
City _____ State _____ Zip _____

Books are \$3.00 each,
first class postage included.

Circle 28 on Reader-Service Card

Recording Techniques

Part 15

by Bruce Bartlett

Probably the most creative part of recording engineering is “getting a sound.” This means taking the raw sound from instruments to the studio and shaping it, playing with it, until you create a pleasing new effect.

For example, some producers and engineers work for hours getting a good drum sound. They experiment with various microphones, microphone placements, ambience mics, drum synthesizers, delays, equalization, reverb and so on, until they achieve a musical illusion that is interesting and colorful.

In this article we’ll reveal several ways to play with sound creatively. By experimenting with your equipment and connecting it in unusual ways, you can invent new sounds to intrigue the listener and enhance the music.

Modifying Room Acoustics and Instruments

Try manipulating the environment around an instrument to affect the acoustics. For instance, make an acoustic instrument sound more brilliant and “live” by surrounding it with hard reflective panels. Record a sax player standing on a hard floor

for a bright sound; record the sax in a carpeted area for a mellow sound.

Move a hard panel toward and away from a microphone while recording an instrument; the changing delays of the sound reflections off the panel give a flanging effect.

Stick tacks in the felt of piano hammers for a bright attack.

Use a \$40 kiddie drum set in place of a regular set. Find one with rivets in the cymbals. When played with regular sticks or brushes, a child’s set can sound surprisingly good and can

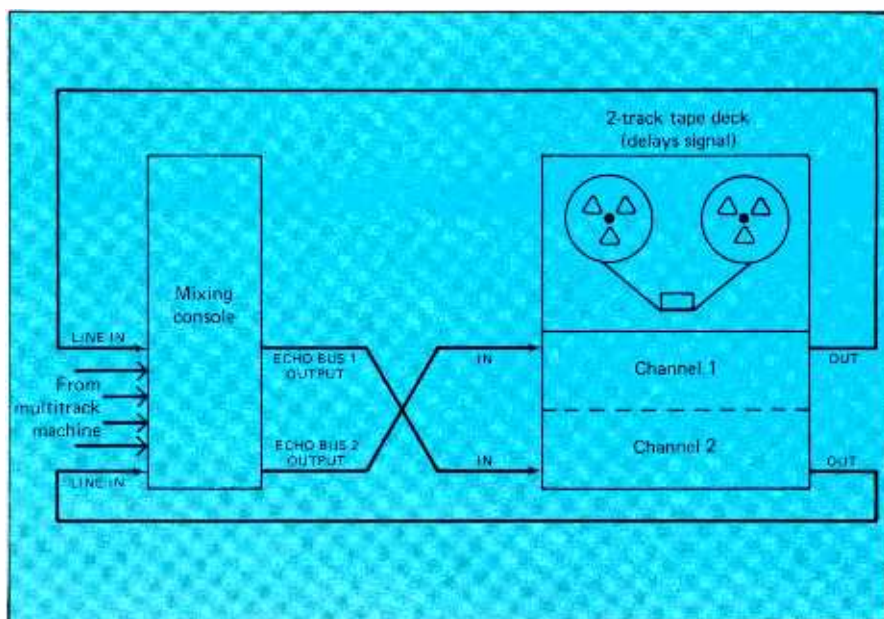


Figure 1. Set-up for making stereo echo move back and forth between speakers.

yield some interesting effects. In fact, such a drum set can substitute for a real set on home demo tapes if a regular set isn't available.

Bounce a basketball near a microphone to simulate a kick drum. Slam books on a table top for extra "sock" during a clap track. Use a Slinky for a percussion instrument (good for Latin tunes).

Microphone Techniques

- Place a cardboard tube in front of a microphone for a strong coloration. The tube resonates and puts a complex series of peaks and dips in the frequency response. The longer the tube, the lower the pitch of the coloration.

- Move microphones around as you record with them. Swing two mics by their cables while taping a lead guitar solo. If the recording is heard in mono, you'll hear phasing effects. If you monitor in stereo, the sound will be all over the place.

- Place microphones in unusual positions. Try mic'ing a guitar amp from inside the cabinet for a hollow sound. Mic a piano underneath the sound board for a full, mellow tone. Try recording a rock group at a distance with just two microphones. Mic drums from across the room for a "live," "roomy" effect.

- Combine several microphones on a single instrument, or combine a direct box or a pickup with a microphone. Mic different areas of an instrument up close, then mix the microphone outputs. For example, mic a sax near the bell (for presence) and also near the finger holes (for warmth). Combine the two signals for a sound with fullness and clarity.

- For an unusual reverb sound, mic a piano with the sustain pedal on, and blow a sax into the piano.

- Record some segments of a song *binaurally*. Binaural recording uses two miniature omni-directional condenser microphones placed on the head—one in each ear. These microphones capture what each ear is hearing. When binaural recordings are played back over headphones, each ear hears the signal of the microphone that was in it. That is, the original sound at each ear is reproduced. The re-creation of room ambience is startlingly accurate. You may be fooled into thinking that you're hearing a real instrument playing in your listening room.

Another way to record binaurally is to place two omni microphones on either side of a head-sized cushion.

SEPTEMBER 1983

This gives a smoother response than the on-head method.

Edit binaural recordings of conversations or solos into recordings made with the usual close-mic'ing techniques. You'll surprise a listener wearing headphones when these passages come up, because their realism is striking.

- If you have some rugged, expendable microphones, use them for drumsticks while recording with them. That is, play the drums with the microphones and record their output. It's the ultimate in close mic'ing! Cymbals sound especially strange this way.

- Try using some very cheap microphones occasionally. They may give you a trashy sound that is just right for a particular song.

- Try recording with microphones near the players' ears. After all, they are hearing a sound that they like—it may sound good to the microphones, too.

- Instead of using faders to balance instruments, use microphone techniques. Normally a track is made more prominent by boosting its fader. Try the following instead: Close-mic instruments that you want to stand out. Mic background instruments at a greater distance. On playback, the close-mic'ed instruments will tend to stand out, while the distant-mic'ed instruments will tend to stay in the background.

This technique applies well to lead vocal and backup harmony vocals. If all the singers are mic'ed at the same distance, it will be hard to audibly separate them or distinguish them. You'll have to boost the level of the lead singer closer than the harmony singers, the lead vocal will sound "up front" and the harmony will sound "in the background."

- You can use microphone frequency response as a tool to make instruments distinct. Suppose you record a lead acoustic guitar playing with a rhythm guitar. Use a condenser mic on the lead guitar for clarity; use a dynamic mic on the rhythm to soften the detail. The differences in timbre will help keep the instruments distinct. If you use the same microphone on both guitars, they will tend to mask each other.

Playing With Reverb and Echo

- Vary the echo-send or echo-receive levels during a mixdown. Turn them

**Professional Grade
Recording
Tape**

Stocked for Immediate Shipment

AMPEX
3M
TDK

1/4" & 1/2"
**Audio
Tape**
ALL TYPES

CASSETTES
ACCESSORIES

ASK FOR OUR CATALOG
OF PROFESSIONAL
RECORDING SUPPLIES

Polyline
Corp.

1233 Rand Rd. Des Plaines, IL 60016

312/298-5300 25

Circle 24 on Reader Service Card



In general, spring reverbs don't have the best reputation in the world. Their bassy "twang" is only a rough approximation of natural room acoustics. That's a pity because it means that many people will dismiss this exceptional product as "just another spring reverb". And it's not. In this extraordinary design Craig Anderton uses double springs, but much more importantly "hot rod's" the transducers so that the muddy sound typical of most springs is replaced with the bright clarity associated with expensive studio plate systems.

Kit consists of circuit board, instructions, all electronic parts and two reverb spring units. User must provide power (±9 to 15V) and mounting. (reverb units are typically mounted away from the console).

CHARGE TO VISA OR MC TOLL-FREE
1-800-654-8657 9AM to 5PM CST MON-FRI

DIRECT INQUIRIES TO
RAA Electronics, Inc.
Dept. 7M, 1020 W. Wilshire Bv. Oklahoma City, OK 73116 (405) 843-9626

Send the 6740 REVERB KIT \$59.95 plus shipping (\$3) enclosed or charged.

Send Free Catalog

name _____

address _____

city _____ state _____ zip _____

Circle 33 on Reader Service Card 39

up just after a loud isolated crash in the music, then turn them back down. The same can be done with an ambience track.

- Adjust the reverberation to follow the phrases in the vocals. Turn the reverb up during singing, then cut it off whenever singing stops. This is a totally unnatural effect, but it will attract a listener's attention.

- If your console has "pre-fader" echo sends (reverb sends), you can make an instrument recede into the distance. Play the instrument's track through the console; set the appropriate fader up; set the echo send to "pre-fader," and set the echo send about 3/4 up. Gradually pull down the fader. The direct sound of the instrument (controlled by the fader) will diminish, but the reverberation will remain. The effect is as if the instrument were moving farther away from you into space.

The opposite effect was heard on Lou Reed's "Walk on the Wild Side," where the backup vocals start in the distance and end up very close to the listener. You can duplicate this effect as follows: Play a track through your mixer. Start with the fader slightly up, the echo send set to "pre-fader," and the echo send up full. Gradually boost the fader and turn down the echo send. The track will seem to approach you.

This technique can be applied to a 2-track master tape of a song. Play the tape through your console and record the console output on another 2-track machine. Set the controls as described above. At the beginning of the song, slowly turn up the faders and turn down the echo sends. The song will begin swamped in reverb, then will gradually become more coherent and clear (like bringing order out of chaos).

- To add ambience to dry tracks, feed a mix of the tracks to a loudspeaker in the studio or some other room. Pick up the loudspeaker sound with one or two distant microphones. Return this signal to the board and use it as an ambience signal.

- Have a vocalist and lead guitar play identical melody lines at the same time. Record them on two separate tracks. Feed the guitar track through the console to your reverb unit, pre-fader, with the fader down. Feed the vocal track to a fader with no reverb. You'll hear a vocal that has the guitar's reverb behind it!

- Filter out everything below 5 kHz in the reverb return signal. Try

this reverb on vocals to brighten the sound, or on snare drum to add a "splash."

- You can make a stereo echo that moves back and forth between the speakers (see *Figure 1*). Suppose you're using a 2-track tape deck for tape echo. Set the source/tape switch on the deck to "tape" for both channels. Patch tape channel 1 OUT to a mixer input, and assign that input's echo send to tape channel 2 IN. Patch tape channel 2 OUT to another mixer input, and assign that input's echo send to tape channel 1 IN. Set the recorder in record mode and adjust the echo sends for the desired amount of repetition. The echo should bounce from side to side, giving a spacious effect. An electronic delay device can be used in place of the tape machine if the delay can be set around 0.2 to 0.5 second.

- Vary the speed of a tape deck as it's echoing to vary the pitch of the echo. Do the same by varying the delay on an electronic delay device. Try routing the reverb-send signal through a pitch shifter.

- Bring an echo-return signal back through a fader. Equalize this signal. The EQ will double each time the sound repeats.

- Here's a quadruple echo effect that uses a 4-track recorder. Set all source/tape switches on the recorder to "tape." Patch track 1 out to track 2 in. Patch track 2 out to track 3 in. Patch 3 out to 4 in. Set all tracks in record mode, and record an instrument on track 1. Monitor all four tracks in mono. By carefully adjusting the record and repro levels, you will achieve four equal repeats of each note. Try this on a drum solo. Even if the drummer is playing very slowly, the quadruple echo will make him sound like his sticks are made of lightning.

Try setting the repro levels so that each successive echo gets louder—a most unusual effect. Vary the tape speed as you're recording. Pan each track to a different stereo location for a moving echo.

Console Tricks

- Record a guitar direct on track 1. Record its amp with a microphone on track 2. Combine the two tracks to mono in mixdown, or pan them left and right.

If an electric guitar is being played through a chain of effects boxes, you can pan the clean guitar signal to the left and pan the effects output to the right.

- Record a drum set on track 1. Feed the track 1 signal to a guitar amp in a separate room. Mic the guitar amp and record it on track 2. During mixdown, combine and pan the tracks as desired. Do the same with a lead guitar or vocal, but route the signal to a Leslie organ speaker.

- Place two microphones side-by-side near an instrument. Assign the mics to two faders. As the instrument is being recorded, rapidly alternate the gain between the faders (push one up while pulling the other one down, then reverse). The effect is like subtle phasing.

- Ride several faders slightly up and down in time with the music. This will add a subconscious emphasis to push the tune along.

Recorder Tricks

- Using varispeed, record a floor-tom lick at a speed slightly faster than normal. Play it back at normal speed. The pitch of the toms will be lowered, making them sound thunderous.

- After recording a lead vocal part, record a second take at half speed. Play it back at normal speed

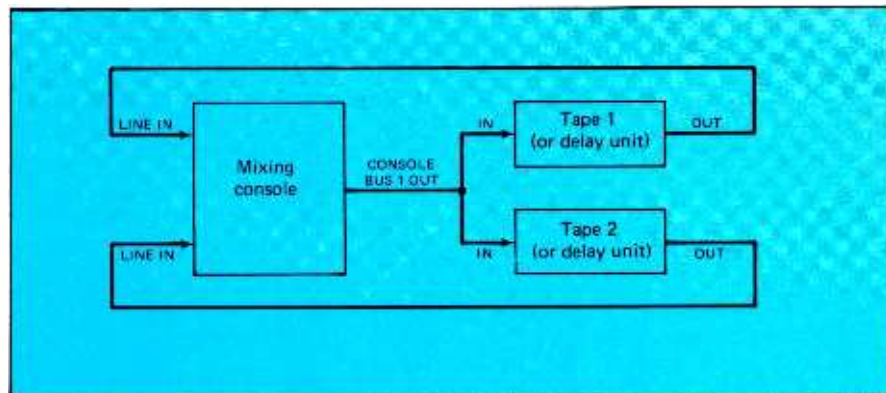


Figure 2. Set-up for creating feedback tones that echo, flange, and shift in pitch.

for a chipmunk effect. Mix the chipmunk voice at low level with the regular voice at normal level to add “edge” to the vocal.

- Form a tape loop by splicing together the head and tail of a short length of tape. Route the tape past the heads and between the capstan and idler wheel. Insert a pencil in the loop to stretch the tape taut.

Set the tape machine in record mode, and record a second or two of random sounds in the studio—say, someone dropping a box of junk. Stop the tape loop and play it back. The repetition of the loop will impart a rhythm to the random noises.

Record a single lead guitar note on the loop. Then during mixdown, turn up the loop’s signal at an appropriate point in the lead guitar solo. It will sound like the guitar has infinite sustain.

- During mixdown, play some of the tracks in sync mode (off the record head). Those tracks will be heard out-of-sync with the rest of the program.

- Add wow and flutter to a guitar line by applying pressure to the feed-reel flange or by wrapping some tape around the capstan. Be careful not to damage the tape or tape machine.

- See *Figure 2* for this next effect. Use two identical 2-track recorders. Set their outputs to “tape.” Patch their outputs to two console inputs. Assign these two inputs to the same console output bus, and connect the bus to both recorder inputs.

Set both recorders in record mode. Gradually increase their fader levels

on the console until an echo and then feedback occurs. Using varispeed or pressure on the feed-reel, vary the speed of one recorder. You’ll hear an outer-space feedback tone that shifts pitch, echoes, and flanges all at the same time.

How does this work? Both recorders delay the signal by the same amount. Recycling the delayed signal from tape output to tape input causes an echo. Varying the speed of one recorder causes a time difference between recorders that makes the flanging effect.

Outboard Equipment

- Connect several equalizers in series and boost them at the same frequency. The result is a screaming peak that can add a sense of pitch to unpitched instruments (such as drums and cymbals).

- Play a previously recorded track through a graphic equalizer or parametric equalizer. Boost a single frequency and vary the frequency as the track is playing. The tone color of the instrument will change as you adjust the frequency.

- Patch a track to two console inputs. Equalize each input differently and pan them left and right.

- Set a compressor for infinite compression ratio. Record a drum set with crashing cymbals, and run the drum track through the compressor. Every time the kick drum beats, the cymbals will get “sucked down” in level.

- For a drum sound with sustain, apply bass boost to a drum track

before compression. Apply a complementary bass roll-off after compression to restore the tonal balance. Only the lows will be compressed. Try other complementary equalization schemes.

- Leave a signal Dolby-encoded for special effect. This is effective on snare drum and acoustic guitar.

- Patch a signal through several tube-type amplifiers in series to get a “soft-distortion” tube sound. Use old tube microphone preamps or tube limiters.

- Try putting a signal out-of-phase with itself on the left and right channels. This requires studio equipment that has balanced lines. Make a polarity-reversing adapter as shown in *Figure 3*.

Mult or “Y” the track output. Feed the track directly into your console. Also feed the track through the polarity reverser, then into another console input. Pan the in-phase signal full left and pan the out-of-phase signal full right. The sound image produced will be diffuse, directionless, and hard to localize. It may even sound like it’s behind you. This is effective for audience-reaction tracks and lead guitar solos. Caution: The out-of-phase track will cancel if the recording is heard in mono (both channels combined).

Conclusion

These are several suggestions for sonic effects that should be fun to try out. Also, invent your own and send the ideas to us at *MR&M*.

Basically, new effects are created by (1) using recording equipment in unusual ways, (2) connecting equipment in unusual ways, or (3) using unusual equipment for a particular function. Let’s illustrate this with a description of the ultimate special effect:

Record a vocalist in a bathroom using a small loudspeaker for a microphone. Route the signal to a guitar amp and mic front and back with a dynamic and condenser microphone. Using a graphic equalizer, boost these signals 15 dB at every other octave and cut in between. Send the equalized signal to a reverb unit and flange and compress the reverb. Record the result on a 4-track recorder while varying the speed and bias settings. Finally, run the tape through a bulk tape eraser.

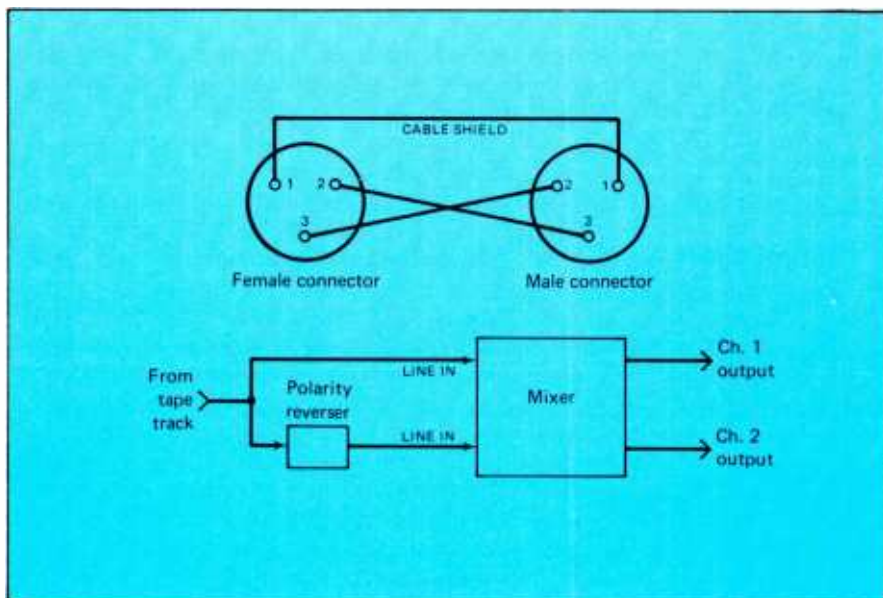


Figure 3. Using a polarity-reversing adapter to put a signal out of phase with itself on left and right channels.

Studio Notebook #15

By James F. Rupert

IT'S NO LONGER A RUMOR! The 15th installment in the Studio Notebook series is here! Days in the making, now you can witness the spectacle and majesty for yourself! See the incredible saga of free-standing business property unfold before your amazed and disbelieving eyes! Gasp at the mind boggling imagery! Laugh at the heart-warming antics of those zany recording studio characters as they wind their way into your heart!

Stare open-mouthed at lines like... "Is it zoned for business?" and "Somebody's got to pay those taxes!" and "Okay, I'll jump, but from up here I don't know if I can hit it!"

It's here! It's now! And it's all happening just for you! It's the 15th installment in the Studio Notebook Series! (Soon to be a minor motion picture.)

Let's talk money. (Hey, I know... you're not interested, I'm not interested, but it may come up at a cocktail party sometime.) We've now reached the point in our studio planning where we've got to determine what is the best way for money to be spent. And believe me, when we're talking real estate (as indeed we are today), there are many ways to spend it.

While we're waiting for all the entries to filter in for the Studio Design Contest (featured in Studio Notebook #13 in the April '83 issue), this would be an opportune time to speak to those would-be studio owners who have decided that a basement or garage operation is really not for them. If this diagnosis fits your condition, then our prescription has to be a massive dose of cost-effective, free-standing business property.

Obtaining the ideal studio location means opening up several pesky cans of worms. Is the proposed studio site solid enough to isolate acceptable levels of outside noise without incredibly expensive acoustical treatment? Are neighboring noise levels controllable with some reasonable amount of acoustical treatment (i.e., trains, bus garages, bowling alleys)? How about nearby electrical or radio interference (arc welding shops, radio stations, CB radios)? Does the building meet all the local codes for plumbing, structural stability, wiring, ventilation and door and window access? Does the landlord expect you to make any necessary (read costly) renovations to meet these codes? Is the building (and here's one of the peskiest and wormiest cans of all) in an area that is zoned for business?

Sounds hairy, huh? Let's complicate it even further. Is your prospective studio location convenient to your customers? A rock band might be willing to cruise the countryside looking for your facilities, but an

advertising agency generally cannot afford to spend heaping hunks of transit time on a product. If you're involved in tape duplication, a hard-to-find location will knock the bottom out of the number of customers who come flying in for those last minute (and highly profitable) quick dubs. You might be able to combat this to a certain extent by offering free or low-cost delivery to your client, but this is also a two-edged sword. Costs of delivery have to be absorbed into the price of your studio services somewhere or else the loss of profit margin will rapidly offset the convenience to the customer. If delivery costs are too high, you lose money. If delivery from your distant studio is eliminated, you could lose customers. What's a mother to do?

The solution is to think twice before you slap down a deposit on a building that seems to be priced right but is nine miles from nowhere. If at all possible, try to map out the different clients and firms you will potentially be serving and make every effort to pop for a location in the center of the pattern they form.

Also check the track record of other businesses in any area you are considering settling in. If there is a scandalously short life-span for others who have tried to make a business go in this area, it shouldn't take much deduction to see a pattern forming. Is vandalism high in this area? Is the area well-lit after dark? Does the community have any reason for not patronizing businesses in this part of town? Try giving a call to the industrial development department of your local Chamber of Commerce for the information you'll need to make a decision you can live with. Some banks and insurance companies have personnel that are specially trained to help companies with their location decisions. State governments may also provide agencies to help you with just such matters at no

charge. It's only good business for them to help you succeed in any way they can. (After all, somebody's got to pay those taxes!)

Stability in the eyes of your clients is something that cannot be overemphasized. Businesses that remain in operation but move around like a crosstown bus often come to be viewed by the public as fleeing from location to location one step ahead of the sheriff. Customers like the security of coming to the same firm in the same location time after time. For this reason, look over a prospective studio site with an eye for tomorrow. Will the location in question allow you to expand in the future? Are there adequate parking facilities for now and down the road when the demand for your services increases? If you are securing just part of an existing building, will the remaining space really fit your needs should you decide you need it next year? If a building seems perfect for you now, but does not allow for future expansion, are there other potential spaces in the same section of the city that would allow you to move to a large facility without leaving the area you've established as your own?

Remember that you're not a factory that gets its orders through the mail and ships out its product to customers it never sees. You are a recording business that (fairly or not) your customers judge partially by the appearance you put up. You don't need the high visibility and access of a retail stereo shop, since you don't depend on walk-in traffic or lunch-hour browsers. But you do need to be more recognizable in your location than an FBI stakeout of a counterfeit ring. The public needs to know where you are and where you'll be tomorrow.

I've personally secured two different studio locations by grabbing up spots where other studios had gone belly up and left spaces that for the most part had already been remodeled to my needs. It was still a matter of checking out the problems that caused them to go under to determine whether or not the location was at fault, but in following this course I was able to save a load of money for several reasons.

First, my remodeling costs were much lower since I merely worked around the basically sound design concepts the past studios had incorporated. Had the previous tenant's work needed to be torn out and rebuilt, the savings advantage would have been nil. Thus, this all had to be nailed down before I agreed to purchase the buildings.

Second, the landlord knew he was over the proverbial barrel. If anybody but another recording studio rented the space, he would have been the one stuck with an expensive remodeling bill to convert the building to a more conventional use. After negotiating an acceptable rent figure, I subtracted the cost of remodeling from the total lease figure and offered him that amount of money as total rent for the lease period. After considering the matter, he finally accepted the offer and the deal was cut. Let me stress at this point that I tried to show him my reasoning and his savings with all the diplomacy and courtesy I could muster. (Real estate dickering should never turn into mud-wrestling!) When the dust had cleared, I had my buildings at the price I wanted and the landlord still had his dignity. No one left with the impression that they had just eaten an apple with a worm in it, and take it

from me that that's exactly the kind of relationship all of us had better maintain with our landlords if we want to keep our sanity.

The bottom line to all of this is that the location you select for your studio is very important to your business success. Sometimes, a business that might only be marginal makes a good profit solely because of an excellent location, whereas a crummy location can drag down a good business pronto. A poor location can affect sales adversely and decrease a studio's overall profit by adding to its costs in more ways than one.

As a studio owner/manager, you must reassess the situation regularly even after you are settled in to determine if your present site is an advantage or a millstone. A site that fits your needs like a glove today might, in three or four years, be hopelessly inadequate. Stability in the eyes of your clients is one thing; leasing an outdated anchor to wear around your business neck is quite another.

Once again, the United States Small Business Administration has plenty of free pamphlets available on the ins and outs of business site selection. Copies are easily obtained by giving a call to your local field office of the S.B.A. and telling them your needs.

So let's suppose you find the ideal location you've been dreaming about. It's in a respectable area of town, it has good visibility and access, the building structure is perfect for a recording studio and it is surrounded by other successful companies. You notice as you're drying your sweaty and trembling palms that the size in the window says, "For Sale or Lease," and suddenly an entirely new possibility opens up in your head.... Do you want to rent the building temporarily or purchase it to make it your own?

We'll be talking about the pros and cons of leasing versus purchasing next time in more depth. For now, before we close, don't forget about the Studio Design Contest that was featured in the April '83 issue of **MR&M**. Check out Studio Notebook #13 for details on how you can win great prizes from companies like JBL, Shure Bros., Inc. and much more, or see the separate notice elsewhere in this month's issue. Extra copies of the April issue can be ordered from the **Modern Recording & Music Offices**, 1120 Old Country Road, Plainview, Long Island, New York 11803 and all entries can be sent there as well. Because of the super line-up of prizes now being offered by the contest sponsors, we've extended the deadline until October 31, 1983 so that everyone has a chance to enter and win. If you think the designs you've used for your own studio are innovative enough to deserve some recognition, send them to me here at the magazine. Somebody is going to win some fantastic prizes, and why shouldn't it be you?

So what are you waiting for? Send your entries c/o **Modern Recording & Music Design Contest** and start dreaming about how all that new equipment is going to look in your new studio after you win. This contest is void where prohibited (wherever that is!) but can still be a lot of fun. All members of **Modern Recording & Music** magazine's staff and their families are ineligible to enter. (Our Editor told us just the other day, "Nobody's going to work here and have fun at the same time.")

See you next time.



Ambient Sound

By Len Feldman

Mastering And Making Compact Digital Discs

I have just returned from an exciting three-countries-in-five-days trip. No, the countries were *not* Japan, Taiwan and Korea! Despite rumors to the contrary, there are still companies in Europe involved in electronics and the recording business, and this particular trip provided an overview of what promises to be the most important innovation in the recording industry in the hundred-plus years that recordings of music and voice have been with us. I'm referring, of course, to the Compact Digital Disc, or the CD as it's now called. (DAD has pretty well been abandoned as an acronym for the new digital disc by universal agreement among the inventors and licensees of the system.) The three countries I visited were The Netherlands (home base of the giant Philips Company, who invented the CD records), Belgium (where, in the town of Hasselt, Philips has a factory dedicated to the manufacture of CD players that bear the name Philips in Europe and Asia, but will be marketed in this country under the Magnavox label, a North American Philips-owned trade name) and, finally, Hannover, West Germany, the home base of Polygram Records, where I saw the almost unbelievable production processes involved in the making of the finished CD discs themselves. At this point, the Polygram facility is one of two mass production houses able to turn out CD discs in large quantity (the other is CBS-Sony in Japan).

All sorts of rumors have been floating about concerning the current production rate of these discs and current yields of acceptable discs. I can report with reasonable assurance that as of my visit, Polygram was turning out between 20,000 and 25,000 discs per day, and that this quantity represented approximately a 70 percent yield. Both the daily output and the yield are expected to improve over the next few months, so that if we don't see more CD records from Polygram available in this country, it won't be because they are unable to produce them. Rather, it will be a calculated marketing plan for the introduction of software to meet the increasing availability of CD players introduced in this country.

Master Disc Preparation

Superficially, at least, the mastering and disc production steps involved in mass-producing CD records are not unlike those required to produce conventional vinyl LP records. A disc master surface is transferred onto a nickel shell, or "father," that contains a negative version of the digitally encoded program information. This father is then used to produce a number of "mothers," or positive versions of the master. Each of these, in turn, is used to produce several stampers, referred to by Philips as "sons." The stampers, after suitable processing, are finally used in injection molding machines to produce the plastic, transparent carriers which, after further processing, become the incredible 12 cm diameter discs which you've been reading so much about.

At Eindhoven, the Master Disc for any CD release begins life as an optically ground and polished substrate that is cut to standardized dimensions. Following visual inspection, this glass disc enters an automatic, computer-controlled four-stage processing system. This begins with a scrupulous cleaning of the glass disc and ends with the application of a photo resist coating. The final stage involves checking the uniformity of the photo resist coating by an automatic scanner linked to a computer. The master disc is then placed in a special protective carrying cartridge and cured in an oven. After curing, the master disc is stored until it is needed for laser recording.

The master recording system consists of a laser beam recorder, an encoder, a subcode processor, a digital tape recorder and a system controller. This last item is a computer that is programmed to automatically monitor and control all stages in the recording process. The resist master disc, previously stored, is fed to the disc-carrying mechanism while still in its protective cartridge. The cartridge is automatically opened and the disc itself is passed on to the recorder's drive spindle. The laser beam recorder is equipped with its own dust filtering system, and all operations take place in a climatically controlled clean air environment.

The master tape is placed on the digital tape recorder and recording begins. Digital audio and

subcode information are fed into an encoder. The encoder carries out multiplexing, CIRC encoding and EFM modulation. For testing and quality control applications, the encoder can also generate various test signals. The data bit stream from the encoder passes on to an acoustic-optical modulator that lies in the path of the laser in the laser beam recorder. This laser beam is modulated according to the data bit stream and focused by means of an objective lens system onto the light-sensitive coating of resist on the master disc. Various servo mechanisms guide the objective lens so that it moves radially outward and maintains perfect focus.

At the end of the recording, the disc is automatically returned to its cartridge and is passed on to the developing stage. It is then removed from the cartridge and developed, using fluids which etch away those areas that have been exposed to the laser beam. The process is continuously monitored until the desired pit geometry is achieved, at which point the operation stops automatically and the disc is cleaned and spin-dried. To give you some idea of the dimensional tolerances involved, the track pitch, or distance between tracks, is specified as 1.6 microns, with a tolerance of plus or minus 0.1 micron! Even more amazing, one square millimeter of a recorded disc carries some 200,000 pits!

Following successful development, the disc passes through an evaporation stage where it receives a micro-thin coating of silver. This enables electrical inspection and, later, galvanic processing. A so-called Master-Player system is used to measure pit geometry using signals from the optical readout system. Readout signals can be relayed to a "Silent Room" for audio evaluation. A similar system is available for inspection and measurement of stampers and finished compact discs. Final inspection of the master disc is done with a stereo microscope to confirm surface quality of the CD-disc master.

The entire disc mastering process has been designed to minimize manual contact with the disc once the plain glass disc has been introduced into the Resist Master Preparation System. Throughout the complete mastering process, the disc remains in a clean air environment, moving from one process to another in an airtight cartridge, from which the disc is withdrawn for each operation and to which it is returned automatically after each operation.

If the process I've just described seems almost too precise to be accomplished reliably, the processes involved in the mass production of the finished CD discs were even more amazing. Touring the CD production facilities in Langenhagen (a suburb of Hannover), it seemed almost incomprehensible that just eighteen months ago there wasn't even a hint of what was to be produced in this factory.

'Pressing' CD Discs

The injection molding machines we saw were configured around the outside of the gigantic clean room, in such a way that only their input and output apertures faced into the clean room itself. Thus, machinery could be serviced from outside the clean room while the molding of the discs themselves as well as their movement from station to station occurs completely within the clean room environment. In order to maintain the clean room, filtered and cooled

air is blown through giant air duct systems from above into the compact disc manufacturing room below.

The first step in the mass production of CD discs is electroforming, which replicates the master disc in a nickel bath, forming the first negative or "father." Multiple positives, or "mothers," are then made in order to produce "sons," which serve as the actual stampers in the molding process. We learned that while each stamper is able to produce far fewer discs than can stampers used to produce conventional LPs, this is partially offset by the fact that many more stampers can ultimately be produced from the single glass master than would be the case for a master disc used to produce LPs.

Both the mastering and the electro-forming process are subject to conditions of maximum accuracy. Metal parts must not vary in thickness. Unlike the conventional LP replication process, mechanical or manual cleaning of masters is not possible and dust can cause great problems. The pit tracks on the disc are no bigger than one hundredth of the width of a human hair! If they become clogged or covered, sound reproduction is seriously affected.

The actual molding of the discs was derived from technology that is well known in the record business. Because of the minute dimensions involved, however, the processes had to be customized to meet the new requirements. While an LP can have a warp of as much as 1.5 millimeters and still be playable on most systems, the compact disc must be flat to within 0.4mm, even at temperatures of 55 degrees C. and at relative humidity levels from 0 to 95 percent. The material must not contain bubbles or inclusions greater than one tenth of a millimeter and must be highly transparent for optical readout. Molding is done automatically under pressure and heat. The 12 centimeter disc resulting here must be as clean and as accurate as optical glass, and its surface has to be optically flat.

The next step is known as metallizing. The molded disc emerging from the molding machine is coated with aluminum in a vacuum chamber. The side carrying the tiny "pits" is coated to a thickness of 70 to 80 millionths of a millimeter to build a reflecting layer. Here, too, microscopic irregularities could easily ruin a disc.

Following metallizing, a protective varnish is applied to the aluminum surface by dripping a lacquer onto the rotating disc. The center hole punching operation comes next. This hole has to be punched with great accuracy, expressed in fractions of a millimeter. Correct positioning of the center hole is established by opto-electronic means, referencing the actual pit tracks on the disc. This is a totally new process developed expressly for CD discs. Printing of the label is done directly onto the protective lacquer, much like the process used in printing labels on LP records. However, in the case of CD discs, the label serves as a secondary protective layer. Following this step, the record is finished and is sent on to inspection and packaging. Initially, at least, 100 percent inspection of all discs is being done and, thanks to this visual final inspection, rejects in the field currently amount to no more than 0.3 percent!

This trip certainly dispelled any doubts I might have had about the CD disc format. It's here to stay!

Lab Report

Tascam 234 Syncaset



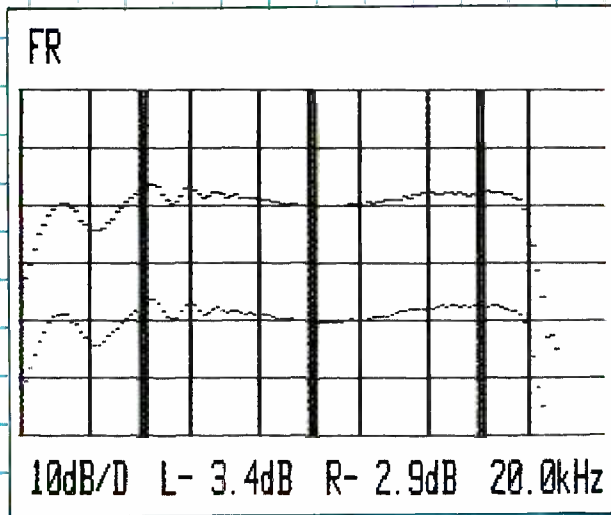
In this month's "Hands-On Report," editor John Woram describes the features and control layout of this Philips cassette-based "recording studio in a single, small package." What remains for me to do is to tell you how the unit lives up to its published specifications, and give you my reaction to this novel product.

I think the folks at the Tascam division of Teac Corporation have done a remarkable job in creating this product. If you think of the Syncaset as a central piece of hardware that you can build upon, the significance and utility of the product becomes at once apparent.

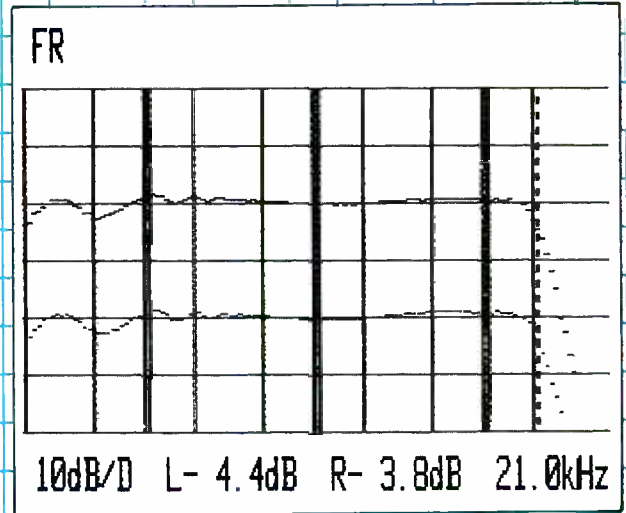
Test Results: As usual, I've prepared a table of VITAL STATISTICS in which manufacturer's published specifications are listed alongside the measured results obtained in our lab. If you get hold of the owner's manual for the Syncaset, you'll notice there are many more specifications listed there. I've

omitted those relating to the electrical performance of the record and playback amplifiers of the unit. It's been my experience that the performance of such amplification circuitry is invariably much better than the overall record/play performance of any deck when the tape itself is included in the measuring loop. In any event, it seems to me that if you're buying a deck for recording four tracks onto cassette tape, you aren't all that interested in how quiet its internal amplifiers are or how flat the frequency response is; those performance parameters would be of concern if we were talking about consoles, equalizers, or even a microphone.

Although we found a sample of Scotch (3M) SX-11, high-bias cassette tape included with our sample of the Syncaset, we chose to measure performance by first using one of the tapes recommended by Tascam: TDK Type SA. *Figure 1* is a plot of frequency response for the record/playback cycle. In *Figure 1A*, the dbx noise reduction circuitry is turned on, while in *1B* we switched it off. Notice how the irregularities in

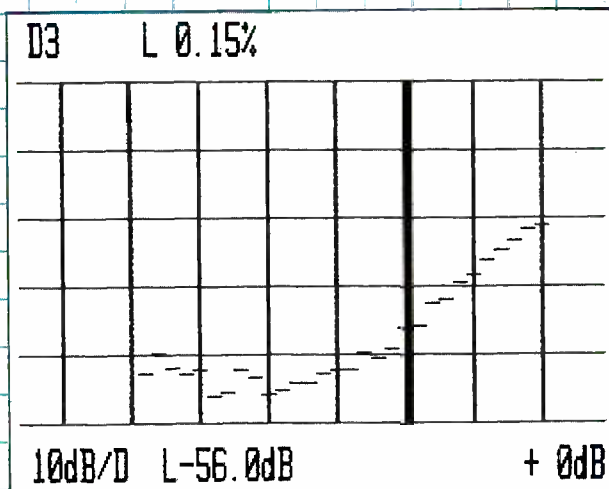


A

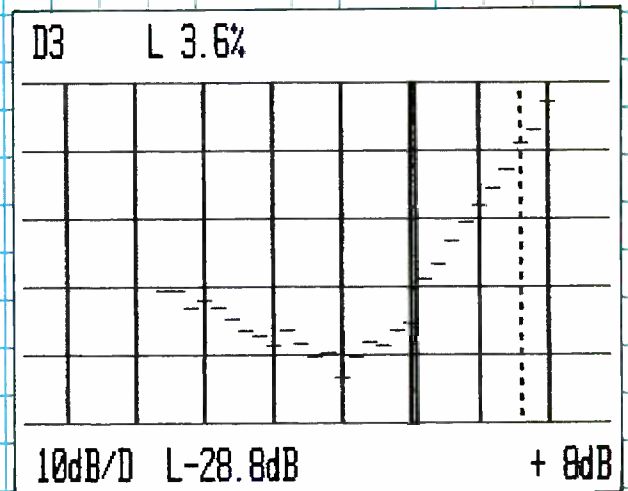


B

Fig. 1. Record/play frequency response of Tascam's 234 Syncaset at 0 dB and -20 dB record levels, using TDK-SA tape with dbx (A) and without dbx (B).

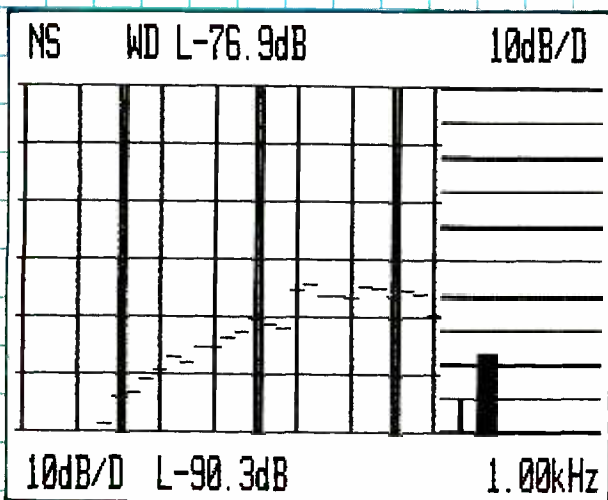


A

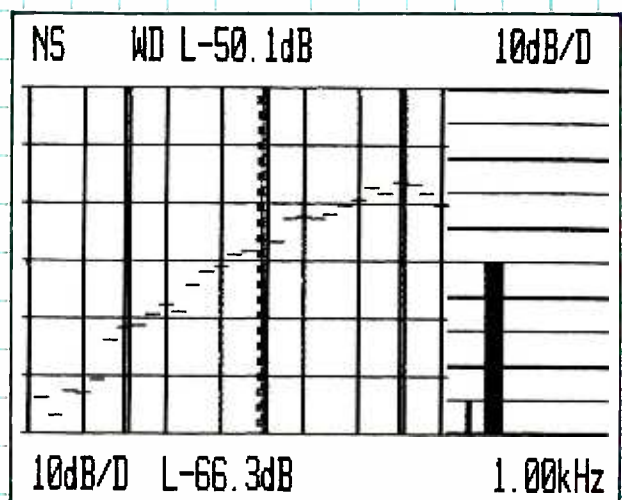


B

Fig. 2. The compression circuitry of dbx keeps third-order distortion extremely low, even above the 0dB level (A). Without dbx (B), even though HD at 0 dB remains almost as low, 3 percent THD is reached at a record level of +8 dB.



A



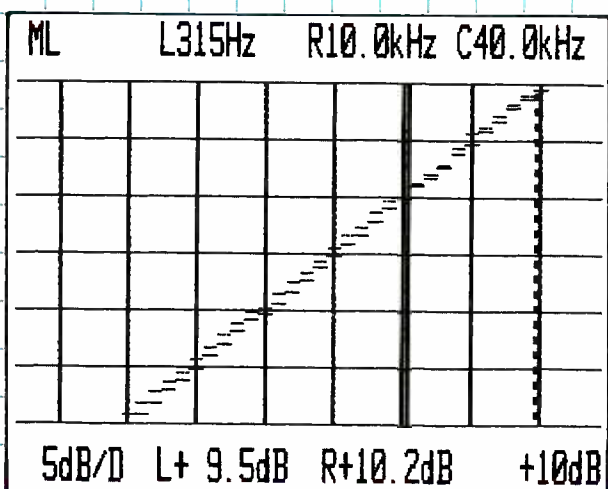
B

Fig. 3. 3 percent HD with dbx on occurred at +17 dB; thus S/N with dbx is 93.9 dB (76.9 + 17) since S/N on graph is referenced to 0 dB (A). Without dbx, headroom for 3 percent HD was +8 dB; thus S/N without dbx is 58.1 dB (50.1 + 8), (B).

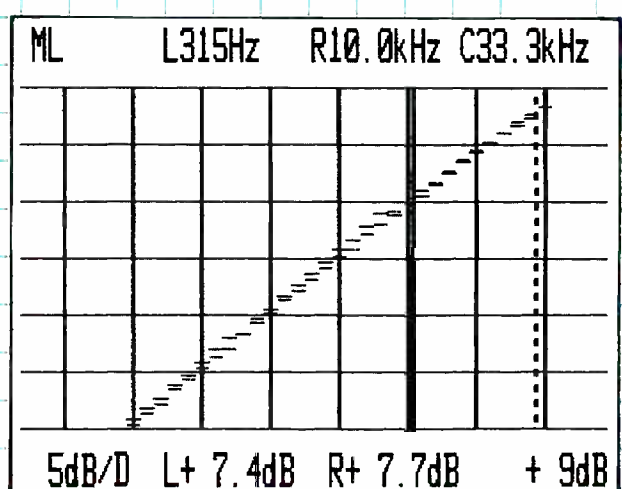
response (particularly the low-frequency variations caused by head contouring) increase in severity when the dbx is on. The effect is common with any full-bandwidth companding system where errors in response are amplified by the compander itself. The slight rise in response above 2 kHz seen in *Figure 1B* is also intensified by the dbx action in *Figure 1A*. Nonetheless, response is excellent overall, thanks in part to the 3 3/4 ips speed used by the 234 Syncaset. These days, there's not much problem maintaining

relatively flat response up to 20 kHz, using good tape on a standard speed (1 1/2 ips) cassette recorder at -20 dB level (the lower plots in both *Figures 1A* and *1B*). But try getting the same flat response at 0 dB record level on a slower-speed machine using even the finest grade of metal tape, and you'll see why the use of 3 3/4 ips speed is so important to the performance of this deck.

Figures 2A and *2B* are plots of third-order harmonic distortion versus recording level. In *Figure 2A*, the



A



B

Fig. 4. Thanks to higher tape speed, 10 kHz MOL was excellent with dbx (A) or without dbx (B). Linearity (output vs. input) was almost as good at 10 kHz as it was at 315 Hz, even up to record levels of +10 dB.

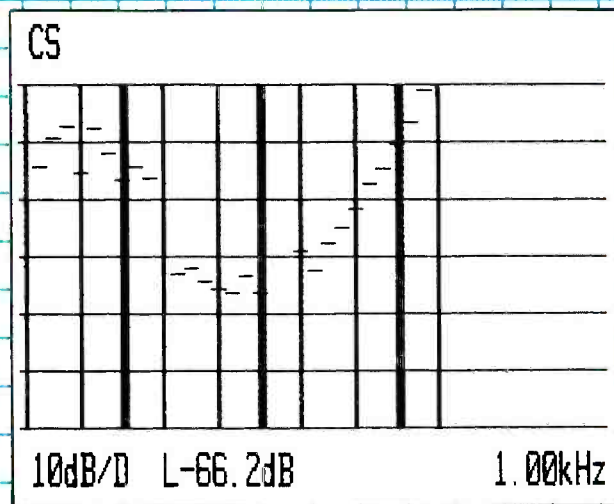
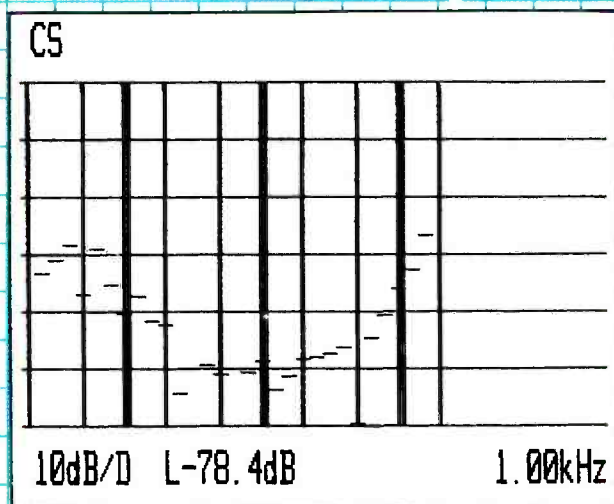


Fig. 5. Channel separation (crosstalk) was superb with dbx (A), and remained excellent without dbx (B).

cursor is set to 0 dB (the heavy vertical line in the graph); we see that third-order HD measures 0.15 percent. This plot is taken with dbx turned on. Note that even at levels way above 0 dB, third-order distortion remains quite low. At +10 dB it's still only 0.9 percent. In this presentation, each vertical division represents a change of 10 dB in distortion; thus the top line is 10 percent HD, the one below that is 3 percent, and the third line from the top is 1.0 percent HD. In Figure 2B, the dbx is turned off. Now, even though HD at 0 dB recording level is about the same as before (actually it measures 0.17 percent as against 0.15 percent), when recording levels are increased above the 0 dB level, third-order distortion rises rapidly, reaching 3.0 percent (actually, a bit higher, or 3.6 percent) at a +8 dB level. Happily, +8 dB is where Tascam has calibrated the overload LEDs to flash on the four level meters, providing near-perfect indications of where excess distortion and saturation will take place. To reach the same level of third-order distortion with dbx turned on, we had to increase levels to (are you ready for this?) +17 dB!

The added headroom, provided electronically by the dbx companding system, improves signal-to-noise capability of the deck as well. In Figure 3A we plot S/N referred to 0 dB VU with dbx turned on. Overall A-weighted S/N measures 76.9 dB under these conditions. As good as that is, the additional 17 dB of headroom available must be added to it before the 3 percent distortion level is reached, so the actual available dynamic range, from noise floor to tape saturation at mid-frequencies, is an incredible 93.9 dB! Even with dbx turned off, results are quite good for a cassette deck (as shown in Figure 3B). Here, S/N with respect to 0 VU measured 50.1 dB, but since there is 8 dB of additional headroom available, the actual S/N ratio works out to be slightly better than 58 dB.

Figures 4A and 4B show linearity of output-versus-input for both mid-frequency recordings (315 Hz) and

high-frequency signals (10 kHz). With dbx turned on, linearity (in Figure 4A) is nearly perfect; +10 dB input level results in a +9.5 dB playback level for the 315 Hz signal and a +10.2 dB output for the 10 kHz signal. Even with dbx turned off, the higher tape speed results in good linearity, with little difference observed between the output of 315 Hz and 10 kHz at a +9 dB input recording level. Typically, when this test is performed on conventional cassette decks operating at 1 7/8 ips, the 10 kHz plot ceases its linear climb at or below the 0 dB recording level point, flattening out and

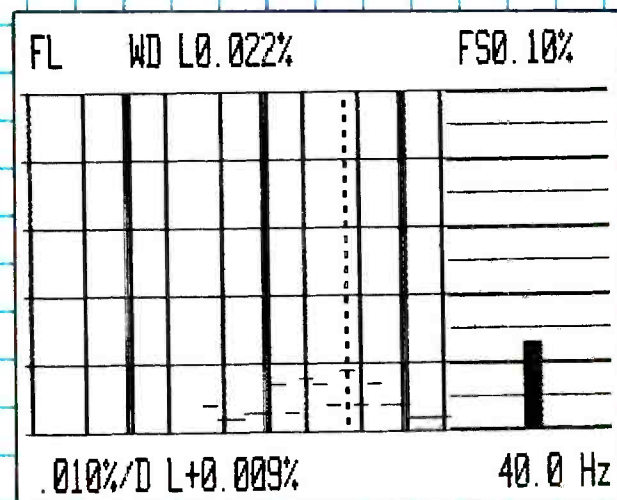


Fig. 6. Plot of wow-and-flutter, showing frequency components of flutter. Overall reading appears at top of graph (0.022 percent), while cursor reads largest component of flutter at 40 Hz, which contributed 0.009 percent to overall reading.

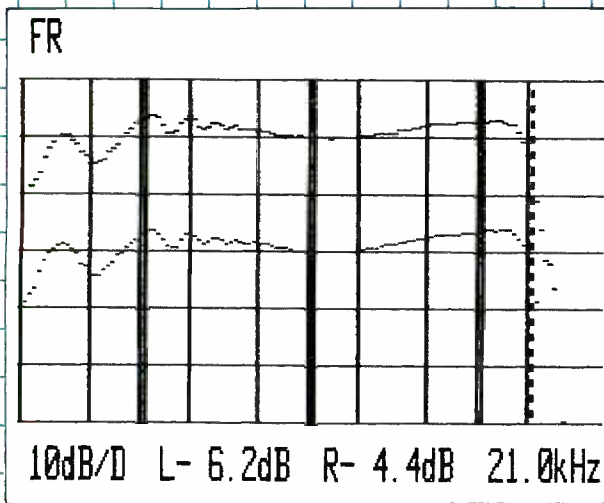


Fig. 7. Frequency response using Scotch XS-11 tape, with dbx on.

even reversing its climb to a *negative* slope (less output for increased input levels at 10 kHz).

Crosstalk between adjacent tracks is also excellent, measuring an incredible -78.4 dB at 1 kHz when dbx is used (Figure 5A) and 66.2 dB at that same test frequency when dbx is turned off (Figure 5B). Crosstalk at other frequencies may be read from the graph, taking into account the fact that the topmost line represents -30 dB, and each horizontal division below that represents a +10 dB increment in the crosstalk readings. The plot is from 20 Hz to 20 kHz, with double vertical lines at 100 Hz, 1 kHz and 10 kHz, as in all these graphic plots of Figures 1, 5 and 7.

Figure 6 is an analysis of the wow-and-flutter of the Tascam 234 Syncaset. Here, the plot of individual flutter components is taken from below 1 Hz to 200 Hz, with double vertical lines denoting frequencies of 1 Hz,

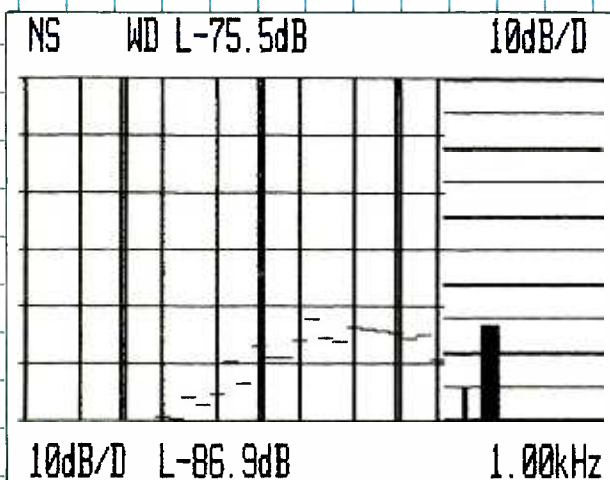


Fig. 8. Third-order distortion vs. record level using Scotch XS-11 tape, with dbx on.



Fig. 9. Headroom for 3 percent THD using Scotch XS-11 was +12 dB; thus S/N with this tape is 87.5 dB (75.5 + 12) with dbx on.

10 Hz and 100 Hz. Overall wow-and-flutter measures 0.022 percent WRMS, well below the 0.04 percent claimed. In fact, even peak-weighted wow-and-flutter was below 0.04 percent, measuring only 0.35 percent as against 0.06 percent claimed by the manufacturer.

Just for the record, we decided to measure the record/play performance of the Scotch tape sample (SX-11) which had been packed in with our sample. These measurements were made only with dbx turned on. The frequency plots of Figure 7 should therefore be compared with those of Figure 1A. In doing so, we see that there is a slightly greater rise in response at the treble end and a tendency for response to roll off a bit faster above 20 kHz with the Scotch tape. Nevertheless, either of these tapes would be well suited to the applications for which the Syncaset was intended. Third-order distortion using the 3M tape is plotted as a function of recording level in Figure 8. At 0 dB, the distortion is considerably higher than that obtained using the TDK tape, but all that proves is that our sample has indeed been factory calibrated for the TDK tape and not for the Scotch tape. Since there are no user adjustments for bias or record-EQ, this points up the importance of staying with the tape recommended by the manufacturer when you can't readjust a machine for some other tape of your choice. (See the Hands-On Report for more on this point.)

Headroom for 3 percent third-order distortion using the Scotch sample tape (with dbx ON) measures +12 dB. Accordingly, that number of dB must be added to the S/N reading of 75.5 dB shown in Figure 9 to obtain an overall S/N ratio of 87.5 dB; again, not quite as good as the results obtained using the TDK sample, but hardly worth complaining about should you use this or some other high-quality alternate tape.

Comments: In my opinion, the Tascam 234 Syncaset is a brilliantly designed piece of equipment especially suited to the needs of the serious recordist who doesn't need (or perhaps, can't afford) a four-channel

TASCAM 234 SYNCASET: Vital Statistics

SPECIFICATION

Tape Speed
Pitch Control
Wow-and-flutter
Recording Time
Fast Wind Time
Nominal Mic. Input Level
Nominal Line Input Level
Nominal Line/Cue Output Level
Line/Cue Output Impedance
Line/Mic Input Impedance

MANUFACTURER'S CLAIM

3 $\frac{1}{2}$ ips (9.5 cm/sec) $\pm 1\%$
 $\pm 13\%$ of normal speed
0.06% Peak/0.04% WRMS
15 minutes for C-60
85 Seconds (C-60)
0.3 mV (-70 dBV)
0.3 Volts
0.3 Volts
100 ohms (10K ohm nom. load)
22K ohms, Bal./100K ohms unbal.

LAB MEASUREMENT

Confirmed
 $\pm 14\%$
0.022% WRMS
Confirmed
73 Seconds
Confirmed
0.3 Volts
0.3 Volts
Confirmed
Confirmed

Recorder Performance Specifications

Overall Freq. Response
Total Harmonic Distortion
S/N Ratio, dbx OUT, A-wtd
S/N Ratio, dbx IN, A-wtd
Crosstalk (adj. Channel)
dbx OUT (1 kHz, 0 VU)
dbx IN (1 kHz, 0 VU)
Erasure (re: 285 nWb/m, 1 kHz)
Bias Frequency
EQ
Peak Level Indication

40 Hz-14 kHz, ± 3 dB
1% (400 Hz, 0 VU)
54 dB
95 dB
50 dB
70 dB
70 dB
100 kHz
3180 + 70 usec.
+ 8 dB above 0 VU

40 Hz-20 kHz, ± 3 dB
0.15% w/dbx; 0.17% no dbx
58.1 dB
93.9 dB
68.2 dB
78.4 dB
More than 70 dB
Confirmed
Confirmed
Confirmed

General Specifications

Power Requirements
Dimensions (W x H x D, inches)
Weight
Price: \$900.00

120V 60 Hz, 30 Watts
19 x 5 $\frac{3}{16}$ x 14 $\frac{1}{16}$
21 lbs. 10 oz.


Circle 55 on Reader Service Card


professional reel-to-reel multitrack deck, but who needs the flexibility and professional features found on such recorders. More than anything else, I was amazed by the price of the unit, which is far lower than I would have guessed for a deck that performs this well and has the features that this one does. For real economy, you could begin serious recording work with just this unit and a few decent microphones. The other embellishments could come later and the nice thing about them, as pointed out by John Woram, is that even if you eventually replace the Syncaset 234, the "extras" that you accumulate along the way will work just as well with your next deck.


Tascam has come up with just the right balance of features for a machine of this type. It goes without saying that music groups who want to do their own test and audition recordings at minimum cost would do well to consider this Tascam Syncaset recorder. The cost of a few hours in a professional recording studio will pay for the entire Syncaset, and that's really something to think about!


CABLES


SPECIALISED ELECTRICAL WIRES & CABLES FOR:


BROADCAST 


RECORDING 


DATA 


AUDIO 

COMPUTER 

VIDEO 

MACHINE TOOL 

AUTOMATION 

COMMUNICATIONS 



Connectronics

UNITED KINGDOM & WORLD EXPORTS

CONNECTRONICS LIMITED
20 Victoria Road
New Basset, Bedfordshire
EN4 9PF England
Telephone 01-4493663
Telex 8955127 SGAL G

UNITED STATES OF AMERICA

CONNECTRONICS CORPORATION
852 Glenbrook Road
Stamford CT 06906 U.S.A.
Telephone (203) 324 2889
Telex 643628

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:

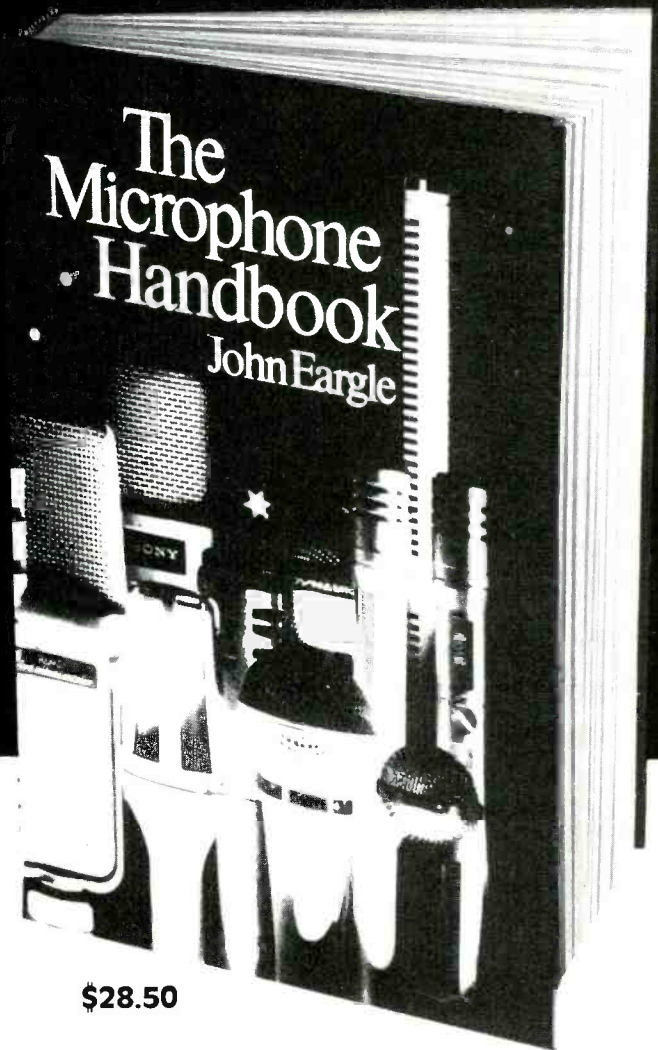
- Directional characteristics—the basic patterns.
- Using patterns effectively.
- Microphone sensitivity ratings.
- Remote powering of capacitors.
- Proximity and distance effects.
- Multi-microphone interference problems.
- Stereo microphone techniques.
- Speech and music reinforcement.
- Studio microphone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



\$28.50

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.

Hands On

The Tascam 234 Syncaset

by John M. Woram

What do you think it would cost to put together a modest multi-track recording system? Let's say a four-channel tape recorder, noise reduction for all channels, and minimal mic/line input mixing capabilities. How about \$900?

No, it didn't come off the back of somebody's truck on a dark night. It's Tascam's new model 234 Syncaset 4-track Recorder/Reproducer. In a little more than five inches of 19-inch rack space, the 234 is an impressive complement to the company's well-known Portastudio System. Like the Portastudio, it takes the standard Philips cassette, runs it at double speed, and records up to four tracks in the same direction. Unlike the Portastudio, it lacks equalization controls, effects sends, in-line faders, and a master fader.

Depending on the application, these space/money-saving omissions may not be missed. For any sort of serious 4-to-2-track mixdown work, a good console will be needed anyway, and this will certainly provide the necessary signal-processing and gain-riding facilities. Therefore, having these features on the 234 would be somewhat redundant. (If you simply must have these bells and whistles built-in, then read no further. Go out and get a Portastudio or Fostex's model 250.)

Anyone who is serious enough about recording to be reading *MR&M* is probably not going to be satisfied for long with the purchase of a single piece of hardware. (Anyway, that's what we keep telling our advertisers.) That applies to microphones, signal processors, amps, speakers—you name it. Even if you're starting from scratch (and with not much more than scratch to spend), sooner or later you're going to want more!

Taken in this context, the 234 could very well be the nucleus around which to build a total system. Later on, you can replace it with an open-reel machine simply by unplugging the 234 and plugging in the open-reel deck. At about this time, you'll be glad all that peripheral stuff doesn't need to be replaced as well.

On the other hand, you may already have a fair-to-middlin' two-track system, and want to move up to four-track without going broke. The 234 fits in here too, since it adds nothing superfluous to your system.

Tape Selection

Like the Portastudio, the 234 does not provide equalization and bias adjustments. The machine has been optimized for high-bias, 70 μ s equalization cassettes, and Tascam recommends TDK's SA-X, Maxell's UDXL-II, or equivalent formulations. Although this lack of adjustment power may frustrate the dedicated knob-jockey, it's an economy move that

makes a lot of sense in a system of this type. To do the job right, excellent potentiometers—and the appropriate circuitry, of course—are required. Next, the user must have adequate test equipment capable of making accurate, repeatable measurements. It's the sort of sophistication that you'd want in a professional quality open-reel machine. But for a cassette recorder, it makes a lot more economic sense to find a good tape formulation and then stick with it.

For those who may have forgotten about such things, *Figure 1* shows the frequency response of the 234 using various kinds of tape. First, a 1 kHz, -10 dBV signal was fed into a line input, and the input level control was adjusted for a 0 VU meter reading. With no further adjustments, each of four tapes was inserted (yes, one at a time), and a sweep frequency response was taken for each tape. The results should convince anyone of the importance of proper bias and record equalization. Unless you are set up to do the necessary calibration work, you may actually get better results out of a fixed system—provided you use the right kind of tape.

As a final note on tape selection, Tascam recommends not using C-120 cassettes in the model 234. These may be OK for routine dictation work, but will probably not withstand the repeated stop-and-start, multiple-pass recording work that will be done with the 234.

Remember that for single-direction double-speed recording, the elapsed time will be one-quarter of the tape's normal running time. Thus, a C-90 tape is good for 22.5 minutes of continuous recording, etc. A front-panel pitch control may be used for adjusting the play/record speed, over a ± 12 percent range. Tascam recommends not using either the maximum or minimum setting during recording, since control-circuit drifting could prevent making certain corrections during playback. For example, if the control circuit is running a little slow during playback, it would be impossible to match a maximum speed setting used during recording. As a further precaution, a change of speed between record and playback will influence the performance of the built-in dbx noise reduction system, which is frequency-sensitive. If you know that major changes in running speed will be required, you may want to record and playback with the noise reduction turned off.

Getting Down to It

The 234's tape counter and memory system is quite versatile and easy to master, even by those who feel it is bad engineering practice to read the directions first. Such folks are in luck, since the front panel is

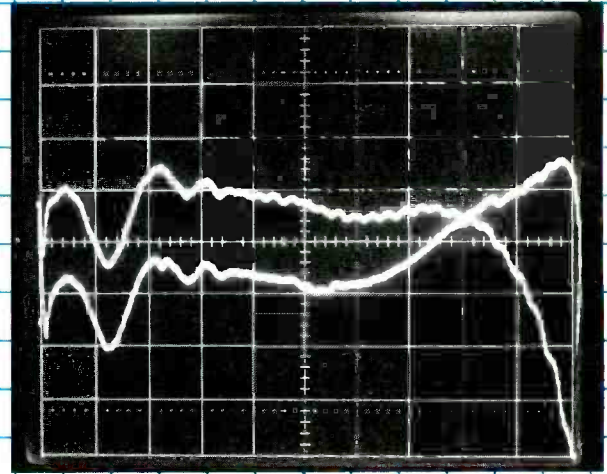
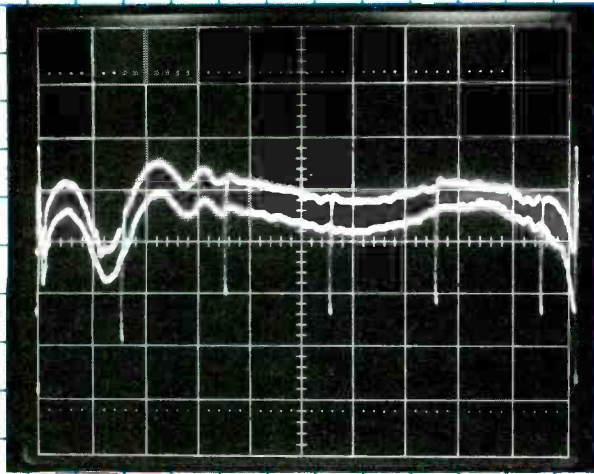


Figure 1. When all else fails, follow the directions. Figure 1A shows the 234's response when using the recommended tape formulation. The upper curve is TDK SA-X90 and the lower one is TDK SA-90. The markers (vertical lines) are at 62.5, 250, 1000, 4000 and 16000 Hz. (Compare with Len Feldman's Figure 1.)

In 1B, the rising high end is the result of using a metal-alloy tape, while the opposite effect is seen when a normal bias tape is used.

pretty much self-explanatory. A RESET switch zeroes the counter. Next to it, three ZERO RETURN switches (STOP, OFF, PLAY) dictate what will happen when you hit REWIND. The tape will return to zero and either stop, continue rewinding to the top, or go into play mode, depending on which of the three switches is depressed.

Just below the RESET and ZERO RETURN switches, a set of five other switches puts the memory system to work. Pressing the ENTER switch puts the current tape counter number into memory. Pressing CHECK displays the contents of the memory. Now comes the good part: three switches labelled STOP, OFF, and RWD (rewind). If the RWD switch is depressed, the tape will rewind every time the counter number matches the number stored in memory. If you pressed the PLAY switch in the ZERO RETURN section, the tape will play between zero and the memory number, rewind to zero, and play again, and again, and again...forever—or until the next power failure, whichever comes first. If you do any punch-ins and/or punch-outs within the zero-memory number interval, the tape will rewind and play back what you just did, over and over again, until you've had enough.

For critical cueing, the cassette compartment door may be removed and the tape wound by hand with the 234 in the PAUSE mode. You can also try this in the RECORD/PAUSE mode for making spot erasures.

There are a few ways in which to handle punch-ins. For routine recording, just hit the RECORD and PLAY switches simultaneously. To punch-in on cue while the tape is rolling, just hold the PLAY switch down, and punch RECORD at the right instant. To punch out without stopping the tape, again hold down PLAY and hit record at the punch-out point. Remote punches may also be accomplished with an accessory pedal (Tascam RC-30P or make your own).

Either of these methods will affect all tracks being recorded (but not previously recorded tracks of course). If you want to punch-in and out on one track while continuously recording on others, just use the FUNCTION SELECT switches. There's one for each track, with a

red LED next to each one. When a FUNCTION SELECT switch is depressed, the adjacent LED begins blinking, warning that the track is in a record-ready mode. When the RECORD switch is hit, only those tracks in the ready mode will go into record. If the FUNCTION SELECT switch is released and then depressed again, that track will go out of record, and then back in again, without affecting any of the others. If all FUNCTION SELECT switches are released while the 234 is in record mode, the RECORD light will blink, indicating the machine is still in the record mode (although presently not recording anything).

If you've ever punched in or out at the wrong moment, you'll appreciate the value of a punch-point rehearsal or two. It's easy on the 234. Just remain in the PLAY mode, and use the appropriate FUNCTION SELECT button to punch in and out. As you do, the monitoring will switch between the previously recorded material on the track in question, and the new program ma-

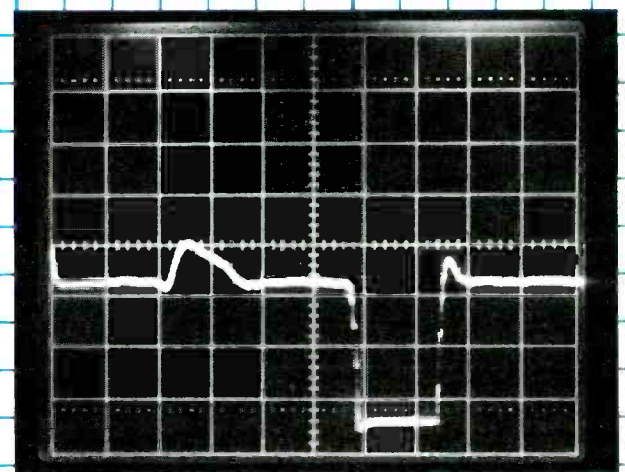


Figure 2. The level discontinuities seen here are a function of punch-in and punch-out. The horizontal scale is 200 ms per division (total display = 2 seconds).

terial. Once you've got the cue points rehearsed, you're ready to try it for keeps.

To give the punch-in system the acid test, a 1 kHz tone was recorded for a few moments, the tape was rewound, and the same 1 kHz tone was punched-in and out over the original recording. The punch-in and punch-out discontinuities are shown in *Figure 2*. As might be expected, the punch-in discontinuity varied with each try, depending on how the two waveforms happened to line up. The punch-out always created a gap of 200+ ms, which might be audible on very tight, and exposed, cues. Do a little cut-and-try rehearsing on a practice take before trying to perform tight punches on anything important.

Each track has both a phone-jack mic/instrument input and an RCA-type line input. These are controlled by a single input potentiometer on the front panel. However, some rudimentary mixing is possible (though probably not very practical) using the rear-panel trim pot next to each mic/instrument input. In its full-off position, the input will handle a line-level signal; when it is full-on, it will boost a -60 dB (mic level) signal up to the 234's line level. So, a lower level signal at the mic/instrument input could be mixed in with a regular line-input signal by using the trim pot. Not a very elegant way to get out of buying a mixer, but within limits it works fine. (Remember, the Syncaset is a recorder, not a mixer.)

The metering is well thought-out. During recording, the meter and line output levels are affected only by the input potentiometer on each channel. A separate cue out with a stereo mix of all four tracks appears on a pair of rear-panel RCA jacks, and a front-panel pan pot controls the left-right cue balance. On playback, an output level control (mounted concentrically with the pan pot) permits line out and cue levels to be balanced, without affecting the record settings. To meter the cue level, simply depress the METERSwitch. This disables two of the meters, while the other two display the cue out levels. As a nice added touch, the lights on the inactive meters are extinguished when the METER switch is depressed. An adjacent CUE switch selects mono or stereo monitoring.

With a single patch cord, it's possible to bounce tracks as required. Pan all the tracks to be bounced to one side of the cue mix, and work out a suitable balance using the output level controls. Pan all other tracks to the other side—or, make sure their respective output levels are turned all the way off. Now feed the appropriate cue output into the line input of an empty track, and record that track in the usual manner. (But first, make sure your bounced tracks are not in the record-ready mode!)

A quick glance at the 234's signal-flow suggests that it would be no big deal to modify it for audio/visual work. This area of recording is often overlooked, usually in favor of the more "glamorous" types of recording gig. However, there are often a few bucks to be made by putting together a show for a local club, church group, or whatever. Unless you simply don't need any more income, don't sell the slide-show short. It could help you pay for the 234, and a lot more besides.

There are three sure things in this world: death, taxes, and lousy sound on slide-show presentations. Usually, one track on a standard cassette recorder has the audio, the other has the projector-control cue tones, and the operator isn't sure which is which.

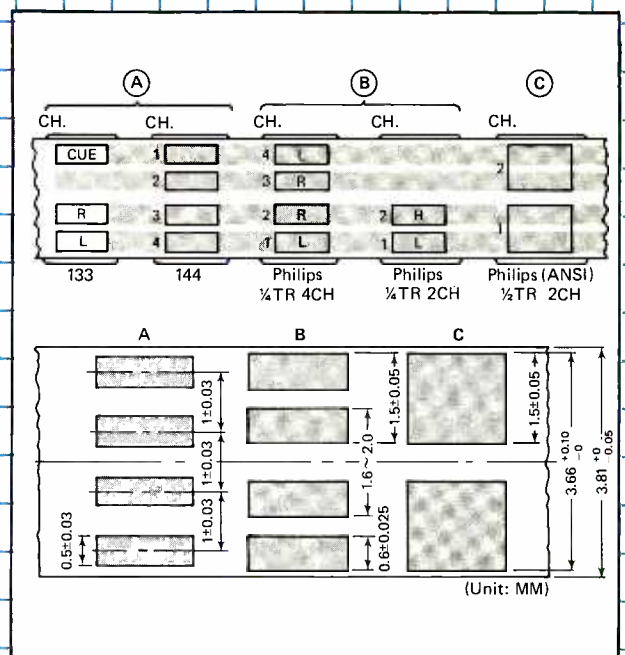


Figure 3. Tape head formats for cassette recorders.

As a defense against awful audio, the model 133—in Tascam's multi-image series—is designed specifically for quality A/V work. It's a two-speed, three-track machine, with the cue track located well away from the two audio tracks.

However, the 234's potential to deliver three audio tracks plus cue is very attractive, since it allows stereo music with the narration on a separate track. This makes it very easy to alter the voice track later on, or replace it entirely without scrapping the rest of the production. Also, the voice level can be adjusted on-site to suit the needs of each presentation (more voice for "instructional" presentations, etc.) However, if the 234 is to be used during the actual slide show, a minor circuit modification is needed to keep the cue tone out of the stereo cue output. Of course, a separate mixer could be used to combine the line outputs of just the three audio tracks, but that detracts from the 234's simplicity of operation as a stand-alone system. It looks as though a rear-panel on/off switch just ahead of one of the pan pots would take care of this without too much trouble, other than voiding the warranty.

The manual cautions that tapes made on Tascam models 133 and 144 with Dolby B noise reduction are not compatible with the 234's dbx II noise reduction—a point worth considering if the 234 will be used in multi-machine installations.

Speaking of compatibility, since there are now a few "standard" cassette track configurations, it might be a good idea to review the various dimensions quickly. *Figure 3* has been lifted from the model 133 product literature, and the model 234 head configuration matches the 144 specs seen in the figure.

Summing Up

To borrow a term from the computer industry, the Tascam 234 Syncaset is "user friendly." You don't need a PhD in engineering to operate it, but if you have one anyway, you'll doubly appreciate the human engineering found here. Now that all the testing is over, the 234 is being returned to Tascam under protest. (It's the publisher who's protesting. He wants to take it home for further study.)

Building the 'Hyperflange + Chorus,' Part II

Craig Anderton

Installation

You must provide the H + C with a *regulated* ± 15 volt power supply or it will not work correctly. Use heavy-gauge wires to connect the supply to the unit, especially if the power leads are more than about a foot long. The most important connection is the ground wire; this should be as thick as possible—even a few thousandths of an ohm can cause a voltage drop which may affect performance.

When using the H + C as a stand-alone unit, simply hook up the power supply +, -, and ground leads, and treat the unit as you would any other effect.

If you decide to mount the unit in a metal rack frame, you can hook up the power connections as described above, and bolt the unit into the mainframe. However, you may experience ground loop problems. If this is the case (as evidenced by hum, whistles, or other strange problems), remove the ground wire running from circuit board pad G10 to the front panel, and connect the rack frame to the power supply ground point through a heavy ground wire. If your rack frame is made of wood, that wire should connect directly to the front panel rather than the rack frame.

In some instances, you might have less problems if you leave the ground wire from pad G10 to the front panel intact. It is impossible to predict which of the above will work best for you; I'd suggest hooking a

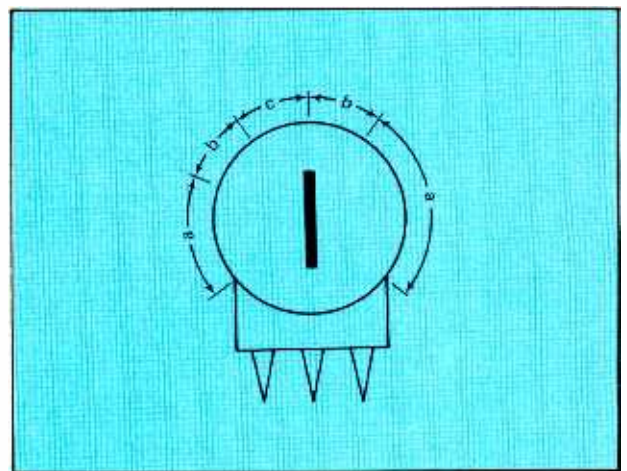


Fig. 1. Bias trimpot (R55) details. As the pot is rotated through regions a-b-c-b-a, you should hear (a) no sound, (b) distorted sound, and (c) clear sound.

'scope probe on to ground and see which way puts the least amount of RF and hum onto the ground line. Improper grounding will not necessarily damage the unit, but it may keep it from working up to its full potential.

Calibration

Correct calibration is absolutely essential for best operation. The following procedure is for those without test equipment; the H + C Assembly and Using manual (see parts list) gives details on calibration using a 'scope or 'scope and function generator.

"CW" means turn a knob clockwise; "CCW" means counter-clockwise. Positions in between these extremes are indicated in the same way as a traditional analog clock—for example, 12:00 means the knob pointer should point straight up.

Start off calibration with the knobs and switches set as follows: Input level, 12:00; Pre-emphasis, off; Regeneration phase, (+); Lo cut, off; Regeneration level, CCW; Balance, CCW; Output, 12:00; Initial delay, CCW; Modulation depth, CCW; Hypertriangularity, CW; LFO rate, 12:00; all trimpots (except R54), CCW as viewed from the front of the trimpot. Set R54 CW.

Begin calibration by hooking up a regulated ± 15 volt power supply, plugging a signal into AC coupled input jack (J5), and listening to the output through an amplifier. Since the balance control is selecting dry signal only, you should hear the unmodified sound of your instrument. If not, check over your wiring, power supply, input signal and amp. Otherwise, proceed as follows.

Turn the Balance control CW and turn your amp level down to prepare for a LOUD sound. Adjust Low Clock Trim R16 CW for the highest pitched audio tone you can still hear. Now, adjust Clock Cancel trim R56 until you hear the minimum amount of high frequency tone; this should occur towards the middle of the trimpot. As you reach this "null point," you will need to turn up the amp level to hear the signal better. You should be able to almost completely eliminate this tone through careful adjustment of R56.

Plug an instrument or other signal source into the input, and turn the Initial Delay control to 9:00. You shouldn't hear anything as you play. Now it's time to adjust the bias; this is a critical adjustment, as lowest distortion, greatest dynamic range, and lowest noise all depend on the proper calibration of this control.

As you play your instrument, vary R55, the Bias trimpot. At some point in its rotation, you'll hear your instrument briefly, after which the sound may go away. So far, so good. Now for the fine adjustment.

Vary the trimpot in *small* increments. Referring to *Figure 1*, as you vary the trimmer from CCW to CW you'll go through a band of no sound, then lots of distortion, a clear spot where the sound is undistorted, more distortion, and then another band of no sound. *Figure 1* is approximate—your trimpot may have these sounds occur at somewhat different places, but the basic drawing is close enough. Remember to vary the trimpot only a little bit at a time, since it takes some time for the adjustment to "settle" whenever you make a change.

Continue by setting R55 for minimum distortion. If there is no spot which is undistorted, then you are feeding in a fairly high-level signal. Adjust R55 for as little distortion as possible, then pull back a bit on the Input Level control until the sound clears up.

Now that you have a clean sounding signal, increase the input level until you hear just a hint of distortion.

Readjust R55 in small increments until the distortion goes away. (Throughout these procedures, if you are using an instrument [such as a guitar], play in a consistent manner to make calibration easier.) Increase the level some more, and again adjust R55 for minimum distortion. Past a certain point, R55 will no longer be able to trim out distortion; when this happens, back off a bit on the input level, adjust R55 for minimum distortion again (if necessary), and the bias will be properly calibrated. To sum up: The object of this exercise is to have the *lowest* possible amount of distortion with the *highest* possible input signal level.

To calibrate the modulation section, set the LFO rate CW, Hypertriangularity CW, and Modulation Depth CW. Adjust R27 in a clockwise direction; at some point, you'll hear a periodic modulation of the signal which is similar to vibrato. Turn R27 CCW until the modulation just disappears, then CW until the modulation just kicks in. Vary the Hypertriangularity control; note that as you vary it from CW (hypertriangular) to CCW (normal triangle), the LFO speed increases somewhat.

Finally, play your instrument and turn up the Input Level control so that you hear distortion on peaks. Adjust clipping trimpot R54 so that the overload light flashes whenever the distortion occurs.

Whew... that took some work, but the unit is finally built and calibrated! Now let's take a general look at what the jacks and controls do, and finally, cover applications.

Jacks

IN (AC). This is a capacitively coupled input to the H + C. Please note that AC does not refer to AC line voltages, but to the nature of the electrical coupling used. Do *not* under any circumstances plug an AC cord into this jack, or you will seriously and irreversibly damage the unit.

IN (DC). This input couples directly into the Hyperflange without any coupling capacitor. It is the recommended input for electric guitars and any other equipment that does not exhibit a DC offset. The input impedance is 470k, so you can plug a guitar in without suffering any loading.

OUT 1, 2. Two paralleled output jacks. Note that these are not synthesized stereo outputs, but rather, two identical outputs.

LFO CV IN. Applying a 0 to +10 V control voltage to this jack alters the speed of the LFO in an exponential fashion.

LFO OUT. Taps off the LFO. Provides a hypertriangular or standard triangular signal to other voltage-controllable units, or can slave two H + C units together. (For how to slave one unit to another, see the section on Applications.)

SYNC. A positive +10 V pulse to this jack reverses the LFO sweep direction if the LFO is sweeping upward.

DELAY CV IN. Applying a 0 to +10 V control voltage to this jack linearly varies the frequency of the clock controlling the delay time from maximum to minimum, while disconnecting the internal LFO

from the clock. The initial delay and modulation depth controls are still active in this mode.

Controls

INPUT LEVEL. Turn up for lower level signals; turn down for higher level signals. Adjust for maximum level short of the overload indicator flashing.

PRE-EMPHASIS. When you want to add a treble “zing” to your signal, switch this to “on.” However, attempting to add pre-emphasis with a signal that has lots of high frequencies could overload the circuitry as well as cause serious “aliasing” (whistles etc.). You will not be able to add pre-emphasis under all conditions, but in most applications it will work just fine.

REGENERATION PHASE/LEVEL. The (-) position gives a whooshing, breath-like sound, while the (+) position imparts a more metallic, zinging sound. Note that it is impossible to turn up the Regeneration Level control to the point where the circuit breaks into loud oscillation. To lock the resonance below a certain level, turn the Regeneration Level up all the way and play your instrument; you should hear a loud tone. Keep playing, and turn the Regeneration Level CCW just until the oscillation stops. Unless there is a significant increase in input level, the unit will not break into oscillation unpredictably.

LO CUT. In the ON position, this switch introduces a low-cut filter in the regeneration path that prevents low frequency resonance. In the OFF position, all frequencies are regenerated with equal intensity.

BALANCE. CCW gives straight sound only, CW delayed sound only. In the mid-position, there is an equal balance of delayed and straight sounds.

INITIAL DELAY. CW gives minimum delay, CCW maximum delay.

MODULATION DEPTH. This control determines how much the delay line is affected by the LFO sweep. CW gives the widest sweep range; CCW gives no sweep at all.

HYPERTRIANGULARITY. Full CW gives maximum hypertriangularity; CCW gives a standard triangle wave.

LFO RATE. CCW gives the slowest sweep, CW the fastest.

APPLICATIONS

Now comes your reward for slogging through all the technical stuff: you get to create some really intriguing sounds. In the following examples, Input Level, Pre-emphasis, Regeneration Lo Cut (when regeneration is specified), and Output Level are adjusted to suit. All indicated control settings are initial settings, and are intended to provide a point of departure for further experimentation.

Chorusing

This gives a lush, full sound. The crucial controls are Initial Delay, Modulation Depth, and LFO Rate. If the Initial Delay is too long, then the sound will resemble slapback echo more than chorusing; but if it's too short, then you'll hear more flanging-like sounds. Modulation Depth should be moderate, since at longer delays too much depth can give unpleasant detuning effects (as well as make the chorus sound less interesting). Should detuning effects occur, slowing down the LFO Rate will usually minimize any prob-

lems. Triangle waveforms work well for chorusing at fast LFO speeds.

Regen Phase (+)	Regen Level	Bal-ance	Init Delay	Mod Depth	Hypertri	LFO rate
	9:00	12:00	9:00	9:00	12:00	12:00

Auto Sweep Flanging

With this patch, Initial Delay sets the bottom of the flange sweep, while Mod Depth sets the top of the sweep. Setting the Initial Delay for the longest possible delay can give you some dramatic effects with slow LFO rates. If you want a vivid demonstration of why hypertriangularity is needed, try this same patch but turn the Hypertriangularity control full CCW so that the flanger is swept with the standard triangle wave. You'll find the difference *very* convincing!

Regen Phase (+)	Regen Level	Bal-ance	Init Delay	Mod Depth	Hypertri	LFO rate
	2:00	12:00	9:00	CW	CW	12:00

Pedal Flanging

Same as above, but plug 0 to +10 V control voltage pedal output into the DELAY CV IN jack.

Vibrato

Critical controls are Hypertriangularity (which determines the “smoothness” of the vibrato) and LFO Rate. Incidentally, for foot pedal controlled vibrato (where pushing down the pedal injects vibrato), patch the LFO OUT jack into the instrument input of a pedal, and then patch the amp output of the pedal to the DELAY CV IN jack. This lets guitarists vibrato entire chords—not just single notes—under foot control.

Regen Phase (-)	Regen Level	Bal-ance	Init Delay	Mod depth	Hypertri	LFO rate
	CCW	CW	1:00	12:00	1:00	4:00

Fast Rotating Speaker Sound

This is similar to the above patch. When simulating slower rotating speakers, you will probably have to pull back on the Modulation Depth a bit.

Regen Phase (-)	Regen Level	Bal-ance	Init Delay	Mod Depth	Hypertri	LFO rate
	CCW	12:00	12:00	12:00	1:00	4:00

Phase Shifter Simulation

While flangers and phasers are quite different, this patch does a reasonably good phase shifter imitation. Be careful not to set the Initial Delay to full CCW, since phasers don't give much of a time delay. For the most realistic sound, set all controls more subtly than you would for flanging effects.

Regen Phase (-)	Regen Level	Bal-ance	Init Delay	Mod Depth	Hypertri	LFO rate
	10:00	12:00	12:00	3:00	3:00	12:00

Notch Filter

Not all flanger sounds involve the LFO. For static, equalizer-like effects, vary the Initial delay and Regeneration Level controls for the desired tonality.

Regen Phase (-)	Regen Level	Bal-ance	Init Delay	Mod Depth	Hypertri	LFO rate
	vary	12:00	vary	CCW	CCW	CCW

Stereo Simulation Spreading

Set up the flanger as follows: Split the signal coming from your instrument or tape track. Take one split and

feed that output into one channel of an amp or mixer. Take the other split and patch it into the Hyperflange + Chorus, and patch the H + C's output into the second channel of an amp or mixer. Adjusting the Initial Delay alters the separation effect between the two channels. If you want some "motion" to this simulated stereo, simply add some Modulation Depth.

Note that combining two "stereo" channels created in this manner back into mono will usually affect the timbre of the signal.

Regen Phase (-)	Regen Level CCW	Bal-ance CW	Init Delay vary	Mod Depth CCW	Hypertri CCW	LFO rate CCW
-----------------	-----------------	-------------	-----------------	---------------	--------------	--------------

Slaving Two Units Together

Splitting a signal through two H + C units, with each output going to a different channel, can provide dramatic stereo effects (particularly if the settings on the two units are somewhat different). If you want them to both track the same LFO, run a patch cord from the LFO OUT jack of the first unit to the DELAY CV IN jack of the first unit to the DELAY CV IN jack of the second unit. The second unit will now be slaved to the first unit.

Closing Comments

This is the most complex do-it-yourself project I've presented to date in any magazine, but I feel the performance will really turn on *MR&M* readers—especially considering the cost. The parts list gives you

options on materials available from PAIA to help you build the unit—from circuit board artwork to complete kits. Take your time, be patient, follow instructions, and you'll have a flanger which will delight you with its cost-effectiveness.

Specifications: Delay Channel

Dynamic range, unweighted: 80 dB

Dynamic range, "A" weighted: 86 dB

Maximum input before clipping, any delay time, Input Level up full: 2 V p-p

Frequency response, R42 and R43 = 22k: -6 dB, 10 Hz; -2 dB, 20 Hz; 0 dB, 50 Hz; +2 dB, 4500 Hz; -6 dB, 8500 Hz; -20 dB, 12 kHz. With R42 and R43 = 10 k, response is flat to 10 kHz. However, this isn't recommended—the noise becomes more obvious, but there isn't a whole lot of musical energy up there worth flanging.

Pre-emphasis boost: +14 dB @ 6 kHz (excellent for guitar and voice)

Other Specifications

Straight channel frequency response: +1 dB, 20 Hz - 20 kHz

Maximum notch depths: 60 dB

Sweep range, manual control: 15 ms to 250 μ sec (60:1)

Typical sweep range, LFO control: 15 ms to 170 μ sec (greater than 88:1)

Maximum output @ 1 kHz into 1 k load: 20 V p-p

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
8730 Dill Drive
Sterling Heights, MI 48077
or call (313) 977-4160



Dealer Inquiries Welcome

PARTS LIST, HYPERFLANGE + CHORUS MODULATION SECTION

Resistors

R1	10 ohm
R2, R3	470 ohm
R4	820 ohm
R5, R6	1k
R7	1.8k
R8	4.7k
R9	5.6k
R10-R14	10k
R15	33k
R16	50k trimpot; trim for longest initial delay consistent with 4046 oscillating above 20 kHz
R17-R23	100k
R24	100k log front panel (FP) pot; sets initial delay
R25	100k log FP pot; sets modulation depth
R26	220k
R27	500k trimpot; trim for maximum hypertriangulation effect before IC1 stops oscillating
R28	500k lin FP pot; sets amount of hypertriangularity
R29	500k lin FP pot; sets modulation rate
R30	330k
R31-R33	1M
R34	2.2M

Capacitors (rated at 16 working volts minimum unless noted)

C1	47 pF polysterene
C2	1200 pF polysterene
C3-C6	.01 μ F ceramic disk
C7	.1 μ F ceramic disk
C8	.22 polyester
C9-C11	10 μ F electrolytic
C12	100 μ F/6.3 V electrolytic
C13, C14	15 pF ceramic disk

Semiconductors

IC1	CEM3340 VCO
IC2	4046 phase-locked loop
IC3	4041 quad buffer
IC4, IC5	LM301 or equivalent uncomp op amp

Mechanical parts

J1-J3 (3)	Open circuit mono 1/4" phone jack
J4	Closed circuit mono 1/4" phone jack

PARTS LIST, HYPERFLANGE + CHORUS DELAY SECTION

Resistors

R35, R37-R39	33 ohm
R36	470 ohm
R40	100 ohm
R72	1k
R41	2.7k
R42, R43	22k

R44-R53, R74	10k
R54	10k trimpot; trims clipping indicator trip point
R55	10k trimpot; trims delay line bias
R56	10k trimpot; trims for clock cancellation
R57	5k FP pot; sets output level
R58	5k FP pot; sets input level to delay line
R59	5k FP pot; sets recirculation amount
R60	15k
R61	33k
R62, R63	47k
R64-R67	100k
R68	100k dual ganged FP pot; sets balance
R69	470k
R70, R71, R73	10M

Capacitors (rated at 15 working volts min.)

C15, C19-C22,	470 pF poly preferred, 500 pF ceramic disk OK
C52	ceramic disk OK
C16, C17	47 pF polystyrene preferred, ceramic disk OK
C18	240 pF polystyrene
C23	2280 pF polystyrene
C24	.005 μ F ceramic disk
C25-C27	.01 μ F ceramic disk
C-28	.1 μ F polyester
C29	.22 μ F polyester
C30, C31	1 μ F electrolytic
C32	5 μ F electrolytic
C33-C40	2.2 μ F electrolytic
C41-C43	10 μ F electrolytic
C44-C49	33 μ F electrolytic
C50, C51	.001 μ F ceramic disk

Semiconductors

IC6	NE570 or 571 compander
IC7	SAD1024 analog delay line
IC8	4136 quad op amp
IC9	LM301 or equivalent uncomp op amp
LED 1	Red LED

Mechanical parts

J1-J4 (4)	Open circuit 1/4" mono phone jack
S1	DPDT switch
S2	SPDT switch
S3	SPST or SPDT switch

NOTE: The following are available from PAIA Electronics, 1020 W. Wilshire Blvd., Oklahoma City, OK 73116. Oklahoma residents add sales tax.

Complete kit, including all parts, circuit board, Assembly and Using manual and front panel: \$149.95. Include \$3.50 for shipping and handling.

Circuit board artwork with component layout: \$19.95. Include \$1.00 for shipping and handling.

Etched, drilled, and legended circuit board with component layout: \$19.95. Include \$1.00 for shipping and handling.

Assembly and Using manual only: \$5.00

The Beatles: Releases By Mobile Fidelity and Others

by Allan Kozinn

For anyone who grew up in the 1960s, and whose memories of that colorful era still seem fairly fresh and not too distant, it may have been momentarily disorienting to learn that this past October marked *twenty years* since the release of "Love Me Do," the Beatles' first single. But time does march on, and, in fact, a string of Beatles-related anniversaries is (or soon will be) upon us: March 1983 was the twentieth anniversary of the group's first LP (in Europe, anyway), *Please Please Me*; and although Beatlemania came a bit late to the United States, next February will mark two decades since the band's first visit to these shores for a pair of concerts and three Ed Sullivan Show appearances. To look at it from a different perspective, it has been nearly 13 years since the "Fab Four" stopped working together as a group; yet, you can find their complete output at any well-stocked (or even moderately well-stocked) record store.

Even putting aside the sociological impact the Beatles had, and thinking only statistically, how much music by their colleagues from the days of the "British Invasion" (you remember—Herman's Hermits, the Animals, the Dave Clark Five, the Yardbirds, etc.), has weathered the last 20 years so well? Rolling Stones

fans may (correctly) point out that every one of that band's LPs has remained in print; but when was the last time you heard one of the non-single cuts from an early Stones album—say, "Walking the Dog," "Grown Up Wrong," or "Off the Hook?"

At any rate, the "Love Me Do" anniversary has instigated a handful of releases to commemorate both the specific 20 year milestone, and more generally, the Beatles' illustrious recording history. Both here and in England, EMI has reissued "Love Me Do" as a single, and the British have brought out a special 12-inch version containing both the familiar version of the



A PROFESSIONAL WIRELESS MICROPHONE AT A BREAKTHROUGH PRICE!

Hands free, cable free, you can move anywhere in the room, hold or touch anything and be heard by everyone. Samson, one of the world's largest makers of wireless systems, adds low price to convenience and reliability with its new TR2AL system.

For only \$385, you get the compact transmitter with Sony ECM-150 microphone and the FM receiver. Just plug the receiver in, connect to your PA system and you're wireless.

The mic is sensitive and the sound is natural. The price is a new low for such a high quality system. At your Samson dealer's now.

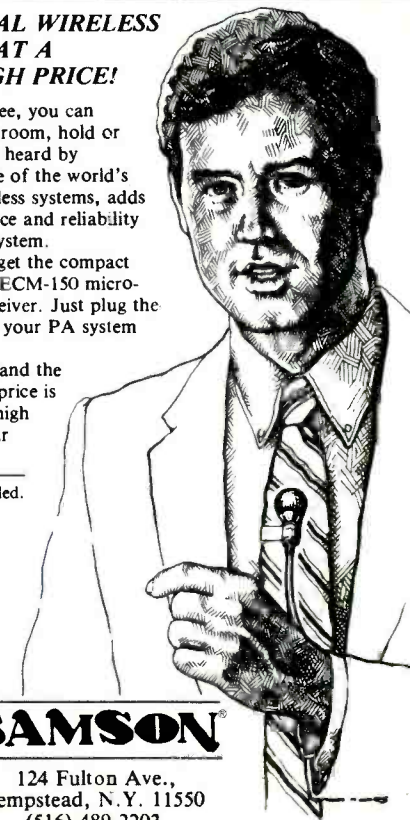
Transmitter battery included.

Available in choice of channel 1 or 5. Two systems may be used at the same time.

Also Available: portable battery pack receivers, diversity receivers with second antenna for unusually large or obstructed rooms, and hand-held models.

SAMSON

124 Fulton Ave.,
Hempstead, N. Y. 11550
(516) 489-2203



song, and a rarer one that was withdrawn after the initial pressing of the single, in 1962. The EMI affiliates of several countries have also released boxed sets containing all the band's singles; and, there is a new *20 Greatest Hits* LP compilation in the stores—although the American (Capitol) and British (Parlophone) versions, which share the same cover art, offer different songs. Meanwhile, several small labels have brought out selections from the Beatles' 1962 Decca audition tape—a performance long available on bootlegs, but only now released commercially. The integrity and quality of these releases varies considerably; more about them later.

By far the most impressive of the new additions to what seems an infinitely expandable Beatles market is a 14-disc set entitled *The Beatles/The Collection*. Housed in a huge black box, with a pair of hinged doors held together by a brass latch, this set is the creation of Mobile Fidelity Sound Lab. It contains the 14 "original" LPs (counting the double "White Album" as two) that the Beatles recorded for the Parlophone and Apple labels between 1962 and 1969 (released between 1963 and 1970). It is, in other words, the full set of Beatles LPs as they appeared in Britain, from *Please Please Me* to *Let It Be*, but *not* including any of the compilation albums released either during the group's existence or afterwards.

A Little Background

To the American collector, this means that the first seven LPs (all those before *Sgt. Pepper's Lonely Hearts Club Band*) are substantially different from the LPs released in the U.S. by Capitol Records. Most Beatles collectors are already familiar with the somewhat Byzantine machinations that took place in the arrangement of the group's early discs; but for the novice, here's a brief explanation: When the Beatles prepared an LP for release, they chose 14 songs, put them in the sequence they felt made for the best continuity, and released them as an integral collection. Admittedly, the earliest albums were samplers drawn from their stage repertoire, and could be rearranged without much harm being done. Even so, some attention seems to have been paid to running order from the start; by the time the group got to studio masterpieces like *Rubber Soul* and *Revolver*, this integral quality became more crucial to the spirit of the LP.

Around the time of each LP release, the Beatles also put out a single, containing two tracks that were, as a rule, *not* on the album; and occasionally, there was a single released between two LPs. Thus, every few months the group released 16 or 18 tracks. Unfortunately, when these tapes were sent to the U.S. for release, they had to be trimmed to fit a few of Capitol's house rules—first, that LPs should contain only ten to twelve tracks; and second, that the songs released as singles should also appear on (and boost the sales of) the LP. It was a difference in philosophy.

In practical terms, here's the kind of thing that happened: In late November 1963, the Beatles released their second LP, *With the Beatles*, and a single, "I Want to Hold Your Hand" and "This Boy." In America, Capitol decided to release "I Want to Hold Your Hand," but backed it with "I Saw Her Standing There," a track from the group's first British LP (which Capitol later released, in truncated form, as *The Early Beatles*).

Nevertheless, Capitol chose to put all three of these "singles" tracks on the label's first Beatles LP, *Meet the Beatles*. That left room for nine more songs, all of which were drawn from *With the Beatles*. What happened to the five remaining tracks from the British LP? They turned up on Capitol's next release, *The Beatles' Second Album*, along with six songs that had been released in England only on singles and EPs.

Matters were further complicated by the soundtrack LPs for *A Hard Day's Night* and *Help!*, which in England contained seven songs from the respective films on one side, and seven more new tracks on the reverse. In America though, only the film songs were included, and the soundtrack LPs were fleshed out with orchestral music from the incidental filmscores. The result of this kind of tampering was that for every three British LPs, Capitol was able to bring out a fourth disc, to catch up with the leftovers.

Nor do the trans-Atlantic differences end there, for it was Capitol's feeling, early on, that the American record-buying public demanded "a certain kind of sound" from its records—namely, one heavily laden with studio reverb. So in many cases, Capitol not only dismantled the original British LPs, but tampered with the mixes and added thick layers of echo. Sometimes, in adding the singles to their LP issues, Capitol used re-channeled (or fake) stereo tracks, rather than the true stereo mixes that had been prepared in England; other times, curiously enough, songs appeared in true stereo on American LPs long before they were available on stereo compilation discs in Britain.

But the matter of mixes is a whole 'nother story. The point of all this is that the obvious starting point for any serious Beatles collector must be the basic set of British LPs, sequenced as the Beatles envisioned them, in mixes the band approved for release.

Mobile Fidelity

Which brings us back to the Mobile Fidelity set. A small audiophile firm based in Chatsworth, California, Mobile Fidelity has built its reputation on a series of classical, jazz and rock discs whose covers bear a colored band across the top, with the legend, "Original Master Recording." What Mobile Fidelity does is negotiate with the major record labels for the use of their original master tapes—meaning, obviously, the masters of the stereo mixes, not the actual session tapes; but, on the other hand, not the dubs of the stereo masters, from which many discs are cut (particularly when the recording originates in a foreign country, as do the Beatles discs). From these tapes, the company cuts its lacquers at half-speed, allowing, so the company says, "twice as much time for the master disc cutting system to capture every sonic detail, every nuance of sound." Mobile Fidelity also points out that the half-speed mastering process demands 75 percent less power than real-time cutting, and that the cutting head amplifiers are therefore less heavily taxed—a situation that yields greater headroom, which in turn yields a more faithful disc copy of the original tape. The company uses an Ortophon cutting lathe, and says that its process does away with the need for transformers or limiters.

Once the lacquers are cut, they are flown to Japan for plating and pressing by JVC, which uses a special

Super Vinyl compound developed originally for the manufacture of CD-4 discs and video discs. This vinyl is said to be heavier and harder than that used on standard discs, and it is supposedly superior to even the 100 percent virgin vinyl used for other Japanese audiophile pressings. Mobile Fidelity also claims that these discs, therefore, have no “memory”—that is, unlike normal LPs, whose shapes are altered by playing, and which should be allowed several hours “rest” before being played again, Super Vinyl discs can be played repeatedly without damage.

Beyond the manufacturing process, the company takes special care in its packaging. Each of its discs comes in an antistatic, non-abrasive sleeve which, in turn, rests within an open cardboard stiffener that is cut to compensate for the folded/glued edge of the LP jacket—the theory here being that this slight edge may cause undue pressure on part of a disc, contributing to warpage. The company’s standard line—priced at \$15 to \$18 a disc—is packaged in the same covers as the original LPs, but for the “Original Master Recording” band, and the series has already included LPs by the Doors, Led Zeppelin, King Crimson, the Rolling Stones, Pink Floyd, Jethro Tull, and dozens of others. Among its early successes were separate releases of three Beatles albums—*Abbey Road*, *Magical Mystery Tour*, and *The Beatles* (“White Album”).

In the case of its *The Beatles/The Collection*, Mobile Fidelity has replaced the familiar LP covers with photographs of the logs adorning the master tape boxes. These contain a wealth of information, some of it intriguing, some less so—the “official” track timings, the dates and reasons each master was removed from EMI’s vault and/or copied (mostly for foreign pressings and compilation albums). The regular cover art is, however, included in a beautifully printed, LP-size book. Finally, the box includes a Mobile Fidelity “Geo-Disc,” a device with which you can, fairly easily, align your cartridge to within 3/1,000ths of an inch accuracy. The book, “Geo-Disc” and 14 LPs fit into spacious grooved compartments within the set’s ark-like box; all this retails for around \$325.00.

The set is not without flaws, some of which are difficult to fathom. But for the most part, these are matters of detail—flaws of concept rather than imperfections of execution, and I’ll return to them later. The main point of Mobile Fidelity’s ambitious endeavor is to reproduce the Beatles’ master tapes without loss or distortion, so that the listener can, for once, hear them as the Beatles and their ingenious producer, George Martin, heard them in the studio. Not having the masters at my disposal for comparison, I can’t say how close to perfection Mobile Fidelity has come; but I *can* say that the sound on these discs is cleaner, crisper, and more life-like (at least on the early, pre-electronic era discs) than I’ve heard on any standard Beatles pressings, including those from Germany, Holland and Japan, where disc-cutting is taken seriously, and where fine grade vinyl is used. These discs leave the American pressings miles behind, and they are considerably better sounding than the British pressings.

General Characteristics

To begin with some general characteristics of the set, it’s a treat to be able to play through 14 discs

without hearing so much as a single click or pop. The surfaces are extraordinarily quiet, although in several cases, particularly (but not exclusively) before the first cut on a side, I was surprised to hear a bit of pre-echo. This could, of course, emanate from the master tape itself. The discs are all perfectly flat (another rare occurrence these days), and each has an extremely long lead-in groove that effectively prevents the stylus from skipping into the first track, as too often happens with the short lead-ins on today’s mass-produced discs (a problem made worse by the degree of warpage that disc manufacturers today consider “tolerable”). The run-out groove between the final track and the label is also quite lengthy, providing for a nice, gradual descent. I found that the label’s so-called “rice paper” sleeves kept the records remarkably static free, so that they rarely needed to be cleaned before playing. Mobile Fidelity recommends, by the way, that cleaning solutions *not* be used on their discs.

I found the extremes of the sonic spectrum far more responsive in these pressings than in standard editions. To test this, one must alternately filter out all the bass and boost the treble, and then filter out the treble, boosting the bass. On the Mobile Fidelity discs, this exercise yielded perfectly clear, undistorted sound at both the high and low end; whereas the British, French, and Australian discs I used for direct, track-by-track comparison put forth an ill-defined, muddy sound in the bass, and a more pinched treble sound. German, Dutch and Japanese pressings came closer,

A SINGER'S DREAM!

TVE

REMOVES VOCAL FROM MOST STEREO DISCS

The Thompson Vocal Eliminator can actually remove most or virtually all of a solo vocalist from a standard stereo record and yet leave most of the background music unaltered! Not an equalizer! We can prove it works over the phone. Write for a brochure and demo record below.

YOU SHOULD SEE US

- Studio Echo/Reverb
- Tape Noise Reduction
- Parametric Equalization
- Electronic Crossovers
- Comp/Limiters

For:



We manufacture a full line of high quality audio and recording equipment. You will probably have to pay twice as much elsewhere to obtain comparable quality. Only Direct Sales make our prices and quality possible. Send \$1 for a 24 page brochure and 20 minute demonstration record.

Write to: **LT Sound**, Dept. MR, P.O. Box 338,
Stone Mountain, GA 30096 (404) 493-1256

but still failed to equal the clarity of the Mobile Fidelity versions; they also yielded more obtrusive surface noises than the Mobile Fidelity discs under those conditions. Obviously, no one listens to their discs this way; but certainly, even subtle distortions at the high and low ends will have an effect on the clarity of the overall sound picture at flat tone-settings.

One criticism I've heard leveled at the half-speed mastering process is that a low bass note, played at half speed, will not allow a cutting head to properly etch it onto the lacquer. The net effect, according to this theory, is that the bass response is weaker on half-speed cut discs than on standard (real-time cut) ones. It sounds plausible as a rhetorical position, but I found nothing lacking in the potency of the bass response on these discs. In fact, they show more clearly than ever what an inventive and virtuosic bassist Paul McCartney was in his Beatle days—a quality that becomes especially evident on the later LPs, when his bass parts become extremely clever and well-formed contrapuntal lines that add a great deal to the sonic tapestries the group was creating in its studio-only phase.

This observation about the bass guitar parts can be extended to take in virtually every instrumental and vocal timbre in the set. You hear, or think you hear, details you hadn't heard before—bits of studio crosstalk before vocal entrances on several songs ("Don't Bother Me," for one); the touch of distortion in the guitar chording on "Chains"; the bizarre perspective shifts during the solo breaks in "Not a Second Time" and "Little Child"; the gasp at the end of "Twist and Shout," and the acidic, raspy qualities of John Lennon's voice in "You've Got to Hide Your Love Away," to name but a few. Yet, when you bring out the British discs for comparison, you find that all these details have been there all along. They are revealed now, probably because of a combination of things: Part of it may be that the "audiophile" nature of the set leads one to listen more closely, and to *expect* to hear new details; but the quietness of the pressings and the crystalline reproduction of the music must also have something to do with it.

Otherwise, tracks that have always sounded decent enough take on a more lustrous and realistic character. In "I Saw Her Standing There," the first track on the first disc, you hear a lead guitar line that sounds more twangy and thin, or even tinny, than it does on the standard pressings—not a bad sound, actually, but one that more truly conveys that for this first LP, *Please Please Me*, the Beatles were still a provincial dance band using relatively cheap equipment. As the series progresses, the timbral clarity, supplemented by remarkably discrete stereo imaging, becomes all the more fascinating. Percussion parts (maracas, cowbells, etc.) ring out as if someone were standing in front of your speakers adding them to the mix; and the bass drum underpinnings to many a track becomes similarly tangible, an improvement over the dull thuds they often seem on average-quality standard pressings (although some of the German, Dutch, Japanese and even British discs don't do badly in this regard). Also notable is the pristine purity of the acoustic guitars on "And I Love Her," the sharpness of the kaleidoscopic sound paintings on *Revolver* and *Sgt. Pepper*, and the sheer variety of textures on *The Beatles* and *Abbey*

Road. *Abbey Road*, in fact, seems to have a warmer and somehow more relaxed sonic character than the standard release.

Some Minor Flaws

One can go on and on citing the set's sonic attractions, and undoubtedly the aggregate of Mobile Fidelity's process—from its use of the master tapes, to its half-speed cutting, and its careful pressing and packaging—is responsible for what is overall a triumphant success. I suspect, however, that certain of these elements carry more weight than others, with the Japanese pressings and the Super Vinyl bearing the most responsibility, and the use of the master tapes the least. It is, of course, a perfectly commendable policy to insist on working from the original masters, but Mobile Fidelity does overdramatize this a bit, claiming that "the high fidelity losses you can suffer by working from a duplicate tape can range from hysteresis to distortions that result in phase anomalies, blurred transients, blurred imaging, and added noise."

To some degree this may be true, but it is apparently not always audibly so. The Beatles set offers a few cases in point. On the tape log reproduced on the cover of the *Help!* LP, a note indicates that the final track, "Dizzy Miss Lizzy," was damaged during a transfer in 1976, and was replaced by a *copy from the safety copy*—that is, a third generation tape. Yet, "Dizzy Miss Lizzy" sounds none the worse for it, and is just as crisp as anything else in the set. Similarly, we have two copies of "Yellow Submarine"—same take, same mix. The first, on *Revolver*, can be taken to be the original; the other, on the *Yellow Submarine* soundtrack LP, is a copy, but the two sound identical.

In the case of most of side two of the *Magical Mystery Tour* LP, perhaps a second generation copy would have served the set (and those who may buy it) better than the master tape Mobile Fidelity used. As on the American version of the LP, the British disc contains true stereo recordings of only two of the second side's five tracks ("Hello Goodbye" and "Strawberry Fields"); the rest ("Penny Lane," "Baby You're a Rich Man" and "All You Need Is Love") are re-channeled mono. A stereo "All You Need Is Love" is included elsewhere in the set on *Yellow Submarine*. But the German version of the *Magical Mystery Tour* LP (Electrola IC 072-04 449) contains the entire side in glorious stereo. Because they could not tamper with the masters, and considered the German master a copy, Mobile Fidelity went with the British version.

Another minor flaw in this collection—but one that will catch the ear of most Beatles collectors—is the omission of the so-called "Sgt. Pepper Inner Groove." This is a 15 kHz tone, followed by a short burst of studio chatter, tacked onto the end of the LP as an inside joke: the high tone was meant to be appreciated by dogs, and the chatter was cut into a continuous groove so that it played indefinitely (and also revealed a suggestive message when played backwards). This curiosity never appeared on the American *Sgt. Pepper*, but it can be found on pressings from virtually every other country.

A spokesperson for Mobile Fidelity insists that the only reason the "Inner Groove" failed to appear on their version is that they were not on the master tape.

The tone and chatter are, however, indicated on the tape log photographed for the disc's jacket, and are still included on all current foreign pressings.

The artbook containing the standard album jackets also contain a few anachronisms that, minor as they may seem, could have been corrected if the book was assembled with the same attention to detail that the engineers paid to the disc sound. In most cases, the covers used are not those of the original issues, but either those that adorn more recent pressings, or in a few cases, those of the mono reissues. Overall, of course, they look virtually the same as the originals, but they differ in a few odd details. On the first pressings of *Beatles For Sale*, for instance, the last song on side one is listed as "Kansas City." Actually, it's a medley of "Kansas City" and "Hey Hey Hey Hey," and the corrected version (with amended author credits) turns up on more recently printed covers, and in the Mobile Fidelity set. Equally anachronistic is the Parlophone logo on the back cover of *Let It Be*; the original bore the symbol of the group's own Apple label.

Beyond the covers, the book contains only an essay on Mobile Fidelity's mastering and pressing process—something that is interesting enough, and which has a place in this set. But given the scope and ambitions of this project, wouldn't it have made sense to also include an essay on the production techniques used in creating the original? After all, this 14-disc collection charts the coming of age of modern pop production, and as you listen through from the first disc to the last, it is fascinating to see how these techniques flower. To look at it in a nutshell, the first LP was recorded on a two-track machine, which offered little flexibility, and yielded tracks that were either straight mono, or had all the instruments on one channel, with the vocals on the other.

By the time the Beatles returned to the studio to cut their second LP, EMI had installed a four-track deck. Still, you can hear, on *With the Beatles*, that the engineers were not quite used to the expanded mixing possibilities, and when they attempted something fancy (fading in separately recorded harmony vocals, or doubling the instrumental tracks to make the solo break sound a bit flashier) the results sound awkward. By the third LP, *A Hard Day's Night*, multi-tracking techniques seem more fully under control, and the final mixes—with centered vocals and split instrumental tracks—are far more creative. As we continue along, we find the group striving for a more mellow, country-oriented sound on *Beatles For Sale*; back to more straightforward rock on *Help!*, but with a few hints of the more complicated writing on *Rubber Soul*, which was itself the dawn of the group's great period of studio mastery. With *Revolver*, we are brought into a new sonic world, with George Harrison's Indian-instrument scored tracks, Paul McCartney's ventures beyond the group's own instrumentation (the string octet in "Eleanor Rigby" and the horns in "Got To Get You Into My Life" are examples) and John Lennon's experiments with electronics and tape loops ("Tomorrow Never Knows").

For all this, the group made do with only four-track facilities. With *Sgt. Pepper*, an album packed with dense sonorities and electronic effects, they pushed four-track recording to the limit, and had to use two synchronized four-track decks to achieve their goals.

Soon after that epochal disc, EMI acquired eight-track facilities, and the group used these until its final sessions, those for *Abbey Road*, ironically returning to more simple and direct production techniques for that disc and for *Let It Be*, which was intended to be a straight rocker, without overdubs.

Prospective investors in the Mobile Fidelity set should also be aware that it does not contain the *complete* music of the Beatles, or even the complete music of the band's EMI years (earlier recordings having been issued on other labels). As I mentioned earlier, the group did not include most of its singles on the original LPs; therefore, no fewer than 27 songs are missing from this 14-disc collection, many of them in the "greatest hits" category, among them "From Me To You," "She Loves You," "I Want to Hold Your Hand," "I'm Down," "We Can Work It Out," "Day Tripper," "Lady Madonna," "Hey Jude," "Revolution," and "The Ballad of John and Yoko." In addition, there are versions of "I Want to Hold Your Hand" and "She Loves You," sung in German ("Komm Gib Mir Deine Hand" and "Sie Liebt Dich," respectively).

The Famous Decca Tapes and More

Now, in addition to the Mobile Fidelity package and various other Beatle compilations, comes the famous Decca audition tapes. This is a collection of 15 songs the Beatles recorded on January 1, 1962, during an audition for a Decca recording contract. They were turned down, but they were able to use the tape to secure other auditions. Over the years, good quality pressings of the full tape have made their way onto the bootleg market; so the legal versions of the disc that have appeared in the last year leave something to be desired—the chief of their failings being that they do not contain the full session. They are also all credited to "The Silver Beatles"—a name the group had dropped long before the 1962 sessions, but which is used here so as to avoid legal hassles from Apple (yes, it still exists), which closely guards the use of the Beatles tradename.

For the record, the 15 songs on the Decca tape contain three Lennon-McCartney originals—"Hello Little Girl," "Like Dreamers Do," and "Love of the Loved"—all unavailable elsewhere, plus a dozen cover versions, including "Money," "Till There Was You," "Sheik of Araby," "To Know Her Is To Love Her," "Take Good Care of My Baby," "Memphis," "Sure To Fall," "Three Cool Cats," "September In the Rain," "Besame Mucho," and "Searchin'."

The first legal release is offered by none other than Pete Best, the Beatles' former drummer (replaced by Ringo Starr eight months after these sessions). His version of the Decca tapes, entitled *Like Dreamers Do*, comes in two versions on Backstage Records. One (BSR 1111 three LPs) contains a picture disc with a Pete Best interview and a Beatles press conference, and two musically identical discs (one on white vinyl, the other a picture disc) containing 10 of the 15 songs. The second version (BSR2-201) eliminates the Decca tapes picture disc. Missing are "Hello Little Girl," "Sheik of Araby," "To Know Her Is To Love Her," "September in the Rain," and "Besame Mucho." The pressings are not at all bad, but if you must have this, go for the two-disc version.

Slightly more complete is *The Complete Silver*

Beatles (Audiofidelity AR 2452), a single disc offering all but the three Lennon-McCartney tunes. The quality here is quite good; but beware of the label's budget versions, packaged in similar covers, *Silver Beatles, Vol. 1* and *Vol. 2* (Audiofidelity/Phoenix PHX352,353). These are absolutely reprehensible. The two discs are padded out not only with repeated tracks, but worse, several of the songs themselves are artificially lengthened by unscrupulous tape editing. For instance, guitar solos from the middle of a track are spliced onto the start, as if they were introductions; the same solo will return in its proper place, and yet again between two verses where no solo appears on the originals. Obviously, this misrepresents the band's performances in a way no serious collector can condone.

As for the Decca performance itself, it's a bit nervous-sounding, sometimes corny, and often quite good. Most of the renditions are filled with a kind of fresh energy, and the acrid version of "Money" here sounds more like the Stones version than the one the Beatles recorded nearly two years later. A few of the tracks are tightly played, Fiftyish ballads ("To Know Her Is To Love Her," with Lennon singing lead, and "Take Good Care of My Baby," featuring Harrison); others are almost amateurishly jocular ("Three Cool Cats" and "Sure to Fall," which they performed on the BBC in several more sober versions in years hence). According to an article in a recent issue of *The Beatles Monthly Book* by Tony Barrow, the group's former publicist and LP annotator, Lennon blamed the group's failure to secure a recording contract on manager Brian Epstein's insistence that the band record unrepresentative novelty tracks rather than more original material and rockers from their stage set. Still, the originals here barely hint at what was to come. But be that as it may, the collection offers an interesting look at the state of the band's performance standard just ten months before the release of its first disc.

EMI's latest collections cover ground that is much more familiar. In England, Parlophone has, for the second time since 1976, brought out a boxed set, *The Beatles Singles Collection* (BSCP-1). It contains the group's 22 original British singles, each in an attractive new picture sleeve (except for "Penny Lane" and "Let It Be," the only British singles given picture sleeves when they were first released, and which retain those), plus the four singles issued by Parlophone over the last five years (up to the "Movie Medley" travesty). There is also a bonus in the form of a "Love Me Do"/"P.S. I Love You" picture disc. Apparently, the label will be reissuing each of these singles as their twentieth anniversary rolls around: Following "Love Me Do," which climbed higher on the British charts this time than it did in 1962, Parlophone put out "Please Please Me"/"Ask Me Why," both in its picture sleeve from the boxed set, and as a picture disc.

These singles, oddly enough, serve a purpose, particularly for those who collect both mono and stereo mixes. After all, anyone who amassed the originals as a kid in the 1960s has undoubtedly found, by now, that youthful exuberance and old-style styluses have all but destroyed them. Here we have fresh, clean pressings on Parlophone and Apple labels—and two mistakes: "Yellow Submarine" and "I Am the Walrus," which should be in mono, turn up in stereo. For that matter, the inclusion of the second version of "Love Me Do," instead of the original, was also a factory

error, which EMI rectified by releasing its 12-inch version.

Finally, we have EMI's new *20 Greatest Hits* compilations. The American version (Capitol SV-12245) has only one thing going for it: It offers "I Want to Hold Your Hand" and "I Feel Fine" in true stereo for the first time (believe it or not) on an American LP. Otherwise, it's appalling. The sound is below par, even for Capitol, and the disc includes a strangely truncated version of "Hey Jude," which fades out about two minutes before the end of its classic mantra-like refrain.

The British version is somewhat better, and as noted above, it's at least of some use to collectors seeking to supplement the original 14 LPs with tracks released as singles. The sound on the British version is also quite impressive, and "Hey Jude" is included in all its glory. Because of the differences between the American and British singles releases, there are a handful of substitutions here ("The Long and Winding Road," not a single in Britain, is exchanged for "The Ballad of John and Yoko," and so on), and overall, this version makes a more satisfying program.

But this is not what Beatles collectors, even casual ones, want from EMI; nor is it by any means the best EMI can provide, given the slightest effort. Sadly, the company now regards its Beatles catalogue as a cash cow, and it is content to reshuffle the components into equally superfluous compilations once a year.

It would, of course, be far more interesting to have some new material, for a change, and there's plenty of it to be had. For the last two years, EMI has dangled the possibility of its releasing "Leave My Kitten Alone," a hearty rocker, and "How Do You Do It?"—familiar as a Gerry and the Pacemakers track, but first offered, recorded by, and ultimately rejected by, the Beatles. Then, there are the hundreds of recordings the Beatles made for broadcast by the BBC—an intriguing body of live-in-the-studio performances, many of which have long been available on bootlegs of varying quality. Then, there are the countless reels of tape, including some interesting jam sessions and a wealth of old rock standards, recorded during the *Let It Be* sessions (about seven hours of which are currently on the bootleg market). In fact, EMI could do (and has done) much worse than to release the original, pre-Spector version of *Let It Be* (called *Get Back* at that stage), acetates of which were sent to radio stations around the world midway through 1969.

But for the time being, since collectors are being offered only different packaging of recordings they already own, it seems to me that the wisest thing to do is to ignore all but the few useful compilations EMI issues, and save your cash for the Mobile Fidelity audiophile pressings. If you have champagne tastes but a beer budget, worry not: Mobile Fidelity will soon be releasing all the discs in the set separately (four are already on the market, plus the *Sgt. Pepper* UHQR). The full collection turns out a bit less expensive that way, but of course, you don't get the tape log album jackets or the "Geo-Disc." But at less than \$18 a throw, rather than \$325 at once, obtaining this excellent sounding series is considerably less painful. At the other end of the spectrum, for the Beatles fan who has everything, including lots of money, Japanese Toshiba-EMI has announced the release of an 83-disc set containing all the Beatles group and solo discs, housed in a wooden cabinet, for \$1,400. Somewhere, there's a line to be drawn....

GROOVE VIEWS

SUSAN BOREY
ROBERT HENSCHEN
ROB HOERBURGER
GENE KALBACHER
JOE KLEE
MICHAEL ROBERTS

POPULAR

THE POLICE: *Synchronicity*. [Produced by Hugh Padgham and the Police; engineered by Hugh Padgham; recorded at Air Studios, Montserrat and Le Studio, Quebec.]

Performance: **Sounds like they mean it**

Recording: **Sparkling clean**

As far back as "Roxanne," it was apparent that the Police were leaning in a direction where rhythm, more than melody or volume, was the center of gravity. Percussion doesn't keep time with the Police, it makes time. Stewart Copeland, one of few rock drummers that can handle that responsibility, is compatibly coupled with Andy Summers, one of the few rock guitarists that can keep the diverse mastery of his instrument under tight enough rein to allow the percussion its place in the forefront.

Perhaps due in part to the KC-600 Audiophile Vinyl with which this record has been pressed, *Synchronicity* retains a very "natural" sound. Effort has been taken to insure the authentic reproduction of the many folk instruments used on the album; a certain dryness here has the impact of vivid, undiluted colors. Tonal clarity, as well as depth, is emphasized, from the bass guitar whose presence is sensed as vibration as well as heard, to the upper registers of the xylophone and flute with their respective characteristics.

The album opens with a one-two punch of polyrhythms with "Synchronicity I," a Jungian view of time that couples melodic percussion with the driving trapset, followed by the tribal singalong ode to our pre-historic kin, "Walking In Our Footsteps." Here, flutes and tuned drums are brought out to the forefront to frame the song around the vocal. Fading into "O My God," a return to a more traditional arrangement where the fretless bass is the most prominent feature, Summers' guitar presents a scenic yet understated backdrop for the sax solo. The drums, crisply present as usual, sparsely punctuate the song; the cymbals have a short crash, and any after-ring that might have been present has been erased.

Andy Summers' anti-Oedipal composition, "Mother," takes off in a frenzied $\frac{7}{8}$ that has an affected, harried vocal accented by chimes, and Stewart Copeland's romantic view of a political flunky resumes the Police's calypso groove on "Miss Gradenko." "Synchronicity II" exemplifies the new dimension for trios that the Police have eked out. Far away from a clogged, cluttered sound characterized by thrashing drums, maniacal sustained lead guitar and lead bass, the band even manages to add a few synthesizer lines and maintain the song's clean, simple, yet hard-driving character. The howl of guitar feedback at the song's beginning is softened into a moan and returns later to personify something



somewhat nefarious that crawls out of a Scottish lake.

Currently the hit single, "Every Breath You Take" is the simplest of the ten songs. Staccato guitar, acoustic piano and very sparse drums provide the accompaniment for Sting's plaintive vocal and the cross-rhythmic, receded background vox. The string synthesizer is atmospheric; it is barely noticeable until the other instruments fade out.

Summers' strength in creating textures from his bank of effects is displayed on "King Of Pain," but once again it's in the background, subservient to the drums. Lots of empty spaces reinforce the depth of the percussion on "Wrapped," which carries a contrasting-timbred duet, with the guitar doubling the xylophone melody.

Pushing out once again to create aural portraits, the Police close *Synchronicity* with "Tea In The Sahara." The bass guitar strikes an even pulse while Summers manages to make his guitar sound like shifting mirages in desert heat.

As recorded music becomes more wedded with visual imagination, the Police will undoubtedly find themselves pursuing a new art form. *Synchronicity* is a giant step in this direction. SB

THE KINKS: *State Of Confusion.* [Ray Davies, producer; recorded at Konk Studios, North London, by John Rollo and Damian Korner.] Arista AL 8-8018.

Performance: **Sharp, but...**
Recording: **Fine**

The Kinks, like the Rolling Stones and The Who, continue to grapple

with the problem of making relevant rock music some 20 years after they began playing. Judged in that light, *State of Confusion* is a success. The playing and recording is precise, polished and energetic, and the subjects the Kinks deal with—divorce, unemployment, new republicanism, aging itself—are made pertinent for young and old(er) people. It just seems as though they have reached all these conclusions before.



That's why the first single from the album, "Come Dancing," was such an unexpected surprise. The effervescent, rock-for-a-carousel swing, with drums and guitars spilling all over each other, brought back a simplicity and release that's been missing since the great early singles. (The levels alone on this cut are so high that it sounds more suited to an AM car radio than a state-of-the-art tuner.) Moreover, the song defies the dreaded categorization: it's not new wave, or black, or AOR, just a danceable pop song which fits all formats.

The rest of the album is merely well-thought out, intelligent rock 'n' roll, about par for the course. There's not much instrumentation beyond the band members, and Davies typically makes the production suit the music. On "State Of Confusion," "Young Conservatives" and "Bernadette," guitars crash and crowd each other with all the frenzy of a Clash tune. The softer songs are as clear and uncluttered as any Alan Parsons production. "Don't Forget to Dance" works especially well, as Davies puts a soft echo on the guitar to set the mood for a story about a woman reflecting upon lost youth. Yet, it all seems like perfection from a craftsman, without enough of Davies' "boziness" to lighten things up.

In "Cliches For The World" Davies sings about life just being a cliché, and maybe this disillusionment has prevented him from finding anything new worth trying in the studio. While the Kinks' music is far from being clichéd—there's still too much vitality in it—the only thing really new about *State Of Confusion* is that the band made a great single...and everybody's known they could do that since "You Really Got Me." RH

MEAT LOAF: *Midnight at the Lost and Found.* [Produced by Tom Dowd; recorded at The Power Station and The Hit Factory, New York and Criteria Recording Studios by Tom Edmonds; mastered by Mike Fuller at Criteria Recording Studios.] Epic/Cleveland International FE 38444.

Performance: **Just on this side of controlled hysteria**
Recording: **Good mix of voice and instrument**

The darker side of life in the fast lane is one of the central themes of Meat Loaf's newest album. For Marvin Lee Aday, rock 'n' roll (lately) has meant living on the razor's edge, what with all the lawsuits against him and his recent bankruptcy filing. This album chronicles some of that eggshell existence.

Many of the songs have the feeling of "Razor's Edge," with Meat Loaf's husky tenor sounding as if it had been wrung through yet another year of nonstop touring and singing. The instrumental attacks are sharp, often searing, and come close to overwhelming even this singer's powerful voice.

Come Help Us Celebrate The Child

St. Jude Children's Research Hospital continues its search for life-saving knowledge about childhood disease because people like you care. The cost of treatment, equipment and research programs is met primarily by public contributions.

Help us celebrate the children of the world with your check or request for further information to St. Jude, 505 N. Parkway, Memphis, TN 38105.



ST. JUDE CHILDREN'S RESEARCH HOSPITAL
Denny Thomas, 600-800



The material seems introspective, sardonic, even cynical, but the sound is pretty straightforward, with few frills. The title track features a nice gospel-sounding chorus singing a cappella at the end, in rounds, but the dominant feature is the charged-up drumming by Max Weinberg. His drums are prominently displayed again in "Wolf At Your Door," another autobiographical slice of Meat Loaf's current life. This song is punctuated with a consonants-only delivery and an overblown anthem-like arrangement that overpowers the guitar lines.

Without Jim Steinman, Meat Loaf has teamed up with some of the members of his band (bassist Steve Buslowe, guitarist Mark Doyle) and others on the composition of some of the tracks. He also has provided an interesting cover of Chuck Berry's "The Promised Land" that adds the distinctive near-hysteria sound to a song that merely oiled along before.

There are some curious sounds, too. In the blues-tinged "You Never Can Be Too Sure About This Girl," the sound contains too much treble, and one wonders if the echoing vocal effect at the end of each line is part of the control booth or a natural element of Meat Loaf's voice.

The duet with Dale Rossington (of Rossington & Collins fame) "Don't You Look At Me Like That," is nicely handled and mic'ed, although Meat Loaf's vibrato works against the full impact of the duet. As if to mirror the twin vocal lines, there is a nicely done guitar duet as a break in this track.

The Springsteen-esque "Priscilla" is a better all-round effort, with nicely separated channels and a good blend of voice and instruments (drums and percussion especially prominent).

As with previous efforts, there is very little that is subtle about this album. The distinctive Meat Loaf sound has lost none of its raggedness or intensity, and this latest release is a pretty fair showcase for the voice at the center of that sound. SR

STEVE MILLER BAND: *Steve Miller Band Live*. [Steve Miller, producer; Rick Ruggieri, recording engineer; recorded at Pine Knob, Detroit, Michigan; David Cole and Bill Palmer, remix engineers; Wally Traugott, mastering engineer.] Capitol ST-12263.

Performance: **Tight**
Recording: **Is it live...?**

The Art of Jazz Lyricism: Michel Legrand and Jim Galloway

Nat Hentoff

Writing recently of the ballad artistry of "Big Nick" Nicholas, critic Jon Pareles observed in *The New York Times* that "his solos have a sense of leisure becoming increasingly rare in jazz." Pareles has a point. The kind of unhurried, lovingly savored lyrical solos that Ben Webster and Johnny Hodges specialized in are indeed rather rare. Maybe the increasing fragmentation of the times has affected current jazz; maybe an age of romanticism will nonetheless return. In any case, it's a special pleasure to come upon "After The Rain" (Pablo Today), an informal session by pianist-composer Michel Legrand.

Unlike many other Legrand sessions, this is not a busily orchestrated date. Just lead sheets were used, and the rest was up to the remarkable improvisatory imaginations of Legrand's truly distinguished colleagues—Zoot Sims, Phil Woods, Joe Wilder (trumpet and flugelhorn), Gene Bertoncini (guitar), Ron Carter (bass), and Grady Tate (drums).

With an ambience of mutual respect and affection, and with no feeling of beating the clock to save a buck, the date turned out to be one of the most deeply, satisfyingly relaxed sessions in some years. And the solos have plenty of that "sense of leisure" which, years back, made time seem to stop when jazz ballads were played.

The engineering is first-class—clear, immediate sound with the sense that you're joining the musicians as they listen to each other. A special delight is hearing a lot of Joe Wilder again—his singing sound has been resoundingly captured in this set.

One of the most accomplished of Canadian jazz players is Jim Galloway, who triples on soprano, tenor, and baritone; but on his newest album, *Thou Swell*, he

focuses on the soprano. Galloway's is another singing horn, romantic and just as leisurely as need be in such tunes as "Someone To Watch Over Me," Duke Ellington's "Black Butterfly," and "I've Got The World on a String."

Having played the soprano, or tried to, years ago, I can testify that it's a difficult horn to tame, but Galloway gets a wondrously warm but airy and often playful sound on the soprano. He can also, however, make it into a most intimate seducer. Moreover, Galloway has a finely honed sense of dynamics, such that the shadings and tints of color enhance his already intriguing solos.

Superbly complementing the dancing, gliding Galloway is Jay McShann, the quintessence of exhilarating, deeply pulsing, two-handed swinging piano. Making it all cohere are bassist Don Thompson and drummer Terry Clarke. A note about the recording company, Sackville, one of the truly high quality jazz labels in the world: It is devoted to musicians rather than profits. Or, as their producers say in the notes, "We wish to thank the musicians for the privilege of being able to record their music." Predictably, the engineering is a model of letting the sounds breathe, in balance, and without a tinge of excessive wizardry with the dials. Sackville Recordings is at Box 87, Station J, Toronto, Ontario M4J 4X8 Canada.

MICHEL LEGRAND: "After The Rain." [Michel Legrand, Nat Shapiro, producers; Mike Moran, engineer.] Pablo Today 2312-139.

JIM GALLOWAY: *Thou Swell*. [Bill Smith, John Norris, producers; Bill Whiteacre, engineer.] Sackville 4011.

The Steve Miller Band are veteran performers of over fifteen years. In that time, they have collected seven platinum and four gold albums. It is, however, surprising that they have never recorded a live one...that is, until now. This, their first live LP, illustrates that this band is a *performing* band. In fact, after listening to a few of their studio albums, it was hard for me to find one that surpassed this one in energy and quality.

Its production was approached in much the same manner as a studio project: close mic'ing was employed during the recording process, and, during a subsequent mixdown session, signal processing—actually just equalization and reverb—was applied. The result, a recording with an incredibly high impact thump and spaciousness, sounds good on both small and large speaker systems.

Live covers a wide range of the group's output; it reaches back to such classics as, "The Joker," "Rock 'N Me," "Livin' In The U.S.A.," and "Fly Like An Eagle"; "Abracadabra," their most recent hit, is also included. The songs, which seem as complete and modern as ever, serve as vehicles for riveting guitar and harmonica solos and modest embellishments on the original lead vocals.

Unlike a lot of live albums, no one performer here overshadows another; every one of the band's seven members contributes to the energy and excitement this LP throws out. Thanks to the remix, however, the bass, drums, and lead vocals are relatively loud; in addition, they are panned towards the center of the stereo space. The other instruments—the guitars, harmonica, and keyboards—and the background vocals pad the sides and are mixed a little lower.

Steve Miller Band fans, you have waited for more than a decade for this live album. I am glad to report to you that it has fulfilled all expectations. These guys, who play with the expertise of jazzmen, deliver their greatest hits with both skill and spirit. A flawless recording, pressed on a noiseless vinyl surface, serves to intensify the spirit even more. HN

MARIANNE FAITHFULL: *A Child's Adventure*. [Wally Badarou, Barry Reynolds and Harvey Goldberg, producers; Harvey Goldberg, engineer; Don Wershba and Carl Beatty, additional engineering; Don Wershba and Scott Mabuchi, assistant engi-

neers; George Marino, mastering; mastered at Sterling Sound Studios, New York, NY.] Island 90066-1.

Performance: **Renoir meets Van Gogh**
Recording: **Takes a few chances successfully**

Alongside her poetic vision which, with a streetwise grace, spans the territory between illusion and reality, the most endearing aspect of Marianne Faithfull is her voice. Innocently fragile, yet grainy with experience, it easily reaches a breaking point while retaining a solid, tough edge, exposing a deeply-rooted soul. This voice, with its undisguised British accent, has always been dependent on clear, sensitive production and placement in the mix—a certain transparency of reproduction that guarantees an unobstructed view of its potential.

A Child's Adventure, for the most part, adequately presents Faithfull's voice. However, there are also times

the rest of the instruments fade.

A percussive bass line, prominent bass drum, and a generally sparse arrangement make "Ashes In My Hand" the album's catchiest cut. With its mandolin-like accents and despairing lyrics, the velvet gloved punch of this song brings to mind Faithfull's earlier work, *Broken English*.

Consistently mellow, *A Child's Adventure* treads a line between being low-key and easy listening. Where sparsity would help retain an edge, layers of instruments are often found, weakening that potential. For example, on "Running For Our Lives," synthesized strings and multi-tracks of background "ooh's blunt the edge that Faithfull seems to lyrically project with "I think I'd like to get out of here, this place it frightens me."

One of the most interesting arrangements is "Ireland," Faithfull's tribute to a special place. The three-



when it is obscured by the instrumentation and (unfortunately) even briefer moments when it shines—free from any distractions. On "The Blue Millionaire," where the lyrics are recited rather than sung over the funkily scratched riff, the percussion is the crispest element, standing out over the rest of the instruments.

Reminiscent of folk mixes of the '60s, where everything seemed to come from one isolated point in the distance, the child-song quality of "Falling From Grace" justifies the lack of dynamics that carries throughout the cut. At the end of the song, however, a simple repetitive keyboard melody sustains its volume while

quarters timing of the acoustic guitar, juxtaposed with the military cadence drumming and droning bass create a lilting Celtic background for the haunting vocal. Simulated bagpipes are placed atmospherically in the far background, ghostly and wistful.

Presenting a quieter side of Marianne Faithfull than that found on most of her recent work, *A Child's Adventure* doesn't necessarily present a more withdrawn or negative one. Visions of darkness still predominate the picture, but the artist seems to possess the immunity of an observer rather than the desperation of a victim. SB

CLASSIFIED ADS

Portable Equipment, UHER, Sony, Sennheiser, AKG, Audio-Technica. Send SSAE: Model, Quantity. Carpenter Sound Box 1321, Meadville, PA 16335-0821

1983 MUSIC BUSINESS DIRECTORY—OVER 1000 CURRENT LISTINGS—PRODUCERS, RECORD COMPANIES, MANAGERS, MUSIC PUBLISHERS, AGENTS. SEND CHECK OR MONEY ORDER FOR \$12.95 TO: TOP TEN, #102, 130 W. 72 St., NEW YORK, NY 10023.

CASSETTE DUPLICATION in Real Time, from 10 to 10,000. Highest Quality, low rates. Labels, inserts and shrink wrap available. Fast turnaround. AUDIOHOUSE sells Valley People, Mic Mix, Ecoplate, Symetrix and EXR Exiter at the best prices. AUDIOHOUSE (303) 751-2268.

George Benson GB-20 (Proto-type) one of twelve hand built units. Serial No. 007, this guitar was designed and used by George Benson. Restored to original condition by Ibanez. A must for collectors or experts, \$3500.00. Signed piece (305) 563-8699. Privately owned. *Serious buyers only.*

Eventide 1745-A DDL and TEAC 3340-S Recorder, Orban Reverb #106-c, 4 Gain Brains, 4 Kepex with rack and power supply, Audiotronics PEQ-82, Nakamichi Tape Deck 600 II. All items in very good condition. Call Mike at (212) 226-4278.

Make convincing recordings using low-budget equipment! Techniques revealed in "Studio Cookbook," only \$5.95. Info pack on other products, \$1.00. **dbm Professional Products, Box 40280, Albuquerque, NM 87106.**

LEARN MUSIC THEORY! Step by step correspondence course with corrected and graded assignments. Write for free details. **TECLOR MUSIC SCHOOL, 323 S. Franklin #804, Dept. S-131MA, Chicago, IL 60606.**

FOR SALE: Ampex ATR-700, 1/4 and 1/2 track head blocks, remote control, 7 1/2/15: \$1200.00. Nagra S, stereo recorder, universal preamps, power supply: \$2800.00. Nagra IV-L, mono, sync, w/crystal, resolver, power supply: \$2200.00. Sennheiser 805 shotgun mic., pwr. supply: \$300.00. (814) 237-6462/237-8400.

"SYNTHESOUND" Musical Products/CABLEMATIX Division, P.O. Box 148, Poquonock, CT 06064. Musical, Recording and Broadcast Cable Assemblies, Custom Cables and Cable Systems, Bulk Connector and Cable Sales.

BUILD YOUR OWN PA ENCLOSURES! Save hundreds of dollars with our kits. Write for free brochure: Omarco, Dept. MM9, Box 3131, Coos Bay, OR 97420.

WANTED: McIntosh, Marantz, Western Electric Tube Type Amplifier, Preamps; (713) 728-4343, MAURY CORB, 11122 ATWELL, HOUSTON, TX 77096.

"C-24, M49 and other old mics and used gear for sale (415) 441-8934 or (415) 527-6167"

Mixers, Equalizers, Limiters, Pre-Amps, VCA's, Power supplies, parts, and more... CATALOG

NEW AUDIO KITS

Modular design featuring plug-in construction. Design your own combination of functions. Write RODCAR ELECTRONIC SALES 214-351-9895 9983 Monroe Drive Dallas, Texas 75220

WANTED: McIntosh, Marantz Tube Amplifiers. Tannoy Monitor Speakers. Altec 604A/B/C/D/E. Western Electric, Any Products. (213) 576-2642, David P.O. Box 832, M. P. CA 91754.

MCI JH-500 Console, Allison automation, JH-16 multitrack recorder with 24 track heads. Very reasonable price: Contact Gregory King (305) 425-1001 (Florida).

The "LOWER PLATE" is real, full-size, plate reverb, lower priced—\$888.00! Kit—\$400.00! Write DaviSound, P.O. Box 521, Newberry, SC 29108.

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.

Classified Rates

\$1.00 per word.

Minimum \$25.00.

DISPLAY

ADVERTISING

\$40.00 per column inch.

Employment Wanted: Management/Supervisory position with reputable Pro Audio manufacturing firm. Will relocate, travel. Self motivated, hard working. Send responses to: Dept. 10, Modern Recording & Music, 1120 Old Country Rd., Plainview, NY 11803.

BLANK AUDIO & VIDEO CASSETTES: Direct from manufacturer: Below wholesale: Any length cassettes, for different qualities to choose from. **AMPEX & AGFA MASTERTAPE:** from 1/4" to 2". Cassette duplication also available. BROCHURE ANDOL AUDIO PRODUCTS, INC 4212 14th AVE DEPT MR. BROOKLYN, NY 11219. TOLL FREE #1-800-221-6578 NY RESIDENTS (212) 435-7322. ext. 2

SYN-AUD-CON Super Saver 2-Day Fundamentals Seminars and 3-Day Advanced Workshops. Nationwide. Write for schedule. P.O. Box 669, San Juan Capistrano, CA 92693 or call (714) 496-9599.

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.

**1626 N. Wilcox No. C-677
Hollywood, CA 90028**

Order by phone using Visa or MasterCard by calling (213) 708-2933.

Advertiser's Index

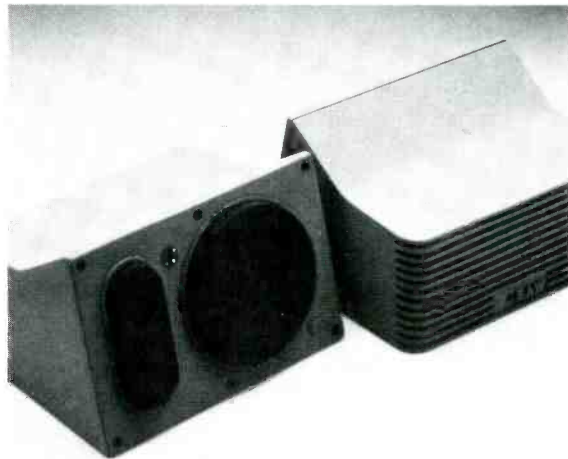
RS #	Page #
15 Audio Technica	7
32 Carver	33
22 Carvin	19
29 Connectronics	51
12 Countryman	4
20 Crown	14
No # .. dbx	9
No # .. DeltaLab.. Cov. 4, 17, 25	
23 DOD Electronics	21
13 Electro-Voice	5
16 Fostex	8
14 Furman Sound	6
10 Ibanez	Cov. 2
18 ITT Cannon	11
No # .. LT Sound	28, 68
11 Mattel	Cov. 3
21 Orban	16
24 PAIA	39
28 Phoenix Audio	37
33 Polyline	39
19 QSC Audio	13
27 Rane	35
17 Renkus-Heinz	10
31 Rocktron Corp.	59
30 Sam Ash	61
No # .. Soundcraftsmen	12
26 Tascam div. of TEAC Corp.	31
25 Yorkville Sound	23

LAST CHANCE

Jim Rupert's Design Contest

In our April issue, we announced a Design A Studio contest. (If you don't have a copy, write to us for a back issue—\$1.95 plus \$0.65 postage.)

The following are the prizes we are offering (with the help of three very generous companies):



The B&W LM1 speaker

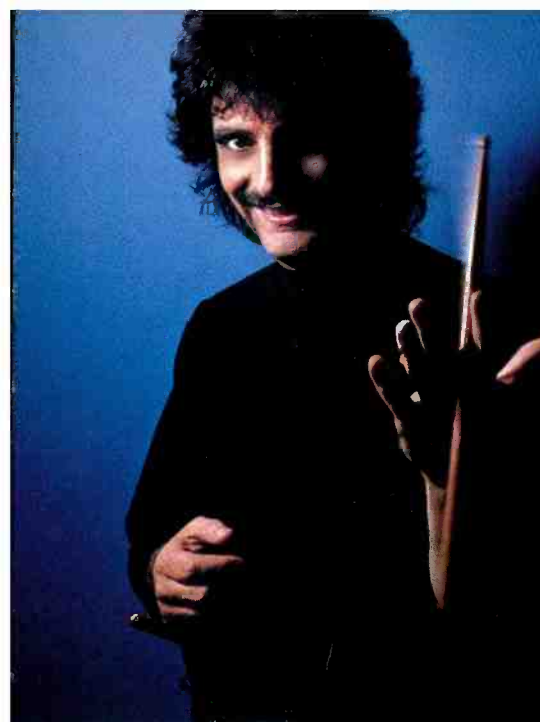


The Shure SM81



JBL 4401 Studio Monitors

So... send those ideas to **Design Contest, Modern Recording & Music, 1120 Old Country Road, Plainview, NY 11803.**



**“WHAT WOULD
YOU CALL AN
ELECTRONIC DRUM
THAT SELLS
FOR THE PRICE OF A
CYMBAL?**

UNBEATABLE.”

Carmine Appice.

“Synsonics™ Drums sound like they cost a lot of bread, but they don't. And that's why I like 'em.

Not only can you use them to learn how to play, but you can compose on them, using the three memory banks.

And for pros like me that's really great.

I used them on my latest record. The sound is irresistible.

You get everything from machine gun effects to spacey Tom Toms.

So, get a set of Synsonics™ Drums for yourself.

I think they're the best musical value of the eighties.”

© Mattel Electronics, Inc., 1983.
All Rights Reserved.

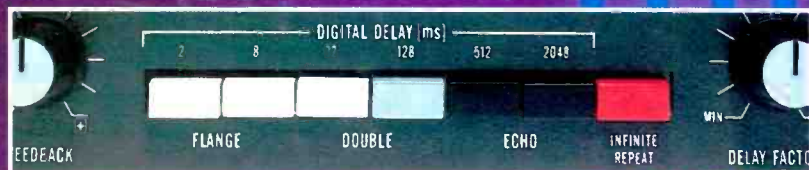
Batteries and drumsticks not included.



SYNSONICS™ DRUMS
FROM MATTEL ELECTRONICS®

Circle 11 on Reader Service Card

DELTALAB'S NEW SUPER TIME LINE



SIMPLE

The Super TIME LINE® offers basic simplicity without compromising performance. Each control on the front panel is easily understandable and readily accessible.



PROGRAMMABLE

Now you can store your favorite settings via the "simple-to-use" program bank. Each program is easily addressable by either the front panel or the optional accessory remote control.



BEST OF ALL...AFFORDABLE.

The ADM 2048 is a full bandwidth (16kHz), wide dynamic range (90dB), fully programmable special effects processor that features flanging, doubling, chorusing and echo effects with up to 2048 milliseconds (2 seconds) of high performance digital delay . . . all for only \$999.00.* The Super TIME LINE®, born in the tradition of DELTALAB's reputation for value, quality and performance, establishes a new standard of affordable excellence.

Visit your dealer and check it out . . . You will be simply amazed!!

Also available is the ADM-512 providing 512 milliseconds (½ second) of full bandwidth digital delay for only \$799.00.*



*Manufacturer's Suggested Retail