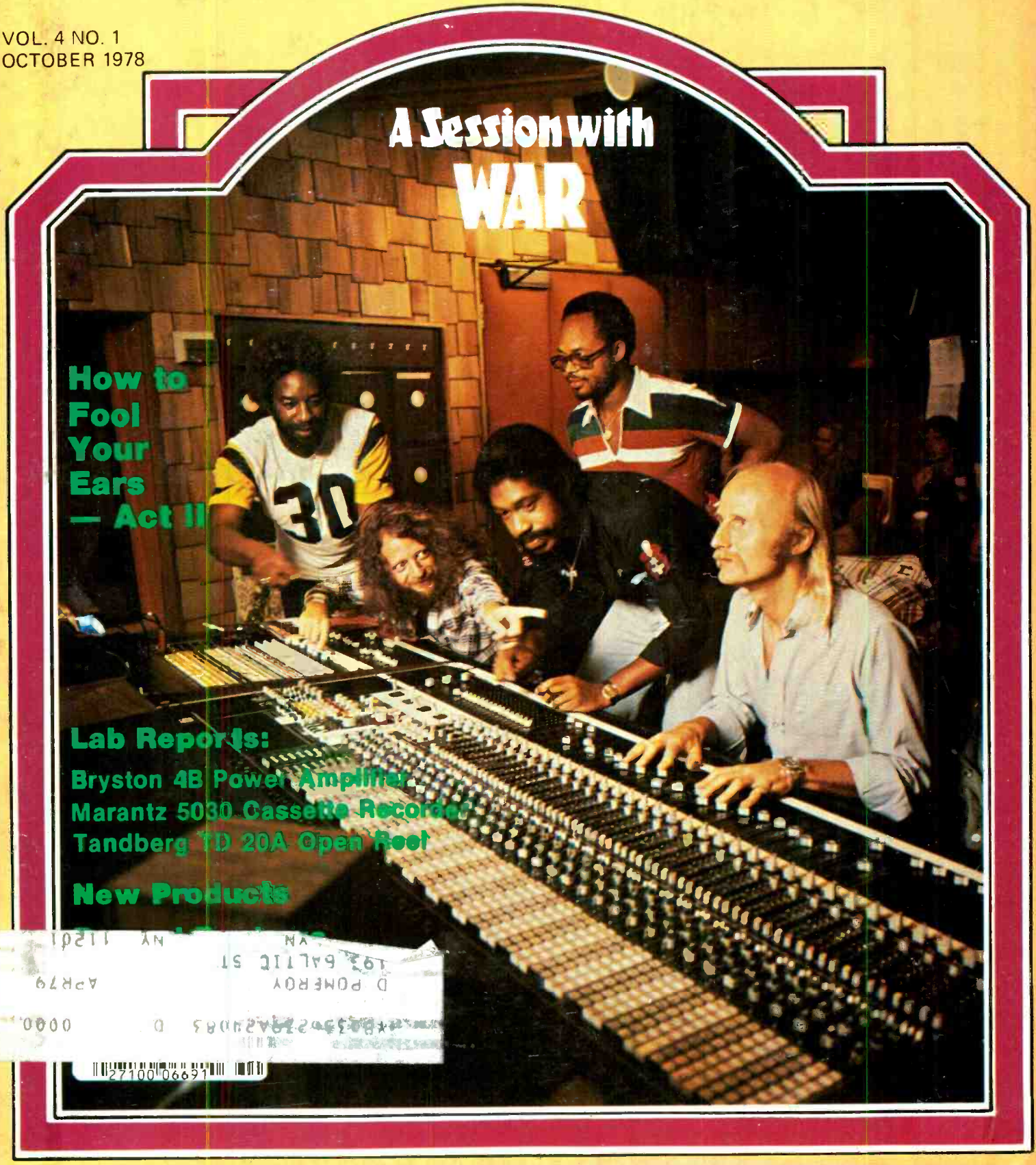
Building A Power Supply

MODERN RECORDING

SERVING TODAY'S MUSIC/RECORDING-CONSCIOUS SOCIETY

#06691 (F)
$1.50

VOL. 4 NO. 1
OCTOBER 1978



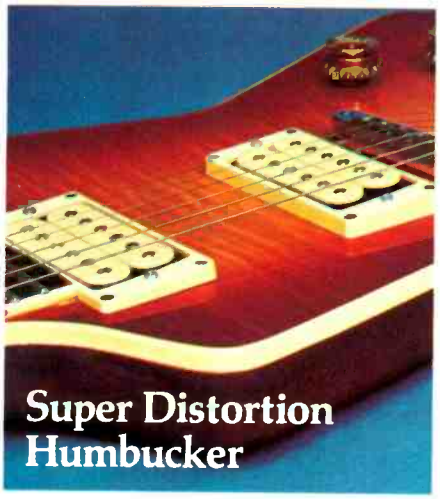
A Session with WAR

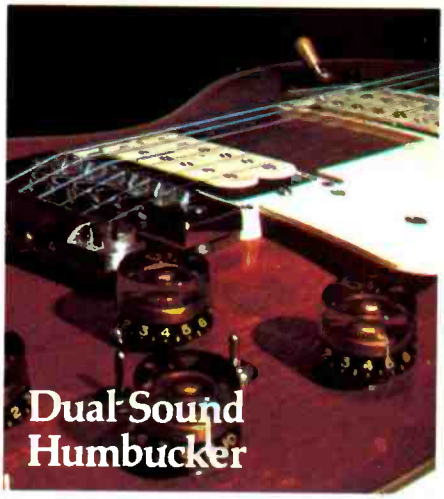
How to Fool Your Ears — Act II

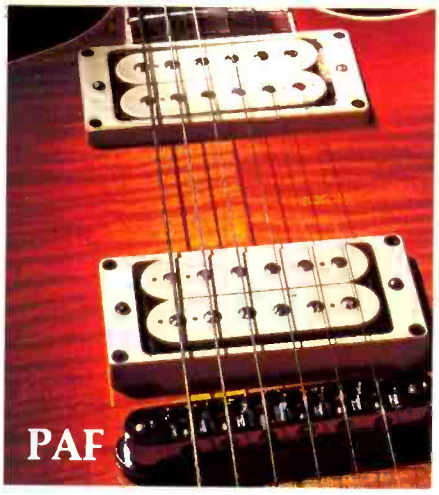
Lab Reports:
Bryston 4B Power Amplifier
Marantz 5030 Cassette Recorder
Tandberg TD 20A Open Reel

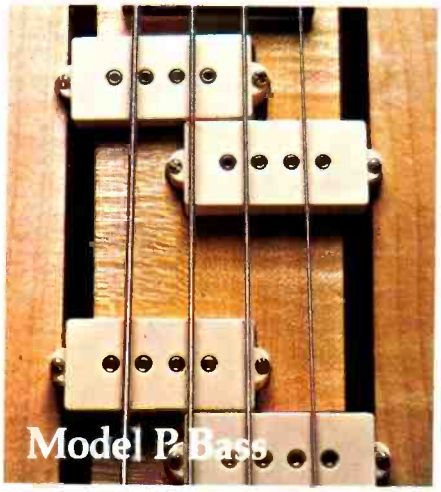
New Products

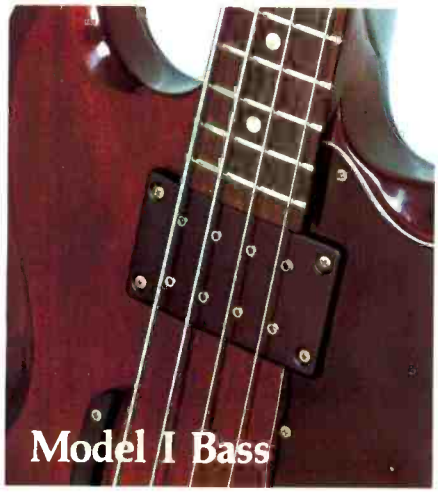
Don't choose one of these for our sound. Choose one for yours.









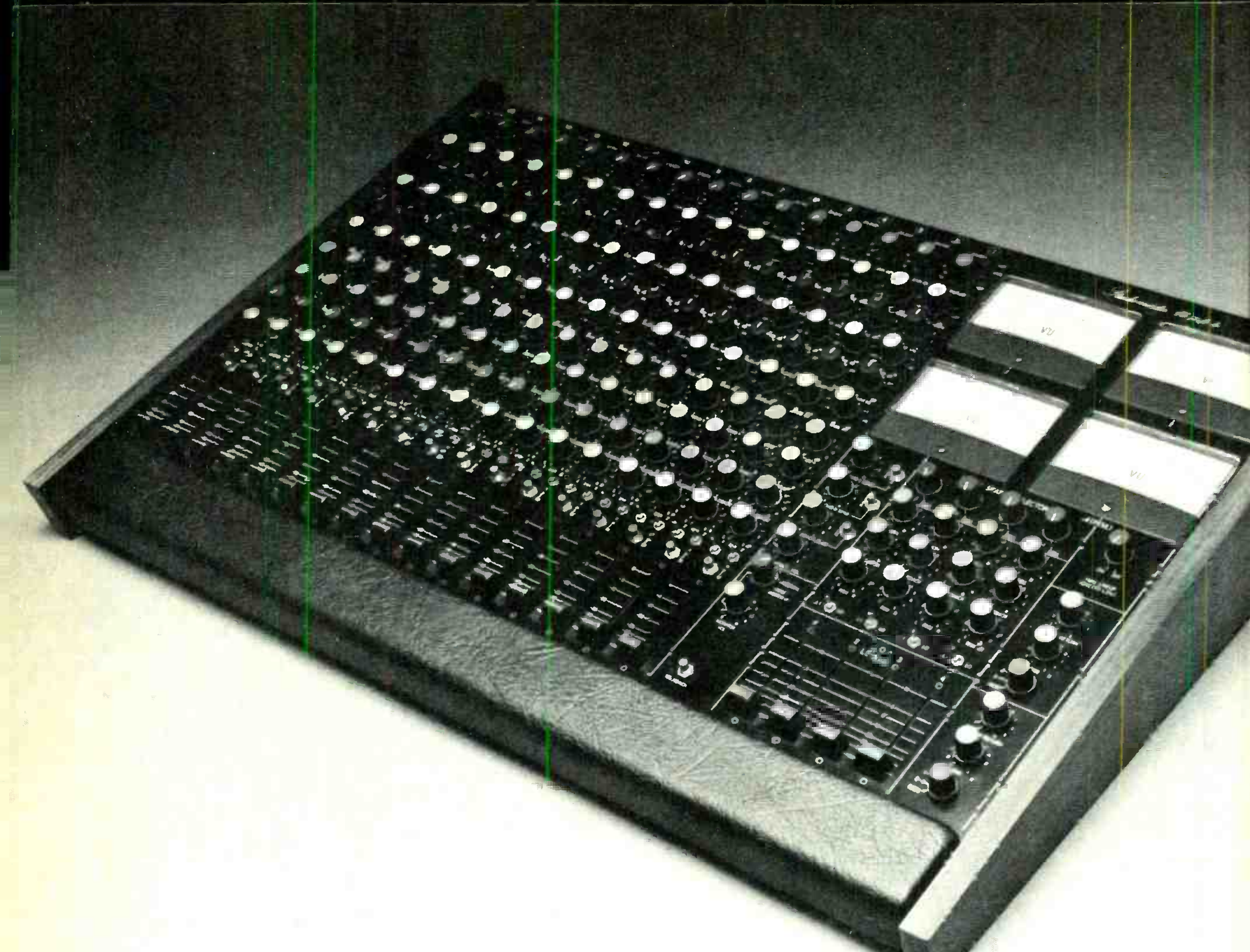


For a full color catalog on all our fine pickups, send 75¢. Also, if you'd like a poster of this ad, send $1.00 to cover postage and handling.

DiMarzio
Musical Instrument Pickups, Inc.

1388 Richmond Terrace
Staten Island, N.Y. 10310
(212) 981-9286

CIRCLE 107 ON READER SERVICE CARD



The Best Advice We Can Give About Recording Consoles:

"Visit your closest Studiomaster dealer"

ALABAMA

Numcie's Music
1917 5th Ave. N.
Birmingham 35203
205-252-4491

ARIZONA

Bill Fry's Music Center
8322 N. 7th St.
Phoenix 85020
602-997-6253

The Music Stand
2229 Country Club
Tucson 85716
602-327-6375

CALIFORNIA

Calif. Musical Inst. Co.
1019 E. Vermont Ave.
Anaheim 92805
714-533-8610

Hanich Music
235 N. Azusa
West Covina 91791
213-966-1781

K&K Music
1904 W. San Carlos St.
San Jose 95124
408-249-5780

WAH Sound
1115 R Street
Sacramento 95814
916-444-5491

(CALIFORNIA)

Gospel Sound & Music
555 Lighthouse Ave.
Monterey 93940
408-37 -5 72

Banana at Large
802 4th St.
San Rafael 94901
415-45 -7 00

Fancy Music
744 State Street
Santa Barbara 93101
805-96 -3 -05

CONNECTICUTT

Acoustic Control Audio
440 Danchwood
New Milford 06776
203-354-3874

FLORIDA

Warehouse Music
1014 S. Wooden Ave.
Orlando 32806
305-425-4204

Music City
1714 S. Lois Ave.
Tampa 33609
813-879-8327

Music City
2583 Atlantic Blvd
Jacksonville 32204
904-399-5719

(FLORIDA)

Ace Music
13630 W. Dixie Hwy
N. Miami 33161
305-891-6241

GEORGIA

The Music Mart
575 Cherokee Rd.
Smyrna 30080
404-433-1142

ILLINOIS

A&A Swing City Music
1312 Vandalia
Collinsville 62234
314-421-1558

INDIANA
INDIANA

I.R.C. Music Store
3708 E. 38th
Indianapolis
317-547-2159

KANSAS

E.M. Short Guitars
175 S. Green
Wichita 67211
316-684-6252

KENTUCKY

Owensboro Music Center
411 Park Plaza Dr.
Owensboro 42301
502-684-2 56

(KENTUCKY)

Cam's Music Center
255 E. Main
Lexington 40507
606-254-0324

LOUISIANA

Sound City
308 N. Carrollton Ave.
New Orleans 70119
504-482-7894

MASSACHUSETTS

K&L Audio
28 Acton St
Watertown 02172
617-926-6100

MICHIGAN

Hy James Enterprises
711 Catherine Ave
Ann Arbor 48104
313-994-0934

Stage Gear Music
4718 Elizabeth Lake Rd.
Pontiac 48053
313-683-2844

Pro-Gressive Music
414 W. Kilgore
Kalamazoo 49001
616-381-18 1

MISSISSIPPI

SM's Music
Cook Center, Terry Rd.
Jackson 39212
601-373-1644

NEVADA

Pro Drum Shop
608 Maryland Pkwy
Las Vegas 89101
702-382-9147

NEW JERSEY

Rondo Music
Hwy 22 at Vauxhall
Union 07083
201-687-2250

M&M Music Co.
2006 S. Delsea Dr.
Vineland 0836
609-691-9568

NEW YORK

Whirlwind Music
100 Boxart St.
Rochester 146 2
716-663-8820

Audio by Zimet
1038 Northern Bl.
Roslyn 11576
516-621-0138

NORTH CAROLINA

Reliable Music
1001 S. Independence
Charlotte 28202
704-375-8662

OHIO

Coyle Music
2864 N. High St.
Columbus 43202
614-263-1891

(OHIO)

The Music Connection
14312 Pearl
Strongsville 44136
216-238-6966

Howard Early Music Center
3171 Glendale Milford Rd
Cincinnati 4 2 1
513-563-9300

OKLAHOMA

Driver Music Co.
6600 NW 39th Expressway
Bethany 73008
405-789-4711

OREGON

Portland Music
520 SW 3rd
Portland 97204
503-226-3719

PENNSYLVANIA

Cintioli Music Center
5359 Oxford Av
Philadelphia 19124
215-742-4115

D.C. Short Sound Systems
239 Center Ave.
Elsworth 15 0
412-761-2724

Markham Music
1651 W. 26th St
Erie 16508
814-452-3340

SOUTH CAROLINA

Smith Music House
120 Magnolia Street
Spartanburg 29301
803-582-4108

TEXAS

Arnold & Morgan Music
510 S. Garland Rd.
Garland 75040
214-272-1551

Danny's Music Box
4303 Montana
El Paso 79903
915-566-8675

River City Music
6718 San Pedro
San Antonio, T 78216
512-826-4 10

Parker Music Co.
5005 Gulf Freeway
Houston 77023
713-923- 035

Billy's Band Aid
150 Hamlet Shopping Center
Amarillo
806-383-4232

TENNESSEE

Strings and Things in Memphis
205 S. Cooper St.
Memphis 38104
901-278-0500

UTAH

Guitar City Studios
67 E. Main
Kaysville 84037
801-376-9381

VIRGINIA

Ambassador Music
7461 Tidewater Dr.
Norfolk 23505
804-583-1894

WASHINGTON D.C.

Washington Music Center
11151 Viers Mill Rd
Wheaton 20902
301-946-8808

WISCONSIN

The Music Shop
6605 University Ave
Middleton 53562
608-836-1501

WEST VIRGINIA

The Pied Piper
1200 3rd Ave.
Huntington 25701
304-529-3355

CANADA

Axis Music
1959 Hastings St. E.
Burnaby B.C.
604-299-7521

CANADA

Mother Music
10611 er Ave
Edmonton Alberta
403-42 - 74

Guitarland
533 Broadway Ave.
Winnipeg Manitoba
204-77 3461

Mother's Music
1415 1 th Ave SW
Calgary Alberta
403-24 3925

Kalua Music
2271 Kingston Rd.
Scarborough Ont
416-26 -2547

Ken Parkinson Music
1099 St. Laurent Bl.
Ottawa Ontario
613-74 -0911

Richard's Music
6078 Sherbrooke St
Montreal Quebec
514-48 -9911

The Music Shop
169 W Rd
Dartmouth Nov Sc
902-46 3565

For more information about our 16X4 and 12X2B mixing consoles, or about a new dealer perhaps closer to your area, please write: **Studiomaster, P.O. Box 221, Rowlett, Texas, 75088. In Canada contact RMS, 2271 Kingston Rd., Scarborough, Ontario, M1N-1T8.**

CIRCLE 56 ON READER SERVICE CARD

The 90-16.
$1000[00] per track.*

Now you can make money while you save money.

Let's face it. What you really want to do is sell your album. And the new affordable TASCAM Series 90-16 can help do just that. But at the same time, you can pick up cash to help you pay for it by recording other musicians' songs for them.

And here's how you save. You don't pay studio time. You don't pay for 2" equipment. And you don't pay the heavy hit of "outboard" DBX which usually cost about $300 per channel. Our suggested retail price of just $16,000* *includes* integral DBX interface.

If you're an engineer, the 90-16 Function Select panel will make a lot of sense to you. One button operation simultaneously switches three interrelated functions: tape/source, playback/record, and DBX decode/encode thus eliminating the need for three arms. If you're a musician, this human engineering factor means you won't have to wait for the engineer and lose the spontaneity of your music in the process.

All of which means that if you need 16 tracks, you only have one choice: the new TASCAM Series 90-16. You'll find it exclusively at these TASCAM dealers.

DEALERS

Audio Concepts
7138 Santa Monica Blvd.
Hollywood, Ca. 90046
(213) 851-7172

The Express Sound Co., Inc.
1833 Newport Blvd.
Costa Mesa, Ca. 92627
(714) 645-8501

Sound Genesis
2001 Bryant St.
San Francisco, Ca. 94110
(415) 285-8900

Nashville Studio Systems
16 Music Circle South
Nashville, Tenn. 32703
(615) 256-1650

Audio By Zimet, Inc.
1038 Northern Blvd.
Roslyn, New York 11576
(516) 621-0138

Lebow Labs
424 Cambridge St.
Boston, Mass. 02134
(617) 782-0600

A.M.I., Inc.,
680 Indiana St.
Golden, Colo. 80401
(303) 279-2500

AVC Systems
1517 East Lake St.
Minneapolis, Minn. 55407
(612) 729-8305

Electronic Music Box
2320 6th Ave.
Seattle, Wash. 98121
(206) 622-6984

Arnold & Morgan
510 South Garland Rd.
Garland, Tex. 75040
(214) 494-1378

PA Palace
2631 Buford Hwy.
Atlanta, Ga. 30324
(404) 636-3044

Ford Audio & Acoustics Inc.
1815 Classen Blvd.
Oklahoma City, Ok. 73106
(405) 525-3343

TASCAM SERIES BY TEAC®

A new generation of recording instruments for a new generation of recording artists.

*Prices subject to dealer preparation charges where applicable.

TEAC Corporation of America • 7733 Telegraph Road • Montebello, California 90640

In Canada TEAC is distributed by White Electronic Development Corporation (1966) Ltd.

CIRCLE 71 ON READER SERVICE CARD

OCTOBER 1978
VOL. 4 NO. 1

MODERN RECORDING

THE FEATURES

COMING NEXT ISSUE!
Monitors: How & Why
Miking Techniques: Vocals

THE STAPLES

Cover photo by Darrell M. Westmoreland
War article photos by Darrell M. Westmoreland

Modern Recording is published monthly by Cowan Publishing Corp., 14 Vanderventer Ave., Port Washington, N.Y. 11050. Second class postage paid at Port Washington, New York, and at additional mailing offices. Subscription rates: $12.00 for 12 issues; $22.00 for 24 issues. Add $3.00 per year for subscriptions outside of U.S. Subscriptions must be paid in American currency. Postmaster: Send Form 3579 to Modern Recording, Cowan Publishing Corp., 14 Vanderventer Ave., Port Washington, N.Y. 11050.

MODERN RECORDING
SERVING TODAY'S MUSIC/RECORDING-CONSCIOUS SOCIETY

H.G. La TORRE
Editor

PAM HIGHTON
AUDREY KURLAND
Assistant Editors

NORMAN EISENBERG
LEONARD FELDMAN
JIM FORD
BRIAN ROTH
Technical Editors

ROBERT ANGUS
NAT HENTOFF
DAVID MOYSSIADIS
FRED RIDDER
PETER WEISS
Contributing Editors

SEDGWICK CLARK
JOE KLEE
GIL PODOLINSKY
RUSSELL SHAW
Music Editors

LORI RESSA
Production Manager

BILL TRAVIS
Art Director

LIZ BEENER
HAROLD PERRY
BARRY SIMON
SHERYL STERN
FRAN VITRANO
Art Staff

JANET KURTZ
Circulation Manager

MELANIE DEUTSCH
Assistant to the Publisher

BILL SLAPIN
West Coast
Advertising Representative

VINCENT P. TESTA
Publisher

Editorial and Executive Offices
Modern Recording
14 Vanderventer Ave.
Port Washington, N.Y. 11050
516-883-5705

COWAN PUBLISHING CORP.
RICHARD A. COWAN Chairman of the Board & President
CARY L. COWAN Vice President
JACK N. SCHNEIDER Vice President, Marketing
RICHARD A. ROSS Vice President, General Manager
MARC L. GILMAN Credit Manager
AMY C. GILMAN Secretary/Treasurer
SANFORD R. COWAN Founder & President Emeritus

Editorial contributions should be addressed to The Editor, Modern Recording, 14 Vanderventer Ave., Port Washington, N.Y. 11050. Unsolicited manuscripts will be treated with care and must be accompanied by return postage.

Letters to the Editor

Mics and Cords

On page 130 of the *1978 Buyer's Guide* reprint of "PA Primer," Jim Ford and Brian Roth state in the section entitled "Mics and Techniques" ". . . make sure all mics and mic cords are electrically phased the same so there will not be cancellation in the final sound mix."

We are currently in the process of buying new mics and would like some recommendations as to the right cords for the mics we're purchasing. The mics we plan to buy include the AKG D-1000E, the Shure SM 57, and the Shure SM 58.

We were planning on using Belden #8412 or 8413 cable but would like to be sure that the cables match the mics. Will this cable match the mics listed above and do a satisfactory job? If not, please suggest a cable that might work better.

—Billy Morgan
Talladega, Al.

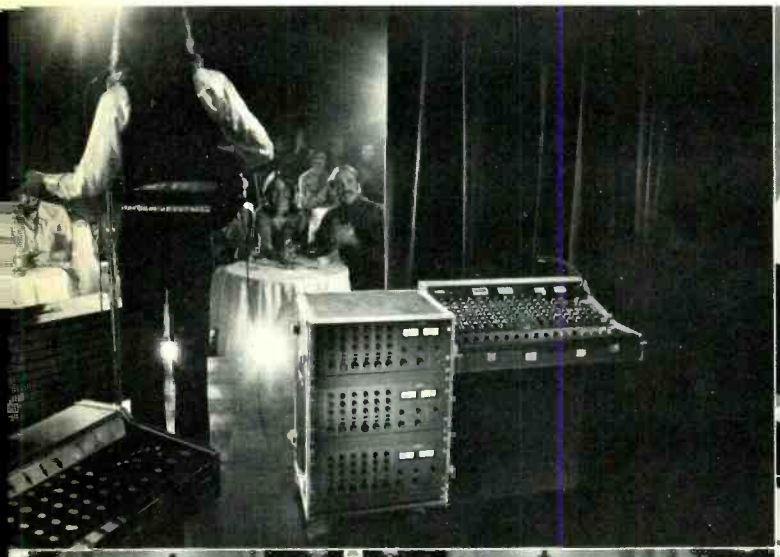
Brian Roth informs us that the cables you have selected should work just fine. (As a matter of fact, if you had read on to the section entitled "Wire and Connectors" you'd have seen that the cables you have selected are mentioned as commonly used wires.) However, he went on to say that attaching the connectors properly is more important than the cables you use. He told us that all mic cords should be wired to a standard configuration. The cable's shield should always connect to Pin one at each end. Where the other wires go is pretty unimportant, but in America the black wire on each end of the cable usually goes to Pin two, and the red or white wire (depending upon the manufacturer) on each end of the cable usually goes to Pin three. In Europe, it's pretty safe to assume that this is just reversed. It doesn't matter how you choose to do it, only that both ends are done exactly the same.

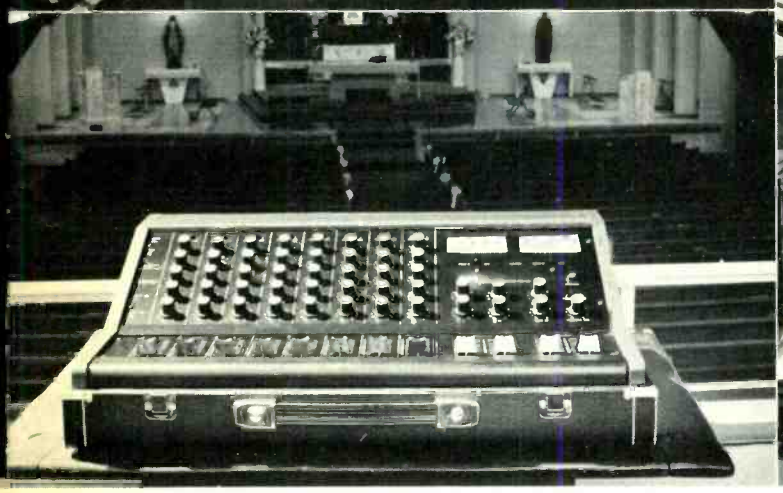
As for the actual problem of phase, it might be worth your while to note that European mics are sometimes different internally than American-made mics. One easy-to-do test to check the phase relationship of the mics you'll be using is to select one mic (in your case, the Shure SM 57 might be a good one to use) as your reference mic. Consider this mic to be the one that is in phase. Plug it into one channel of your mixer. Then plug the mic to be compared into the second channel of your mixer. Turn up both channels, matching the volumes as closely as possible. Mike a common sound source (speak into the mics or set up a synthesizer to generate a continuous tone, and mike its loudspeaker) with the reference mic, and then with both mics simultaneously, while watching the VU meters and monitoring. If the mics are in phase, the volume when both mics are used will be greater than when only the reference mic was used. The mics are out of phase if the volume is lower than the reference mic alone when both mics are used. This test will not tell you the absolute phase of each mic, but it will allow you to measure the relative phase of any two mics.

If you find a mic out of phase, it can be corrected by unscrewing the connector, and inside the mic, reversing the wires between Pins two and three, being careful not to butcher the mic itself.

In summation, the two most important things for you to remember is to shield to Pin one, and to be sure that you do both ends of the cable the same way.

Yamaha's PM Series. A mixer to match every job.





No matter what the application, or how tough the job, there's a Yamaha PM Series professional sound mixer that can handle it.

Think of the Yamaha PM mixers as business machines that insure your sound. The PM-170 and PM-180 are ideal as prime mixers for small clubs, discos, schools and the like. Or they're excellent submixers to extend the capability of larger consoles.

The Yamaha PM-430 and PM-700 are the portable heavyweights. They have the specs, power and flexibility to mix well in moderate to major events and concerts, broadcast production and recording studio applications.

Each PM mixer can be used as a complete sound system controller. Or they can be combined to solve your most complex reinforcement and production problems.

And all your mixes are well under control with balanced, transformer-isolated inputs* and +24dBm (12.3 volts RMS) **stereo** outputs for no-hum sound over long distances. Precision Yamaha engineered and manufactured long-throw, smooth-flow, dB-calibrated faders respond to your most subtle adjustments. And foldback and monitor functions that help you precisely feed the right mix to the right performer or technician.

Send six dollars, and we'll rush you an operating manual complete with schematics on our PM Series. (Please, certified check or money order only. No cash or personal checks.) Or better yet, see your Yamaha dealer and match a Yamaha PM mixer to your job.

*PM-170 uses unbalanced inputs, ideal as a keyboard mixer.

Yamaha International Corporation, Musical Instrument / Combo Division,
6600 Orangethorpe Avenue, Buena Park, CA 90620. Write: P.O. Box 6600, Buena Park, CA 90622.

YAMAHA

CIRCLE 87 ON READER SERVICE CARD

Crossover Kits

Where can I find high-quality crossover kits and/or details on building a crossover with off-the-shelf pieces?

—Dave Howse
Lagrangeville, NY

Electronic crossover kits are available from Old Colony Sound Lab, P.O. Box 243, Peterborough, N.H. 03458 (phone) 603-924-6526. Write them for details. While you're at it, enclose a stamped, self-addressed envelope and ask the people at Old Colony to pass it upstairs to the Audio Amateur *magazine offices—or write* them *directly at P.O. Box 176, same city, state, zip and phone—requesting the* Audio Amateur *index. The index will direct you to articles they have published on, among others, crossover building.*

Although spokesman Ken Williams says they don't have crossover kits per se, SpeakerKit, P.O. Box 12, Menomonie, Wis. 54751 (phone) 715-235-0970, does market individual passive crossovers. Send them 25¢ for their catalog.

Among the technical reports of Speakerlab, 735 N. Northlake Way, Seattle, Wa. 98103 (phone) 206-633-5020 is "A Guide to Crossover Design," which covers the basic principles of crossover networks. Speakerlab includes passive crossover kits in its mail-order catalog, as well as assembled pieces and individual parts for crossovers.

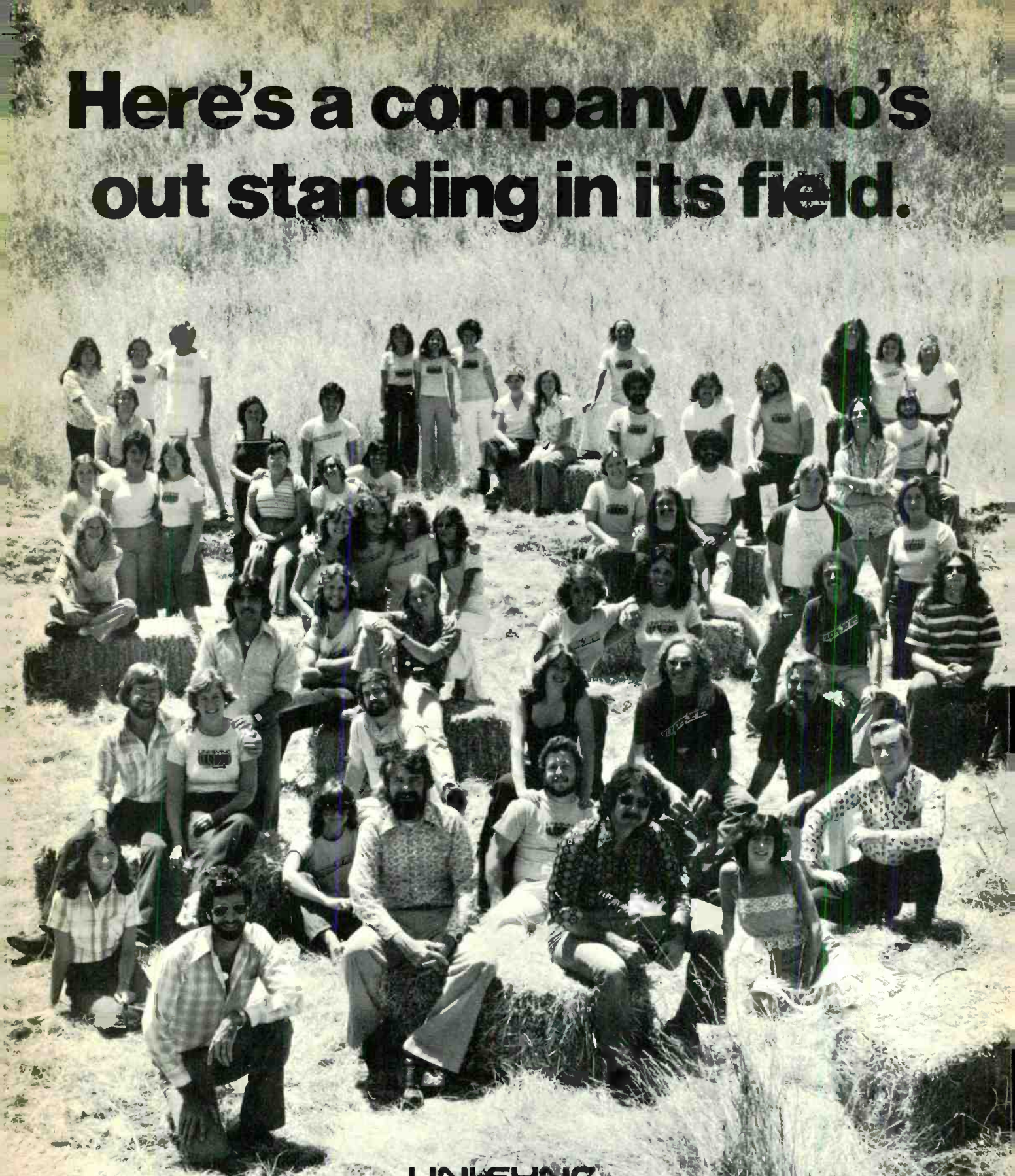
In all probability, still other sources for crossovers and kits exist—by no means assume the above listing is all-inclusive.

In the Interest of Phase

Columbia Records' Andrew Kazdin, in the June 1978 Talkback section, gives advice on orchestral recording based, no doubt, on considerable experience. However, his remarks about microphone phase deserve elaboration.

As he points out, with twenty-five or thirty mics spread over a hundred-piece orchestra, phase relations between the mics "can only be thought of as being randomly related." Therefore the consequences of multi-mike or spaced mike recording of a concert ensemble are the destruction of phase coherence and the illusion of depth or fore and aft three-dimensionality. Also, the implication seems to be overhead placement, but this can be extremely unnatural in terms of frequency response characteristics of the instruments. Kazdin indicates that miking systems are largely a matter of taste, but the trade-offs

Here's a company who's out standing in its field.



UNI-SYNC
A BSR COMPANY

Designers & Manufacturers of Professional Audio Systems & Equipment
Featuring the Trouper Series & Professional Power Amplifiers
742 Hampshire Rd., Westlake Village, CA 91361, (805) 497-0766
Sync Division of BSR (Canada) Ltd., 26 Clairville Rd., Rexdale, Ontario M9W5T9, (416) 675-2402

CIRCLE 79 ON READER SERVICE CARD

should be made clear: in other words, multi-miking offers great flexibility for post-session musical adjustments and synthetic manipulation, and spaced miking can alleviate unfavorable acoustic setting, but depth and perspective are largely lost and overtone structure can be unnatural.

Also, it is not entirely true that the "phase connections of any one microphone become truly insignificant" in multi-miking of a concert ensemble. Low-frequency effects could result which might be audible or cause overload in taping or disc cutting.

It is, of course, a fact that all the large producers of orchestral records favor multi-mike or spaced miking techniques and highly synthetic results. This trend may have caused commercial harm to quadraphonic development as many serious listeners and record buyers would prefer realistic hall ambience to an aurally synthetic seat amidst the ensemble.

Perhaps the interest in coherent phase recorders and reproducers may gradually influence classical record producers to change their methods.

—David Markle
Minneapolis, Minn.

[*We forwarded Mr. Markle's letter to Andrew Kazdin, who made the following reply.* —*Ed.*]

To begin with, allow me to thank Mr. Markle for elaborating on my response to Mr. Suarez's letter. Clearly, he sensed that my answers were simplified and brief. It isn't exactly fair, however, to criticize my response because it didn't run on long enough in those particular directions Mr. Markle would have liked. His "thing" seems to be phase coherence and he jumps in where I leave off. Had his interest resided in the area of microphone types, he might have picked on my all too brief description of "what" we use "where." However, it's "phase" and I must respond.

First, I am not at all sure that multi-miking, per force, eliminates the illusion of depth. I really wouldn't know, since I don't mike any other way. But what is crucial here is whether the illusion of depth is created at all. Depth is very important to a symphonic recording and, within the procedures of multi-miking, there are always steps taken to create this illusion. I might add that sometimes this quality is more present in a multi-mike pick-up than in a simple "coherent" set-up. Neither the fact that I didn't include this issue in my response to Mr. Suarez, nor the lamentable fact that multi-miking *can* be abused so as to virtually eliminate depth, condemn multi-miking per se. A camera with elaborate shutter, diaphragm and focus adjustments cannot be categorized as inferior to a "Brownie" just because it is easier to make a wide variety of mistakes using the more complicated instrument. Being "user-proof" is a characteristic of amateur equipment. To my way of thinking a "crossed pair" of mikes is equivalent to the "Brownie." Something reasonable will emerge from almost every effort, but with multi-miking, a superior result can be achieved with *no* sacrifices *if* the system is handled both intelligently and sensitively.

The question of "overhead" placement is another issue which stems from a too brief answer of mine. I didn't mean to imply that the mike is placed *directly above* the player's head—merely that it appeared on a plane above the head of the player. Rest assured, there is no "extremely unnatural" overtone structure created. Mr. Markle's phrase

If you want the condenser microphone sound on stage, Electro-Voice gives you that option.

The PL76 and PL77 condenser cardioid microphones are fast becoming the number one choices of vocalists who want to make the "studio-condenser" sound a part of their act. Both mikes give you condenser performance in a package that competes with dynamic microphone durability. Their cutsy, bass-boosting proximity effect adds presence to any voice. The PL76 is powered by a 4.5 volt battery. The PL77 is similar except that it is also phantom powerable. The "77's" output is 4 dB down from the "76's" to allow for more flexibility at the mixing board, and it has a recessed on/off switch that many sound men prefer.

For those desiring the more traditional dynamic sound, the PL91 and PL95 fit the bill perfectly. The PL91, with its mild bass-boost and clear highs is a joy to work with. The PL95, the "pro's choice" in a dynamic cardioid, offers the best gain-before-feedback of any

dynamic mike in the business – a test we invite you to make.

Electro-Voice also offers four superb instrument microphones. The PL5 dynamic omni is the mike to use when high sound pressure levels are encountered, as you would find when miking bass drums or amplified guitars, basses or synthesizers.

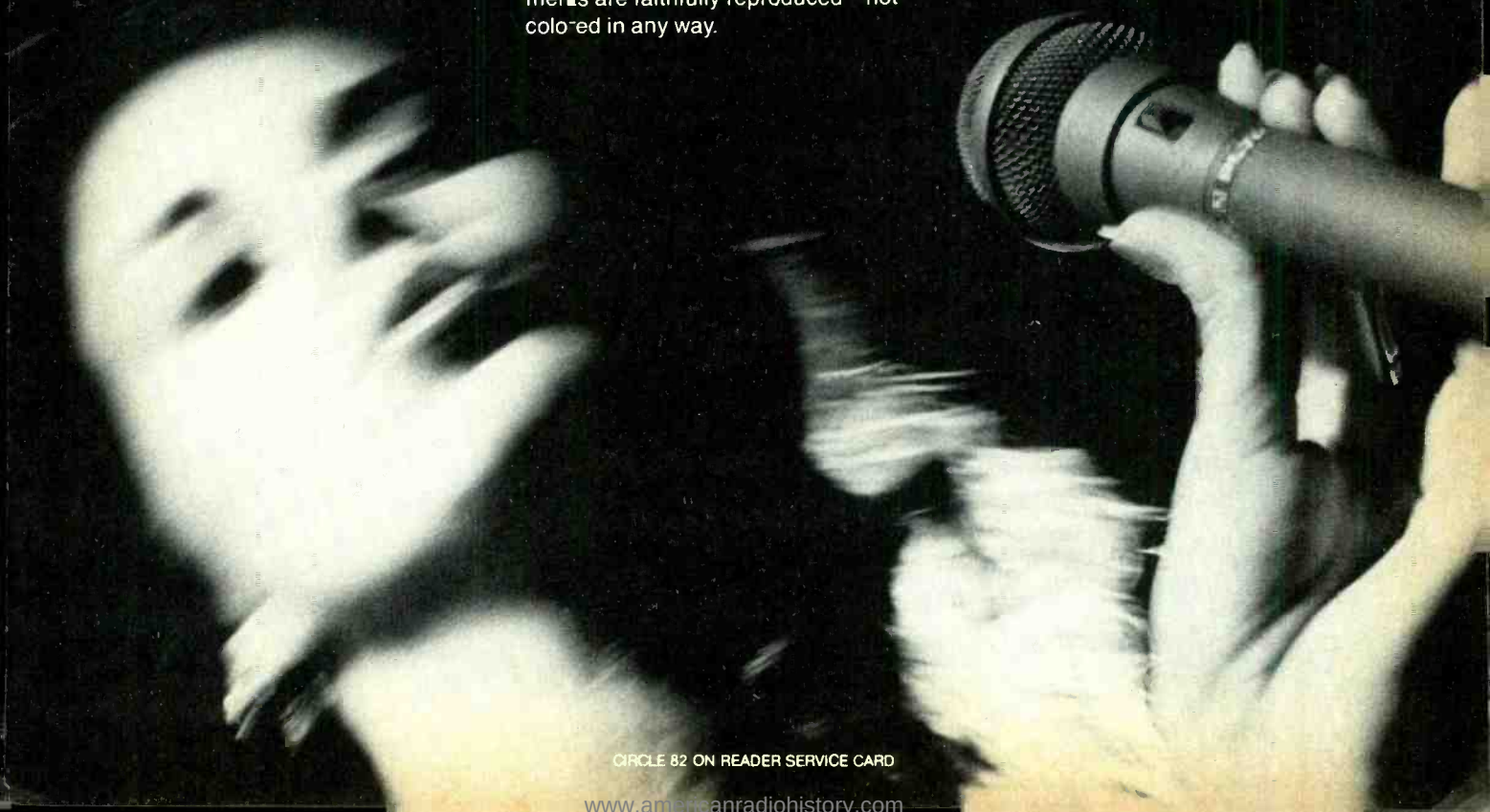
The PL6, with its patented Variable-D® construction gives you cardioid (directional) performance without up-close bass boost – perfect for miking brass, reeds, percussion or piano. The PL11, ever though it's a directional mike, maintains its response curve off axis. "Leaked" sound from off-axis instruments are faithfully reproduced – not colored in any way.

E-V's PL9 dynamic omni has one of the flattest frequency response curves in the business – from 40 to 18,000 Hz. And its small size lets you mike instruments you couldn't get near with other mikes offering this performance.

All E-V Pro-Line microphones come with super-tough Memraflex grille screens that resist denting. Designed to keep your mikes looking like new for a long time. All have a non-reflecting grey finish that won't compete for attention under bright stage lights.

When the time comes to update your current mike setup, we invite you to A-B Electro-Voice Pro-Line mikes against any others, for any application. If you try them, you'll want them in your act.

Electro-Voice®
a gulton company
600 Cecil Street, Buchanan, Michigan 49107



CIRCLE 82 ON READER SERVICE CARD

"overtone structure can be unnatural" reminds me of an amusing TV commercial which I sometimes see. In an effort to promote its cold tablet formula which *omits* a popular ingredient, the manufacturer states with firm equivocation that many doctors feel this is an additive "you may not need." Does Mr. Markle think we are in the business to distort overtone structure?

I'm sorry to flatly disagree with him, but it *is* entirely true that the phase connection of one mike out of twenty-five forms an insignificant factor in the overall pick-up. Low frequency effects will not result. No tape or disc overload will result. These are alarmist words like "cancer" and "communism." Is it really necessary to explain what a complex pattern of acoustic cancellations and reinforcements exist across a concert stage at any instant of time for any one note played by a section of double basses? During the next instant or during the next note, all bets are off. Should one really care whether the first ¼ of a second of a low F-sharp reinforces or cancels between any two mikes if the next ¼ of a second exhibits a completely opposite effect?

("Low frequency effects *could* result which *might* be audible . . .") . . . have a cold tablet.

—Andrew Kazdin
Director, Masterworks
A&R, Production
CBS Records
New York, NY

Really Live, but Wrong Name

Having recently moved to Los Angeles to continue my career in the hub of the music business as a recording-engineer/producer lately of Trident Studios, London, I happened to be reading the April 1978 edition of *MR*, and noticed, in Groove Views, the review of the Brand X "Livestock" album, Passport PB 9824. I was very pleased with the review, as the writer seemed to be favorably impressed with my recording.

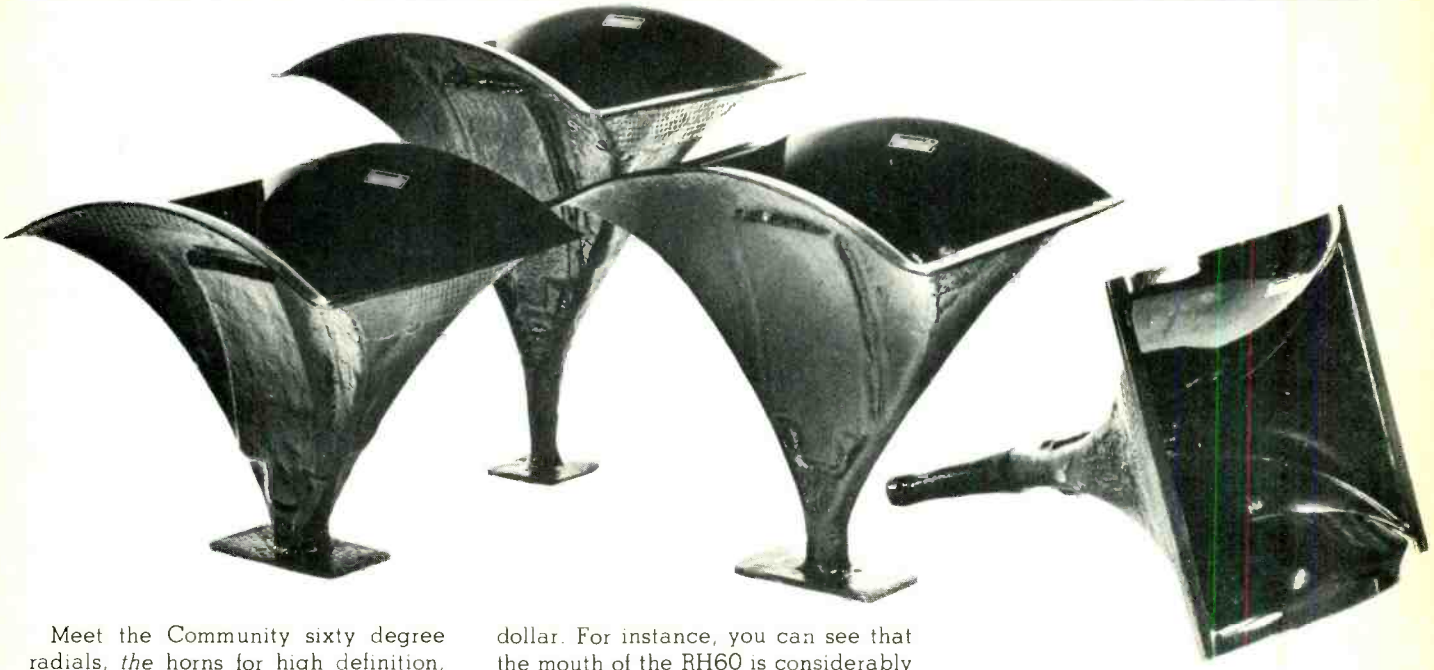
Primarily, I am writing to let you know my name is Jerry SMITH, *not* Jerry Smell!!! I'd also like to establish the authenticity of this live recording, which just so happened to be my premiere live recording.

Ronnie Scott's is a quite famous jazz club in London with a relatively small stage area; Gil Podolinsky, the album reviewer, was correct in assuming that Robin Lumley's Rhodes, Moog and string machine were taken direct into the board—to obtain good sound separation—as was Percy's bass. The only instruments miked were the drums, with bass drum mike, tom tom mikes, separate snare, high hat mikes, and overhead mikes, including John Goodsall's guitar set-up. All Maurice Pert's percussion used two overhead mics.

The band has extensive experience in studio recording (Robin Lumley and myself having worked on several projects together at Trident), making my job a lot easier. However, because we were supporting Stanley Clark at the Hammersmith Odeon, and he was also being recorded—both engineers using the same Mobile—I had what I seem to remember was a 15-minute sound check, just enough time to make sure that everything was working. Out of this performance we used Nightmare Patrol, first track, side one.

The longest part of the making of

RH60 RADIAL HORNS



Meet the Community sixty degree radials, *the* horns for high definition, understandable sound. The horn pictured is our RH60, the midrange mainstay of the large system. We've recently added two new sixty degree horns to our line for HF and VHF projection, the SRH60 and the SQ60.

Some people still think that our horns and cabinets look a little strange, perhaps not realizing that at Community shape and construction are determined by the laws of physics, not marketing, packaging or the almighty dollar. For instance, you can see that the mouth of the RH60 is considerably taller than that of comparable sixty degree horns. Why? Well, if a horn is to act as a wave guide at its lower operative frequencies (which it is) it must have a tall mouth to support the larger wave forms generated near crossover. The idea of a thin, wide-mouthed radial may be pleasing in terms of packaging and handling, but it is a convenience that does not pay off in operation. Some conveniences that do pay off in operation are one-piece construction, low resonance, high strength-to-weight ratios and the meticulously executed design that characterizes a Community horn.

Would you like more information? We recently published a catalog which details the performance of all Community products. Already it has been called a must for anyone wishing to design a sound system on a professional level. Please write or call to order.

RESPONSE AND SPL

RH60-A DRIVER: **GAUSS HF4000** BANDWIDTH PINKNOISE: **250Hz-16KHz**

1 Watt @ 1 Meter **107.24** dB-SPL — 1 Watt @ 4 Feet **107.28** dB-SPL

										−12	−7	−6	−4	−3	−1	0	+1	−1	−2	−1	−3	−5	−5	−9	−9	−9	−13	−17
Hz	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1K	1.25	1.6	2.0	2.5	3.15	4.0	5.0	6.3	8.0	10.0	12.5	16.0	KHz

SRH60-B DRIVER: **ALTEC 288.16G** BANDWIDTH PINKNOISE: **350HZ-16Hz**

1 Watt @ 1 Meter **108.99** db-SPL — 1 Watt @ 4 Feet **105.52** dB-SPL

												−10	−6	−4	−2	0	0	0	0	0	−2	−2	−4	−8	−8	−6	−10	−12
Hz	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1K	1.25	1.6	2.0	2.5	3.15	4.0	5.0	6.3	8.0	10.0	12.5	16.0	KHz

SQ60-C DRIVER: **EMILAR EA. 175.16** BANDWIDTH PINKNOISE: **800Hz-16KHz**

1 Watt @ 1 Meter **103.85** dB-SPL — 1 Watt @ 4 Feet **102.14** dB-SPL

															−6	−2	−2	0	0	+2	0	0	0	−2	−2	−5	−12	−16
Hz	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1K	1.25	1.6	2.0	2.5	3.15	4.0	5.0	6.3	8.0	10.0	12.5	16.0	KHz

Community

Community Light & Sound, Inc. 5701 Grays Avenue Philadelphia, PA 19143 (215) 727-0900

CIRCLE 60 ON READER SERVICE CARD

"Livestock" was choosing which takes to use from some 30 reels of tape. Mixing the album, in all seriousness, took 15 hours. We had to finish it quickly for an early release date.

—Jerry Smith
Los Angeles, Ca.

We really don't know how that happened, but we're pleased to be able to clear the air and credit your name accurately. Thanks for writing.

Ambience Restored

Thank you for your recent review (Lab Report, August 1978) of the Sound Concepts SD550. It is obvious Messrs. Feldman and Eisenberg think very highly of this, our second generation ambience restoration system.

Though not specifically brought out in the review, the SD550 is excellent for use in professional studio and sound reinforcement applications. For example, it was the device used to provide the adjustable delay for the rear channels in the Dolby Laboratories Motion Picture Playback System first used in the movie "Star Wars."

The price as quoted in the review, however, was incorrect. The SD550 carries a suggested list price of $675. As clever as we'd like to think we are, we were not able to increase the performance, versatility and flexibility of our original without some increase in cost. I'm sure you'll agree, however, the value of the improvement was more than the 12% increase in price.

—Howard C. Jacks
Director of Sales
Sound Concepts Inc.
Brookline, Mass.

Who Said "Cheese?"

Bet you were wondering who was responsible for the shots of David, Kent, Kris and Rita on pages 70, 72, 73 and 74 of MR's July 1978 issue. Belated credit is due photographer Bob Jenkins for these four fine photos incorporated in the "Recording Kris Kristofferson and Rita Coolidge" interview.

—Ed.

Delta-Graph Equalizer Kits

About a year ago, you featured ads for Delta-Graph equalizer kits, and in the *1978 Buyer's Guide* their address was given as that of another equalizer manufacturer in Washington. Writing that company to order some Delta-Graph kits proved fruitless: what ever hap-

Meet the AKG "Recordists"

A clean master tape is the number one goal of any recordist (studio or home). So, if you're serious about your standards of recording, here are two microphone pairs that will give you the clarity and smoothness of sound that distinguish AKG microphones, and all great recordings. They're available separately or in our economical "Stereo Pair" combinations as shown. Both pairs are compatible with today's state-of-the-art cassette and open reel recording systems and are available in high (10,000 ohms or more) or low (25 to 1,000 ohms) impedance versions. Mating cables have XLR connectors and ¼" phone plugs.

Recording a live performance?
Capture it as it happens with the D-190E: Cardioid dynamic mics that couple smooth response with slight mid-frequency rise to give you clean, crisp recording.

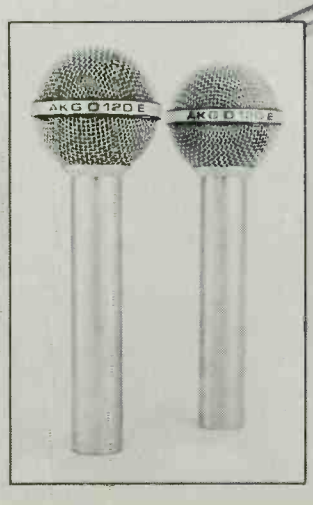
Bass response gradually rolls off to reduce interference from low-frequency and subaudible rumble, vibrations, handling noise and feedback. The reasonably priced D-190E brings studio-controlled quality to your on-location home recordings.

Be sure to ask your AKG dealer for Martin Clifford's famous 200-page easy-to-read guide, "Microphones—How They Work & How To Use Them."

AKG acoustics

The Mark of Professional Quality... in microphones, headphones, phonocartridges, reverb units.

PHILIPS AUDIO VIDEO SYSTEMS CORP.
A NORTH AMERICAN PHILIPS COMPANY
91 McKee Drive, Mahwah, N.J. 07430 · (201) 529-3800



The economically priced D-120E:
These dynamic mics use a cardioid pattern to control feedback. Lightweight, rugged construction, integral windscreen/shock mounting, and the ability to withstand high sound-pressure levels encountered in "close-talk" applications combine to make the D-120E an excellent value home recording microphone.

pened to Delta-Graph? Are their kits still available, and how can I go about getting in touch with them? Thanks.

—Stephen W. McGowan
Northglenn, Col.

Delta-Graph, which in the past has experienced mailing problems and is presently relocating, can be contacted through P.O. Box 247, Northgate Station, Seattle, Wash. 98125 (phone) 206-525-7196. Their equalizer kits are still in production and now incorporate BI-FET opamps from Texas Instruments, which, a company spokesman tells us, "improve performance substantially."

Consoling a Blue Fan

Your feature articles on certain bands' setups, sound, equipment and recording techniques are unique and among the finest articles in print. *MR* has greatly increased my "recording awareness."

I've noticed, though, in my short acquaintance with *MR*, no mention made of one of the world's most innovative groups—The Moody Blues. I'm extremely interested in the makeup of their sound, and hope that their new release signals renewed vitality.

Did you ever run a feature article on their recording or remote? An effort would greatly console this "Blue fan."

—Bill McClair
Nashville, Tenn.

We too have had our editorial eye on The Moody Blues, and were very close to a story on the "Octave" sessions, which involved a number of months' work at Indigo Ranch Studio and The Record Plant in Los Angeles, and mixing at the Little Mountain Studio in Vancouver, British Columbia. Unfortunately, the sessions were totally closed. Whereas we know this is not very consoling, we are *following the work of the group, and hope you are reassured in the knowledge of our intent and continued efforts.*

Two for the Road

In a recent album review by Joe Klee on Steve Kahn and Larry Coryell's live LP "Two for the Road" on Arista (*Modern Recording*, June 1978), the writer said the album cover was devoid of certain information. Since I was one of the engineers who mixed the tracks, perhaps I can fill in some of the gaps.

First, the tunes were all live tracks with no sweetening added. All of it was Steve and Larry on acoustic guitars (Sorry, I can't remember the models of

EXPANDABLE LOGIC.

SHOWN IN OPTIONAL CASE

With the 6100 mixing system you get exactly what you need. Start with the 6 input master unit. Add 8 more channels when you need them. You get a 14 input mixer with all the functions you need, at the kind of price you'd expect from TAPCO.

3-knob, 5 frequency EQ
The famous 6100 EQ system gives you precise control of spectral balance.
BASS — selectable, 80 Hz and 200 Hz. ±18 dB shelving.

MIDRANGE — selectable, 800 Hz and 2.5 kHz. ±12 dB peak and dip.

TREBLE — fixed at 10 kHz. ±13 dB shelving.

Monitor mixing
Pre-everything monitor send on every input. No matter what changes are needed in the house mix, the monitors never change unless *you* change them.

Effects mixing
Each channel has its own effects send, for either the built-in reverb system or external effects (tape echo, phase shifter, etc.) Effects return and reverb master controls are separate so you can mix both at the same time if you need to.

AutoPad gain controls for that clean, quiet TAPCO sound. AutoPad eliminates overload problems, gives you the best S/N ratio for any input level. There's even a gain range switch for 15 dB more operating room.

3 separate mixes from one board. Mains, monitors, effects.

Meters for both the main output and the monitor output.

Specs that are hard to beat. Nearly unmeasurable distortion and noise, plenty of headroom at both the inputs *and* the outputs. That famous TAPCO sound.

Since its introduction the 6100 system has become the standard of the industry for high quality live music systems. See for yourself why so many people rely on the 6100 system. Ask your friends, then see your TAPCO dealer.

6100 AVAILABLE WITH BALANCED INPUTS

TAPCO
TECHNICAL AUDIO PRODUCTS CORPORATION

For information write: Cindy Cockburn, TAPCO, 3810 - 148th Ave. N.E., Redmond, WA 98052

CIRCLE 88 ON READER SERVICE CARD

guitars.) The tracks were culled from performances at Montreux, Switzerland, and Miami, Florida, sometime, I believe, in the winter of 1976-77.

The album was mixed at Sound Ideas Studio "A", New York, the week of April 20, 1977 by Geoff Daking and myself.

I've worked with both musicians separately and have always enjoyed their music. But together, live and on acoustic guitars, their talent shines through unaided by electric gadgets or studio tricks. It's just "Two for the Road."

—Tom Roberts
Sound Ideas Studios
New York, N.Y.

Delay Confusion

I read your two-part series on Delay, Echo and Reverb (May and June 1978) with great interest. I'm now planning to buy a digital delay, but I'm still a bit confused, with all the different equipment available. I feel I speak for many people when I ask if you might do a technical test and comparison chart on the most popular of them.

—Daniel Rheault
Montreal, Québec, Canada

See the Sept. 1978 issue's Hands-On for an appraisal of the DeltaLab DL1 delay. Other reports have appeared in past issues, including March, June and August 1978, as well as Feb/Mar, July and October 1977. We're not anticipating doing an actual comparison of various models, but if you can wait for the 1979 Buyer's Guide *(or track down a copy of the elusive* 1978 Buyer's Guide*), you'll find a listing of echo, reverb & delay units that includes descriptions of the various features of each.*

Finding Fault

In reading Musical Newsicals of the July issue, I became very interested in the Interfax ST2 Ground Fault Analyzer. I'd like to know more about the item—can you give me the address of the manufacturer so I might correspond with them? Thanks for a real fine publication.

—Randy McGee
Menard, Ill.

The photo we ran of the ST2 did in fact incorporate most of that company's address, but we shall reiterate it here: Interfax, 1008 E. Fairy Chasm, Milwaukee, Wis. 53217 is the zip code, in case you were loath to mail without it.

Sound Stages on TV

Informative, colorful, encouraging, open-minded, savory, contemporary! Now, how about something about all those video sound stages that are springing up all over the tube—*Rock Concert, In Concert, Soundstage* (PBS), and the Grand Old Opry's new "live" broadcasts—to name a few?

—Graham Ralfe
Fresno, Ca.

Inasmuch as most TV viewers suffer the audio of televised sound stages and rock concerts through a single 3½-inch speaker, it would be especially interesting to see what's happening in the simulcast area. It's a real good idea, and we're in ardent pursuit.

Mic Splitter Interest

I'm interested in an article on microphone splitters. Are there any *MR* issues dealing with the construction and use of mic splitters?

—Thomas Patrick Nefos
Pittsburgh, Pa.

The feature you're looking for is due to be published in either the November or December issue of this year.

Announcing what to use when, and when to use what.

"I want to record my daughter playing the trumpet, and send the tape to my mother. So we can both suffer."

"What's the best tape to use for dictation?"

"Man, I need the finest tape you got, cause I've got the best set of ears anyplace, anytime."

People know what they use blank tape for. Where it gets muddled is: which tape to use?

Sony humbly proposes a dramatic clarification. We are going to thread through the tape mess, and tell you simply and directly, which tape fills which need.

And there's no one more equipped than Sony to do it. We've been making blank tape for 30 years. We are the only ones to offer the consumer both blank tape *and* cassette recorders. You learn a lot about both by making both.

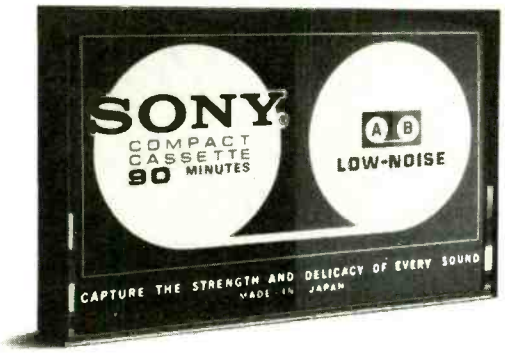
What's more, blank tape is small, and Sony shines in close quarters. Our housing, hub mechanism and oil are all real improvements in reliability.

At Sony we have two goals.

We want our tape to reproduce sound clearly.

And we want to explain it clearly.

Basic Blank.



The workhorse tape, technically called Low Noise—don't trouble yourself why. It's for those times when you just want to get it down.

In school, a boring lecture on "The history of the thank-you note through the ages."

In the office, yet another budget meeting. In the car, for your cassette player.

At home, for your Uncle Iggie practicing the oboe.

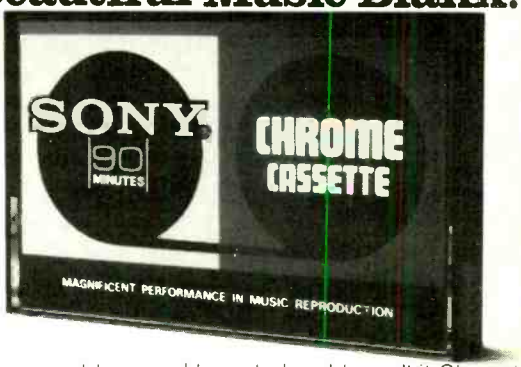
Better Blank.

While Basic Blank is primarily for speech recording, Better Blank is primarily for music. (Its technical name is Hi Fidelity, one of the few technical names to explain anything.)

Better Blank is sensitive to a wide dynamic range—which means the lows and the highs. It's particularly valid in the bass register—and it won't hurt too much at the cash register.

Better Blank is not Ultimate Blank, but you can still use it in a living room, concert hall, or off a record.

Beautiful Music Blank.



If you want to sound knowledgeable, call it Chromium Dioxide. A thin coating of that substance makes this tape loyal and faithful in the high frequency range.

So piccolos will sound perfect. Lead singers, sublime.

Use this tape when quality—particularly in the high range—is the highest priority.

Best Blank.

When the object is the ultimate, and money is no object. Officially called Ferri-Chrome, this tape offers low distortion and a wide, flat frequency response.

It combines Chromium Dioxide, to pick up the highs, with Ferric Oxide—so the lows reach new heights. There is no better tape to reproduce music.

But do you need Ferri-Chrome? Some say that only the Verri-Crazy can tell the difference. But it's nice to know that the difference is there—if you have the ears to hear it.

SONY®

CIRCLE 83 ON READER SERVICE CARD

Open Reel: The format

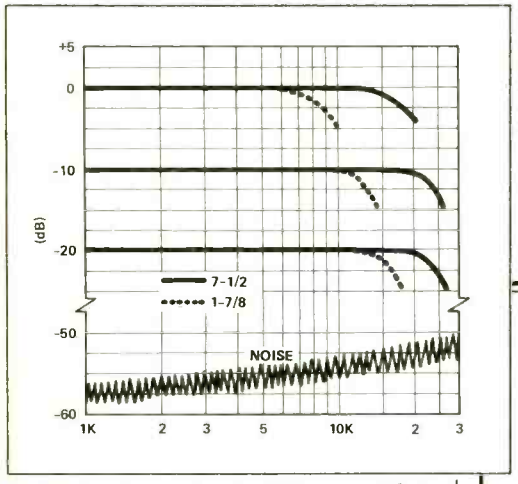
You're looking for a tape recorder. You've heard from friends and salesmen that cassette is the answer. At TEAC we make both cassette and reel-to-reel tape recorders. Because we make each for a specific person and application, you should depend on fact, not hearsay, before spending your money.

IT'S A MATTER OF PHYSICS

There are immutable reasons why cassettes can't match open reel fidelity.

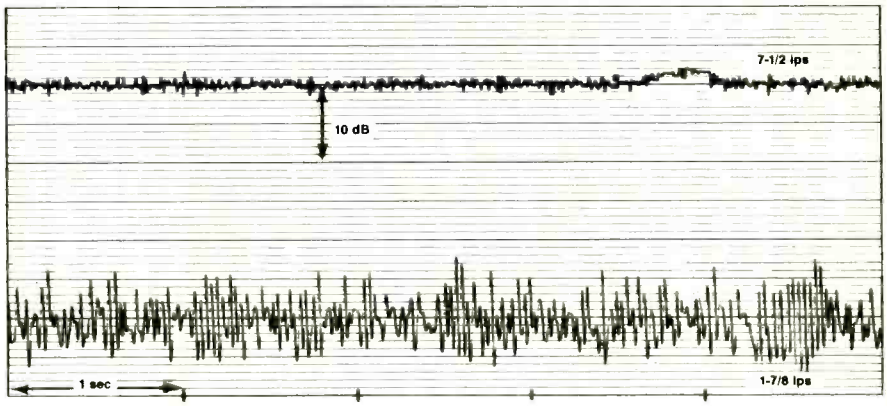
Take tape speed. Open reel tape running at 7½ ips is running four times faster than a cassette. And speed has more to do with the relationship between frequency response and signal-to-noise than anything else by far.

At 7½ ips all audio frequencies can be recorded at full level without tape saturation. Recording at 1⅞ ips forces you to make drastic compromises in record levels. The more you have to back off on recording levels, the more you hurt the ratio of signal-to-noise.



Tape saturation vs. level at 7½ ips and 1⅞ ips.

In short, with a cassette deck you cannot have high frequency response and good signal-to-noise. So a cassette deck is always operating on the ragged edge of disaster. It's so much easier to get into trouble than out of it because there's a difficulty for every solution.



Comparative dropouts between 7½ ips and 1⅞ ips at 15kHz.

MORE IS MORE

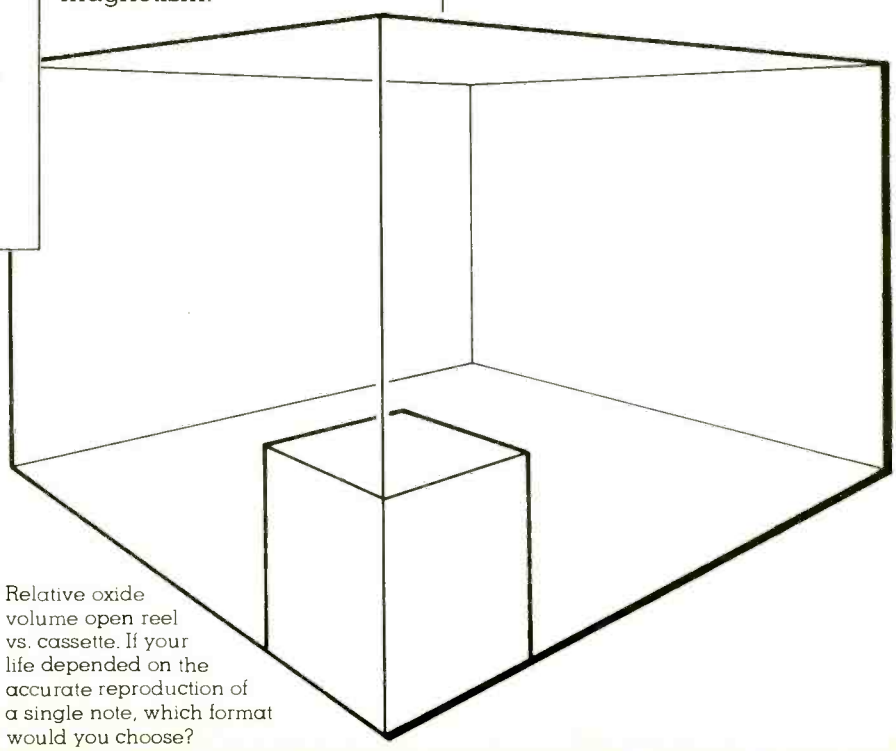
The faster the speed the longer the wavelength, the longer the wavelength the more protection you have against dropouts. You also have an easier job of editing.

Now take track width. Open reel gives you twice the track width of cassettes. The wider the track width the higher the output, the higher the output the better the signal-to-noise ratio. A wider track is also less sensitive to dropouts and, obviously, a wider track retains more magnetism.

And while we're on the subject of magnetism, an open reel tape has twice the oxide coating of a cassette.

Upshot: A total tape volume 16 times greater than a cassette, which means 16 times more magnetic particles to store and remember music.

If that sounds better to you, if we've convinced you the cassette format is a high price to pay for convenience, then you ought to look at the TEAC line-up of open reel tape recorders.



Relative oxide volume open reel vs. cassette. If your life depended on the accurate reproduction of a single note, which format would you choose?

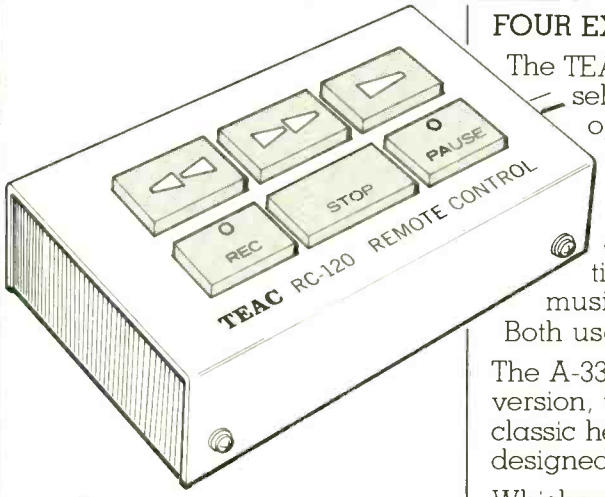
for the informed.

INSIDE INFORMATION

TEAC is a leading designer and manufacturer of computer and instrumentation recorders. In medical centers, for example, physicians depend on special TEAC units to record vital data in life-or-death situations; in remote wilderness areas, scientists depend on TEAC to monitor now-or-never phenomena like earthquakes.

From that experience we've learned that the quality of the transport mechanism is the single most important consideration in a tape recorder. For the computer industry, and for you. That's why many of the same engineers have designed the tape recorders we make for both.

Our entire reel-to-reel line has three motors and micro-switched solenoid operated transport systems, a blend of computer age sophistication and brute strength that nothing else can equal. Ask anyone whose opinion you respect.



OPTIONAL REMOTE CONTROL

Unlike some reel-to-reel machines, TEAC decks have full-function remote capability. Our optional remote units are the perfect answer for recording sessions where you can't be next to the recorder, or for operational access to a recorder in a custom installation.

FOUR EXAMPLES

The TEAC A-2300SX is the best selling, most successful open reel machine ever. Over 300,000 have been sold. The SR version of the A-2300 features an auto-reverse function so you can play music in two directions. Both use 7" reels.

The A-3300SX and its reversing version, the A-3300SR, are classic heavy-duty machines designed for 10" reels.

Whichever TEAC open reel recorder you choose, you can be sure it will last a long, long time. It was designed and built that way.

FACE IT

In the end, the cassette recorder is for those who are fonder of convenience than fidelity. If you want fidelity you can't ignore open reel.

In all crucial specifications, open reel tape recorders are better than cassette decks. And that message comes from the people who make the best of both. TEAC.

TEAC®

First. Because they last.

TEAC Corporation of America • 7733 Telegraph Road • Montebello, CA 90640

CIRCLE 53 ON READER SERVICE CARD

TALK BACK

Patch Bay Pointers

I have a mixer, circa 1970, which has screw-type input and output terminals. Can you tell me whether this affects the building of a patch bay and, if it does, how to do it correctly?

—Steven Klein
Reading, Pa.

The function of the patch bay is to gain access to the audio signal at various points in the system for purposes of signal processing or rerouting. Typically, patching is done at line level. The low signal level present in mic lines makes patch bay connections prone to noise due to oxidation. Running speaker level lines through a patch bay might cause damage to your amplifier due to improper loading so this is not advisable either. What's left to connect through the patch bay? Line level inputs (from tape recorders, turntables, preamps, etc.) and line level outputs (main channel outputs, monitor outputs, echo sends, etc.).

You stated in your letter that your mixer has screw-type connectors. This does not effect the building of a patch bay. What you must determine is the output level impedance and whether or not the line is balanced. You also must know what the sensitivity and impedance is of the inputs to which the line level signal is to be connected; after all, the purpose of the patch bay is to connect outputs to inputs.

Figure 1 is a representation of a section of patch bay. Connector A is an unbalanced standard "tip and sleeve" type; connector B is a balanced "ring, tip, and sleeve" type; connector C is a pair of balanced "ring, tip and sleeve" jacks with "normal" or switching connections incorporated into the jack. This provides an audio connection between the output of one piece of equipment and the input of the next when no plugs are inserted (ie: the main output of the mixer is "normally" connected to the input of the tape recorder). Connector D illustrates how to connect an unbalanced line to a "ring, tip and sleeve" jack. This connection is correct for inputs and outputs. Typically a patch bay is made up of a combination of connectors B, C, and D. Using this connection technique, balanced and unbalanced inputs and outputs can be safely connected provided that level and impedance match. Figure 2 is the hook-up for a typical 8-track studio. I trust this will provide you with a good idea of what's in store for you.

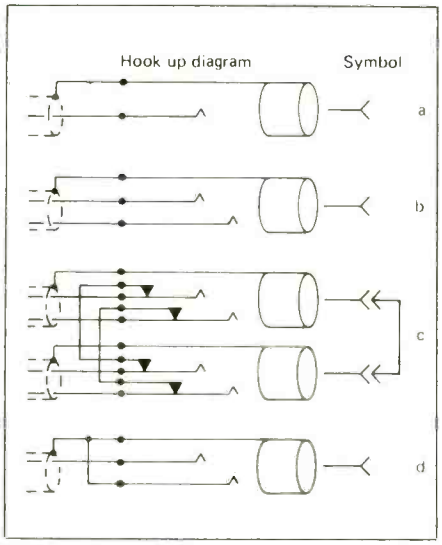


Fig. 1

—Richard N. Anderson
General Manager
audiomarketing, ltd.
Stamford, Ct.

Raising Keyboard S/N

In reading the trade magazines, I see a lot about the many problems encountered when recording with the Hohner Clavinet D6 and various Rhodes keyboards. What could I do to raise my signal-to-noise ratio when working with these pieces?

—Joey Daniels
Winston-Salem, N.C.

A good way to record these pieces is with a direct box on the output before the instrument's amplifier. Ideally, the di-

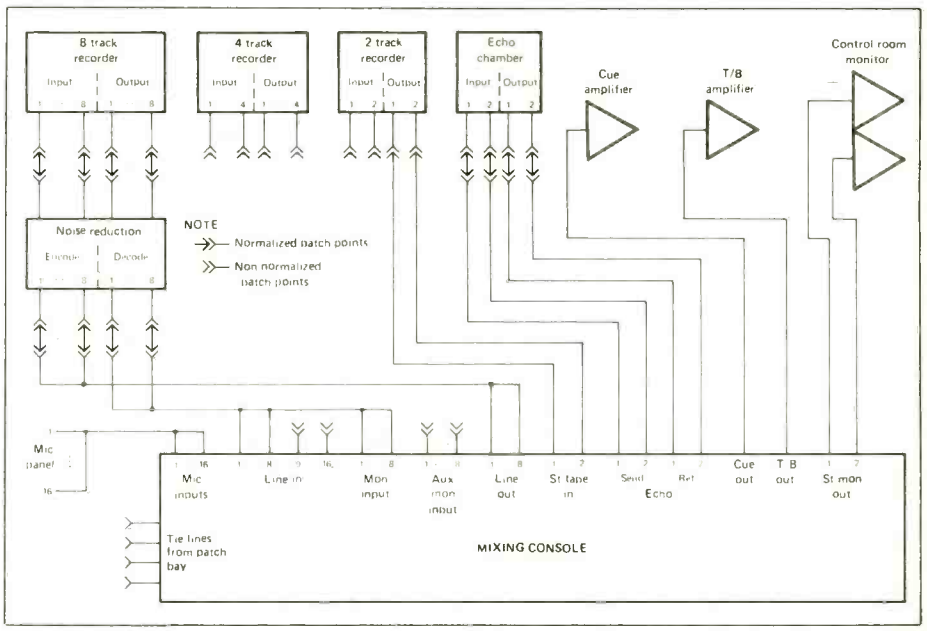


Fig. 2

rect box innards should be permanently built into the instrument. This eliminates connections via guitar cords and therefore reduces noise pickup. Setup time will be faster, too.

A high-quality transformer such as those made by Sescom, UTC, Beyer, etc, with a high-impedance primary and a low-impedance secondary should be mounted close to the volume control. Keep this transformer away from any power transformers. You can connect the primary winding to the volume control's ground and input terminals if you want the direct output to be independent of the volume control's setting. Otherwise, connect the primary to the output jack, in either case keeping the leads as short as you can. Observe proper phasing from the transformer secondary to the XLR-type direct output connector. If the amp is miked, you will want to have the mic and direct signals in phase.

For additional information for building a direct box, you might want to refer to the April 1978 issue of *Modern Recording* for Peter Weiss's article on that subject (page 48). You may want to include a ground switch.

Outside sources of noise can reduce the s/n ratio, especially with the Clavinet. A guitar amplifier's power transformer as far away as eighteen inches can induce the line frequency and its harmonics into the pickups and tone control section. A common practice of keyboard players is to stack keyboards on top of one another. Induction of hum, synthesizer control voltages, Mellotron motors, etc, can occur here. Physical separation or perhaps grounded steel plates between the instruments will help.

—Richard Robinson
Chief Engineer
Trod Nossel Recording
Wallingford, Ct.

Figuring Feedback Frequencies

The attached is a chart showing musical notes with their corresponding frequencies in cycles per second listed below, each descending line being an octave greater. I was given the octave C261.6—C523.2 and extrapolated the rest of the frequencies by either doubling or halving.

This chart could be extremely useful to performers who have graphic or parametric equalizers (the latter especially) for the purpose of attenu-

ating feedback frequencies. We can easily identify the frequency of resonant peaks in our system on a Rhodes piano by finding the note and octave of the tone feeding back and then looking on the chart.

We have four Ashly SC-60 parametrics (series numbers 4, 5, 6, and 7—one for each speaker feed) so when I come up with a cps feeding back, I dial it up and kill it.

However, I'm now finding a discrepancy between the numerical figure I come up with to attenuate, and the actual frequency selection I must use on the Ashlys to get rid of the feedback. Most notably, we were getting a feedback tone at slightly above A880. It took a center frequency position of around 1000 cps to flatten the peak.

A	A#Bb	B	C	C#Db	D	D#Eb	E	F	F#Gb	G	G#Ab
55	58.3	61.7	65.4	69.2	73.4	77.7	82.4	87.3	92.5	98.0	101.3
110	116.6	123.4	130.8	138.5	146.8	155.5	164.8	174.6	185.0	196.0	202.7
220	233.2	246.9	261.6	277.1	293.7	311.0	329.6	349.2	370.1	392.0	415.5
440	466.4	493.9	523.2	554.2	587.4	622.0	659.2	698.4	740.2	784.0	831.0
880	932.8	987.8	1,046.4	1,108.4	1,174.8	1,244.0	1,318.4	1,396.8	1,480.4	1,568.0	1,662.0
1760	1,865.6	1,975.6	2,092.8	2,216.8	2,349.6	2,488.0	2,636.8	2,793.4	2,960.8	3,136.0	3,324.0
3520	3,731.2	3,951.2	4,185.6	4,433.6	4,699.2	4,976.0	5,273.6	5,587.2	5,921.6	6,272.0	6,648.0
7040	7,462.4	7,902.4	8,371.2	8,867.2	9,398.4	9,952.0	10,547.2	11,174.4	11,843.2	12,544.0	13,296.0

Since I am certain the Ashly SC-60s are precisely calibrated, I am looking elsewhere for the discrepancy. Is my chart correct? Could voltage fluctuations enter in? Is there an acoustic phenomenon I'm not aware of? How about adjacent, absorbent frequencies—could they alter the center frequency I am seeing? Am I in the twilight zone? Despite this minor difficulty, I am proud to own Ashlys. They are incredible tools.

Thanks, by the way, for printing "Intercepting That Interference" (Talkback, March 1978, page 16). I now have a Corcom filter and it is most effective. Your magazine is an absolute godsend!

—Jim Woodard
Ft. Myers, Fl.

One problem here is that you are confusing feedback and resonant frequencies. Resonant peaks are sharp increases in amplitude at specific frequencies while feedback frequencies are determined by complex amplitude and phase relationships. Resonant peaks in your system are not necessarily feedback points and the two phenomena must be treated in different ways.

In field tests of these equalizers, we have found the following techniques effective in dealing with these problems.

First, let's explore feedback. To locate and attenuate feedback frequencies, switch out all EQ and increase system gain until primary feedback just starts to occur. Roughly estimate its frequency and note the level setting. Reduce the gain about 6 dB and apply a 6 dB boost, ⅓-octave wide at your estimated frequency. Tune the frequency control back and forth as you very slowly increase the gain. As you get close, feedback should start to occur. If only one isolated frequency is involved, sharpness may be increased (or bandwith reduced) to 1/20 octave. Expect this to make the frequency adjustment very critical. Once the frequency and band-

You paid a lot for good specs. Now spend a little more and hear them.

Just because you put a great deal of money into your tape deck, it doesn't necessarily mean you'll get a great deal of sound out of it.

Unless of course, you're using the tape that's engineered to get the most out of high-performance equipment. Maxell.

Maxell is specifically designed to give you extended frequency response, the highest possible signal-to-noise ratio and the lowest distortion of any tape in its price range.

Which is why people who own the finest tape decks use Maxell more than any other brand.

Of course, there are other reasons. Like the fact that every Maxell tape has a unique non-abrasive head cleaner. And a full warranty that covers the one thing other manufacturers don't cover. Everything.

Try Maxell.

It's sure to make the sound that comes out of your tape deck worth every penny you put into it.

maxell

Maxell Corporation of America, 60 Oxford Drive, Moonachie, N.J. 07074.

CIRCLE 90 ON READER SERVICE CARD

width are adjusted, apply a 6 dB cut. You should now be able to increase the system gain beyond its original setting without feedback. Increase the depth of the cut if necessary. If you still don't have enough gain when a second frequency appears, use another band of the equalizer in the same manner.

As for resonances, your Rhodes piano is an excellent tool for tracking down room and system resonances. When you find a note which causes a resonance, apply a 6 dB boost, ⅓- to 1/10-octave wide, tune to aggravate the problem, then apply as much cut as is necessary to control it. If the resonant peak is very sharp like a room "ring-mode," the bandwidth can be reduced to 1/20 octave to suppress the resonance with a minimum of audible side effects. As in the feedback situation, this narrow bandwidth makes the filter frequency adjustment very critical.

The accuracy of the SC-60 and SC-66 frequency calibration is determined primarily by the taper of the potentiometer used to tune the filter. This critical component is manufactured to our specifications to a 10% tolerance (good for potentiometers) keeping the calibration within ⅓ octave.

A second problem with your approach is that in requiring absolute accuracy to one musical note, you can easily exceed this ⅓-octave tolerance. The advantage of the methods outlined above is that the numerical frequency need not be identified to deal with the problem.

—Bill Thompson
Chief Engineer
Ashly Audio, Inc.
Rochester, N.Y.

Questionable Gains

I am curious about the feasibility of and possible benefits that might be gained by converting my TEAC-A-3340S to operate at speeds of 15 and 30 ips. What would I gain at these speeds in terms of S/N and frequency response?

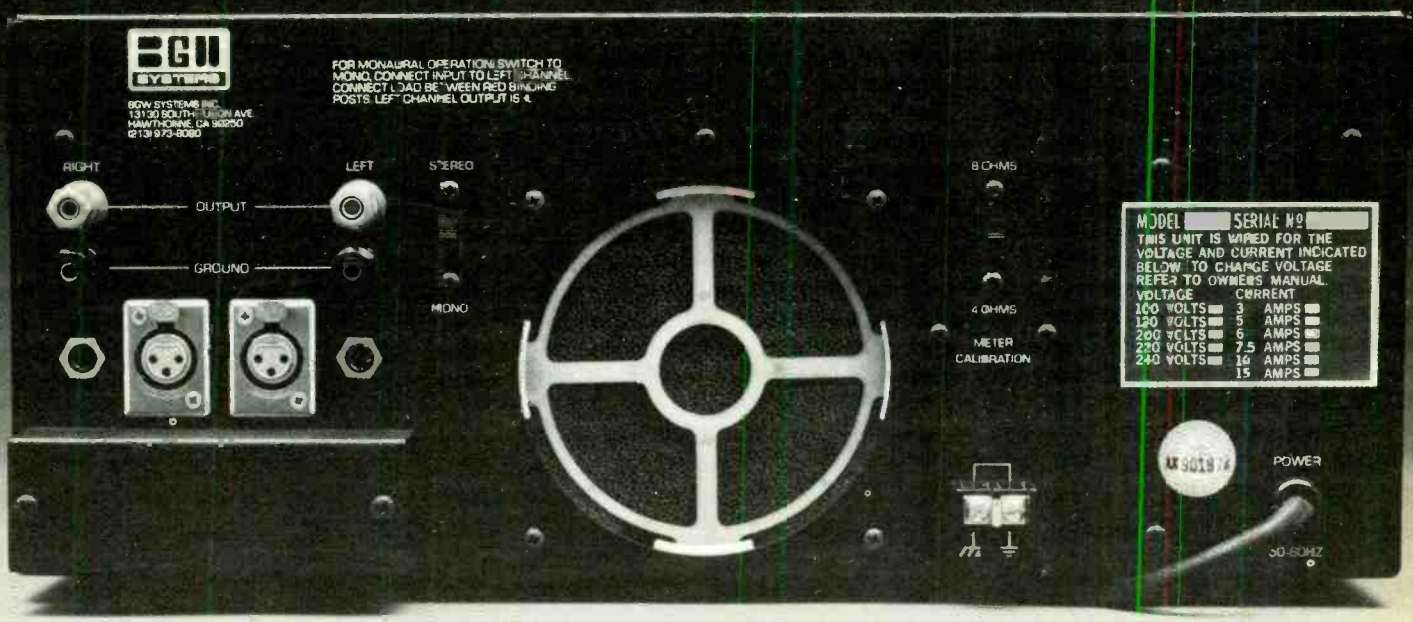
—Rusty Hodge
Orange, Ca.

The actual procedure of modifying a TEAC A-3340S to operate at 15 and 30 ips is relatively uncomplicated. Basically, it involves the replacement of the capstan motor pulley with an appropriately larger one, changing the corresponding belt and recalibrating the bias and EQ of the deck to compensate for the change in tape speed. However, there are many factors to consider before proceeding with such an endeavor.

Depending on your specific application, this modification might tend to create more problems than it would solve. First of all, if your deck is still within warranty, such a modification would void any and all coverage. Secondly, low frequency response below 45 Hz would roll off drastically. Since top end response is already above 24 kHz, any increase obtained in the high frequency range would be beyond audibility anyway.

Another perhaps obvious consideration is that at an operating speed of 30 ips, the play time of a 3600 foot reel of tape would be cut to a mere twenty-four minutes. All of these compromises must be weighed against the corresponding benefit of an increase in headroom of 3 or 4 dB. Of course this figure will vary depending on the type of tape that you plan to use, but we have found that a stock A-3340S, operating at 15 ips, with a S/N ratio of 65 dB provides adequate headroom for most applications. If an increase in S/N is your desired end, you might consider the use of an outboard

PROS GET BEHIND BGW AMPS



Over the past seven years BGW has turned a lot of professional heads around. We came out of nowhere to successfully challenge the stand-pat technology of the aging monarch of professional amplifiers. The most demanding buyers in the music business now rely on BGW: Studio owners. Recording engineers. Serious musicians. Everyone who makes his living from recorded or live sound. Performers and technicians alike have gotten behind BGW's legendary power, impeccable performance and workhorse reputation.

Here's what's made BGW the most imitated product in the pro sound business:

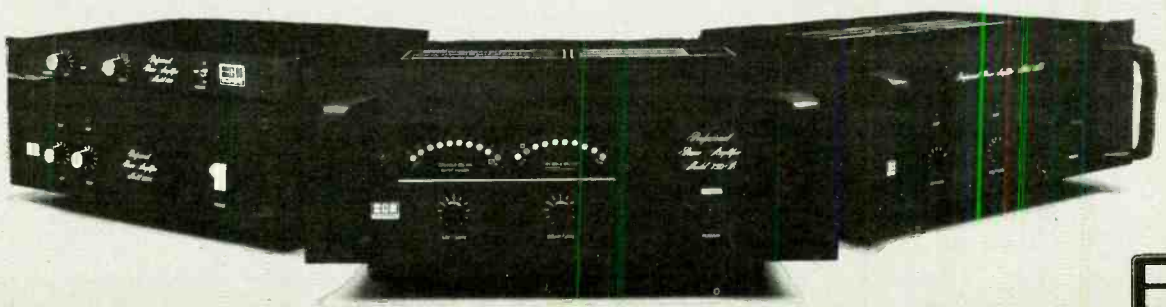
A full professional line starting with the MODEL 100: 30 watts per channel into 8 ohms, 20 Hz to 20 kHz, at less than 0.1% THD (80 watts mono);

The MODEL 250 C: 100 watts per channel into 8 ohms, 20 Hz to 20 kHz, at less than 0.1% THD (251 watts mono);

The new MODELS 750B and 750C: 225 watts per channel into 8 ohms, 20 Hz to 20 kHz, at less than 0.1% THD (720 watts mono).

For the true sound professional, quality isn't a luxury. It's a necessity and something we build into every BGW amp.

Contact our home office for complete technical specs. You'll understand why so many of your professional peers get behind BGW. And why the competition stays behind.



BGW Systems, Inc., 13130 S. Yukon Ave., Hawthorne, CA 90250. Telex: 66-4494
In Canada: Omnimedia Corp., 9653 Cote de Liesse, Dorval, Quebec H9P 1A3
International inquiries please contact the factory.

BGW SYSTEMS

Get Behind Us!

CIRCLE 52 ON READER SERVICE CARD

noise reduction unit, assuming that you aren't already using one. After carefully considering these outlined factors, I'm sure that you'll agree that the feasibility of such a modification is, at the very best, questionable.

Please feel free to call me at our offices in California if there are any questions concerning this response.

—Claude Schnell
Consumer Relations
TEAC Corp. of America
Montebello, Ca.

Difficult Mic Selection

Our keyboard player recently bought a Yamaha Baby Grand. We need some help in choosing the best mic or pick-up system for this piece. We are a rock band, so monitoring "live" performance might prove to be a problem. The system will also be used for recording.

We would prefer to go with a pair of good mics which we feel would be more versatile and would get more use. The big question is—which mics? We have about $400—$500 to spend. While we realize we're lucky to have such an abundance to choose from, it does make selection a difficult task.

Any information that you can pass on to us regarding models in this price range that are suitable for our needs would really be appreciated. We understand your policy in the matter of not comparing companies, but please tell me what you can. Mics are such an important step in the recording/reproduction chain and trial and error selection is a process far too expensive for us.

—Wayne Dobson
Auburndale, Fl.

We feel the type of microphone you choose, rather than the brand, is most important in this case. Perhaps the best way for you to decide what you specifically want and need would be to do a little research. Microphones—How They Work and How To Use Them *by Martin Clifford (published by Tab Books, Blue Ridge, Summit, Pa. 17214) might be a good place for you to start your investigation. The August 1978 issue of* Modern Recording *(like the May 1977 issue before it) was a real goldmine of information on microphones. Dubbed a "Special Miking Techniques Issue," it contained hints on creating special effects using only a practice amp and a mic ("Special Effects (without the special effects)" by Craig Anderton, page 36) and a discussion of miking approaches for the rhythm section of a band ("Hot August Miking Techniques" by Bruce Swedien, page 50).*

To dash into our time machine for just a moment, the May 1977 issue (which is still available in limited supply at this writing) contained "John Woram Presents Mike Graphones" (page 31) and a Hands-On Report by Jim Ford and Brian Roth on common sound reinforcement microphones (page 62).

Getting back to your specific problem, we feel a combination of mic and pick-up and/or transducer would be the best idea. Manufacturers of pick-ups and transducers include Barcus-Berry, Frap and Helpinstill. Refer to manufacturer-supplied information or dealer advise as to what pieces would work well in this sort of application. We trust that you will not neglect getting in touch with the manufacturer of the Baby Grand, Yamaha, for their hints on how to best mic this piece should you require additional help.

Just as a matter of clarification, we do

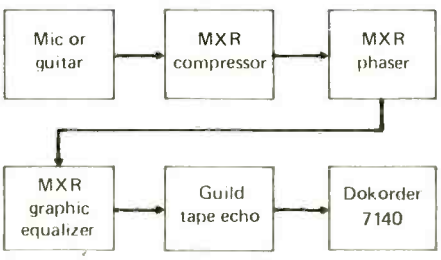
compare like products against a battery of standardized criteria each year in our annual Buyer's Guide.

Different Direct Box Needs

I realize it is several months since Peter Weiss' fine article appeared (see "Building a Direct Box," page 48, April 1978), but I have some questions springing from that article to which I'd appreciate answers.

My needs are somewhat different from those described in the article. I wish to record directly from the auxiliary speaker jack of my amplifier to the microphone input of my Dokorder 7140. (I am sure there are quite a few of us who are still working with these antiques.) The input is rated in the specs as having a sensitivity of .8 millivolts and an impedance of 10K ohms. I have no need for a balanced output; I just wish to have a direct feed from the amp to the tape deck.

If the specs of the input are difficult to match for any other reason, it would be possible for me to patch in somewhere else in my signal path. This is as follows:



The output level of the tape echo seems to work very well just before the tape deck. Perhaps it would be wise to patch in before this point.

All of my devices are set for a high signal level (mic, guitar, synthesizers, etc.). Do I still need a transformer? Is it possible for me to modify your Unit #2 (see schematic on page 50 of the article) in such a manner so that I can get an unbalanced signal of a compatible impedance? Could you also provide some suggestions as to the best transformer for the job should this change be possible?

—Mark C. Leffler
Niagara Falls, N. Y.

In your letter, you neglected to mention whether or not your Dokorder is equipped with a line-level input. If such an input is provided, Unit #2, connected between the auxiliary speaker output and the line-level input, should

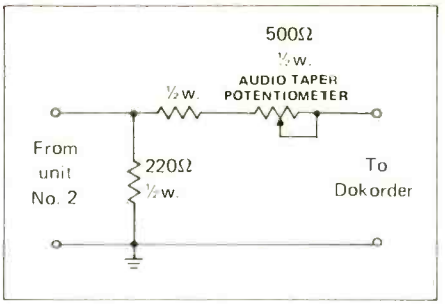


Fig. 1

do the trick. If the only input to the recorder is a microphone input with .8 mV sensitivity, the signal level from the secondary of Unit #2 must be reduced to prevent overloading. A resistive "pad," or attenuator, in the following configuration will provide adequate level reduction (see figure 1).

—Peter Weiss
Contributing Editor
Modern Recording

An Appropriately Portable PA

I don't really know if you guys and/or gals specialize in this sort of request, but one sure way to find out is to write. Here is my situation and subsequent question.

A friend and I have been travelling around the midwest performing for several years now. We both play acoustic guitars and sing. Now my question! Most of our singing is done in churches, schools and small auditoriums. We want the most portable PA system we can find that will still give us quality sound. What system would you recommend? What types of microphones and other audio aids would you suggest?

Currently, we have the old standby Shure Vocal Master PA with the Shure monitors. We are using Shure Unisphere 1 mics (PE565SD). I have a Martin D-35 and my associate plays a D-35-12.

The sound on the Shure is "okay," but I know there must be better available. Also, we would like something more portable, perhaps something that could be carried in a car. We have considered Bose, but wonder if there is something as good as Bose (or better) at a smaller price. Any and all suggestions will be appreciated.

—Kenneth D. Ellis
Menasha, Wi.

Considering your "on the road" performing schedule, reliability and durability in a system must be of extreme importance to you. This being the case, we feel

the best thing for you to do is to go to a reputable, professional audio or PA shop and explain your situation to them as you have here. Not only will they be able to suggest the best system and outboard devices for you, but they could probably outfit you immediately, as well. You would also have the added advantage of establishing a relationship with a local professional who could continue to advise and service you as your needs grow and change.

The Right Combination

I have an SX-1010 Pioneer receiver (100 watts per channel), four Frazier speakers and two sets of Peavey speakers (FH-1 folded horn—8 ohms, MF1-X—8 ohms, T-12 piezo tweeters—16 ohms). The Frazier speakers are also spec'd at 8 ohms.

I'd like to know if I can run the Peavey speakers on one channel and the Frazier speakers on the other channel. What I would like to do is either play both Fraziers on one channel or connect them together. I'm not sure what the impedance load of the receiver is, but I was told that it could damage the amp. Is this possible? I believe the amp is basically made for 8 ohms.

—Dennis Mertland
Nashua, N.H.

Your Pioneer SX-1010 receiver was designed to operate two sets of speakers without problems as long as each speaker is rated at 8 ohms. When you operate both the Peavey speakers and the Frazier speakers in parallel, the total resistance is reduced to 4 ohms. This is still considered a safe operating level and should not harm your receiver. However, we do not recommend that you attempt to connect more than four speakers total (two sets) to your system or use speakers in a parallel arrangement that have a resistance rating of less than 8 ohms since you may create a condition which is equivalent to a short.

—Ronald F. Petty
Public Relations Manager
Pioneer Electronics Corp.
Moonachie, N.J.

Squelching The Squeal

I have just received a tape that was recorded in New York by some friends of mine that I wish to copy. The recording itself is okay, but the tape produces a high-pitched squeal as it runs, even though the amplifier is turned off. Speed does not change

To get a superb performance, you need a precision machine.

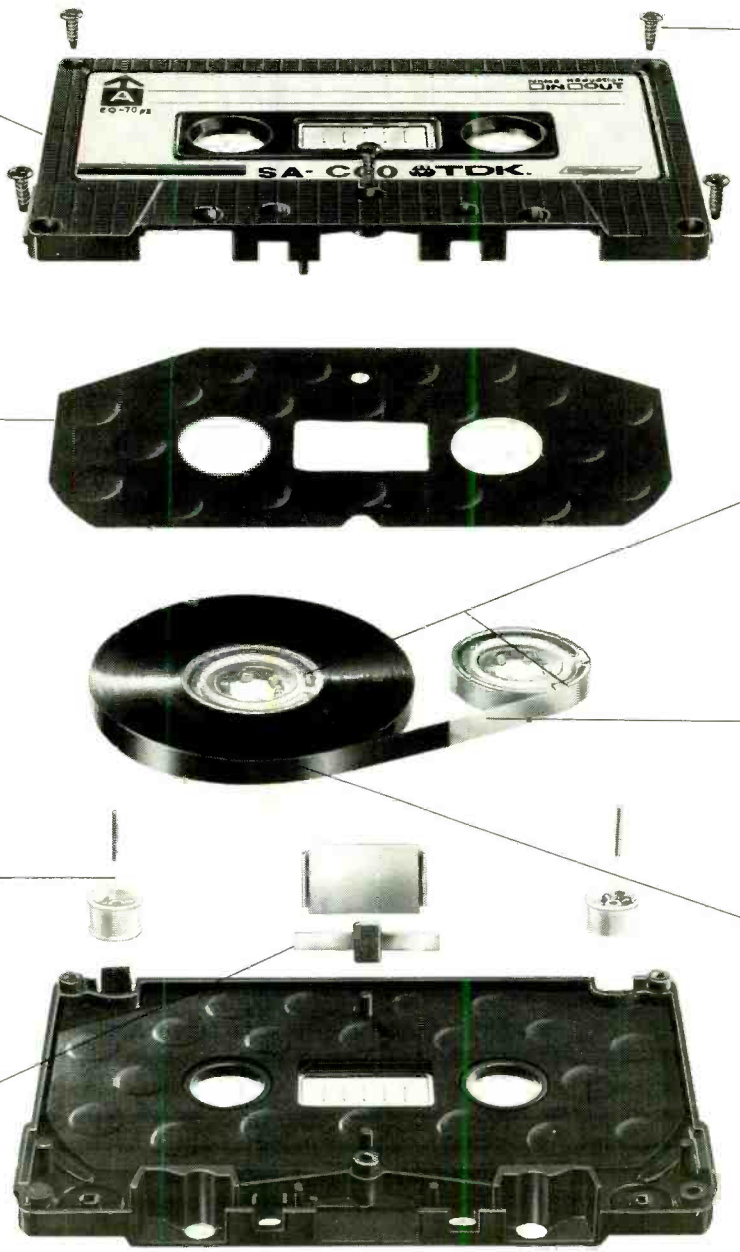
To command a great performance, a cassette shell and cassette tape must be engineered to the most rigorous standards. Which explains why we get so finicky about details. Consider:

Precision Molded Cassette Shells—are made by continuously monitored injection molding that virtually assures a mirror-image parallel match. That's insurance against signal overlap or channel loss in record or playback from A to B sides. Further insurance: high impact styrene that resists temperature extremes and sudden stress.

An Ingenious Bubble Surface Liner Sheet—commands the tape to follow a consistent running angle with gentle, fingertip-embossed cushions. Costly lubricants forestall drag, shedding, friction, edgewear, and annoying squeal. Checks channel loss and dropouts.

Tapered, Flanged Rollers—direct the tape from the hubs and program it against any up and down movement on its path towards the heads. Stainless steel pins minimize friction and avert wow and flutter, channel loss.

Resilient Pressure Pad and Holding System—spring-mounted felt helps maintain tape contact at dead center on the head gap. Elegant interlocking pins moor the spring to the shell, and resist lateral slipping.



Five-Screw Assembly—for practically guaranteed warp-free mating of the cassette halves. Then nothing—no dust or tape snags—can come between the tape and a perfect performance.

Perfectly Circular Hubs and Double Clamp System—insures there is no deviation from circularity that could result in tape tension variation producing wow and flutter and dropouts. The clamp weds the tape to the hub with a curvature impeccably matched to the hub's perimeter.

Head Cleaning Leader Tape—knocks off foreign matter that might interfere with superior tape performance, and prepares the heads for...

Our famous SA and AD Tape Performance—two of the finest tapes money can procure are securely housed inside our cassette shells. SA (Super Avilyn) is the tape most deck manufacturers use as their reference for the High (CrO_2) bias position. And the new Normal bias AD, the tape with a hot high end, is perfect for any type of music, in any deck. And that extra lift is perfect for noise reduction tracking.

TDK Cassettes—despite all we put into them, we don't ask you to put out a lot for them. Visit your TDK dealer and discover how inexpensive it is to fight dropouts, level variation, channel loss, jamming, and other problems that interfere with musical enjoyment. Our full lifetime warranty* is your assurance that our machine is the machine for your machine. TDK Electronics Corp., Garden City, N.Y. 11530. Canada: Superior Electronics Ind., Ltd.

TDK®

The machine for your machine.

*In the unlikely event that any TDK cassette ever fails to perform due to a defect in materials or workmanship, simply return it to your local dealer or to TDK for a free replacement.

CIRCLE 85 ON READER SERVICE CARD

the tone. It was recorded at 7½ ips, but I don't know what type of tape was used or on what kind of machine it was recorded. I used many kinds of tape on my machine for a long time until I finally settled on Maxell, but I have never run into this kind of problem before. Could you please explain to me how this happens and how it can be corrected?

—D. Wydick
Redford Township, Mi.

The problem you describe is becoming more and more rare as tapes become better. While never a common problem, this is the first I've run across it in a couple of years.

The problem is probably "dry" tape. Tape is supposed to glide smoothly over the guides and heads of your tape recorder. In your case, somewhere in the tape path the tape is dragging slightly and causing the squeal—much in the same way that a rusty door hinge sometimes squeaks.

The noise is mechanical but can be coupled into the playback head in such a way to be heard through the amplifiers when they are turned up. What has happened is the lubricants that are part of the oxide/binder systems have migrated, perhaps due to improper storage, or conceivably to a fault during manufacture. The lack of lubricant means the tape can no longer pass smoothly over the heads.

As the problem is most likely in the tape and will show up on some recorders and not on others, whether the problem can be cured long enough for you to make a copy, I don't know.

First, clean your recorder scrupulously. Make sure there is absolutely no foreign material on the guides or the heads. If your machine uses tape pressure pads, make sure they are clean, as they can be the cause of this problem, too.

If, after a thorough cleaning, the problem still persists—try this. Get a silicone-treated cloth (the kind that some people erroneously use to clean records.) While in the fast forward or rewind mode, grasp the tape between your fingers while holding the cloth. Hold tight enough to cause a slight drag on the tape to remove any loose oxide particles, and to impart some lubrication from the cloth.

If this doesn't cure it, the only solution is to experiment with some friends' recorders to find one that doesn't squeal and make a copy on that machine. Then junk the tape.

This problem can also show up during tape editing. A tape will play normally but will squeal when rocked across the heads. I have had this occur to such an extent that the original signal was totally buried by the squeal.

If you ever have this problem during tape editing, here is one solution I have never had fail so far. Find your approximate edit point. Remove the tape from the area of the heads. Run your thumb and forefinger over your nose to pick up a little body oil. Then, while holding the tape between your thumb and forefinger, gently rub in the area of the edit. Rethread the tape and proceed. I have found that this always gives enough lubrication to find the edit point while completely eliminating that annoying squeal.

—Bill Vermillion
Chief Engineer
Bee Jay Recording Studios
Orlando, Fl.

Listen to the music.

Noise in the form of hiss, hum and rumble—all the things that effectively cloud the clarity of records, tapes and FM broadcasts. Ideally, music should be heard against a silent background. The Phase Linear 1000 achieves just that with two unique systems: AutoCorrelator Noise Reduction and Dynamic Range Recovery. The AutoCorrelator reduces noise by 10 dB without the loss of high frequency music and without pre-encoding. The Dynamic Range Recovery System restores 7.5 dB of the overall dynamic range, without the pumping and swishing associated with other systems. The Phase Linear 1000 represents the most significant improvement in sound reproduction for the money...more than any other single piece of equipment you could add to your system. It is easily installed to any stereo receiver or preamplifier. Ask your dealer for an audition, and listen to the music.

Not the noise.

Phase Linear®

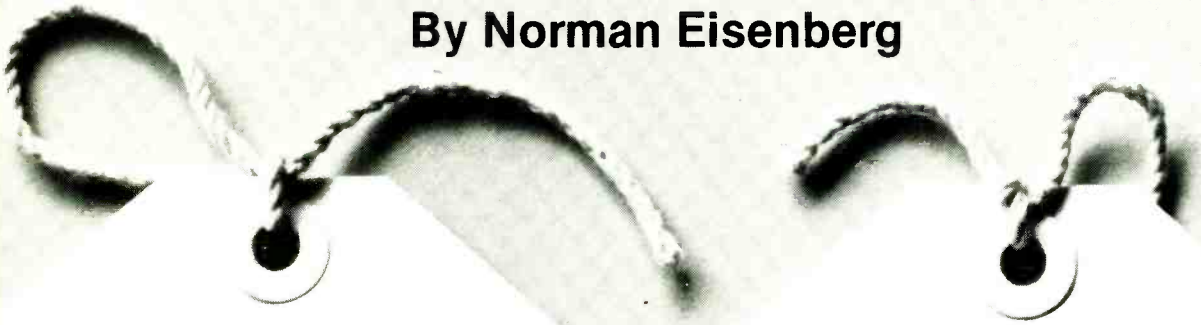
THE POWERFUL DIFFERENCE

MADE IN U.S.A. DISTRIBUTED IN CANADA BY H. ROY GRAY LTD. AND IN AUSTRALIA BY MEGASOUND PTY. LTD.

CIRCLE 84 ON READER SERVICE CARD

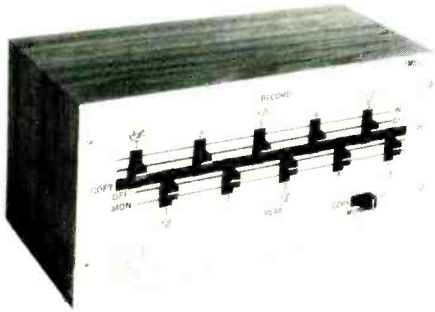
THE PRODUCT SCENE

By Norman Eisenberg



ANOTHER RUSSOUND SWITCH BOX

The latest interface accessory from Russound is its model TMS-2 Tape Recorder Selector which is designed to expand an audio system's tape monitor loop to permit up to five tape recorders to be interfaced for any combination of original recording, duplicating and playback functions. All recorder inputs and outputs are jacked into the rear panel of the TMS-2 and may be left permanently hooked up. Control functions are handled by front-panel switching. The device also can be used for interfacing other "line level" signal sources such as FM tuners, noise reduction devices, equalizers and time-delay units. Announced price is $69.95.



CIRCLE 14 ON READER SERVICE CARD

NEW A-T HEADPHONES

Audio-Technica of Fairlawn, Ohio has announced a new series of five stereo headphones including dynamic and electret condenser models. All are open-back types which are said to provide good bass response without large earcups. Top of the line is the ATH-7, an electret priced at $149.95. Next in the line is the $99.95 model ATH-6, also an electret. The dynamic models include the ATH-5 ($79.95); the ATH-3 ($59.95); and the ATH-1 ($29.95).

CIRCLE 15 ON READER SERVICE CARD

TWO NEW ITEMS FROM OPAMP LABS

The Model 1010 from Opamp Labs of Los Angeles is a 10×10 matrix that provides pushbutton assignment of any combination of ten input audio lines to any combination of ten output lines. The inputs and outputs are transformer isolated. Isolation between input lines is given as 80 dB. The 1010 Matrix, which eliminates patch bays and cords, is 35 pounds, of rack-mount dimensions, and is priced at $2200.

Also offered by Opamp Labs is a power operational amplifier rated to deliver 50 watts rms on each of two channels or 100 watts in mono operation from DC through the audio range. The unit consists of two model 440KR power amps, a model 536 power supply, a stereo/mono convertible circuit board and the panel chassis and hardware. Price in kit form as model SM100K is $200. A wired version, model SM-100W, costs $280.

CIRCLE 16 ON READER SERVICE CARD

TEAC SHOWS TOP END CASSETTE DECK

The Teac model C-1 is an advanced-design stereo cassette recorder featuring three heads, three motors, and a transport that is said to be sold to U.S. computer makers. The capstan motor is DC servo-controlled, and the tape motion system uses a

closed-loop dual-capstan arrangement with twin belts. Wow and flutter is listed as 0.04 percent; S/N ratio (with Dolby) is 70 dB; with dbx it is claimed to hit 90 dB. Overall frequency response is given as 20 Hz to 20 kHz.

Features include feather-touch controls, record mute, r/c capability, pitch control, peak meters. Left and right input knobs are cross-geared with friction coupling. Dolby is built in; an optional interface module, DX-8, adds the dbx function. Interchangeable modules permit matching the deck's electronics to a specific brand of tape. A three-position monitor switch provides independent tape-level readings; a timer switch starts the unit automatically for record or play.

CIRCLE 17 ON READER SERVICE CARD

COMPUTER TAPE PLAYS PIANO

Superscope has announced the Marantz Reproducing Piano, said to be the "first and only piano to use computer tape technology to actually play the piano 'live.'" At a trade demo of the unit, computer-programmed cassettes were employed to activate the piano which produced performances by some of history's greatest pianists. Like the company's "Pianocorder" system, the new instrument uses a cassette to automatically record and play a "live" performance instantly. In addition to serving as another entertainment source, the Marantz Reproducing Piano also is claimed to have applications as a learning aid.

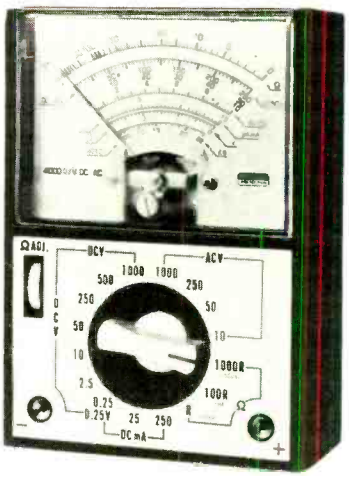
CIRCLE 18 ON READER SERVICE CARD

BROADCAST AUDIO DELAY

Comex Systems, Inc. of Hudson, N.H. announces its "Time Tunnel," described as a six-second audio delay system of professional broadcast quality designed for mono or stereo delay applications. Two models are available; the TDG-1 responds within ±0.25 dB fro 50 Hz to 15 kHz; the TDG-2 goes out to 7.5 kHz. If a mono unit is bought, it may be converted to stereo by removing the front panel and installing three circuit modules. Interconnections and power are provided in the original basic unit. The design of the "Time Tunnel" includes a low-noise differential instrumentation amplifier that eliminates the need of an input transformer; a sixth-order elliptic function low-pass filter; analog-to-digital conversion; memory system; digital-to-analog converter; output filter; output amplifier; control and timing functions; and provision for remote control.

CIRCLE 19 ON READER SERVICE CARD

LOW COST MULTIMETER



Another low-priced test instrument in the Truvohm line from EICO Electronic Instrument Co., Inc. is the model 4A4 Multimeter. Factory assembled at $17.95, the model 4A4 is a 4000 ohms/volt general purpose VOM with 17 ranges. It measures up to 1000 volts DC and AC, up to 250 mA DC, and up to 2 megohms resistance. The diode-protected movement is said to have an accuracy of ±3 percent on DC, and ±4 percent on AC. The 3-inch meter has a mirror-back scale. In its high-impact plastic case, the model 4A4 measures 5×3½×1 7/16 inches

CIRCLE 20 ON READER SERVICE CARD

HEAVY DUTY POWER AMP

A new heavy-duty stereo amp, the QSC 8.0, has been announced by Quilter Sound Co. of Costa Mesa, California. Aimed primarily at the pro sound market, the new amp is fan-cooled and has an 8-ohm power output rating of 175 watts per channel (20 Hz to 20 kHz at less than 0.09 percent THD. Into 4-ohm loads, the amp is spec'd to deliver 300 watts per channel. In bridged-mono mode, it delivers 600 watts into an 8-ohm load. The QSC 8.0 features the PowerLimit circuit with a continuously variable control designed to prevent clipping, to protect loads by limiting the output and to reduce maximum volume to a given level. Each channel has independent gain and PowerLimit controls, and both are calibrated. LED indicators display—on each channel—information on level, output clipping or overload, operation of the PowerLimit circuit, and DC power. Of rack-mount size, the amplifier is priced at $698.

CIRCLE 21 ON READER SERVICE CARD

DIGITAL TIME DELAY

Analog & Digital Systems, Inc. has announced its model ADS 10, described as the world's first complete time delay system. Called an "acoustic dimension synthesizer," it includes a time-delay section, stereo power amplifier and two loudspeakers. The time-delay section has an audio to digital encoder/decoder with time delay and decay variable up to 100 milliseconds. Ambience decay, echo density, stage distance, stage depth, and hall size options are included, plus a "human voice restorer" and memory capacity. The amp offers 100 watts per channel into 4-ohm loads. Rated THD is less than 0.08 percent; S/N better than 94 dB. Each speaker (ADS model L-10) is a compact, mountable on wall or shelf, rated for handling up to 150 watts peak power.

CIRCLE 22 ON READER SERVICE CARD

ON THE THRESHOLD

The Threshold Corp. of Sacramento, California has announced its model Stasis 1, described as a "feed-forward error nulling power amplifier." Instead of depending on large amounts of negative feedback to achieve linearity of response, the new amp is designed around a transistor system based on a "virtually perfect stasis amplifier . . . required to do virtually no work." The amp's performance, determined by operation "under stasis conditions of implicit constant voltage and constant current" is claimed to transcend "definitions previously employed to classify amplifier operation and achieves virtually distortionless performance." Preliminary specs include: rated power of 175 watts into 8 ohms; 300 watts into 4 ohms (both, 20 Hz to 20 kHz); THD at less than 0.002%; slew capability of up to 100 volts/microsecond; bandwidth from 0.01 Hz to 250 kHz; damping factor of greater than 1000. Protection is provided by input to output waveform analysis via a differential comparator. According to the manufacturer, circuit designs will be patent protected. Price was not announced at press time.

CIRCLE 23 ON READER SERVICE CARD

MC PICKUPS WITH HIGH OUTPUT

ESS, Inc., probably best known for its speaker systems featuring the Heil AMT driver, has announced a new line of moving-coil phono pickups that feature signal output high enough to obviate the need for a boosting transformer or "pre-preamp." The design uses very narrow wire (11.5 microns, about half the thickness of human hair) that can be wound to form many more turns than hitherto found in typical moving-coil cartridges. As a result, the new ESS pickups—known as the Dynavector line—can supply a signal output of 2 mV as compared to the fraction of a millivolt typically produced by m-c pickups before boosting. Prices range from $120 to $250.

CIRCLE 26 ON READER SERVICE CARD

EFFECTS CONSOLE

A three-function effects console featuring modes for distortion, wah and volume has been announced by DBJ Laboratories of Ridgefield, Connecticut. Known as the model EC-301, its distortion circuit, while solid-state, includes effects that are described as a "soft tube" type of distortion to total harmonic distortion with extreme sustain. The wah circuit produces a wide range filtering that emphasizes both bass and treble harmonics. Wah and distortion can be mixed. Other features include front-panel controls, steel chassis, electronic switching, LED indicators and electronically regulated power supply. Weighing 8.5 pounds, the EC-301 measures 12 by 10 by 3½ inches.

CIRCLE 24 ON READER SERVICE CARD

MOVE OVER DIGITAL?

Some recent developments, or about-to-be developments, may give the audio field a major portion of the benefits attributed so far to digital recording, but without the major upset in existing technology implied by going digital.

The three new items, featured at the Chicago Consumer Electronics Show in early June, are: new metal-particle tape (instead of some form of oxide-coated tape) [see this issue's "Ambient Sound" column]; a new noise-reduction system (a modified Telefunken pro system that "absorbs" the Dolby-B but goes about 10 decibels better); and a two-speed cassette deck (in addition to 1⅞ ips, it also runs at 3¾ ips for generally improved sound).

Any of these developments requires some modification in existing cassette technology, but they do not make it suddenly obsolete. The new tape, just about everyone conceded, requires a new erase circuit and head since the means for erasing oxide-coated tape are not strong enough to wipe out signals on the new tape. One can, of course, use a bulk eraser to clean the new tape of recorded signals.

Whether or not the new tape also requires new bias and new record/play heads remains in debate.

The Telefunken noise-reduction system can be built into a recorder in switchable steps being compatible with Dolby-B and the other step offering the claimed improvement. At the Chicago show, Nakamichi was demonstrating a modified model 1000 and a model 500 in which the handling of the new tape and the Telefunken noise reduction system were combined in what a company spokesman asserted was as significant a marriage today as was the older wedding of chrome tape and the Dolby-B, which of course kicked off the whole upsurge of serious interest in the cassette format. Other manufacturers reportedly tooling up to handle the new tape include Tandberg, JVC and Technics. The new tape itself (which will cost roughly twice what a top-grade oxide tape costs) is expected on the market by December of this year, from at least the 3M Company although other tape makers (TDK, BASF and Maxell) indicate more than passing interest in it. Of these, at least TDK is reported to have sent samples to a number of equipment manufacturers.

The two-speed idea is from B.I.C., and its espousal of 3¾ ips for normal cassettes is based on the faster speed's potential for generally improved sound, although it does entail using twice as much tape for a given program length.

Obviously, any of these developments or a combination of two or all three, could become the next major trend in cassette recording. If the claims of more headroom, expanded dynamic range, higher signal-to-noise ratios, and so on can be adequately confirmed to everyone's satisfaction, it will mean not only a major upgrading of the cassette format but it also could dampen considerably the thrust toward digital recording since it all could be accomplished within the general framework of analogue recording. And right now the area of digital recording is confused over the number of "information bits" to be sampled, which is a factor relevant not only to the basic accuracy of the system but also to compatibility between digital systems made by competing manufacturers.

Stay tuned in.

MUSICAL NEWSICALS

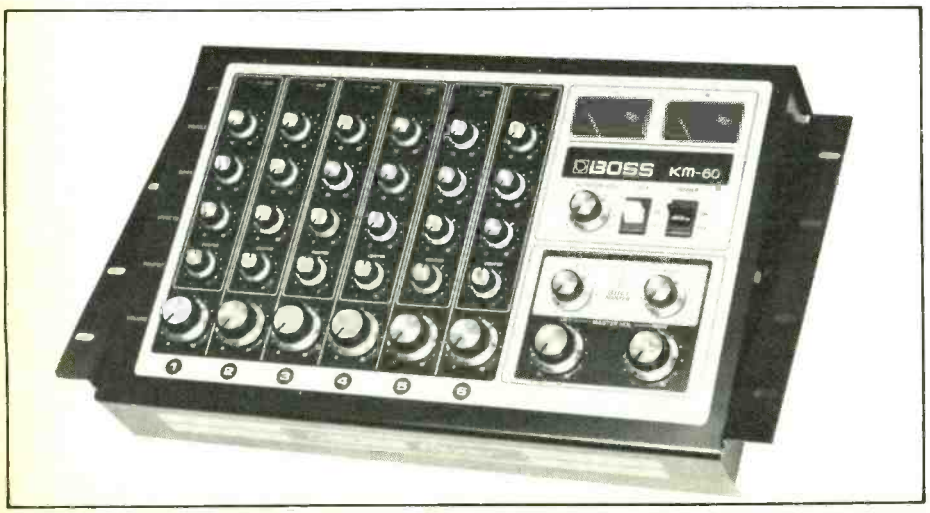
MIXING CONSOLES

Audio Marketing, Ltd. now offers a stereo mixer with an optional echo effects module from England's HH Electronics. The Stereo-12 has balanced, low-impedance inputs which are switchable to accept line level inputs. Each input channel has a continuously variable gain control for the preamp gain, a four-band equalizer and foldback (cue) and echo send level controls. All outputs (main, foldback and echo) of the Stereo-12 are nominally a balanced +4 dBm into 600 ohms and have a maximum output level of +25 dBm for adequate headroom.

CIRCLE 1 ON READER SERVICE CARD

RolandCorp US recently added a low-cost 6-in, 2-out mixer, the model KM-60, to their Boss line. Each input channel features controls for an attenuator, bass and treble EQ, panpot and volume, and send and return for outboard effects. The mixer also features left and right master faders, illuminated twin VU meters and a stereo headphone output. Two KM-60s may be stacked for additional inputs.

CIRCLE 2 ON READER SERVICE CARD



MUSICAL INSTRUMENTS

PAIA Electronics recently introduced the model 1550 "Stringz 'n' Thingz" polyphonic keyboard system. The 1550 has a number of orchestral textures designed into it as presets, including violin, cello and piano. Controls are provided to allow a split-keyboard mode, and to control vibrato/chorus rate and depth, and sustain for the piano and string presets, and the 1550 may be interfaced to any commercial synthesizer. Information on this and all the other recent additions to the PAIA line can be had by writing to the company for a copy of their latest catalog (best of all, it's free).

CIRCLE 3 ON READER SERVICE CARD

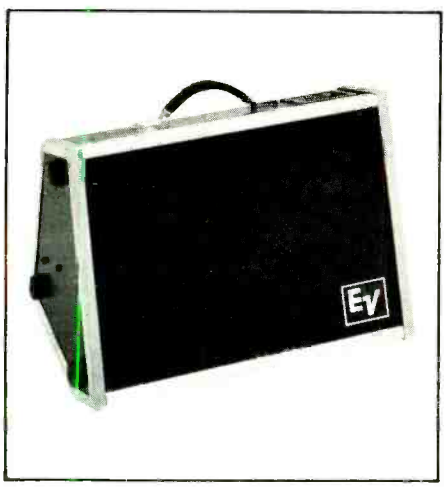
From the Elger Company comes news of an addition to the Ibanez "Iceman" series of guitars. The new model is the IC-400, which features different construction from the other guitars in the Iceman series. The IC-400 has a mahogany body with figured maple top, and a rock maple neck for greater rigidity and improved sustain when combined with Ibanez' Gibraltar bridge and sustain block. The guitar is

said to have a particularly clear, ringing tone due to the construction, the bridge, the Half and Half bone/brass nut, and the two Super 80 pickups which are high-output humbuckers specifically designed to overcome the thicker, sometimes muddy sound of other "hot" pickups. Also brand new from Ibanez is an all-new line of moderately priced acoustic guitars. These six new models have several distinctive features designed to help present a new image for Ibanez, which used to be known for its copies of popular model guitars. All six models have spruce tops and mahogany necks, and the various individual models feature either mahogany or rosewood rims and backs and a variety of finishes and detailing.

CIRCLE 4 ON READER SERVICE CARD

SOUND REINFORCEMENT EQUIPMENT

Electro-Voice has announced two new stage speaker systems. The smaller of the two is the Model S12-2, a two-way system using an EVM12L 12-inch woofer and an ST350A tweeter for frequency response out to 16 kHz with an extraordinary 120° dispersion. The larger model of the pair is the S15-3, a three-way system using a 15-inch woofer and the ST350A tweeter plus a remarkable new midrange driver. In this system E-V has applied the speaker design theories of A.N. Thiele and R.H. Small to a cone type midrange driver. The Thiele and Small theories are related to the design of vented or ported enclosures, and have previously been applied only to low-frequency systems (bass reflex enclosures). By designing a vented cone-type midrange speaker, E-V was able to achieve high sound pressure levels and high efficiency rivaling a horn-loaded compression driver, but without suffering the "honky" sound often associated with small horns. The net result of the new design is a more natural sound quality from a relatively small cabinet, and no sacrifice in output capability (up to 116 dB).



CIRCLE 5 ON READER SERVICE CARD

A new electronic crossover has been added to the line of sound reinforcement equipment, available from QSC Audio Products. Controls on the new unit include crossover frequency (variable from 250 Hz to 6 kHz), high- and low-frequency gain (nominal +10 dBm output), power amplifier gain and a high/low phase switch which reverses the phase of the high frequencies relative to the lows for potentially better performance near the crossover frequency. The unit mounts in 5¼ inches of 19-inch rack space; it is finished in brushed black aluminum and includes custom rack handles.

CIRCLE 6 ON READER SERVICE CARD

MUSICAL INSTRUMENT AMPLIFIERS

Pignose Industries, Inc. is well-known for its tiny, battery-powered practice amp, but it is now moving upmarket with the introduction of the model 3060 amplifier. The 3060 is still a small amp, using a 10-inch speaker and only weighing twenty-seven pounds, but the performance is big with 30 watts RMS. The unit has controls for volume, distortion drive, bass, mid and treble EQ (±14 dB range on each) and master volume. The amplifier uses Pignose's LIPA (logarithmic inverted phase additive) distortion circuitry which gives a tremendous range of tonal possibilities when used in conjunction with the master volume control.

CIRCLE 7 ON READER SERVICE CARD

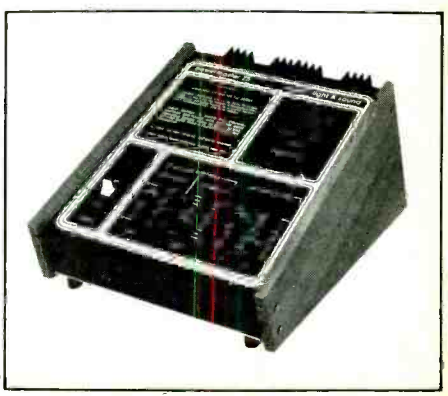
Moog Music has introduced an interesting, new concept in amplifiers, an amplification system specifically designed for the difficult requirements of amplifying synthesizers. The Moog Synthesizer Amplifier head is actually a comprehensive mixing console with dual 200 watt RMS power amps built in. Four input channels are provided, with two input jacks per channel. Each channel features a three-band equalizer with continuously variable frequencies in overlapping ranges, a level control with LED overload indicator and an effects send. The master section features a 10-band graphic equalizer with center frequencies at octave intervals from 31 Hz to 16 kHz, an effects return for external effects or the built-in reverb, a master volume control, a special peak-reading meter with a 60 dB range, and a house kill switch and headphone output for convenient presetting. The two channels of power amplification built in can either be used as a biamplified system with the built-in 4-pole active crossover network, or they may be used as separate 200 watt RMS, full-range amps. Each amp has its own compressor to help avoid clipping or overdriving the amp; compressor threshold is switch-selectable at +2, 0 or −8 dB

signal levels, and separate LED indicators are provided for each compressor. Each amplifier also has a clipping indicator LED, plus two fault indicators are provided to warn of overheating or a DC fault in either amp channel. The companion speaker system is a 3-way, two-cabinet system. The lower cabinet houses two 15-inch drivers in a computer-designed vented enclosure and two wide-dispersion compression tweeters. The upper cabinet is a mid-range horn with compression driver. The speaker system is designed for a 1 kHz crossover from bass to midrange (biamp), and contains an 8 kHz crossover from midrange to treble.

CIRCLE 8 ON READER SERVICE CARD

POWER AMPLIFIERS

Meteor Light and Sound has introduced the Powermaster 75 stereo power amplifier, a 75 watt RMS per channel model. The amp uses a fully complimentary circuit design which is said to minimize transient intermodu-



lation distortion. Center-detented slide-type bass and treble controls which may be switched out of the circuit are provided along with slide faders for individual channel level control. Other features include illuminated twin output meters, LED peak indicators and fast-acting fuses for speaker protection.

CIRCLE 9 ON READER SERVICE CARD

MUSICAL INSTRUMENT ACCESSORIES

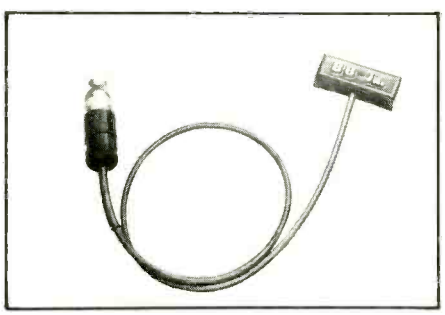
A sophisticated, new, voltage-controlled phase shifter, the Final Phase, is the latest product from Analog/Digital Associates (A/DA). This new unit frees the musician from the monotonous back-and-forth sweep of conventional phase shifters, and has a fully adjustable sweep modulation which makes possible asymmetrical sweep patterns, modulated sweep, syncopated patterns and multiple phasor effects. In addition, the unit is voltage controlled and synthesizer compatible so that an external 0 to +5 volt control voltage may be used to trigger, sweep or modulate the sweep of the phase shift stages. A/DA also makes an optional control pedal for use with the Final Phase for pedal-controlled sweep and sophisticated wah-phase effects. In addition to the extensive sweep facilities, the Final Phase has continuously variable controls for Range and Intensity of phasing effect for very comprehensive control of the range of possible effects. Also included is an overdrive circuit which may be used separately or in conjunction with the phasing. Final Phase was designed for low current consumption to maximize battery life, or a low cost AC/DC converter is also available. List price of the A/DA Final Phase is $139.95; the optional control pedal is $49.95.

CIRCLE 10 ON READER SERVICE CARD

Now available from FRAP is the model GT, a new version of the popular FRAP Model T acoustic guitar pickup. The GT is a complete, prewired kit with all the parts needed for internal installation of the FRAP pickup system. Included with the Model GT is a patented FRAP three-dimensional transducer, a miniaturized preamp, a sealed volume control, ¼-inch output jack with integral battery switch, battery tray, battery connector and batteries. With these items, any competent guitar maker, repairman or accomplished do-it-yourselfer can install the FRAP pickup system in any round-hole, flat-top guitar. The Model GT has a low, 250 ohm output to allow the use of long cables without treble loss or hum pickup.

CIRCLE 11 ON READER SERVICE CARD

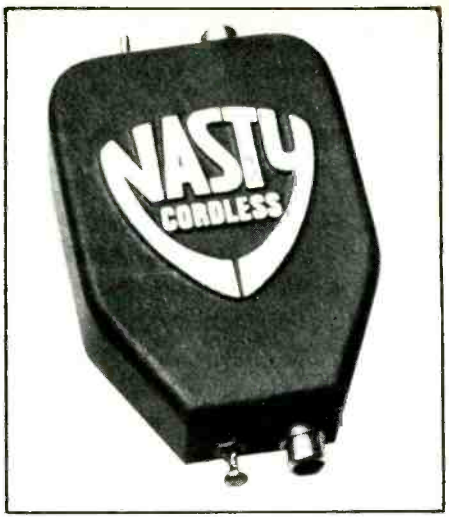
Barcus-Berry has expanded its pickup line downward with the introduction of the B-B Jr. acoustic instrument pickup. The B-B Jr. pickup is a miniature, sealed transducer designed to mount quickly to the bridge of almost any stringed instrument with the



special Barcus-Berry adhesive without altering the sound of the instrument or marring its finish. Frequency response of the new unit is said to be 5 Hz to 50 kHz. Output level from the B-B Jr. is high enough to drive any amplification system comfortably, although the output impedance of the unit is very high so that a preamp may be advisable in some circumstances. List price for the B-B Jr. is under $30.

CIRCLE 12 ON READER SERVICE CARD

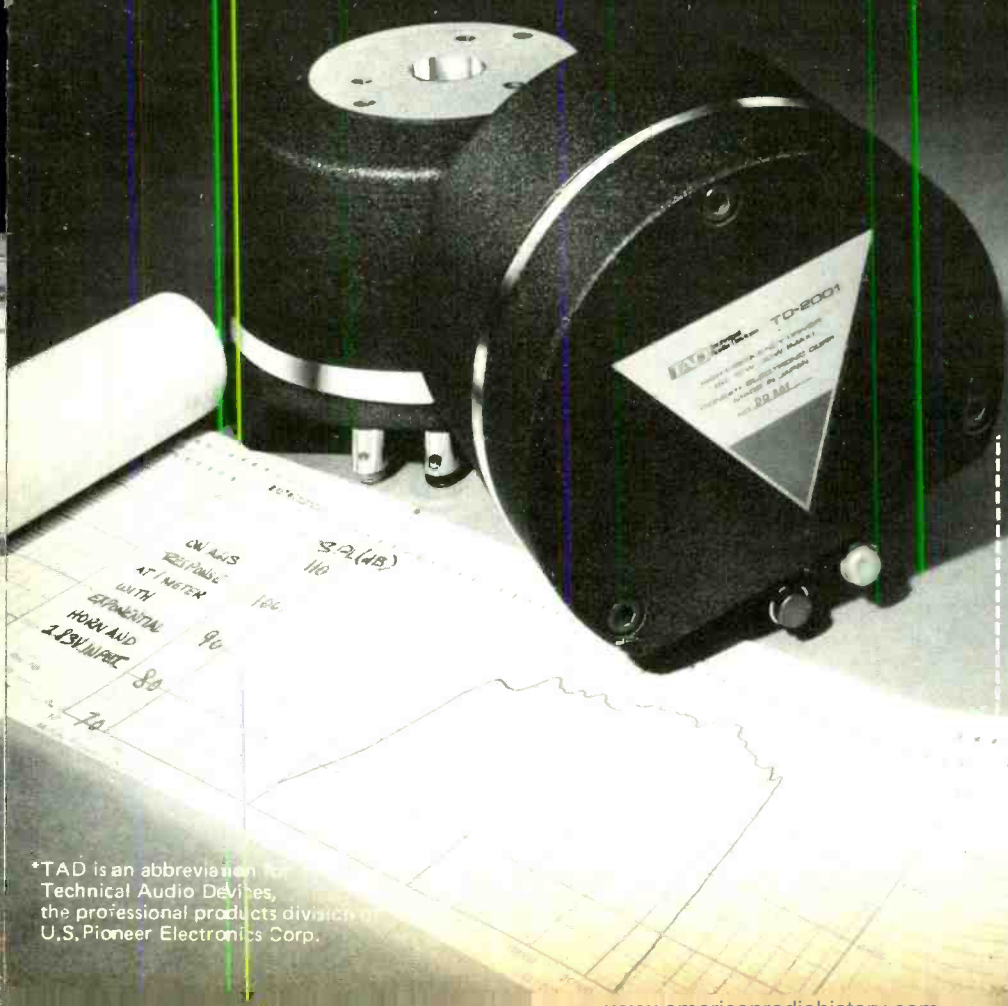
This month brings news of another cordless guitar system, the Nasty Cordless. Unlike the wireless systems based on modified wireless microphone systems, the Nasty cordless was designed from the ground up as a cordless system for musical instrument use. The first major difference is that the Nasty system uses frequencies in



the FM broadcast band rather than the special communications band that the wireless mic systems use. The Nasty cordless transmitters and receivers are fully tunable across the 88 to 108 MHz FM band so that they may be returned to any open spot on the band at will using their vernier-drive tuning knobs; the mic-based systems are all crystal-controlled, making retuning to avoid an already-used frequency much more cumbersome. Two basic systems are available from Nasty: the low-cost Nasty Cordless Black is designed for use with a conventional hi-fi FM receiver which will limit the Black system's signal-to-noise to about 60-70 dB, while the Nasty Cordless Blue is designed for use with the Nasty Pro 400 Receiver which uses a compansion system to yield a claimed signal-to-noise of 95 dB with frequency response from 20 to 20 kHz (±3 dB), and distortion less than 1%. Also available is the Pro 500 Combiner receiver which allows a mode of operation where the system constantly chooses between the output of the regular Pro 400 receiver and the Pro 500 to always yield the strongest audio output signal. The Nasty Cordless transmitters are compact die-cast aluminum affairs with built-in belt/guitar strap clip for convenient use. The transmitters are powered by a 9-volt, rechargeable NiCad battery which is good for some five hours of use between recharges, or by conventional 9-volt transistor radio batteries which are said to last some twenty hours. Nasty Cordless prices start at about $250 for the Nasty Black transmitter to about $1300 for a Nasty Blue combiner system (using both a Pro 400 and a Pro 500 receiver). Usable range for the Nasty systems is said to be approximately 250 feet.

CIRCLE 13 ON READER SERVICE CARD

THE NEW TAD* DRIVER, IT GIVES YOU MORE BY GIVING YOU LESS.



The new one-inch TAD driver is truly unique. There is nothing else like it. Use it with your favorite horn and you'll get a frequency response from 800 to 22,000 Hz. So one speaker does the same job it used to take both a tweeter and super-tweeter to do. Saves weight. And money.

The secret is the TAD driver's beryllium diaphragm.

The diaphragm is the heart of a driver. It must be both light yet rigid. We used beryllium to achieve a standard of performance never before known to the professional. Every single tone — no matter how subtle or how complex — is captured and reproduced just the way it is played or recorded. The resulting sound is a revelation.

The quality of both parts and workmanship, plus the same care in assembly given a fine watch, makes the TAD driver a new standard for the entire industry. It allows the driver to reproduce frequencies up to 22,000 Hz without any major drop-off in response and permits it to withstand high input power.

If your job involves professional sound reproduction — on stage, in concert halls, in clubs or studios — you have an obligation to yourself to hear this remarkable driver.

With the arrival of the TAD driver the state of the art just took a quantum leap.

TAD Technical Audio Devices
A Division of U.S. Pioneer Electronics Corp.
142 Redneck Avenue, Moonachie, New Jersey 07074
Telephone: (201) 440-8234

TO: Technical Audio Devices MR
142 Redneck Avenue
Moonachie, New Jersey 07074

Please send technical data for the TAD product line. (Dealer inquiries also invited.)

NAME _____ (Please Print)
TITLE _____
COMPANY _____
DIVISION _____
ADDRESS _____
CITY _____
STATE _____ ZIP _____
PHONE (_____) _____ EXT. _____
Area Code

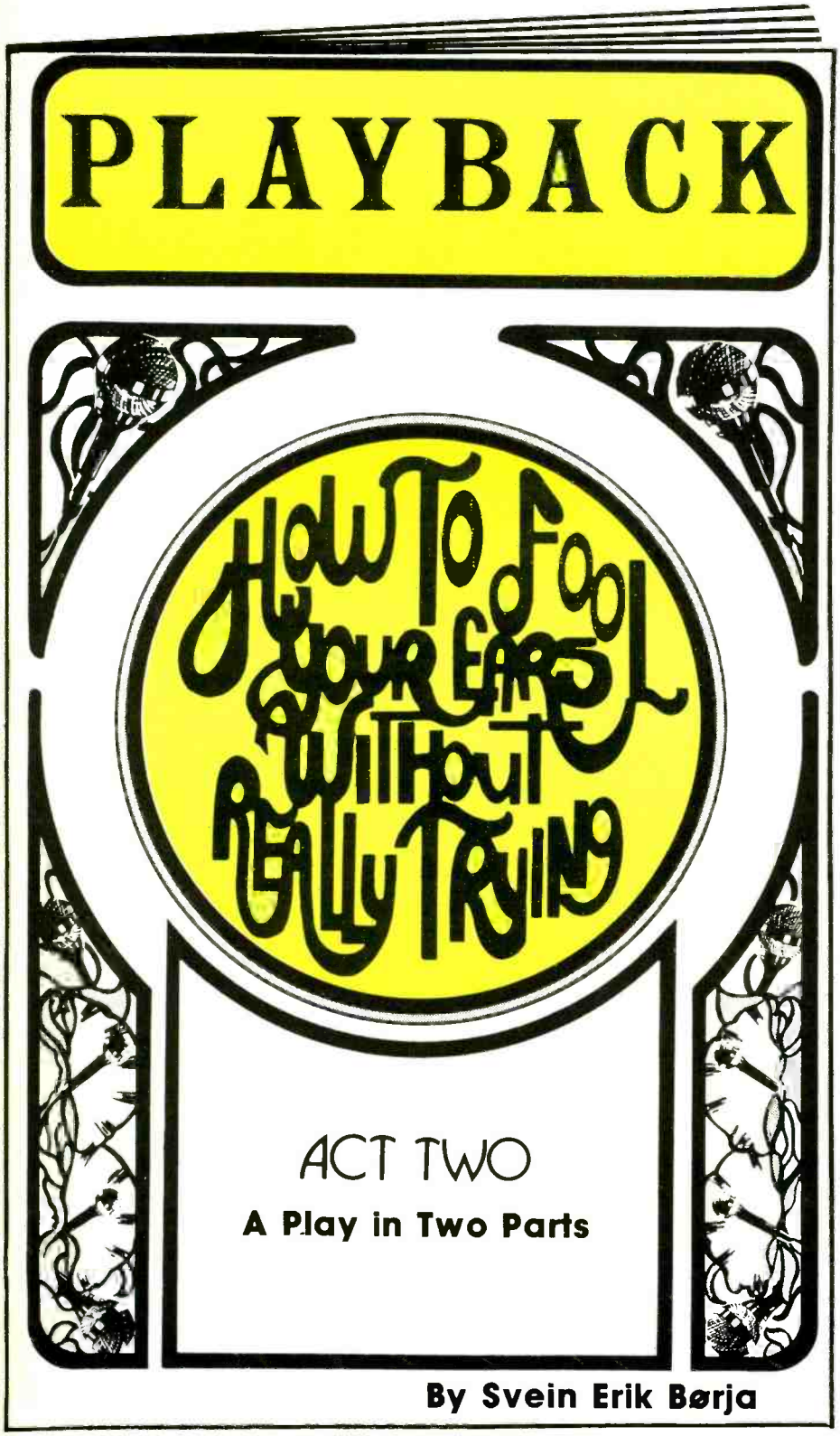
See us in Room 12L at the AES Convention

CIRCLE 86 ON READER SERVICE CARD

*TAD is an abbreviation for Technical Audio Devices, the professional products division of U.S. Pioneer Electronics Corp.

We began this piece last month with an introduction to the listening experiment and the problems in a control room that would bring such an experiment to light.

The reader should have last month's issue (Sept. '78) on hand so that he may be able to refer to diagrams mentioned once again in this issue.



Remix at Studio 1

It was after the first mixdown in Studio 1 that this experiment started. The disappointment of having heard the mixdown played back on a more linear system made me curious about what had happened during the mixing. We decided to measure the listening response of the control room, and after the result (Fig. 2a) it was clear that something had to be done before we made a remix. The result came as a surprise to the staff normally working in the studio.

Some changes had to be made in trying to improve the listening conditions. It was clear that the room resonance could not be cured without having the control room rebuilt or at least largely modified. However, in an attempt to get a more balanced response, the following practicable adjustments were made:

1)The tweeter control on the monitor speaker was turned up fully; 2) The treble control on the monitor amplifier was boosted; and 3) The bass control on the control amplifier was turned down. The result of these steps is shown in Fig. 3a. As can be seen, there was a more uniform response, but still far from a satisfactory result. However, it was decided that a new mixdown should be made under these conditions. It is important to note that this was the only occasion during the experiment where the listening response was known before the mixdown was actually made.

The new mixdown sounded rounder and more full-bodied than the first. However, it was more so than one would like. As can be seen from the spectrum energy response of this mix, (Fig. 3b), the energy levels are quite different from those found in the first recording, with considerably less high-frequency energy. This made the recording sound dull, dense, heavy, untransparent and lifeless. Again, we notice the tendency of the ear/brain to counteract gross deviations in the listening response, and work towards some kind of a tonal and overall balance. A comparison of the listening and energy response (Fig. 3c) made the mirror imaging quite evident.

From our experience with this mixdown we learned that bringing the high-frequency energy in the listening response to such a high level is a rather dubious solution, because such recordings may sound dull and boring on most normal playback systems in the home, at least today.

Studio 2

The control room of Studio 2 is much smaller and far less "live" than that of Studio 1. Basic equipment is a medium-big Neve mixing console, a 6-track MCI and a 2-track Studer tape recorder. The mixing console uses both VU and peak-reading meters. Monitor

amplifier is a 2 x 150 W popular American type. The loudspeakers are also a commercial model by a well-known American manufacturer, and are 2-way systems. They are hanging from the ceiling, as far apart as the control room admits, about 2.5 cm from center to center of loudspeaker. One sits quite close to the loudspeakers, and there is no major problem in establishing the position of each instrument on the sound horizon. This control room has installed an octave-type active equalizer in order to control the listening response.

The loudspeakers are tilted and turned for best possible response at the recording engineer's position. This was common to all the studios in the experiment. Only the engineer had an optimum position for listening. It is quite obvious then that when a producer asks for changes in the balance or in the individual character of an instrument, he is requesting this on the basis of quite a different sound image than that which the engineer is hearing. This often causes confusion. In order to hear the same thing under these circumstances, the producer must either stand right behind and bend over the engineer, or have the courage to sit in his lap, which, as a rule, is quite unpopular. Immediately after the mixdown in Control Room 2 had been completed, the listening response was measured (Fig. 4a). It should be observed that the phonograph cartridge used in this studio to play the B & K test record is known for having a high-end peak. The rise in level above 12.5 kHz certainly is a result of this, and is not the way the monitoring system really behaves. (It probably continues to fall off or level off.)

As can be seen, the listening response of the left channel is quite uniform and controlled. The response of the right channel, however, can not be considered satisfactory. The right loudspeaker is hanging differently from the left. Such a difference in the listening response of two loudspeakers is very dangerous. Just think what one might start doing to a stereo piano recording in trying to make it sound correct through these loudspeakers.

The average sound pressure level during this mixdown was 87-90 dB. Even if the listening response on the left is quite good, and does not exhibit a dramatic rolloff towards the high end, the sound impression is dull and untransparent as if the transient response and resolving ability of these

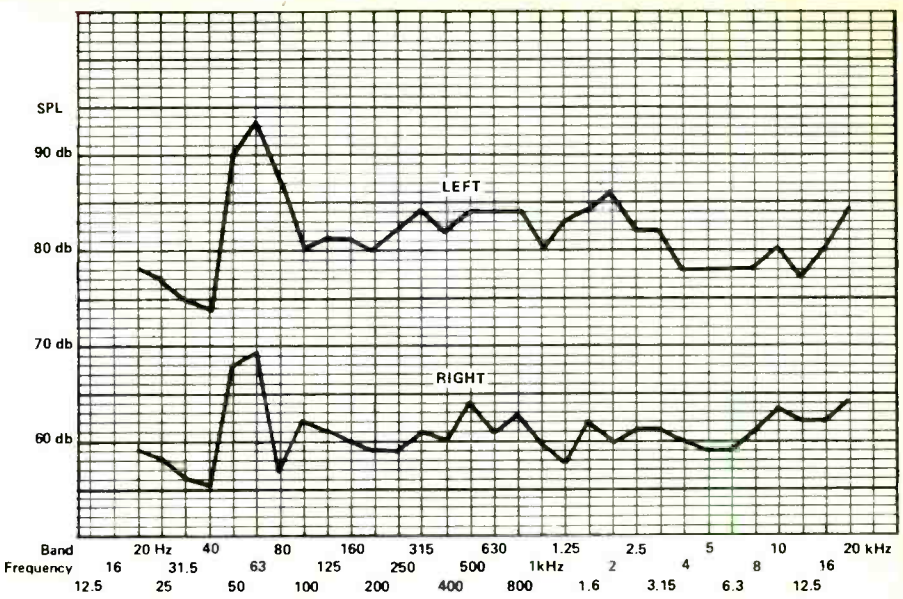


Figure 3A

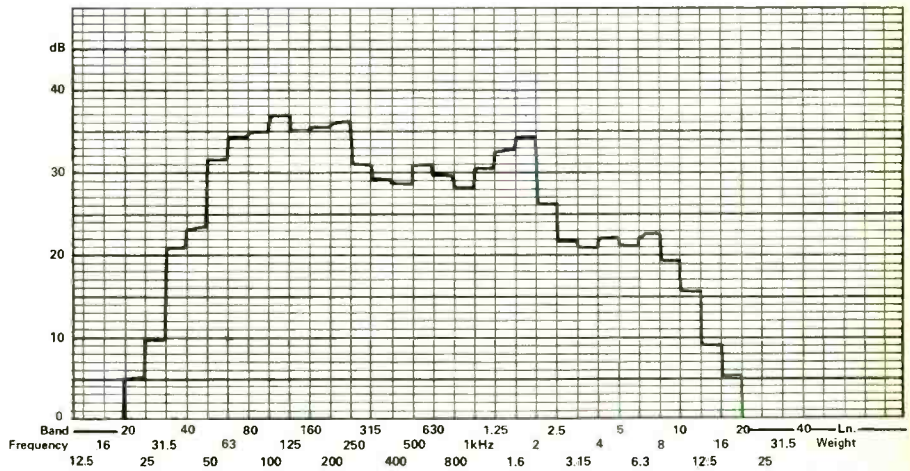


Figure 3B

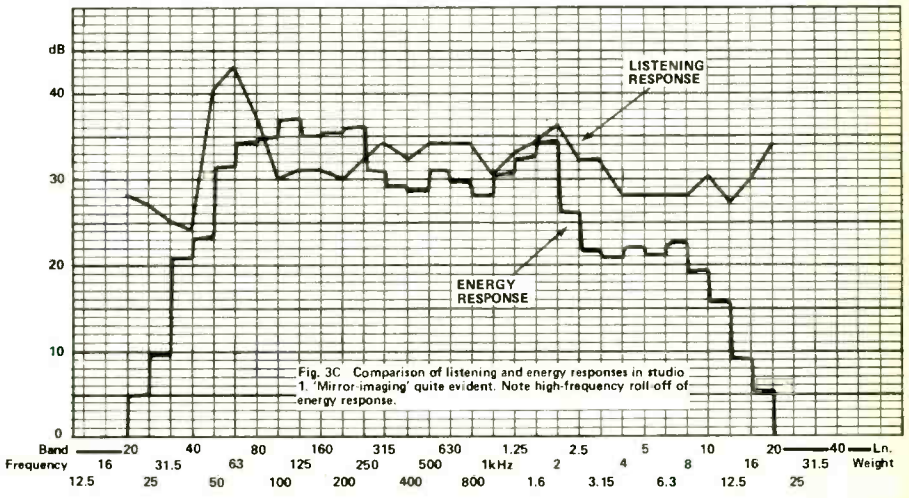


Fig. 3C Comparison of listening and energy responses in studio 1. 'Mirror-imaging' quite evident. Note high-frequency roll-off of energy response.

Figure 3C

Fig. 3: Measurements taken in Studio 1 after the adjustment of monitoring system. *a*) Listening response; *b*) Energy response; *c*) Comparison of a and b.

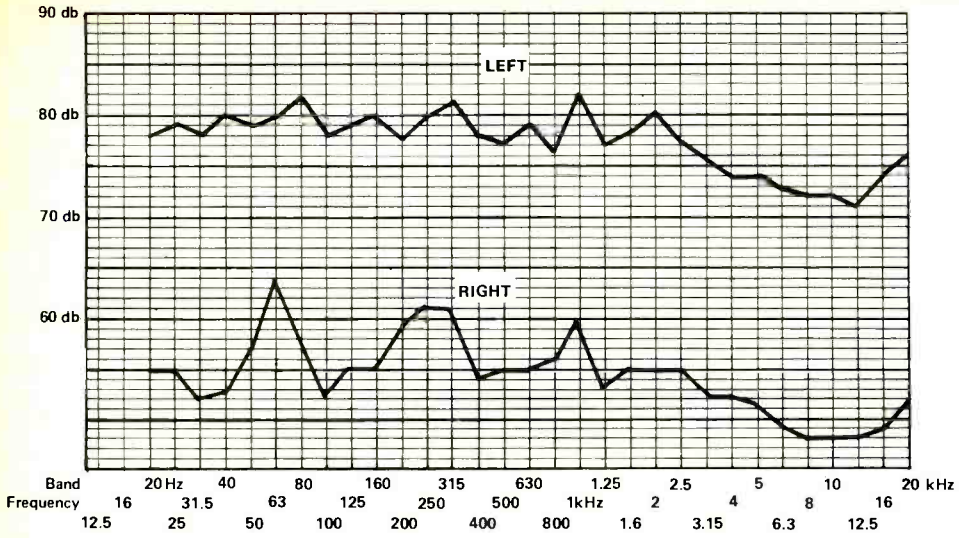


Figure 4A

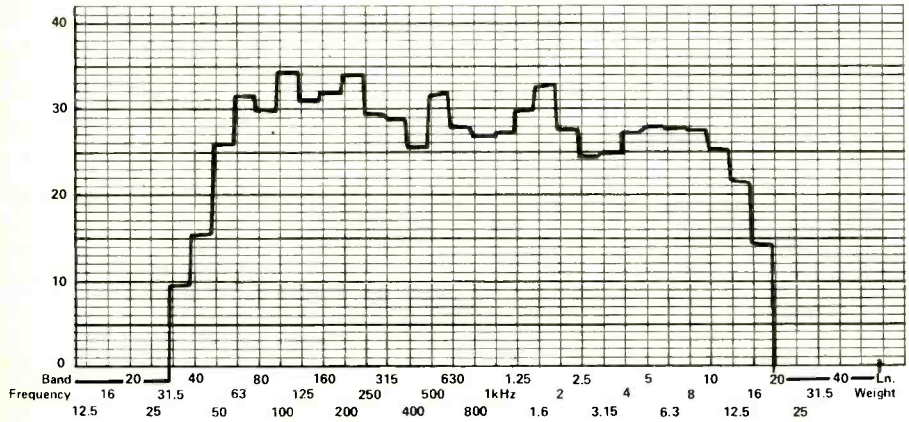


Figure 4B

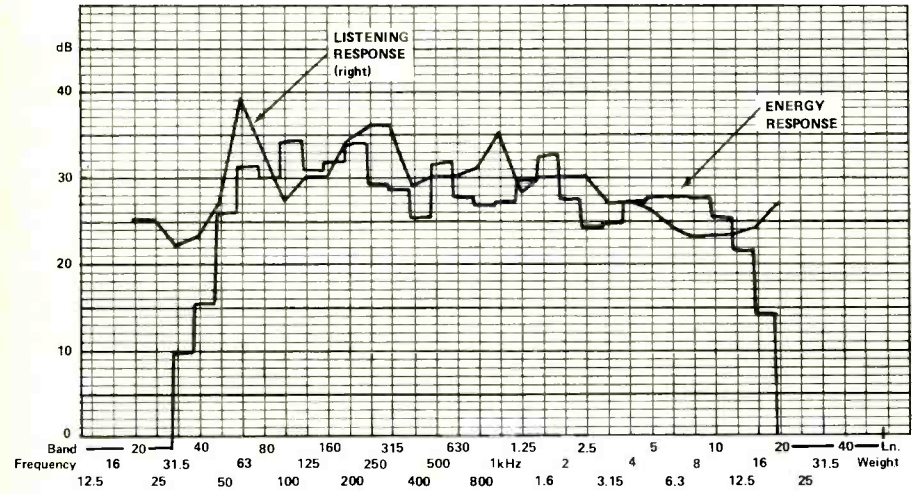


Figure 4C

Fig. 4: Measurements taken in Studio 2. *a*) Listening response; *b*) Energy response; *c*) Comparison of a and b.

loudspeakers are very bad. Cymbals and percussion instruments often need a lot of equalization to make them come through. However, they never sparkle, and one never has the feeling of transient, well-defined highs, often making mixing a hit and miss process.

The energy response data of this recording (Fig. 4b) show what has happened during mixdown. In comparing the energy response with the listening response (Fig. 4c) one should remember that the energy response is monaural. Since the listening response of the left channel is quite uniform, it is the listening response of the right channel that will determine the *variation* in energy emitted from the monitoring system. It is then logical to compare the energy response to the right channel listening response. This comparison makes the mirror image tendency obvious, especially in the 80-200 Hz region where the listening response shows a dip and the corresponding energy response has a boost.

The high-end rolloff of the monitoring system starts at an early point; 2 kHz for the left and 1 kHz for the right channel. This may be responsible for the rather high energy levels between 3-10 kHz. This gives the recording a distinct and powerful character which is not unpleasant for this type of music. Drums and percussions are clearly delineated and "transparency" is added to other instruments which have overtones in this region. However, on a very flat playback system this may easily cause listening fatigue. At any rate, it is mostly a result of a fooled ear, and not so much of creativity. The tendency of being a slave to an imperfect monitoring system is also evident in this recording.

Studio 3

This is the newest and most modern studio of all those used in the experiment with a Helios mixing console, 24-track 3M and 2-track MCI tape recorders. The monitor amplifier is a quite advanced commercial type at 150 W per channel. The monitor loudspeakers are made by the same company as those in Studio 2, but they are more modern 4-way systems. They are used for critical listening purposes, since most of the mixdowns done in this studio are done through a simple home-type loudspeaker. During this experiment we used the big loudspeakers which hang from the ceiling. An active equalizer was used to give a pre-

ferred listening response in this control room. The studio is also equipped for 4-channel mixdowns.

This control room was the biggest, and may be referred to as a "medium-live" room. There are big windows toward the studio on two walls. Because the mixing console is positioned with its back parallel to the main window, the risk of "splash-back" effects is present. Distance to the loudspeakers from the listening position is approximately 3m. The distance between the loudspeakers is about 4.5 m which, the author thinks, is a little too wide, making positioning of the instruments in stereo-panorama difficult due to the influence of reflected sound. The sound pressure level during this mixdown was about 82-85 dB, which is quite comfortable; and the monitoring system was quite "easy" to listen to.

At this point in the experiment it became clear that it would be an advantage to write down the various equalizations done to the program material during the mixdown. The notes were marked on normal graph paper for easy comparison with the two other measurements. The equalization graph shows the center frequency of the correction and the amount of boost or cut at that frequency.

As can be seen from the listening response of this control room (shown in Fig. 5a), the left response is not too bad; if we overlook the valley around 100 Hz and the broad peak below which has been equalized into the monitoring system by the active equalizer mentioned earlier. From 125 Hz to 20 kHz the response is not too ragged, overlooking the level drop of about 6 dB from 2-3 kHz. The listening response from the right hand loudspeaker is not as good. It hangs differently from the left (just as in Studio 2). However, it is beyond doubt that the components in this monitoring system are of a higher quality than that of any of the other studios. Measurements and calculations of the listening response were made as the studio was built.

The energy response of the recording made in this control room is shown in Fig. 5b. The relationship between the listening response and the energy response (Fig. 5c) is not obvious as in the other control rooms, although traces are found of mirror imaging around 100 Hz, 500 Hz and 1.6 kHz (especially when the right channels are compared).

It may be here, due to the relatively

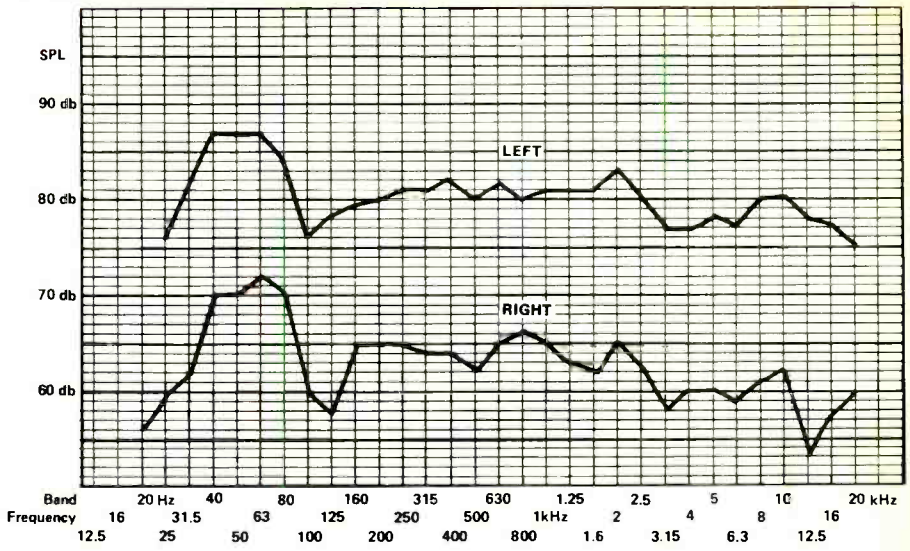


Figure 5A

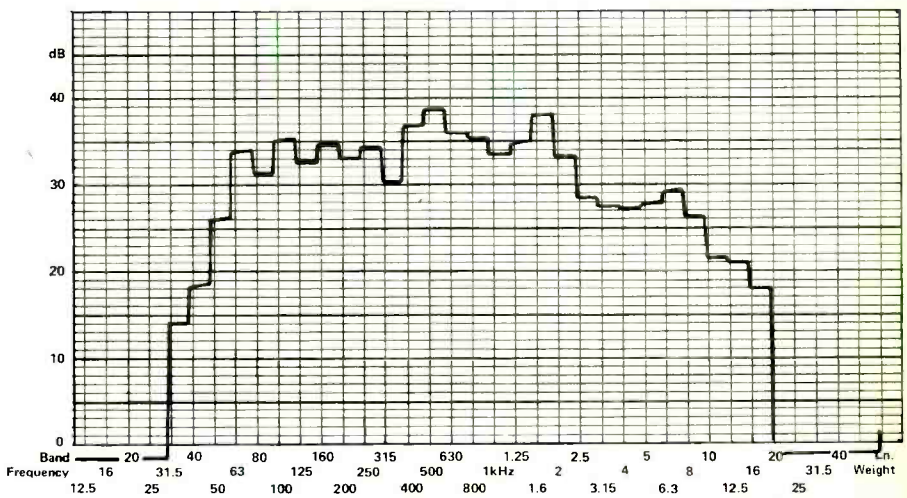


Figure 5B

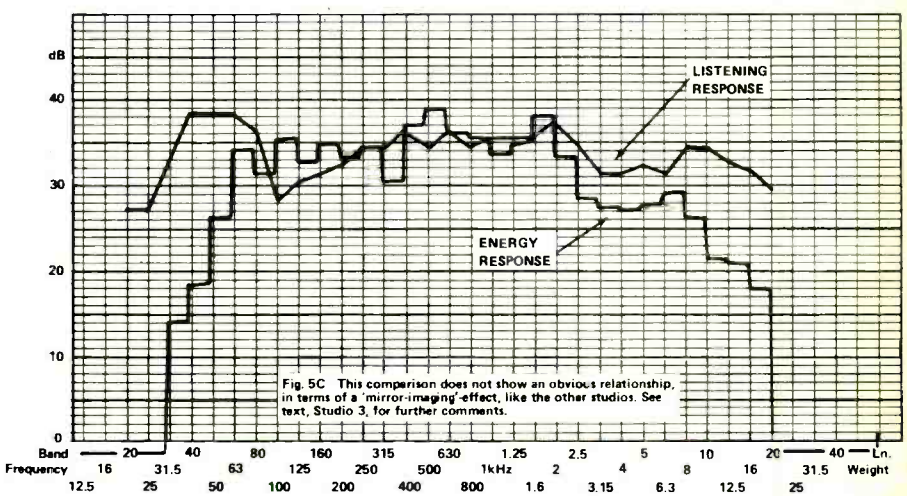


Fig. 5C This comparison does not show an obvious relationship, in terms of a 'mirror-imaging'-effect, like the other studios. See text, Studio 3, for further comments.

Figure 5C

Fig. 5: Measurements taken in Studio 3. *a*) Listening response; *b*) Energy response; *c*) Comparison of a and b.

good listening conditions, that for the first time during the experiment, we see creativity at work, and not creativity at war trying to fight a listening system which forces us to do something other than produce the desired sound picture. However, looking at the equalizations done to the program material during the mixdown shows some rather remarkable results (Fig. 6). Most of the manipulated frequencies are exactly in the areas where the listening response shows its greatest deviations, and the equalization is exactly counteracting the deviation both in frequency and in magnitude.

Many of the corrections done with the equalizers are found exactly in this area: electric guitar, electric violin, and electric piano have been boosted at frequencies of 3.15, 4.5 and 7 kHz and to the same extent as the loss for which they are trying to compensate. Again the ear has detected a loss and tried to restore a natural balance.

The recording made at this studio has a different sound. Whether it is better or worse may be a matter of taste, but to my ears, it is a recording with good balance between the instruments and reasonably good tonal quality and projection of each instrument.

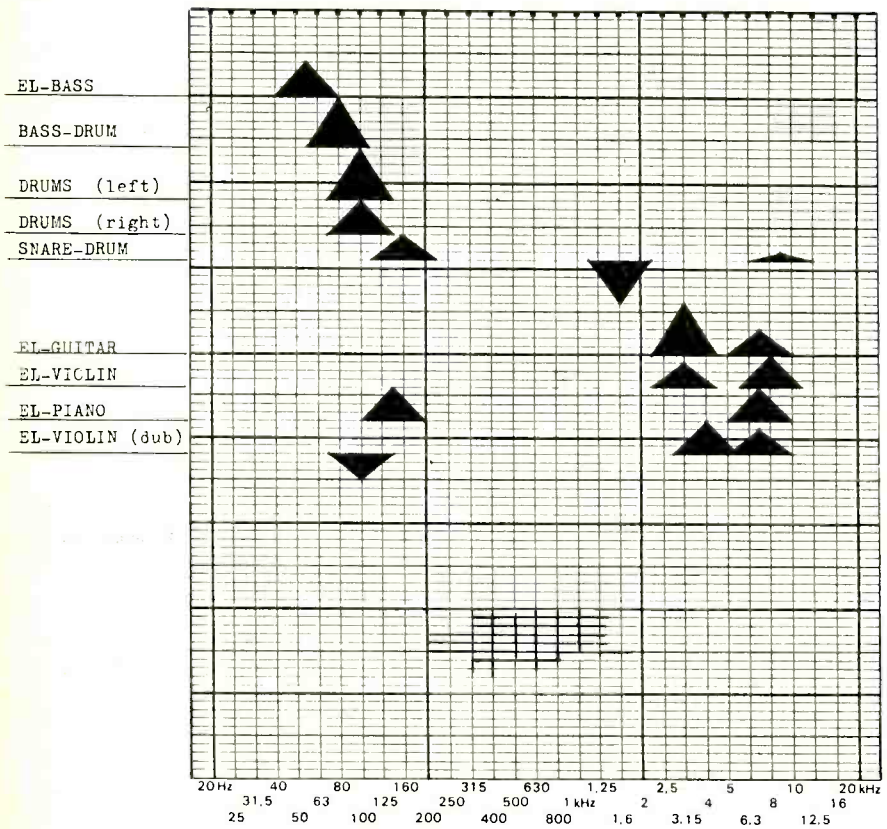


Fig. 6: Equalization made during mixdown in Studio 3.

Looking at the rather wide dip in the listening response ranging from around 60-200 Hz, with its minimum level around 100 Hz at 6-7 dB below the average level, we find that many of the equalization settings have their center frequency right in this valley and have a boost of 5-6 dB. The bass drum has been boosted 6 dB at 80 Hz, and other drums have been boosted 6 and 4 dB at 100 Hz. Without a doubt the ear has detected that something is missing here and tried to compensate for it. We find the same tendency from 2-8 kHz where the listening response shows a wide but not deep valley.

Studio 4

This is the oldest studio, although the equipment is quite new: MCI mixing console, MCI 16-track and 2-track tape recorders, and an English-made monitor amplifier (which often exhibits gross crossover distortion). The loudspeakers, manufactured by the same company as those in Studios 2 and 3, are 3-way systems also hanging from the ceiling, not too high and not too wide apart.

Sound pressure level during mixdown was only about 85 dB, but in spite of this the author experienced almost instant listening fatigue in this control room; probably a combination of crossover distortion in the monitor amplifier and the listening response shown in Fig. 7a. This listening response is very different from the others. We find maximum energy in the 1-3 kHz area where the ear has maximum sensitivity. The sound in the control room was of such quality that gross equalization had to be done on every instrument in order to get an acceptable balance.

The corresponding equalization graph (Fig. 8) shows exactly the same tendency and precision as we found in Studio 3, but here they are of another magnitude, as are the deviations in the listening response. The equalization is compensating exactly at the frequencies where the listening response is showing its greatest deviations.

The resulting energy response (Fig. 7b) will come as no surprise. It is almost a perfect mirror image of the listening response as shown by the comparison in Fig. 7c. Again, we must realize that mixing down under such conditions can not be termed creative work, but rather a blind fight against a monitoring system.

The sound of this recording is extremely aggressive, and has very little presence. Also a high level of distortion is evident. There is more than 15-dB boost in the bass drum at 100 Hz. Cutting a record from this master tape would certainly put an extremely heavy burden on the cutting amplifier which probably would introduce a lot of distortion including transient intermodulation distortion.

Conclusion

The differences between the five mixdowns made during the experiment are not just barely audible or subtle. They are dramatic and easily audible even to the untrained ear. Some of the recordings are so different in sound that one may wonder if they are realy mixed down from the same master tape, or at least from the same take. Equalization may be necessary during both recording and mixdown in order to obtain wanted tonal effects in pop and rock recordings and also for other types of music where it is necessary to match the sound of different instruments to each other in order to get a pleasing blend. But this should only be done as a function of a creative need, and not because of an ear which has been fooled by a monitoring system of low technical standard.

New Mixing Consoles by Dynacord ...

to help you make it to the top

Here are two great new stereo mixing consoles from Dynacord, the people who make the quality equipment YOUR good music deserves.

MC 20/8/2 STEREO MIXING CONSOLE

MC 20/8/2 STEREO MIXING CONSOLE

Twenty-channel audio mixer for stage and studio work. On stage: Four stereo sub-groups allow you to summarize different channels of equal instruments or voices in each stereo group.

In the studio: Balanced microphone inputs with XLR connectors and line inputs with jack connectors in separate circuitry. Controls per channel: slider faders for volume, two foldback send controls, two effect send controls, panpot, sub-group selectors, mute switch, LO-EQ, HI-EQ and parametric EQ for MID 20 dB-PAD.

MC 1233 STEREO MIXING CONSOLE

MC 1233 STEREO MIXING CONSOLE

Portable control console for sound reinforcement systems and disco applications.

Comes in road-rugged aluminum flight case. Each of the 12 channels has individual slider-faders for volume, rotary-type echo send, panpot, bass, presence, treble input-level and foldback controls. Balanced microphone input with XLR connectors.

Dynacord

FOR FREE, COMPLETE CATALOGUE OF DYNACORD SOUND EQUIPMENT AND DEMONSTRATION, CALL (215) 482-4992 OR WRITE P.O. BOX 26038 PHILA., PA. 19128.

CIRCLE 55 ON READER SERVICE CARD

Far too much emphasis has been put on the ability of a loudspeaker to play loud, and too little attention has been paid to the quality of other factors in the monitoring chain, such as loudspeaker listening response, low distortion, high resolution, focusing ability, and energy response. If more attention is paid to these factors it may not be necessary to have loudspeakers play as loudly as they are played in many control rooms today, except for "rock freaks" who need the physical sensation of loud music to enjoy a recording —a sensation that some discotheques may be able to reproduce together with heavy distortion, but very few home systems can presently generate.

To my knowledge, few, if any, sound control rooms today have monitor loudspeakers that approach the state-of-the-art in loudspeaker design. The choice has been made because of the need for high sound pressure levels not high tonal quality.

Companies specializing in building sound control rooms are working on the problem of getting a reasonable listening response in control rooms, and some have come a long way. But so far, their starting point, the loudspeaker, is a long way from a perfectionist's loudspeaker system.

Many of the commercially-made loudspeakers and amplifiers which are used in homes today are of far better quality than similar equipment normally found in studios. These home systems will reveal flaws and shortcomings in recordings and create a demand for better recordings. Not only will bad tonal quality of instruments and overall balance be criticized, but also imperfections in the electronics of the mixing console itself.

Whether a recording is good or bad may be a matter of taste. But the question of its fidelity, its faithfulness to the real music and instrumental sound is a matter of precision, requiring a monitoring system of the highest possible standard, which can be used as a reference second in quality only to how the music sounds where the microphone is set up. The monitoring system of a sound control room, consisting of the power amplifier, the loudspeakers and the room itself, must not fool the ears of those working with recording, but rather must be a precise instrument telling the engineer, producer and musicians what is coming out of the microphone, mixing console or tape recorder. If not, the ear and the creative mind become a prisoner of a listening system that forces the ear to actually work against the precise properties built into the rest of the technical equipment and to add noise, distortion, phase problems, and tonal imbalance, which result in a recording of inferior fidelity.

Monitor loudspeakers and control rooms, including technical equipment

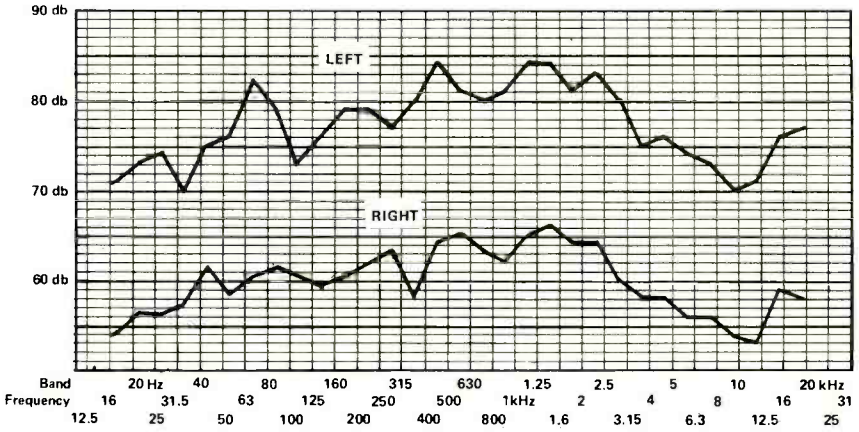


Figure 7A

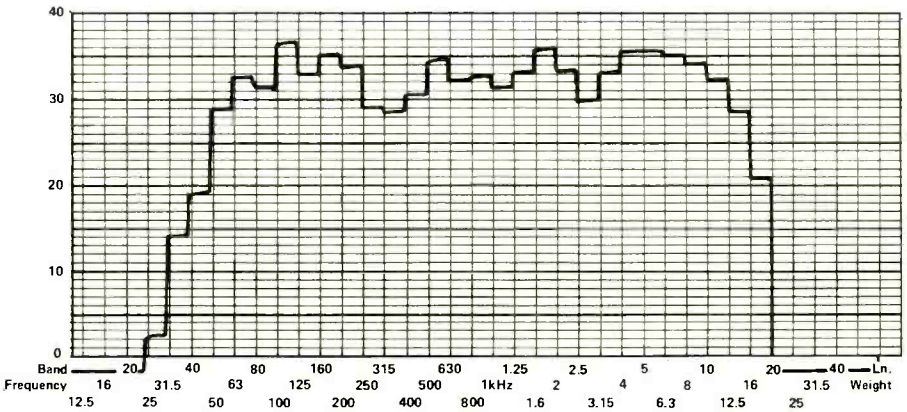


Figure 7B

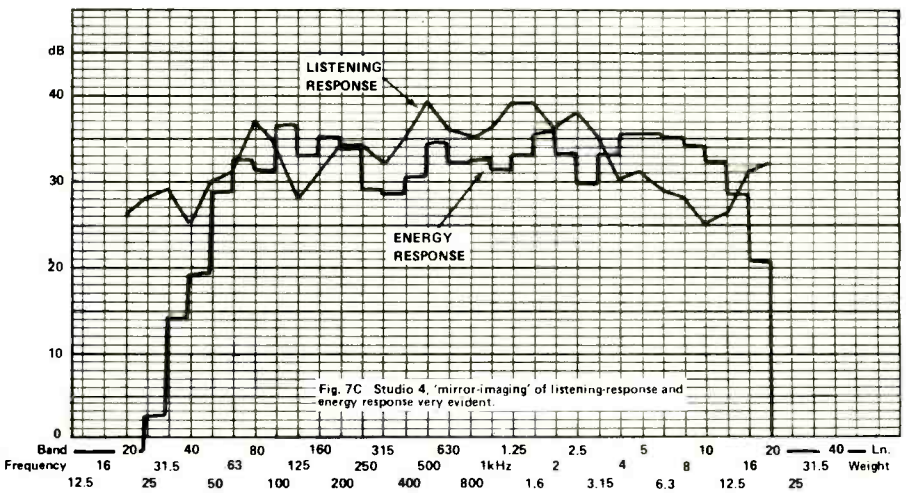


Figure 7C

Fig. 7: Measurements taken in Studio 4. *a*) Listening response; *b*) Energy response; c) Comparison of a and b.

"good acoustics"

Imagine if all clubs were built for live music; that clubowners spent as much on sound systems as they do on decor; and all you had to do was set-up and play. Well, forget it. There is only one Hollywood Bowl and chances are it's not your next gig. More likely, the acoustics at your next room will be just as bad as the last, maybe worse. More likely, the next clubowner's "vocal smasher" is older than the last one, and as usual it will be you and your group that suffers. All too familiar? Well relax. Acoustic, with over a decade of live music experience, is introducing an exciting new line of Sound Re-enforcement products, designed for turning problems into opportunities. Quiet, versatile mixers with low distortion amps built-in for fast, easy set-ups. Features like dual-sensing overload indicators, 9-band graphic equalizers, built-in reverb and light bar output displays. Rack mountable power amps that boast fan cooling, and extensive circuit safeguards. Even the compact solid-plywood speaker systems include a driver protection circuit that will handle power overloads without program interruption. Acoustic has carefully matched these components to perform in the most adverse conditions, and continues to offer the exclusive Lifetime Protection Plan. So why suffer through another night of feedback and blown horns? Don't expect "good acoustics," take them with you.

nobody was ever sorry **acoustic** **...they bought the best.**

professional sound equipment

7949 WOODLEY AVENUE • VAN NUYS • CALIFORNIA 91406

CIRCLE 54 ON READER SERVICE CARD

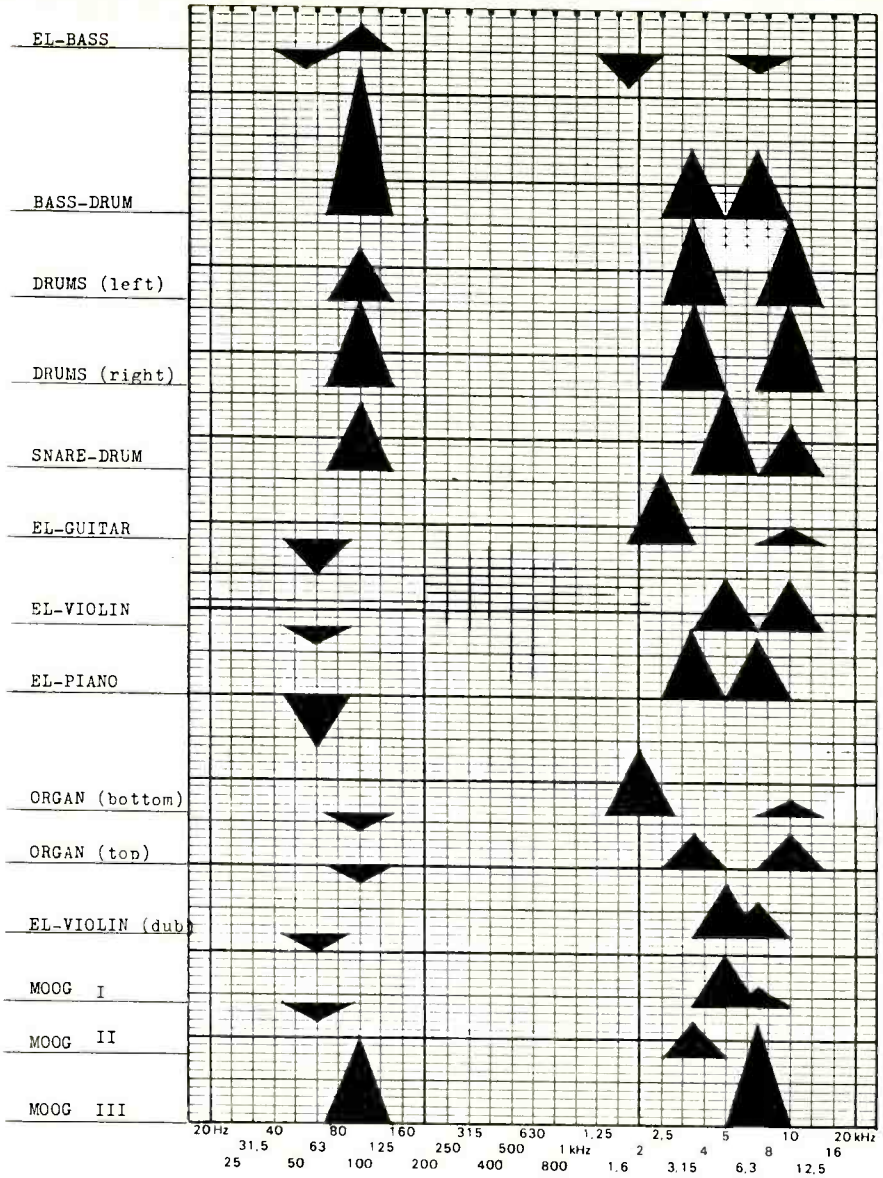


Fig. 8: Equalization made during mixdown in Studio 4.

and furniture, must be treated as one entity. The best starting point may be a linear response which, when needed, can be shaped to a preferred listening response. It is beyond the scope of this paper to discuss the "ideal" shape of this response; it probably depends on the state-of-the-art of reproducing equipment available at a particular time as well as on the listening distance and the directivity/energy response of the monitor speaker.

BIBLIOGRAPHY

[1] D. Queen, "Relative Importance of the Direct and Reverberant Fields to the Spectrum Perception," *J. Audio Eng. Soc.*, vol. 21, no. 2 (March 1973).

[2] R. Allison, "The Influence of Room Boundaries on Loudspeaker Power Output," *J. Audio Eng. Soc.*, vol. 22, no. 5 (June 1974).

[3] G. Holt, "Subjective Testing" (Part 5), *The Stereophile*, Winter 1972.

[4] D. Queen, "Distribution of Maximum RMS Level in Live Music Samples," Preprint AES 52nd Convention.

[5] B. Cornfield and J. Lyon, "New Thinking about the Acoustic Design of Control Rooms," The Everything Audio Approach. *Record Producer and Engineer*, August 1975.

[6] M. Otala and E. Leinonen, "The Theory of TIM," *IEEE Transactions on Acoustics, Speech and Signal Processing*, vol. ASSP-25, no 1, (Feb. 1977).

[7] Henrik Staffeldt: Control-room-acoustics and monitor-loudspeaker-parameters, *Nordic sound symposium* no. 8, 1977.

START YOUR STUDIO For Under $3000!

- Bi-polar Differential Inputs
- Joystick Quad Panning
- 3 Band Parametric EQ (Per Channel)
- Direct Channel Outputs
- Quad Assigning
- Pink Noise Generator
- 8 Main Outputs
- Solid Teak Cabinetry
- Talk-back System
- Hammond Reverb
- G10 Glass Epoxy P.C. Boards
- 2 Year Warranty

The Q1608 is Carvin's offering for the "ultimate" in a Professional Recording/Road Board. Expandable from a 16 to a 32 Channel system, Carvin consoles are designed to provide the sophistication necessary in the modern recording industry.

The quality of the new Carvin "Quad," like that of all Carvin products, is the highest possible — from use of the best name-brand components, through the craftsmanship of the cabinetry, to the vigorous inspection-testing procedures. Plus, it's made in America.

Naturally, the price remains low, as all Carvin Products are Designed, Manufactured and Sold Directly from Carvin, eliminating distributor and dealer profit costs.

The Q1608 is currently used by a major sound co. for a Broadway Production in N.Y., L.A., S.F., & Chicago. For more information Call TOLL FREE 800-854-2235 (Calif. 714-747-1710) Mon — Fri. or send for your FREE Catalog on all Carvin products including Guitars.

Q1608

$2950

List $7600

Carvin Dept. GP-17,

1155 Industrial Ave., Escondido, Calif. 92025

CIRCLE 80 ON READER SERVICE CARD

a session with WAR

by Gil Podolinsky

"There are three ways to approach recording," began War's stalwart engineer Chris Huston, "your way, my way and whatever it takes." Because Huston has recorded (among others) *Zeppelin II, The Who Sellout*, all of the Young Rascal's hits James Brown's "It's A Man's World," one senses the voice of experience behind the remarks. It's no surprise that guitarist Jimmy Page offered Chris $65 per hour to record all of the Swan Song roster (Zep, Bad Co. Detective, etc.). It's also no surprise to learn that Chris declined as he was in the middle of recording Redbone. While the money involved was quite sizeable, Huston's commitment to Far Out Productions and its artists leaves him no time for undertaking outside projects.

Far Out

Far Out Productions came into existence as a result of Eric Burdon & War—the principals being Burdon, Steve Gold [management], Jerry Goldstein [producer] & Huston. The first one-and-one-half albums [*Eric Burdon Declares War, Black Man's Burdon*] were done in three days. Nine years later, the studio team of Goldstein/Huston continues to work with War, although the recording process they undergo has changed dramatically from their initial weekend baptism. Today, War is constantly in some studio recording. Having just completed the soundtrack to the movie *Youngblood* in L.A., they arrived in Seattle shortly thereafter to record at Kaye/Smith studios.

Studio Shifting

War does not go into a studio with the intent of recording ten specific tunes. Since they are always in the recording mode, War logs 150 to 200 hours of taped ideas into their library in a year. Initially booked into the studio for two weeks, the end of their four week stay ran in excess of sixty reels of tape flown up from L.A.

The first question that comes to mind is, doesn't going from studio to

studio create problems, lack of familiarity, etc.? Chris Huston, whose fifteen years of studio experience are preceded by his year as guitarist for the Undertakers, Liverpool rivals of the Beatles, has the constant moving down to a science. Prior to his arrival at the studio, Chris sends a Production Control Form listing the necessary equipment—mics, types of machines, tape speed, etc.—which a studio should have on hand. (When it comes to noise reduction Chris goes with Dolby. He states that "dbx is better but Dolby is standard." So with as much traveling as he does he's got to have something he can rely on. He cuts War on Ampex 407 tape at 15 ips.)

When he first arrives, he walks around the room to get the feel and to see what the room is capable of delivering. He then will ask the maintenance people how he can expect the equipment to perform. Chris will always bring a reference tape he is familiar with to become accustomed to the monitors. This he does alone. The constant shifting from studio does not bother him for he feels that all consoles perform the same functions. The only difference is the monitor systems.

Adjusting to the speakers is a problem because they can be misleading. Over the years he has learned that if you use U87s [Neumann microphone] for overheads, you can safely put [add] 2-4 dB at 10,000 cycles, whether or not you hear it on the speakers. The years of experience enable him to easily adjust whenever he questions the EQ on the speakers.

Most of the time Chris and Jerry decide which studio will be used. What made Chris hesitate on Kaye/Smith is that it's a Westlake room design, and as such is fairly standard. The monitors, comprised of JBL components, Chris found to be very bassy, which, as he quickly pointed out, doesn't necessarily make them bad, it's simply different from what he's used to.

"When they came out with room EQ, one of the serious side effects was that you could do more damage than good on aiming to make a room flat. You could take away all of the dynamics of what you hear in the speakers. I like speakers that have good transient response and are not too 'cloudy.' It's not a question of one speaker vs. another, but the application, what they [the studios] do to them—being raised on Altec 604Es, where if it sizzles in midrange, you know you've got it. JBLs are quite the opposite. Most people tend to overlook the fact that they're so sensitive. The high end is very efficient, so, to EQ a room, they tend to equal the curve all the way over when really they should slope off from 8 K down, so that when you hear the highs it's what is on the tape. I've found that what's coming through the speakers isn't necessarily what's going to be on the tape."

The Main Thing: Happiness

Before he will place his instruments Chris will ask [the studio personnel] what's normally done. Looks and feel are deceiving, so he will walk around, snap his fingers, shout, etc. [testing the acoustics] The main thing, he feels is to be able to cover one's self, for with session musicians it's much more relaxed, but with War that one minute of free-form creativity could turn into one side of an album.

It is essential that everyone feel a part of the action, so eye contact is a must. In order to achieve both the physical arrangement of people as well as fulfill the acoustic requirement to capture the music, it is often the case where, for example, the guitarist may be on one side of the studio and his amp on the other. The main thing that Chris stresses is that the musicians be happy because the music will reflect that and will simplify Huston's job down to just getting it on tape.

Stainless Steel Miking

The drummer, Harold Brown is using a ten-tom stainless steel set. Being a very "live" set, engineer Huston uses [Shure] SM56s "because of their tight pattern."

"What I've learned over the years is that the more mics you use, the better the separation, but you may not get that overall feel. The solution is to get an overall miking pattern with [AKG] 414s. That is, rather than use them to mic the cymbals, use them to pick up the overall ambience of the drum set, then bring the toms into the mix until you've got what you need."

The snare is miked with two 56s, the bottom one through a Kepex to help give a little more separation when needed. The bass drum mic is a C-37. "Mic techniques should never be discussed," says Huston, "they should be demonstrated; someone copying my mic set-up wouldn't get the same effect because of being in a different room, a different set, the temperature would affect it up or down 2 dB, etc.

"Drums are never a problem in getting the sound. The main problem comes in getting the musicians comfortable. You may have an ideal spot for the drums in a room, but the drummer may not like it. So, I ask him where he'd like to set up and here's what I suggest. We started with a smaller set in the same place, then tried the drum booth. I don't like the drum booths 'cos they're too dead. When that's the case your bass goes right into the wall, the highs travel in a straight line and you get too brittle a sound. It wasn't right from the moment he got in there because he wanted to play his big set all the time. The main thing is that if he's comfortable he's going to play better, and that makes everything better; then you'll get something you can use."

The rest of the equipment is as follows: U87 on the sax; on Lee Oskar's harmonicas, he goes through both an amp mic as well as an acoustic mic. Lee records in the drum booth because he plays loudly and Chris likes to use the overtones. The bass guitar goes direct both before and after his toys. It goes from the guitar to a direct box to the gadgets then into another direct box. There are six mics on the percussionist, comprised of 87s and 56s. The guitar is miked through the amp with a Sennheiser 441 placed close on the speaker because Howard Scott plays from very soft to very loud. The amps used are Fender Twins of recent vintage. On the selection of amps Chris comments: "The artist is gonna use whatever makes him feel comfortable. I could use what I found suitable, but it's the artist in the end and that's what's important. I've been around so long that I just make the best of whatever comes."

Elaborate Lonnie

Keyboardist Lonnie Jordan uses so many keyboards that the setup to record as well as to catch vocal cues is quite elaborate. Lonnie and Chris reached an agreement on how to proceed. Jordan utilized a Fender Rhodes, Hammond B3, RMI electric piano, Steinway grand piano, two Arps and a Polymoog. The Hammond goes through a Leslie miked top and bottom with U87s because "they're such a gutsy mic, and being a cardioid you don't have to worry about bleed." The Steinway, the studio's piano, is miked with two Sennheiser 457s placed at

Allen & Heath SD 12-2

No other mixer delivers so many features for so little money . . .

Pan pots
Input metering
Stereo echo return
Built-in power supply
12 Mic and line inputs
4 band EQ on each input
600 ohm line level on outputs
12 direct outputs and patch points
Headphone monitor with stereo tape monitor and metering
Foldback (stage monitor), echo send, and PFL (solo) on each input

Allen & Heath S6-2

A complete broadcast production console and an incredible disco console . . .

2 stereo RIAA phono inputs with EQ
Stereo main and monitor output
80db signal to noise/.05 THD
Input and output patch points
2 stereo tape inputs with EQ
Automatic voice-over circuit
Gain control on each input
TTL logic machine starts
2 Mic inputs with EQ
Broadcast cue

audiomarketing ltd.

a subsidiary of audiotechniques, inc.

142 HAMILTON AVENUE, STAMFORD, CT 06902 USA TELEPHONE: 203 359 2315

CIRCLE 67 ON READER SERVICE CARD

90° angles to each other to eliminate phasing. The piano lid is raised with a 2″×4″, and packing blankets are placed on top. The rest of the keyboards are taken direct.

With such an elaborate setup requiring seven channels plus vocal mics, it is important for Chris to have good visual contact with the band to cue from one instrument to another. When, for example, Jordan goes from Rhodes to Hammond, he'll just inform Huston of the upcoming change and Chris will have the fader all set so all he has to do is put them into play. While he could always sub-mix, he feels that the aim is to keep the flow and continuity going.

"It's a case of working with the group for so long and knowing them so well that I know by instinct how many tracks to allow for. It's not a question of being stingy with tracks."

If done "live" in a group situation, there is slight chance that the acoustic guitar will be heard, so, the instrument has to be isolated. An ECM 50 pointing outwards is placed from inside the guitar pointing up the neck. The mic points at a 60° angle across the strings, eliminating a lot of bass and direct highs, giving the engineer a fair sound to work with. In overdub situations a 451 or an AKG 414 is used in conjunction with the ECM 50. Chris will use the 50 flat and then just blend in the second mic. The result is a good transient response and fullness, with very little EQ required.

Everyone in the group is given an SM54 vocal mic which is used primarily for communication in the room. The cue, or headset, is very important. Kaye/Smith utilizes the AKG headphone, which Huston feels he doesn't have to push as hard "because the AKG has the edge that other headphones lack." The problem is that with a seven-piece group and so many mics in a room, once you get several voices in the headphones you get lots of bleed, inhibiting much separation.

As an engineer of long standing, you are able to cope with the studio transitions with little difficulty, but can the same be said of War?

"When the group is listening to a playback, they tend to use volume for effect rather than clarity. They tend to say that it's not loud enough when they really mean to say something else. I try to select medium volume, something that doesn't hype the speakers too much or load the room. Then one of the guys will reach over my shoulder and crank it all the way, but by that time it's OK because I've heard what I need to hear."

Limited Outboard Use

In terms of outboard equipment, Chris doesn't use much. He uses an 1176 limiter on the bass but not for effect (he limits the bass due to its dynamic range EQ-wise); outside of the Kepex, he doesn't use any other limiter or outboard EQ. He hardly uses any compression. He will occasionally use a Harmonizer to enhance but finds that it doesn't hold integrity on multivoice or wide chords. Huston feels that most of what he needs can be achieved through the console. He does use the Eventide DDL quite a bit when mixing, usually in a mono send. Its most common application in his work is delaying the send to the chamber so that the EMT comes back stereo and you have the delay. In tight spots, like a snappy bass that was smothered by overdubs, Huston has found that parametric EQ can help. He feels that the best way to use it is to set it up knowing exactly when you need it and simply to add whatever you think is missing. "If you try to isolate the instrument, clean it up, you do more damage than good. I tend to leave the instrument flat then get it up in the mix to where it's just about right, but lacking, and then bring in the DDL."

In his approach to engineering, Chris strives for naturalness in recording and therefore uses very little EQ, with 2-4 dB [at a given frequency] being his max, and usually tends to take off rather than add.

War Time

With all the preparation behind him, Chris is ready for War. The sessions, originally scheduled for 7 p.m., keep getting pushed back to 9 or 10 p.m. starts as the weeks wear on. It's not uncommon for them to work all night. Huston knows generally what is going to be cut, but is quick to point up that in general, engineering requires a certain amount of humility.

"Whether it's a group you've worked with before, or a new group, or new producer for that matter, people come in with fixed ideas of what they want, how they should be treated, how it should progress, etc. Obviously it's going to work best if you're allowed to work in your own way. The first day is given to getting people comfortable in the studio. They must be [comfortable], and everyone has to be there for the music. The engineer must realize his place. He's very important, but will be overshadowed by the egos of others. You must be ready for change but also ready to defend what you know is right. That's the time to get rid of all conflict between engineer and producer. In my case, I've worked so long with Jerry that there is none.

"When the musicians arrive, they want to make their various personalities known. I have found that explaining that there are three ways of doing things—my way, your way, and whatever it takes—eliminates any chance for an argument."

While a group will normally come in and play a song until they know it (by which time they're too tired to play it), War doesn't approach recording by first rehearsing. With Chris spending the first day fighting not to over EQ to compensate for what he wasn't hearing on the speakers, War was beginning what twelve reels of tape and ten days later would be a series of free-flowing ideas, or jams. They prefer to let their creativity flow, finding it hard the way that some groups coldly work at going in with nothing and trying to come out with something.

Make no mistake about it, this is Big Budget recording. As producer Jerry Goldstein explains: "You shouldn't think about the money, but the fun of being able to do it right. It's what the money can give you. The numbers are so big now when you hit that most labels don't care [that you are spending a lot of money in the studio]. They care, but they don't *care*." Jerry, who got his start as a songwriter in New York in the sixties ("My Boyfriend's Back", "Hang On Sloopy") then started with UNI Records (Elton John, Neil Diamond), sees his role as producer as basically stemming from the fact that the label wants a record and he has to get it for them. His job is to make sure it [the session] flows, and he is responsible for making it happen. His function may vary from that to the role of father, mother, shrink, etc. . . . whatever it takes. When it's happening, he keeps mum, " 'cos why disrupt the flow?"

As a band that is constantly jamming, there are many "dressing room" songs written and worked out on the road. "The World Is A Ghetto" was one such song, with that particular album [of the same title] being recorded in twenty-eight days while in the

studio—a 2-track running at 7½ constantly on, recording off of the monitor so as not to miss any ideas, which make records.

With so many bits of music on tape working names such as "Rock Party"; "Time To Get Down And Spread It Around"; "Liver Lips"; "Seattle Sunset"; "Seattle After Dark"; "Rhapsody in Black" are used. The song "Low Rider" [from the LP *Why Can't We Be Friends?*] was the result of a jam dubbed "Harold and Charles." Producer Goldstein recalls, "It originally was about twenty-five minutes long, of which there was about ten minutes of good stuff. So, we sat down to review it. At the time, Charles (Miller, reeds) had a low-riding car, so we decided to write about that. We started by just throwing out one liners about low-riding cars. Once we had all that Charles just went out and sang them all, even though they didn't match. We mixed it and took all the lines and edited them together—the ones that worked. Basically, it was just a line here, a line there. Then, we arranged it so that it would be a line, then a horn lick, then a line, a lick, etc. We created the arrangement from that. Then they re-learned the tune and did it, "live." So basically, it was created in a jam, edited into a song, then learned. A lot of War material is done that way.

Sometimes the finished song comes from the middle of the jam, so we've got to create an intro and make it sound like it wasn't made-to-order. The art of editing—the way we approach it, we've really made an art form out of it—is not to have an edit sound like an edit. If you know it's an edit then it's wrong. Sometimes things that *weren't* an edit sound as though they were, so I have to take them out. With War, if you hear something that sounds like an edit, you can bet it's not. We've spent hundreds of hours fine tuning an LP. It's really rather difficult to keep that War sound and feeling without manufacturing it *a la* session musicians."

With such a library full of tapes in various stages of completion, and the next album due in October, how do they know when they have sufficient material? It is all based on feel. The formulation of what will appear depends upon how well the material fits together. That decision will rest with War members Lonnie Jordan and Howard Scott, with final decisions resting with Goldstein.

The More Tracks The Better

With seven musicians it doesn't take long to use up all available tracks. If that situation arises and Lonnie Jordan, for example, wants to try something new, Chris will take that new keyboard track on a second machine and then sub mix down to two tracks. "I sub mix only when something is complete. If there's a chance that a part may change I don't want to sub mix early because then I've cut back on my options. It's a compromise. Last night Lonnie used four synthesizer tracks on 24 tracks. When the part was completed, it was just one big chord used as an accent. What he was going for was to create this overpowering effect, and to get that we mixed the four down to one.

"One thing I really strive for when I'm doing overdubs is to keep the fader down because that makes for a really clean mix. *Youngblood* was done with two twenty-four track machines synched. We used forty-three of the possible forty-eight tracks. For us, the more tracks the better. When digital gets here there'll be no shortage of tracks.

"We've just come up with a production system where we put all basic tracks on the first 24-track and then couple up with the second 24-track for all the ideas. So, when we get something we like we'll transfer it to the main one. This insures that the master tape isn't used too much. I was in Sound City [recording studio] when Fleetwood Mac was recording *Rumours* and Ken Keasey asked me if I knew how to get the highs back because after so many passes of the tape over the heads it took its toll."

Today's Engineers

Relaxing a moment, Chris shares his opinion of the common weaknesses among the engineers of today. "Well, to begin, we're no longer engineers today, we're mixers. When we first came into the studios in the early '60s, we approached it mechanically because the guys ahead of us were the guys that actually built the boards and were the only ones who knew how to run them. The limitations were the limitations of an electrical engineer's interpretation of music. I was one of the first engineers to say, "Hey, man, you know how to fix it, but something's not sounding right, so would you please stand over there, let me do it and if anything goes wrong, you'll still be right here."

"You must remember that the console is really an instrument. What's happening is that a musician/engineer comes into the studio today and is confronted with massive technology. He may have been a guitarist and only used a volume knob. He's used to dealing in Hi's and Lo's so he overequalizes and takes all of this stuff (all the equipment) as being necessary when really it's nothing more than corrective. You don't have to use an EQ to get a sound. They're there to help when used with tasteful judgment.

"Engineers today are ill-equipped because they've been dropped in the middle of something whose origins they don't understand. Most of them definitely have an affinity for the studio, but what they haven't come to grips with yet is that they definitely have a craft to learn. It's like an actor. He may be a natural, but no one will work with him because he hasn't learned the little things. I suppose the engineer has to learn everything. Ten years ago bass drums weren't in. Now thanks to disco it's a lead instrument. Let's look at classical recording vs. 'live' rock. Classical music is a blend, eighty people playing as one. It's based on a blend, not on separations. So, the fewer the mics, the better. You put stereo mics 8 ft. above the conductor's head. You put the capsules 90° from each other pointing left and right. So what you get is a left and right of what *he* heard. Then you mic the solo sections. The secret in mixing it is to bring up the left and right, study it and then just bring in the weak spots.

" 'Live' rock is a different thing. The pitfall is that you can never hope to capture the dynamic range—only the magic. I use the first song to quickly find a level. Knowing that the dynamic range will be incredible, the levels are set very conservatively, with Dolby. Just set them *and leave them*. If you go chasing after it, you can't mix it. What's left is something you, the engineer, have created. It's no longer a 'live' recording, it's that, *plus* whatever you added. You can track a vocal due to movement, softness, etc., but not instruments. Sometimes you find that the group is doing an audience recording where it sounds marvelous in the hall, but doesn't sound like anything back in the truck. That's another problem.

"Another problem engineers have

today is that oftentimes the musician judges the sound by what he hears in his headphones. You have to convince them that the way it sounds in the headset is not the way it's going down on tape. The headset is highly restrictive and just for cue.

"In general, a guy is not drawn to becoming an engineer for the reason of knowing he can get the sounds. He comes in for other reasons. It's something you have to learn. All you have is a firm conviction that if you put your mind to it and learn your craft you can reach that point.

"An engineer has got to 'find his ears,' that means being around a studio. Around the creativity, being a backup, operating all the equipment. It reaches a point where he wants to put his hands on the console. He does his first session, takes it home and is appalled by what he hears. Then he takes it and re-does it. It's getting to know the room, being one with your equipment. When it reaches a point where you can safely put so much dB of highs on a certain mic. It's knowing that despite what you hear, you're covering yourself. There are many people who are technically-oriented, or have studios, but don't have ears.

"You know you've arrived when the artist wants a sound and you get it, put it down and it sounds that way on record. Getting the right sound is a combination of getting the right musicians, equipment and engineer. If you want the result, you've got to get the people who can do it."

Post Recording

Once the actual recording has been completed Chris and Jerry will take those tapes to be mixed at Sound City. The room there is EQ'd by George Augsberger, a studio designer, especially for them. Mixing, they feel, is everything. They see no sense in spending a quarter-of-a-million dollars recording it, $51,000 mixing it and have it not do the job. Chris likes to be able to control the equipment so that the guy with the $87 Sears Roebuck stereo is able to hear the same magic he heard. They will take the track, strip it down to the basics and find out why they did it, then rebuild it. Many times they end up using the actual dummy or rough vocal that has a ton of bleed on it.

"We don't even think about a mix when we're cutting," Jerry began. "We don't care, don't even take the tapes home. I don't want to ever lose my objectivity. Every step of the way is a new step. What we've been doing up to this point is making bricks. Come time to mix, we make a wall out of the bricks." Chris added: "So, you rebuild the track and add overdubs. Usually you find that overdubs go in a straight line because dynamics play across the top of the track. The more options you have to recreate basic tracks, the better. Experience tells me that overdubs run parallel and don't have the same dynamics. The more overdubs you have the flatter it will be in the end. So, I don't want to do any mixing before I have to. One of the problems with multi-tracking is that people tend to refine everything too much and come out with a lot of parallel lines. Every instrument is so clear that they don't fit together. The secret with drums, for example, is that individually you'll get some bleed, but overall with the mix you get the sound. The snare gets a tight sound through augmentation; too much on top would have dragged in the hi-hat. I took 2 dB off of 12 K on top of the snare and brought both together."

Midrange Mixing

Unlike some who mix down to a car speaker, Huston feels that the average listener's equipment is much more sophisticated. Instead, he mixes an album for the audiophile—the person who bought it for the sound of the record, above and beyond the context of the song. "What sold a record in the old days was the emotion in it. In my mixes I tend to use a lot of midrange. The cheaper the system it's played on, the more your highs and lows go. So, you compensate; you mix the way you hear it. But experience tells you that, say, the bass has to be full, but I know that 2 dB at 1200 cycles isn't going to hurt. *Plus*, when the volume's down on the radio, I'm gonna hear the bass. That's instinct. I try to have everything touch a narrow band in the middle. When it comes to cassettes or 8-tracks, labels [recording companies] don't care where they chop the tape. We redo all our masters for them, especially 8-track. We edit or fade in and out. On cassettes we EQ it slightly differently."

To combat fatigue they have certain rules or a back-up plan when tired. They play it safe and get the music down at a safe level, technically good with maximum concentration on what is necessary to make it what it is. They never want to put themselves in a position where they can contribute to something screwing up. The speakers are at moderate volume; they don't mix at high levels, and more so than in recording, mixing has a five to six hour limit.

"The secret of mixing is first to *learn* the mix, then to perform the mix," Jerry began. "When you occasionally lose it mentally you stop and focus your concentration on something else. Once you've done it for so long, instinct takes over. We've done some sessions totally on instinct. I don't mix with the ears, I mix with feeling. I know the mix is right when I can feel it. I can't cop out 'cos I won't be able to sleep."

To what extent does experimentation come into play? "Well," Goldstein says, "you don't experiment at the cost of the artist. That's one reason why we went to 48 tracks. The experimenting comes in taking it as far as you can to make it good. Editing is total experimentation. We'll get a good mix that we think is perfect and I'll say 'Let's do another one.' Maybe one of twenty times we redo it. It gets us to another place, one more place that we didn't know existed. Most of the time I'm wrong, but we've only lost tape and time." Chris took over. "It takes four hours to learn the mix. In learning it you put it in a certain place. To do a move like what Jerry's just said loosens it up again, 'cos you can get too tight with one version. It's like throwing a creative monkey wrench into things."

Far Out Control

Far Out Productions controls every aspect of production from recording to mixing, to final test pressings. On some albums, they have pressed and done the actual lacquers in four different cutting rooms. They've sent them to the factory, gone through all the stages and come back with the mastering plates, compared them and actually chosen one side from one place, one side from another. While they have mastering plants they like, they are always checking out new ones. They will press at a new plant and then go down the street and then A-B them.

When all was said and done, Chris said it best: "The best thing is at the end you have a good record. Until then, it gets a bit hairy."

Caution: playing this keyboard can produce creative side effects.

The Crumar Orchestrator

Easily the most versatile and dynamic polyphonic keyboard on the market! A Brass Section with four different filter controls. Strings with both Violin and Cello with controllable EQ on keyboard. Piano and Clavichord. Two full octaves of rich sounding Bass. Plus, the flexibility to use all of these effects separately or together. Completely portable (46 lbs.), the Orchestrator is an entire orchestra at your fingertips — for a lot less money than an Omni.

The Orchestrator gives a musician endless creative possibilities, from back up melodies to lead lines. And, it's the perfect studio keyboard for sessions, adding an incredible range of sound to anyone's music.

Crumar.
Designing for the creativity that's in every musician.

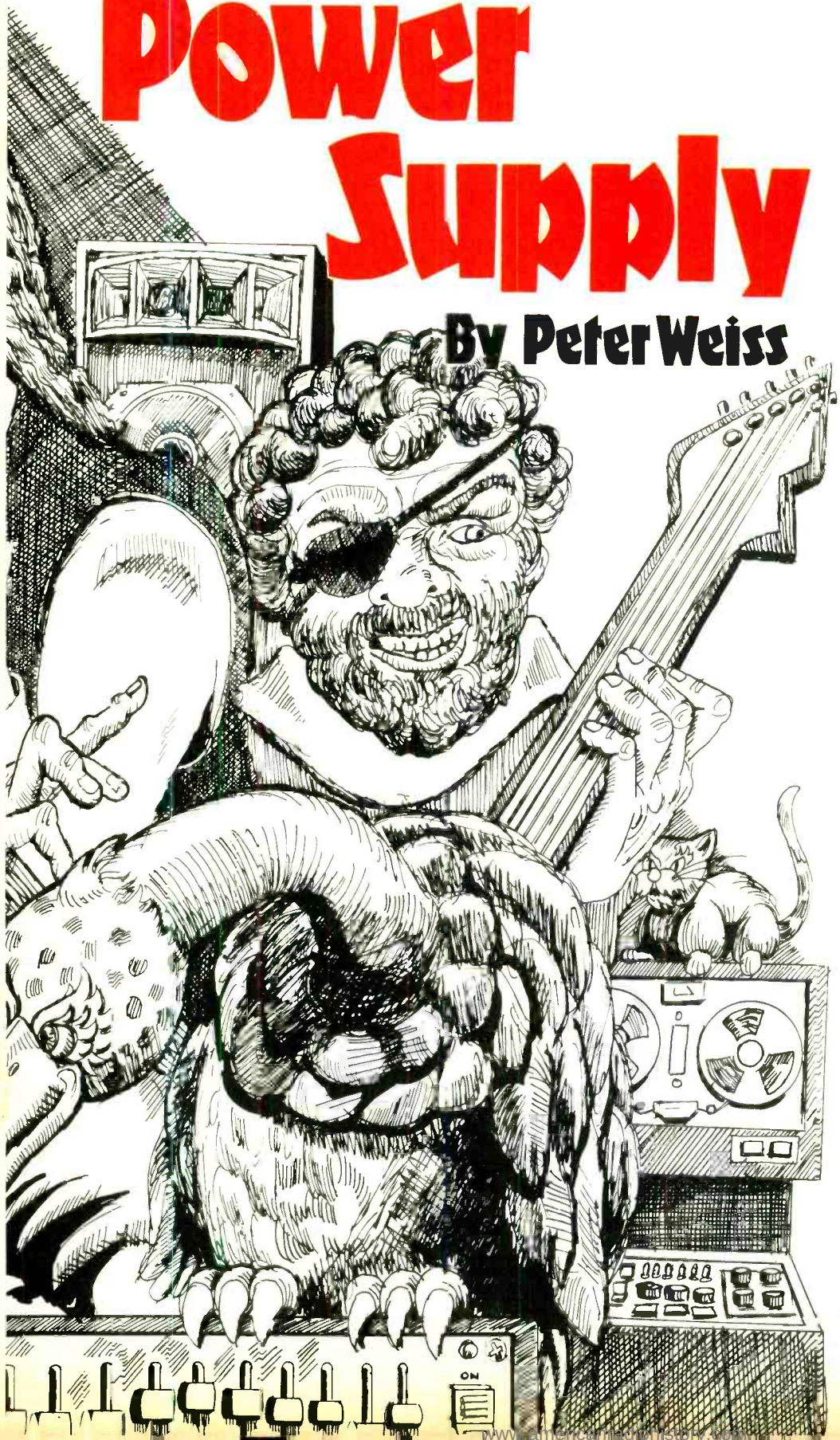
MUSIC TECHNOLOGY, INCORPORATED
105 FIFTH AVENUE
GARDEN CITY PARK, N.Y. 11040
(516) 747-7890

CIRCLE 92 ON READER SERVICE CARD


HAROLD
FERRY

Building a Power Supply

By Peter Weiss



In this month's issue we begin a series of construction articles which in future issues will include articles detailing the construction of an 8×24 active microphone splitter, an easily-tuned spring-type echo device, an analog delay and a "graphic" equalizer. All of these units are designed around integrated circuit (IC) operational amplifiers ("op-amps") and other solid-state components, and the regulated 15 volt bi-polar power supply described in this article is capable of powering any or all of the devices.

It might seem at first that construction of devices like the ones just mentioned might be beyond the skills and/or shop facilities of a sizable portion of our readership. However, the list of tools required to complete the projects demonstrates that no exotic items are necessary.

- ⅜-inch capacity electric hand drill, with a set of bits from 1/16" to ½"
- Lightweight pencil-type soldering iron
- C-clamps or other means to hold work pieces for drilling
- Needle-nose pliers
- Screw driver
- Nut driver or small adjustable wrench
- Small round file, scraper, or tapered reamer
- Wire strippers/cutters
- Metal scriber or sharpened nail
- Alligator clip
- Combination square
- Pieces of scrap wood
- Various insertion tools for circuit board terminals (optional)

So much for shop facilities (except of course, for a well-lighted steady work surface). As for skills, we will try to pass along as much "shop sense" as possible, in addition to specific step-by-step instructions. Many of the tips and suggestions on shop and electronic assembly practices are already second-nature to the "old timers" amongst our readership, and are included so that they might eventually become second-nature to the first-timers amongst our readership as well.

In addition to construction information, both general and specific, the theory of operation of each of the devices to be built will be included, in order to round out the reader's store of information.

All photos by Stan Skroski

± 15 VDC 1a POWER SUPPLY

Theory of Operation

Operational amplifiers generally require a bi-polar (both negative and positive) direct current supply. The bi-polar power supply which is the subject of this article is actually two power supplies, one producing +15 volts DC and the other −15 volts DC. We will describe the operation of the positive supply, and mention that the negative supply works in almost the same manner.

The power transformer (T1) accepts a 115 volt AC supply and "steps down" this voltage to 34 volts AC in each of the two independent secondary windings. Note that each of these secondary windings is center-tapped. That is, there is a connection to the electrical "center" of each winding. If the primary were supplied with 115 volts AC, a voltage of 17 volts AC would appear between the center tap of a secondary winding and either end of that same winding. The voltage across the entire winding would be 34 volts. The voltages appearing between the center tap and either end are equal (17 VAC) but 180° out of phase with each other (see Fig. 1). Each of the diode rectifiers (D1, D2) is capable of passing current in one direction only, and voltages of opposite polarities produce currents that flow in opposite directions. Thus, each diode conducts current for only half a cycle (the positive half, as they are connected in this power supply). Since the two diodes are being fed AC voltages that are 180° out of phase, and each diode can pass only the positive half of each cycle, the resulting waveform is actually no longer AC, but a sort of "lumpy" 17 volts DC. The process that changes an AC voltage to this kind of DC voltage is called full-wave rectification.

The narrow "valleys" between the "lumps" are smoothed over by the action of C1, a 100 microfarad (μf) electrolytic capacitor. This component stores electrical energy as the voltage rises to 17 volts, and then discharges this energy at a rate slow enough to insure that the voltage across the capacitor does not drop too low. The resulting waveform is shown in Fig. 1. This action of the capacitor is referred to as filtering.

The remaining "ripple" in this DC voltage is virtually eliminated by the UA78C15 voltage regulator (VR1). This device maintains its output at 15 volts DC under widely varying demands for current from devices being supplied.

The negative half of this bi-polar supply operates in a manner identical to the positive half, except that VR2 is connected differently. The UA78C15 regulators are designed for an output voltage of 15 volts DC, as measured across pins 2 & 3, with pin 2 being 15 volts *more* negative than pin 3. Therefore, by connecting pin 2 to ground, a voltage of +15 volts DC will appear between pin 3 and ground. For the negative portion of the supply, pin 3 on VR1 is grounded, providing −15 volts DC at pin 2.

The .1 μf capacitors (C3 & C4) across each output serve to "short circuit" high-frequency noise components to ground. This occurs because a capacitor presents infinite resistance to DC signals, but has an AC "reactance" (the AC equivalent of resistance, also measured in ohms) that diminishes with increasing frequency. For example, a .1 μf capacitor has a reactance of 16,000 ohms at 100 Hz, 1600 ohms at 1000 Hz, 160 ohms at 10 kHz. At higher frequencies a .1 μf capacitor becomes a virtual short circuit.

So, at the outputs of the power supply, we have more or less pure DC signals, at voltages and polarities that are compatible with the power supply requirements of the devices to be presented in subsequent construction articles.

SOLDERING TIPS

(1) For electronic soldering, use only rosin core solder, *never* acid core solder.

(2) Never heat solder directly with an iron. Always heat the wire or joint to be soldered and allow *it* to get hot enough to melt the solder. Solder will not adhere to cool metal, and if hot solder comes in contact with cooler metal a cold solder joint will form. A good solder joint will have a shiny metallic appearance, while a cold solder joint will be dull and grainy. A cold solder joint can be non-conducting.

(3) To tin the end of a piece of wire, hold the wire in contact with the soldering iron until the wire is hot enough to melt solder. As you touch the solder to the wire, if the wire is hot enough, the solder will flow over the surface of the wire. For tinning, the purpose of which is to prepare wire ends for soldered connections, only a thin film of solder is required. The same precaution should be taken during tinning as during any soldering operation to avoid cold solder accumulations.

(4) When soldering a connection use the minimum amount of solder necessary.

(5) *It is extremely important to avoid inhaling solder and flux fumes; they contain lead and other poisonous substances.*

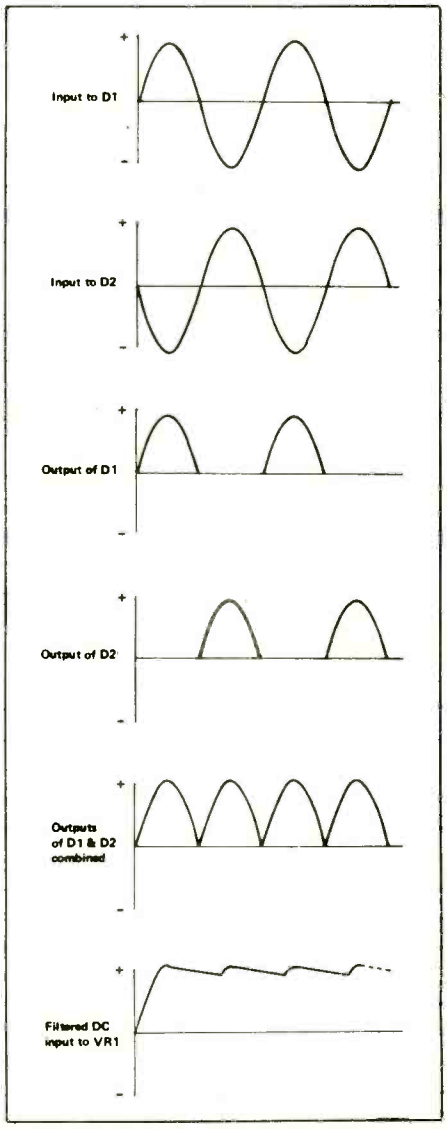
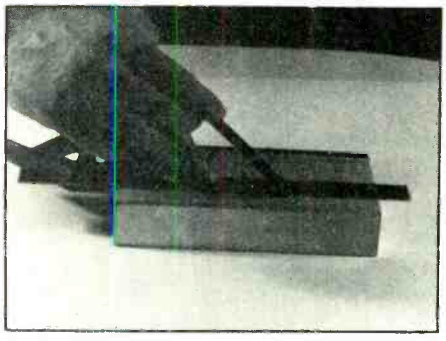


Figure 1. Power supply waveforms.

Construction (Chassis Layout)

Figs. 2 and 3 shows the precise locations and sizes of the various holes that are to be drilled. Depending on how classy- looking a finished product is desired, there are a number of techniques for transferring the information in the layout drawing to the chassis itself. If looks are not going to be important, the layout lines can be scribed right onto the metal surfaces, using a combination square and scriber (or sharpened nail). The next level of sophistication involves the use of "machinist's blue," available at commercial hardware stores. This blue lacquer-like material is painted onto the metal surface, and the lines and hole centers are scribed as in the first method. The advantage to using the blue is that scribe marks can be made very lightly with little pressure and still be visible, since wherever the scribe touches the blue will scratch away to uncover the bright metal underneath. The blue can be removed with lacquer thinner after the holes are drilled.

The third (and preferred) method is to cover the surfaces of the chassis with strips of masking tape laid carefully edge to edge, wallpaper style. All layout marks and hole centers can be located and marked in *pencil* on the tape. When drilling is completed, the tape is removed, revealing a pristine chassis with neat holes in it.



Making layout marks on tape-covered chassis.

Parts List

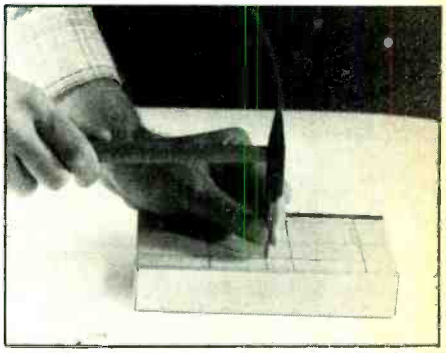
T1—Power transformer, 115 VAC Primary, two 34 VAC center-tapped secondaries.
D1, D2, D3, D4—1N 4001 diodes.
VR1, VR2—mA78C15—15-volt positive regulators with metal finger-type heat sinks.
C1,C2—100 mf 50-volt electrolytic capacitors.
C3, C4—.1 mf 50-volt ceramic capacitors.
P1—Two-terminal Beau barrier strip.
P2—Three-terminal Beau barrier strip.
P3—Insulated binding post.
F1—Two-amp 3AG fuse.
F2, F3—One-amp 3AG fuses.
3 BKP-type fuse holders.
1—Neon pilot lamp (model AC 2150A4)—Industrial Devices, Inc.
1—SPST switch to mount in ½" hole.
14—6-32 × ½" machine screws with split-ring lock washers & nuts.
4—6-32 × ¾" machine screws with split-ring lock washers and nuts.
4—½" stand offs, with unthreaded center hole to clear 6-32 machine screws.
2—Rubber chassis grommets to mount in 7/16" hole.
15—Vector K30CDP pin terminals.
6—Vector T-42 "flea clip" terminals (vector terminals are sold in packages of 50).
1—4" × 2 ¼" P-pattern perforated circuit board.
#18 stranded, insulated hook-up wire.
#22 solid, insulated hook-up wire.
Approximately twenty-four inches of one wire of two-wire zip cord, with insulation.
Rosin-core solder.

Note: T1 is available by direct order from:
Signal Transformer Co., Inc.
500 Bayview Avenue
Inwood, New York 11696
(516) 239-7200.

Before Drilling

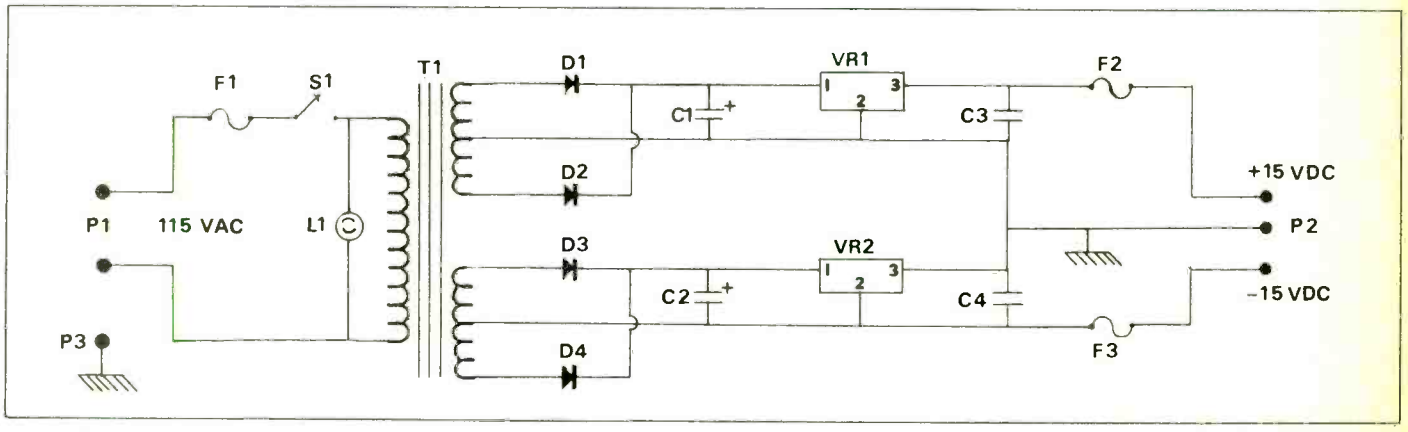
Four *very important* points to become familiar with *before* drilling the chassis.

1) Always, repeat *always,* center-punch hole center locations to prevent drill bit points from skidding and wandering around the metal surface. You can use a sharpened nail if a punch is not available. Support the underside of the chassis with a piece of scrap wood, hold the nail (or punch) point on the *exact spot* you wish to drill the hole (your layout marks should meet like crosshairs at such a spot) and give it a light tap with a hammer. Do *not* strike the nail or punch a heavy blow, since this will cause considerable denting of the chassis surface. All that the center-punching operation is meant to produce is a very small dimple to guide the drill bit.



Center-punching hole locations on tape covered chassis.

2) Before drilling any hole, always have the workpiece *clamped securely* to the work surface. In the case of the box-type chassis used for this project, stack thicknesses of scrap wood under the chassis to support the top surface, and make sure that there is wood



Schematic of 15-volt bi-polar power supply.

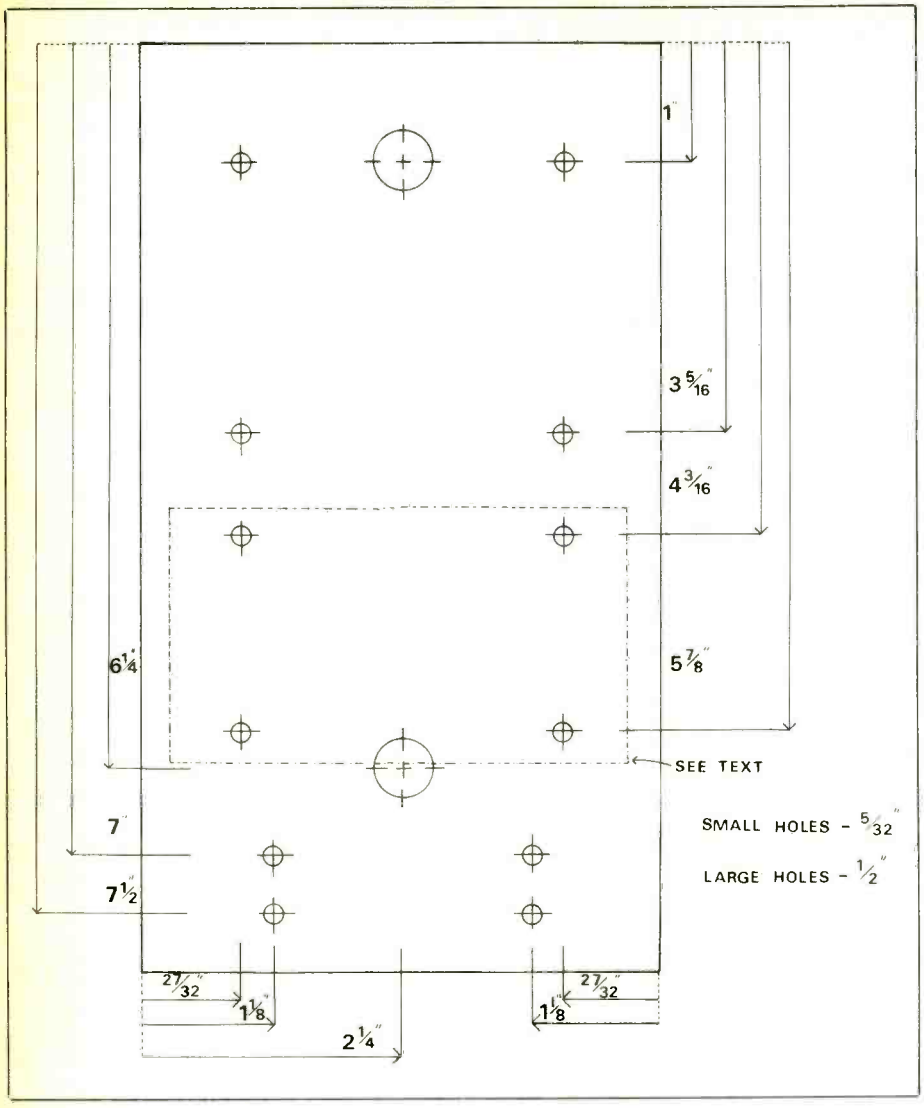


Figure 2. Hole-drilling layout, chassis top panel.

under the area to be drilled. Even if you have to move the clamps and scrap wood for every hole, make sure you clamp and support properly, or you may cause unsightly damage to the chassis or to yourself.

3) In drilling holes larger than 1/16" diameter in metal, it is generally best to drill first with a 1/16" bit, and then work up to the desired final size in increments.

4) When drilling the soft sheet metal of the chassis use minimum downward pressure on the drill, especially when using the larger size bits. Excessive down-pressure tends to cause the drill bit to *push* the soft aluminum out of the way, rather than to cut it cleanly. This pushed-away metal remains as burrs around the edge of the hole. Some burrs will remain in any case, and should be removed with a file, scraper or tapered reamer.

Since the subject of hole-drilling is under discussion, the four 5/32" mounting holes in the perforated circuit board should be mentioned. Lay out, center-punch and drill the chassis first, and then tape the 4"×2¼" piece of "perf board" into the position on the top of the chassis indicated by the dotted lines in Fig. 2. Locating visually is sufficiently accurate. Just try for symmetry, and make sure none of the four 5/32" holes in the chassis are too near an edge of the perf board. Flip everything over, and using a fine-point felt tip pen, mark the perf board through the 5/32" holes in the chassis. Remove the tape, clamp the perf board with a piece of scrap wood under it securely to the work surface, and drill the four 5/32" holes. When drilling perf board to 5/32", there is no need to work up to final size, so use a 5/32" bit only.

Mounting and Assembly

When all of the holes have been drilled, you can begin to mount the components that attach to the chassis, except for T1—the barrier-type terminal strips, P1 and P2, which mount with 6-32×½" machine screws, lock washers and nuts; the grounding post, P3; AC switch, S1; fuse holders; pilot lamp; rubber grommets; and, temporarily the empty perf board on four stand-offs with four 6-32×¾" machine screws and corresponding lock washers and nuts. The purpose of mounting the perf board at this point is to provide a support for it while the pin and clip terminals are inserted into the

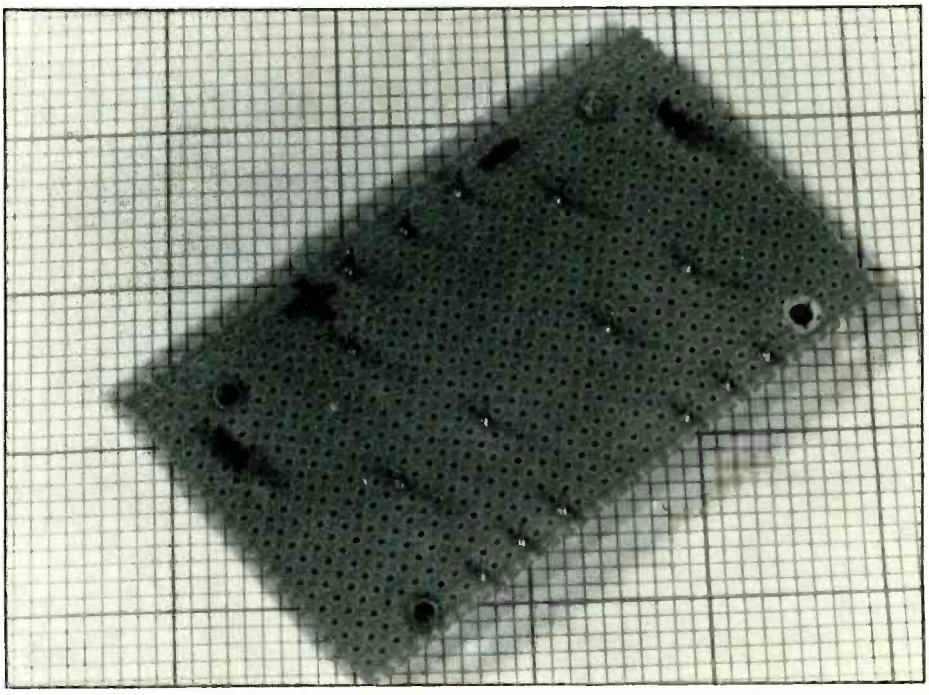


Photo 1.

The difference between these cassette decks isn't sound.

The Nakamichi 1000II: $1,650

The Pioneer CT-F1000: $600

There's hardly an audio enthusiast alive who doesn't admire the Nakamichi 1000II.

But at $1,650,* admiring it is about all most people can do.

That's why Pioneer created the new CT-F1000. A cassette deck that offers all the features and performance of the Nakamichi 1000II, but costs almost $1,000 less.

(We realize this is hard to believe, but be patient. The facts bear us out.)

It's a fact that the $600* Pioneer CT-F1000 and the $1,650 Nakamichi 1000II are both honest three headed cassette decks that let you monitor right off the tape as you record.

Both feature separate Dolby systems for the playback and recording heads. So when you're recording with the Dolby on, you can monitor the same way.

And both are filled with all the remarkable features you'd expect to find on cassette decks of this caliber: there's everything from jam-proof solenoid logic controls, to multiplex filters for making cleaner FM recordings, to memories that automatically let you go back to a particular spot on the tape.

It's value.

The comparison holds up equally well when it comes to performance.

The CT-F1000 and the Nakamichi 1000II both have total harmonic distortion levels of less than 1.5%.

Both have all but conquered the problem of wow and flutter. (An identical 0.05% for each deck.)

And both have signal to noise ratios that are so similar only sophisticated laboratory equipment can tell them apart.

If the incredible value of the CT-F1000 still sounds a bit hard to believe, we suggest you go hear it for yourself at any Pioneer dealer.

Our viewpoint is simple: if you can't hear the difference, why pay the difference?

PIONEER®
We bring it back alive.

*
*Manufacturer's suggested retail price. Handle optional at extra cost.

CIRCLE 57 ON READER SERVICE CARD

proper holes. To determine which are the proper holes, and which type of terminal goes in each, examine Photo 1 carefully, and match by counting holes in the perf board and marking the board with plus and minus signs as shown. Press the terminals into place in the perf board carefully, noting that the "flag" portions of the clip terminals point outward towards the edges of the board. Lay out the components and wiring (#22 solid insulated) as shown in Photo 2. Take special care to mount C1 and C2 *exactly* as shown, with the minus sign on the capacitor body towards the edge of the perf board nearest the transformer location. If an electrolytic capacitor is installed in a reverse polarity position it can *burn* and/or *explode.* Also take care to mount D1, D2, D3 and D4 with the white bands facing as shown in Photo 2. Do not solder anything at this point, merely wrap the component leads and interconnecting wires neatly around the proper pins.

Now unbolt the perf board from the chassis and stand-offs, and turn it over as if it were a page in a book (that is, from right to left) so that it appears as in Photo 3. Observe the plus and minus signs in the photograph. They are marked on the same halves of the perf board as the plus and minus signs in Photo 1. While the perf board is in this flipped position, bolt it to the chassis and stand-offs. Connect wires to the pins exactly as shown in Photo 3. Do not solder yet, just wrap the wires around the pin terminals neatly. Unbolt the board again, turn it over, and insert VR1 and VR2 into the "sockets" formed for them by the two rows of clip terminals at either side of the perf board. Insert the regulators so that the printing on them is facing out-

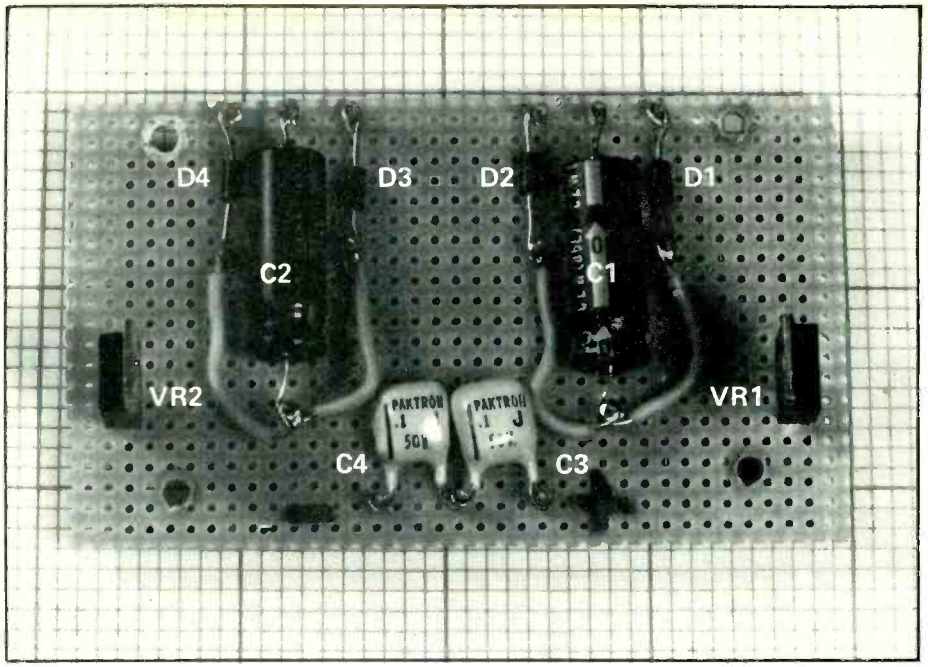


Photo 2.

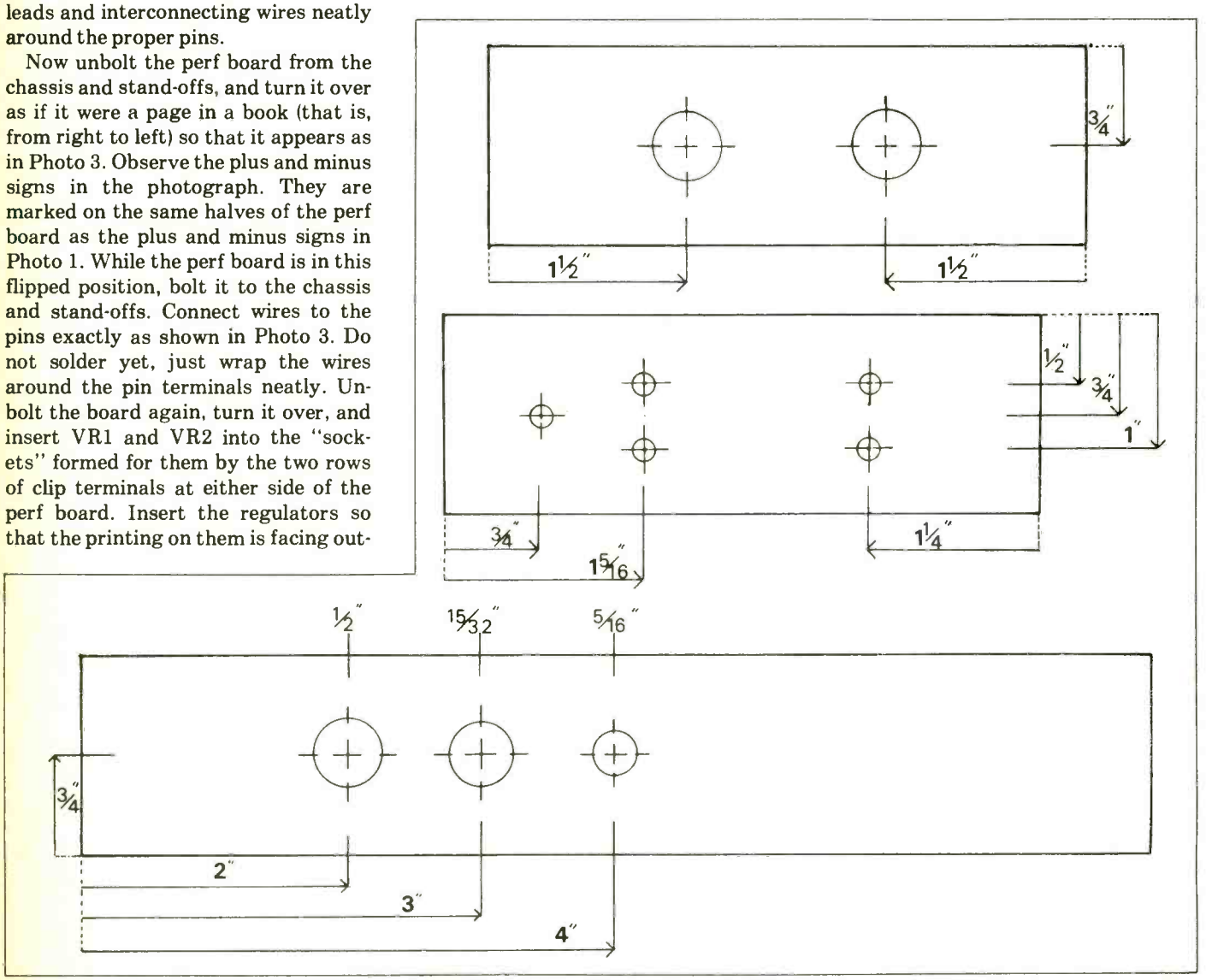


Figure 3. Hole-drilling layout, chassis side panels.

We've Got A Mixer For You

KELSEY®

Professional 4/2 Series Mixers

8 12 16 24 28 32

The first Professional Sound Reinforcement Mixers at affordable prices.

Our new range of Kelsey 4/2 Series Mixers incorporates all the features necessary for fully professional sound reinforcement mixing, including 4 sub masters with direct outs and stereo patch points, talkback, 2 monitor sends, 2 independent effects channels, plus many other facilities.

And our modular concept is unbeatable - get 16 channels in a 24 channel main frame, 24 channels in a 32 channel main frame - in fact any variation from 8 thru 32. Buy what you need now and add what you'll want later!

Lots of money? No - our 24 channel is just $4,600.00 list and that includes separate power supply and road case. We've combined features, quality and roadability at unbelieveable prices.

Write or call:

It's simple we want to be your mixer company!

Dallas Music Industries
150 Florence Ave
Hawthorne, N.J. 07506
201-423-1300

- SMF STEREO 150 POWER AMPS
- SMF ROAD CASES
- KELSEY SNAKES
- SMF DIRECT BOXES

Send $5.00 for your Kelsey/SMF T-Shirts

CIRCLE 59 ON READER SERVICE CARD

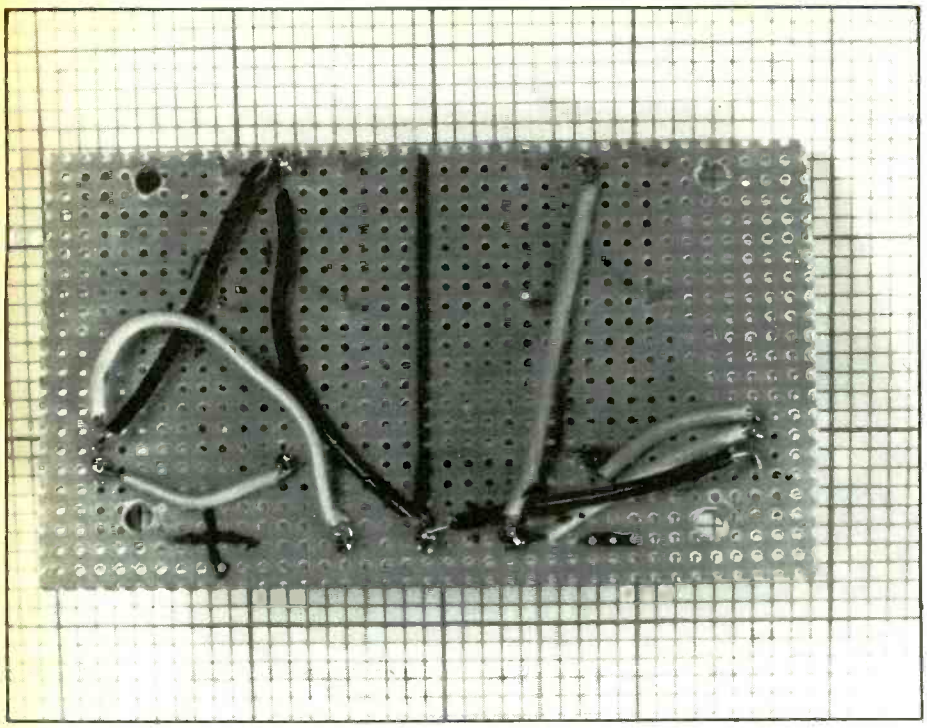


Photo 3.

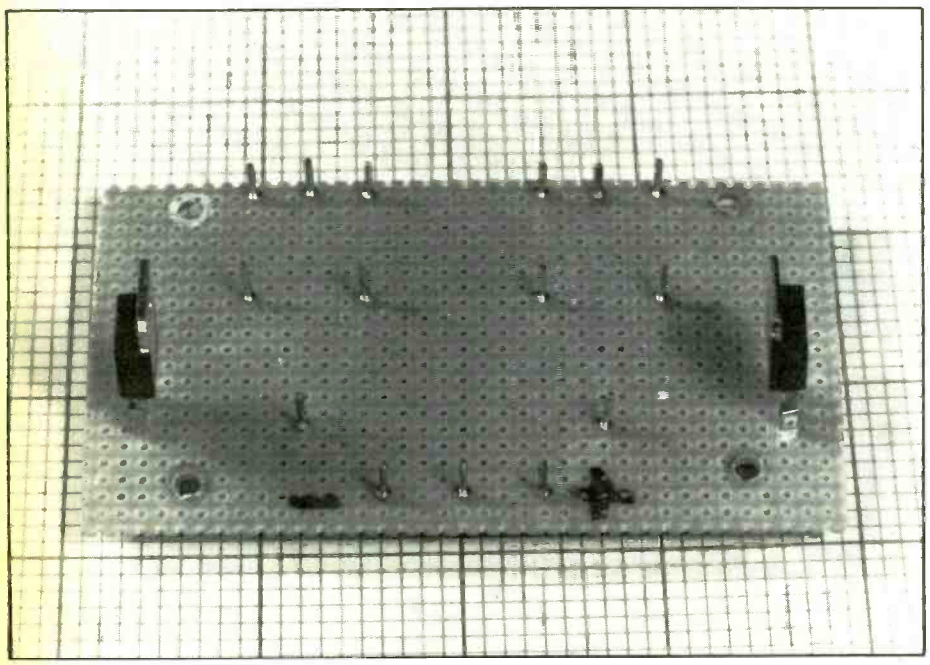


Photo 4.

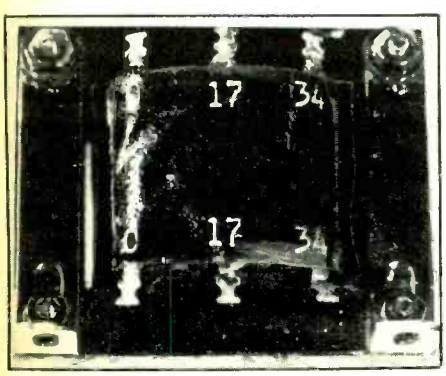


Photo 5.

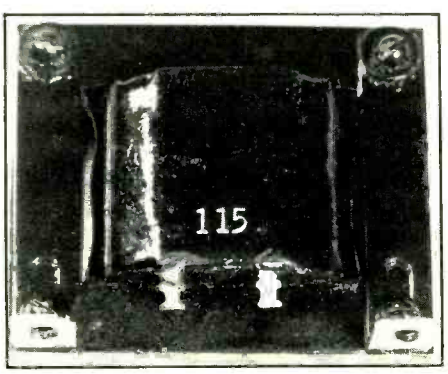


Photo 6.

wards (See photo 4). Use an alligator clip as a heat sink on each regulator lead as you solder it into place along with the wire to that lead on the underside of the board. Solder all other connections on the underside of the board, and re-bolt the board into its proper position on the stand-offs. Solder all connections on the upper surface of the perf board, except the six pin terminals nearest to the transformer location and the three nearest P2. Use the alligator clip heat sink whenever a diode lead is soldered. Bolt the metal finger heat sinks to VR1 and VR2, using a 6-32×½" screw, lock washer and nut for each.

Mount the transformer to the chassis temporarily using only two 6-32×½" machine screws with lock washers and nuts at diagonally opposite mounting holes. The side of the transformer with six terminals (See photo 5) should be towards the perf board. While the transformer is in this position, measure off lengths of the different kinds of wire required to connect the transformer to the various proper points, the six lengths of #18 stranded from the secondary terminals to the six pin terminals at the edge of the perf board nearest to the transformer, and the pieces of half-zip cord from the right-hand primary terminal of the transformer (See photo 6) to the right-hand terminal of P1, and from the left-hand primary terminal to the on-off switch S1.

In the following portion of instructions, it is intended that the chassis be viewed from the end with P2 and the fuse holders for F2 and F3.

The wire from the transformer terminal in the upper row marked "0" goes to the first terminal on the left in the row of six at the edge of the perf board nearest the transformer. The wire from the transformer terminal in the upper row marked "17" goes to the second terminal from the left, and the wire from the upper terminal marked "34" is connected to the third terminal from the left. This pattern is repeated with the wires from the bottom row of transformer terminals; "0" is connected to the fourth perf board terminal from the left, "17" to the fifth, and "34" to the last one on the right.

Once these wire lengths have been determined, prepare each piece of wire by stripping ⅜" of insulation from both ends and tinning the exposed wire. Remove the transformer from its temporary mounting and solder the six lengths of #18 stranded to the proper

HUSH UP YOUR 4-TRACK.

Introducing dbx professional four-track tape noise reduction for under $500.

You've just settled on a TEAC, Tascam, Otari or Dokorder four-track tape deck for that studio you always wanted to have. You've chosen the mikes, the carpenter is almost finished (or maybe you even built it yourself). Your console's ready to be wired into place.

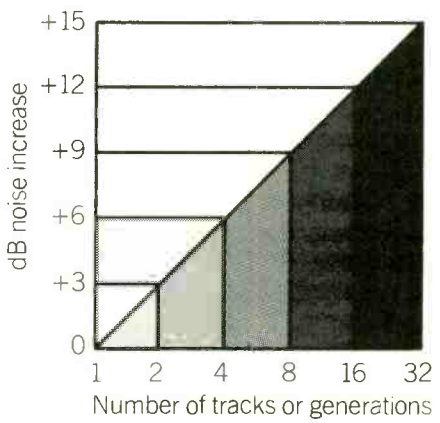
But...haven't you forgotten just one important item?

Noise reduction.

Because every time you (or your group) want to bounce a track, you're adding at least three dB of tape noise (see chart). So the great artistic result you plan to end up with, might end up sounding like a rainstorm.

Fear not. Help is at hand. It's the new dbx 155 four-channel tape noise reduction system. You can add it for far less money than you ever imagined possible. Here, on one compact chassis, is a complete dbx noise reduction system. But the best part is, it will give your tape deck an extra 10 dB of headroom, and reduce tape noise by 30 dB. That means no audible noise whatsoever will be added to your tracks. And, because dbx tape noise reduction operates by linear compression/expansion, you won't have to get involved with tedious level calibration, either.

Additive Noise Chart



All you need do is press the playback buttons to hear noise-free, full dynamic range reproduction of your music.

The new dbx 155 also has user-changeable modular circuit boards, so in the unlikely event that one processor fails, the other channels remain operational. You can even keep a spare on hand.

Visit your dbx professional dealer now, for a demonstration of our new 155 tape noise reduction system. Discover how you can put an end to tape hiss, without putting an end to your bankroll.

dbx

dbx Incorporated
71 Chapel Street
Newton, MA 02195
617/964-3210

CIRCLE 89 ON READER SERVICE CARD

terminals of the transformer *secondary*. The wires to the transformer primary terminals are just wrapped for now, not soldered. Now mount the transformer securely with all four mounting screws and associated lock washers and nuts. Connect and solder the six wires from the transformer to the perf board, using the alligator clip heat sink when diode leads are soldered.

Turn the chassis around so that the end with P1 is facing you. Stuff the piece of half zip cord wrapped around the left-hand transformer primary terminal downward through the grommet immediately below, and bring the two tinned pigtail leads from the pilot lamp up through this same grommet. Wrap

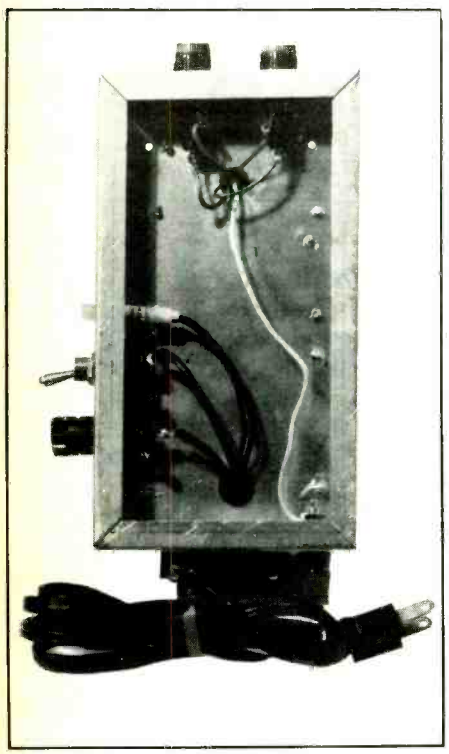
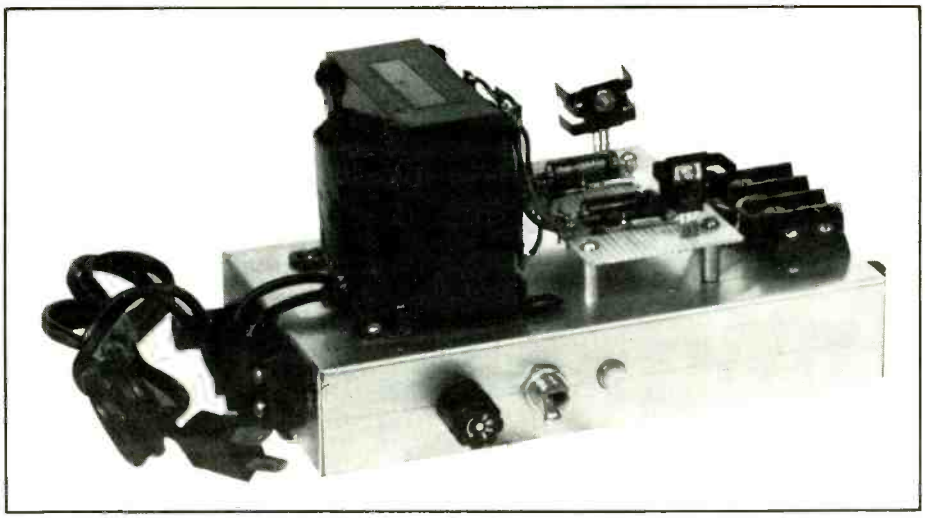


Photo 7.

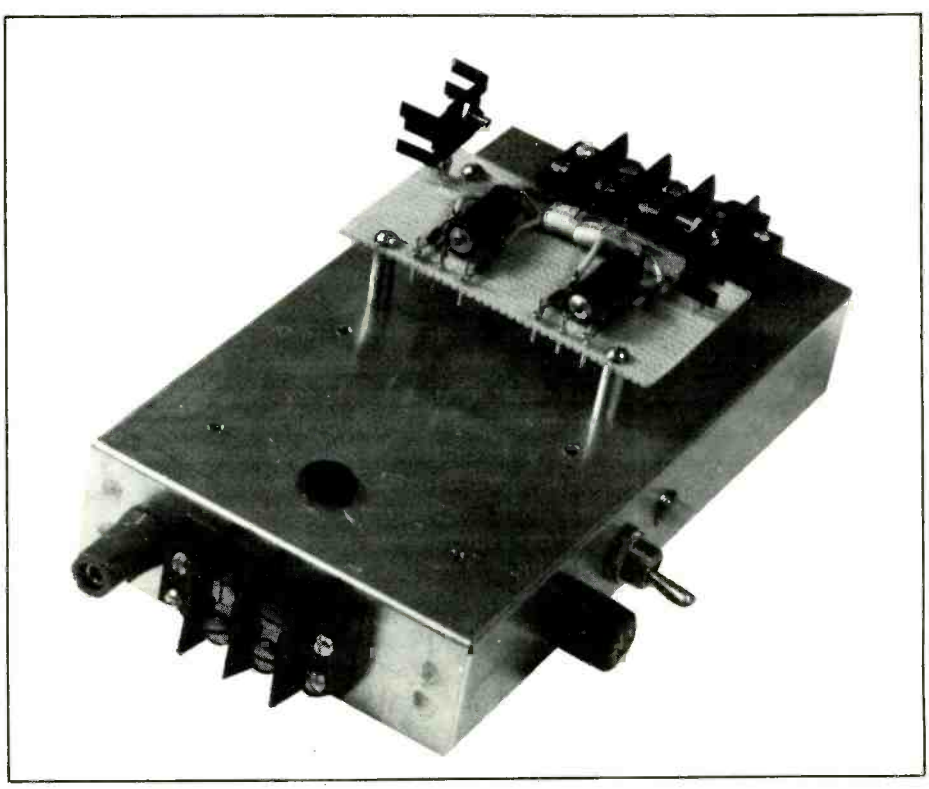
one pigtail around each primary terminal. Another piece of half-zip cord goes from the right-hand primary terminal to the upper binding post screw of the right-hand terminal of P1 (See photo 7). The connections to the primary terminals can now be soldered.

Cut, strip and tin the ends of a piece of half zip cord long enough to go from the upper binding post screw of the left-hand terminal of P1 down through the grommet to the center lug of the fuse holder for F1. Wrap one end under the binding post screw and solder the other to the lug on the fuse holder. Cut, strip and tin the ends of another piece of half zip cord to go from the side lug of the fuse holder for F1 to one lug of the on-off switch. Solder this wire in place. Now solder the tinned end of the piece of half zip cord coming down through the grommet from the left-hand primary terminal to the remaining lug on the on-off switch.



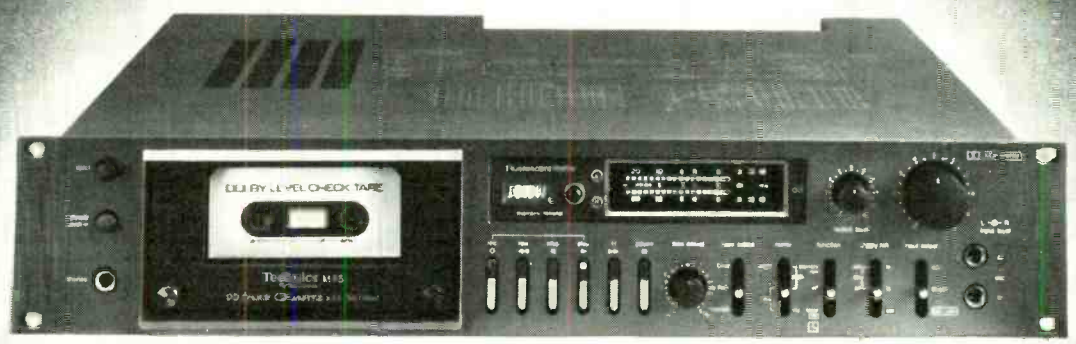
The completed power supply.

Turn the chassis again so that the end with the fuse holders for F2 and F3 are facing you. Cut, strip and tin the ends of six pieces of #18 stranded wire, of such lengths that they can go: 1) From the left-hand perf board terminal through the grommet to the center lug of the holder for F2; 2) From the side lug of the holder for F2 through to the upper binding post screw of the left-hand terminal of P2; 3) From the center perf board terminal to the upper binding post screw of the center terminal of P2; 4) From the right-hand perf board terminal through to the center lug of the holder for F3; 5) From the side lug of the holder for F3 through the grommet to the upper binding post screw of the right-hand terminal of P2; and 6) From the upper binding post screw of the center terminal of P2 through the grommet to the lug on the underside of the ground binding post P3. Solder the connections to the perf board termi-



An intermediate stage in construction.

You know what Technics quartz-locked direct drive does for records. Now listen to what it does for cassettes.



Accuracy good enough for even the most demanding professional, that's what Technics quartz-locked direct-drive turntables are all about. And that's why radio stations use them and discos abuse them.

Now you can record your records as accurately as a Technics turntable plays them. With the RS-M85, our new quartz-locked direct-drive cassette deck. Not only does it have the kind of transport accuracy that's hard to beat, it has that kind of price, too. The reason for all this accuracy: The performance of Technics direct drive combined with the precision of our quartz oscillator.

The RS-M85's servo-controlled system compares the motor rotation with the unwavering frequency of the quartz oscillator and instantly applies corrective torque if any speed deviations are detected.

To complement that accuracy, Technics RS-M85 has a Sendust head with a high-end frequency response of 18,000 Hz, low distortion and excellent dynamic range.

Since there's nothing ordinary about the RS-M85's performance, there's nothing ordinary about its meters. The RS-M85 features Flucrescent Bar-Graph meters. They're completely electronic and therefore highly accurate. Response time is a mere 5μS. There's also a peak-check mode plus two selectable brightness levels.

To all this sophistication, the RS-M85 adds all this: A separate, coreless DC motor for reel drive. Dolby NR* Full IC logic control in all modes. A low-noise, high-linearity amplifier section. And a 3-position bias/EQ selector with bias fine adjustment.

Also available is Technics RP-070 An optional full function infrared wireless remote control.

Technics RS-M85. Compare specifications. Compare prices.

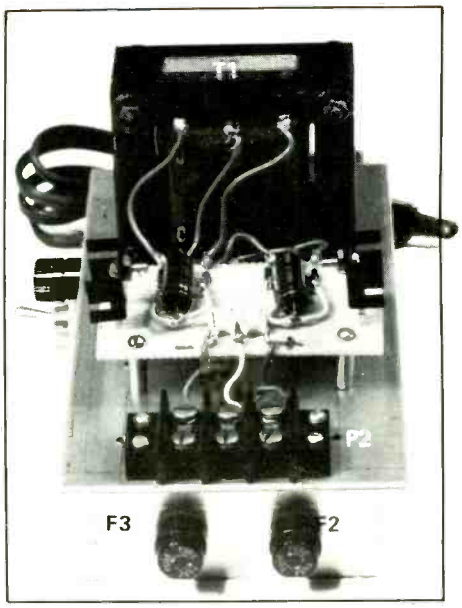
FREQ. RESP. (CrO_2): 20-18,000 Hz. WOW AND FLUTTER: 0.035% WRMS. S/N RATIO (DOLBY): 69 dB. SPEED DEVIATION: No more than 0.3%.

Technics RS-M85. A rare combination of audio technology. A new standard of audio excellence.

*Dolby is a trademark of Dolby Laboratories, Inc.

Technics
Professional Series

CIRCLE 69 ON READER SERVICE CARD



End-view of completed power supply.

nals and fuse holder lugs and wrap the tinned ends of the wires to the barrier strip under the binding post screw heads.

AC connections to the power supply may be made by means of either a two- or three-wire power cord. If a three-wire cord is used, the two conductors are connected to the two terminals of P1, and the ground wire is connected to the binding post on the chassis, P3. When a two-wire cord is used, connect it to the two lower screw terminals of P1. When the proper fuses are inserted in the holders, the 115 volt AC supply is connected and the on-off switch is turned on, the DC voltages will appear as follows: −15 volts DC between the left-hand and center terminals of P2, and +15 volts DC between the right-hand and center terminals of P2.

Check for proper polarities and voltages with a good multimeter. Assuming that no individual component is defective, the most likely source of any difficulty is a cold solder joint. In case of a discrepancy in voltage in either half of the supply, turn off and disconnect the supply from the 115 volts AC and inspect all solder connections, reworking those that have a dull or grainy finish. If this procedure produces no remedy, carefully check your wiring against the schematic, the written instructions and the photographs.

We hope this project is a pleasant and educational experience, and that construction success with this device will encourage our readers to undertake the other projects in the series.

Revolutionary!

Sound-shaping taping mike.

Never before — a single microphone that gives you the versatility of 16 microphones! Four tiny frequency filter switches built into the new Shure 516EQ E-Qualidyne Microphone let you tailor sound for studio effects in virtually any recording situation: flick a switch to add sizzle to vocals . . . flick another switch to highlight the sound of a bass drum. You can even compensate for the acoustic response of a room — *right from the microphone!* In all, the 516EQ creates 16 different response variations that can add a new, professional sound to every tape you make. Available singly or in pairs for stereo recording. Ask to hear a recorded demonstration at your participating Shure dealer.

Shure Brothers Inc.
222 Hartrey Ave., Evanston, IL 60204
In Canada: A. C. Simmonds & Sons Limited

SHURE®

Manufacturers of high fidelity components, microphones, sound systems and related circuitry.

CIRCLE 62 ON READER SERVICE CARD

Ambient Sound

BY LEN FELDMAN

More Tape Recording Breakthroughs!

Last month I told you about the new metal particle tapes that had been annnounced by 3M and that were rumored to be ready from several other companies. I also mentioned the fact that one company at least (Tandberg of Norway) was readying a pair of machines (one open reel, Model TD-20A, tested by Norman Eisenberg and myself for this issue, and a top-grade cassette deck, Model TCD-340AM) that are designed to work with the new higher-coercivity, higher maximum output tapes.

Since then I've attended the recently-held Consumer Electronics Show in Chicago and have learned more about Tandberg's new machines. I've also discovered what one of the other highly reputed firms in the cassette tape deck field—Nakamichi Research—has been doing about the new tapes, too.

While everyone who talks about the new metal particle tapes stressed the need for "better" heads and "higher" erase current, no one has said too much about the record electronics needed to take advantage of the extra "headroom" that will be available with the new tape. No one, that is, until Tandberg announced their new Actilinear recording system.

According to Tandberg, the Actilinear recording system (as used in the TD-20A) provides 20 dB of additional headroom compared with conventional record-amplifier electronics. Additional advantages are cited for the new electronics. These include: less intermodulation caused by slew-rate limiting, less interaction between the audio signals and the high-frequency bias oscillator and, of course, the possibility of adjusting the system for the higher coercivity tapes as soon as they become available.

In most recording electronics, the audio signal and the high frequency bias signal are mixed together, across a passive resistor and the summation signal is applied to the record head. According to Tandberg, this creates a number of problems, such as slew-rate limiting for strong high-frequency audio signals, beats caused by interaction or intermodulation of the two signals and a low reserve margin for extra bias and record signal currents.

In the new Actilinear system, separate modules are used for record amplification-equalization and transconductance conversion. A third module is a low- pass filter circuit which isolates the signal currents from the bias currents produced by the internal high- frequency oscillator. The "transconductance" module acts as a constant current source in that it converts a constantly changing signal *voltage* into an equivalent changing *current*. It also provides further isolation between the recording amplifier and the bias oscillator.

Expressed in audible terms, the system, when employed with metal particle tapes in a cassette format can, according to Tandberg, yield a significantly improved signal-to-noise ratio at 10 kHz—the same as or more than the improvement achieved in the Dolby B system of noise reduction. Furthermore, unlike the Dolby system, an improvement in signal-to-noise ratio of up to 5 dB can be achieved at lower frequencies. No special encoders or decoders are required and the resultant recordings are playback compatible on other machines. The new Actilinear system also provides sufficient headroom so that the Dolby system can be used with the new metal particle tapes for even more spectacular, noise-free, wide dynamic range results.

Nakamichi Offers Point of View

In a carefully prepared presentation, Nakamichi Research, Inc. offered several insights into the problems and promise of the new metal particle tapes. To begin with, they demonstrated two prototype machines, each a variation on one of their existing models. The modified Model 1000 II was given an added prefix, "ZX," the same letters used to designate that firm's separately packaged sample metal particle cassette tapes. (Nakamichi does not make its own tape, but did not disclose the source of their particular version of metal particle tape.) As in the case of the earlier-reported 3M "Metafine" tapes, these new

tapes, recorded and played back on the modified machine performed superbly. Of perhaps more importance, however, was the company's view regarding the directions that the industry ought to take in pursuit of metal-particle excellence.

Nakamichi suggested that the confusion caused by the introduction of yet another "non-compatible" tape at this time should be minimized as much as possible. Towards this end, they demonstrated yet another type of tape, tentatively called ZX/BB. This tape, they said, is a broad-biased version of metal particle tape. It can be used in current cassette decks (both for recording and playback) when they are set to their present "Chrome" or high-bias positions. However, current decks would still require new erase heads in order to make full use of this broad-bias metal particle tape. This "minor qualification" it seems to us, negates the argument of immediate compatibility, or did we miss something?

As we later learned, BASF has come out in favor of yet another form of metal-particle tape which offers not nearly so much coercivity as that "standardized" by 3M. Fuji's "ready and waiting" metal particle tape comes closer to 3M in its parameters but again, does not duplicate them exactly. Add to this the Nakamichi "broad bias" tape proposal and it seems to us that the typical recordist out in the real world is going to get as discouraged about metal particle tape (before it gets off the ground) as did the general audio public when the battle of 4-channel sound (with all its countless variations) was being aired in public a few years ago. We all know what happened there!

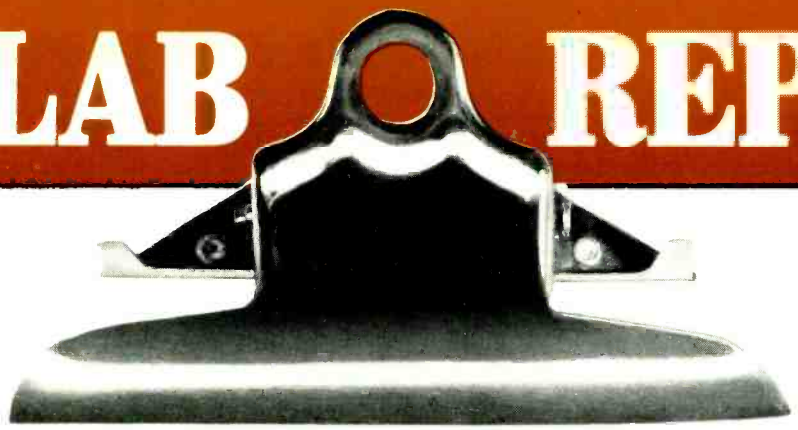
Venturing still further, Nakamichi then surprised us by suggesting that the introduction of hardware that could handle new metal particle tape (of one kind or another) also incorporate a "brand new" noise reduction system. The noise reduction system which they proposed was one developed by Telefunken of Germany and is the consumer version of their well-accepted Telcom 4D system. It is, like Dolby B, basically a compressor/expander system involving an encode process during recording and a decode process during playback. It is further similar to Dolby in that it works only on the upper end of the frequency scale. It differs from Dolby, however, in that it is reported to have a faster attack time and uses a higher (2:1) compression and expansion ratio, similar to that of dbx (but not over the whole frequency range). Furthermore, the system as proposed by Telefunken, provides a maximum of 20 dB of signal-to-noise improvement as opposed to the 10 dB of improvement "above 5 kHz" offered by Dolby B.

In deference to some compatiblity, Nakamichi, in installing this noise reduction system in their prototype 1000 II ZX cassette machine provides a selector switch which permits the user to take full advantage of the 20 dB noise reduction capability and to settle for 10 dB of improvement. Using the 10 dB setting, the system is "virtually" compatible with Dolby B and would permit the user to to play back Dolby-encoded cassettes or to record cassettes which could then be played back on existing cassette decks with Dolby B.

While the performance of the new machine, using metal particle tape plus the new Telefunken noise reduction system was, to say the least, outstanding, I frankly fail to see how adding these new wrinkles helps to solve the problem of compatibility. I clearly recall that dbx (whose linear compress/expand system I regard as being extremely effective in a home recording system) has, for years, been trying to compete with universally accepted Dolby B and, to date, only a very few hardware manufacturers have seen fit to incorporate the dbx system into their best stereo cassette decks. Of course, as is true in the case of dbx, the new Telefunken noise reduction system could be incorporated in a separate 'add-on' box (that's the way Dolby B got started, if you can remember that far back) and the public could then decide whether or not it's time to abandon Dolby B in favor of those extra 10 dB. In the meanwhile, it would seem to me that pushing for this new system now and suggesting that it become a "standard" in cassette decks is liable to confuse the issue more than clarify it.

There is, however, one thing on which I agree with Nakamichi, Tandberg and 3M. The signal-to-noise numbers that one can obtain using metal particle tapes on newly designed (and appropriate) open-reel or cassette decks, whether augmented by Dolby B, dbx or Telefunken's new system are getting so high that problems of containing "the full dynamic range" of music on tape may soon be gone forever.

If that be the case, we need to take a second hard look at the purported advantages (and disadvantages) of the several new digital tape recording techniques that remain looming in the background. As we have said in the past, those systems are extremely expensive, are still a long way from establishing their *own* universal standards and do offer serious disadvantages in terms of editing complexity. If their chief claim to fame is lower distortion and greater dynamic range, we must consider the fact that metal particle tape *also* offers considerably lower distortion in record/playback, and under optimum conditions, can provide a dynamic range capability of around 80 dB! And, if you are overly impressed by the fact that digital or PCM reduces wow-and-flutter to the vanishing point, take a look at the wow-and-flutter figures obtained for the Tandberg TD-20A in our test report appearing elsewhere in this issue. How much closer than 0.012%WRMS do we need to get (can your turntable do as well?) and would we be able to tell an audible difference if we "got there." The more I think about it the more I conclude that digital or PCM recording (insofar as all but the most elaborate multitrack studio professional applications are concerned) may be an idea whose time has *not yet* come after all.



NORMAN EISENBERG AND LEN FELDMAN

Bryston Model 4B Power Amplifier

General Description: Bryston's Model 4B is the highest-powered of a series of stereo power amps offered by this Canadian manufacturer. Its nominal output ratings are 200 watts per channel into 8-ohm loads, or 400 watts per channel into 4-ohm loads. In addition, the Model 4B may be readily converted to mono operation (via a bridging switch at the rear) for a whopping 800 watts of output into an 8-ohm load. (For the other amplifiers in this series, the Models 3B and 2B, simply cut each power rating in half, respectively.)

Of rack-mount size, and relatively small for an amplifier in this power class, the Model 4B also is designed to run cool without any internal fan. Including the chassis, over 1500 square inches of heat-sinking are provided. All voltage-gain stages are handled by regulated power supplies, and each channel is described as "separated back to the line cord." The front panel contains LED indicators for overload (clipping) indication, an LED pilot light and the on-off switch. The rear panel contains signal input and output connectors, the mono/stereo switch, fuse holders and the line cord. The Model 4B we tested was supplied with "audiophile" input jacks, although XLR or photo-plug connectors also are available.

Bryston recommends fusing the speakers employed with its amplifiers. In addition, the Model 4B should not be switched on and off by means of the power switch on an associated preamp. Instead, its line cord should be plugged into a separate AC outlet, and the unit turned on only 15 or 30 seconds after the preamp has been switched on. Bryston also suggests that the system be left on continuously, stating that this will do no damage and will draw no more current than a light bulb or two.

Test Results: In *MR*'s tests, the Bryston 4B either met or exceeded published specs by ample margins, and shaped up generally as one of the very best high-powered amplifiers yet tested. For instance, for a claimed 8-ohm output in stereo mode of 200 watts per channel, we measured over 250 watts per channel. The 4-ohm load output came to 420 watts as compared to the claimed 400 watts. Bryston lists power bandwidth as extending from 20 Hz to 20 kHz; we measured it from at least 10 Hz to beyond 30 kHz. Hum and noise, measured at 115 dB down, were 15 dB better than specs. Distortion figures were spectacularly better than claimed. Apropos of these measurements, incidentally, the curves we derived (see accompanying illustrations) are excellent, but they do not do full justice to this amplifier. For example, the apparently rising levels of distortion at lower power output levels (Figs. 1 and 2) are not representative of distortion at all. Rather, they are simply the limit of the residual noise showing up in our distortion analyzer readings at those low power levels. It should be kept in mind that, for instance, referenced to a 1-watt output, the so-called THD reading of 0.015 percent (which actually is noise plus distortion), when expressed in dB below 1 watt, turns out to be 76.5 dB! Getting from 1 watt up to 200 watts (rated output) adds another 26 dB. Together, these figures add up to a S/N value of 102.5 dB, unweighted. This is not far from the residual noise figure actually measured. We tried to isolate the THD components of this reading from the residual noise, using our spectrum analyzer, but its dynamic range was not great enough to do the job. In short, the Bryston 4B cannot be measured accurately even with the best test equipment we own.

General Info: Dimensions are 19 inches wide; 5¼ inches high; 13½ inches deep. Weight is 50 pounds. Price is $1,295.

Individual Comment by L.F.: We've all heard of so-called "West Coast Sound," and so-called "New

England Sound." Okay, let me introduce "Northern Sound" (since the firm is located in Rexdale, Ontario), and let me say here and now that the Model 4B has got to be the best-sounding amplifier I have yet heard in this high-power class. Several circuit innovations contribute to this amp's performance. For instance, its protection circuits do not limit the signal prematurely on sudden transients with any type of speaker load. And of course, should you ever reach clipping levels, the front-panel LEDs will warn you it's happening. The complete separation of each channel through the unit prevents the least—even the slightest amount—of envelope distortion.

According to its manufacturer, the Model 4B has an open-loop distortion (i.e., with the negative feedback loop disconnected) of only 0.25 percent at 20 kHz. And even that small amount of THD is low-order distortion, with no evidence of notch or crossover distortion in this class AB configuration. Bringing the overall THD down to a double-decimal value, therefore, does not require the enormous amount of overall feedback associated with most conventional amplifiers, and that in turn means there is less of a problem with fast transients that might overdrive the system if the feedback

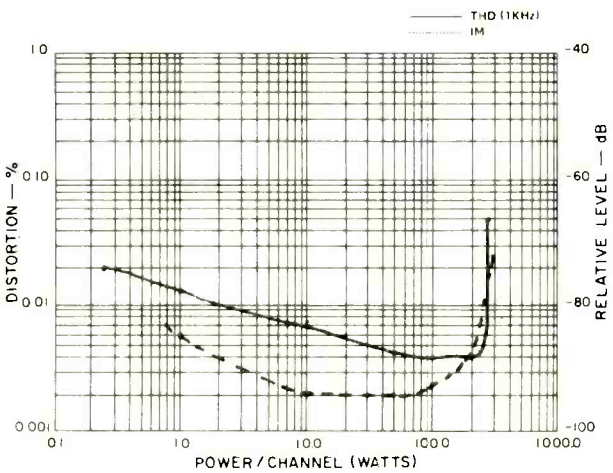


Fig. 1: Bryston 4B: Distortion vs. power output, 8-ohm loads.

is delayed. Actually, Bryston's circuitry is so "fast" that there's little likelihood of that anyway. Would you believe a slewing rate of over 60 volts per microsecond? Because of the care in circuit design employed, Bryston was able to leave the bandwidth "wide open" instead of having to apply bandwidth-limiting. This approach may account for the sense of transparency and depth that we experienced when listening to the Model 4B reproducing music.

Individual Comment by N.E.: It appears that the Model 4B embodies several very plausible design

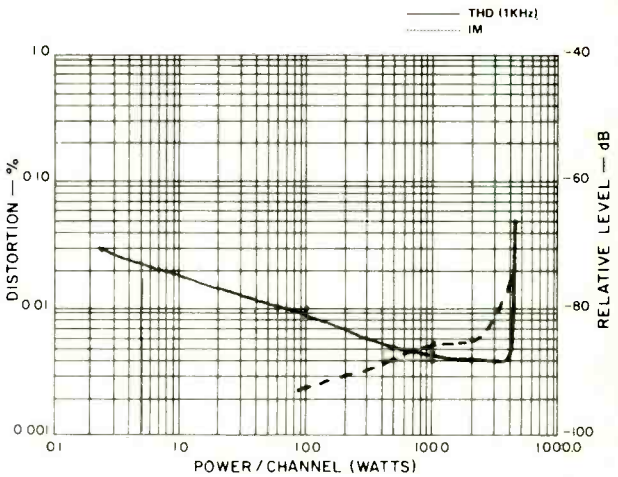


Fig. 2: Bryston 4B: Distortion vs. power, 4-ohm loads.

concepts which have a cumulative effect of providing definitely superior sound reproduction. For instance, the wide bandwidth makes sense here because it is accompanied by very fast-acting circuitry and ultra-clean transient behavior. I think too that this is the first amplifier we've had "on the bench" that virtually defied our rather sophisticated test setup in terms of going it one (or maybe two) better.

While the Model 4B could easily appeal to a well-heeled audiophile, its professionalism should not be slighted. Bryston has managed to come up with a device that can pump out enormous amounts of power and still run "cool" without the aid of a fan. In strapped mono mode, this deceptively "small" monster can produce nearly a kilowatt of power with any kind of program material. You may not need that

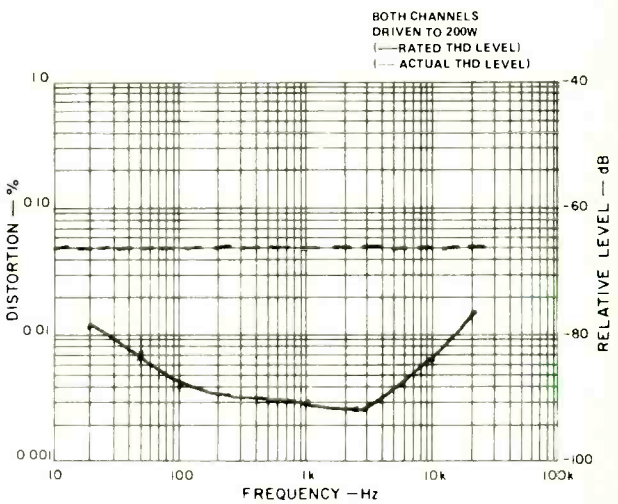


Fig. 3: Bryston 4B: Distortion vs. frequency, 8-ohm loads.

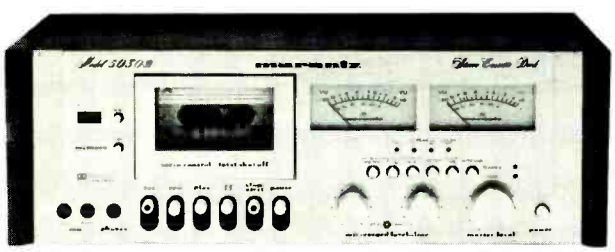
much power but there's a certain comfort in knowing that at less output demands the amplifier is "cruising" easily with no strain. The cautions about plugging in its line cord, and the deliberate 15 to 30 seconds wait before switching it on after the preamp is turned on, and the recommendation for leaving it on constantly may bother some users. The lack of power output readings may bother others. But the sound of the Model 4B may convince you these inconveniences are worth enduring.

BRYSTON MODEL 4B STEREO POWER AMPLIFIER: Vital Statistics

PERFORMANCE CHARACTERISTIC	MANUFACTURER'S SPEC	LAB MEASUREMENT
Continuous power per channel, 1 kHz	8-ohm loads: 200 watts	253 watts
	4-ohm loads: 400 watts	420 watts
Continuous power per channel, 20 Hz to kHz	8-ohm loads: 200 watts	231 watts
	4-ohm loads: 400 watts	400 watts
Power bandwidth	20 Hz to 20 kHz	below 10 Hz to above 30 kHz
Frequency response	NA	+0, −1 dB, 2 Hz to 75 kHz
Damping factor	500	>500
Rated THD (at 1 kHz)	0.05%	8-ohm loads: 0.003%
		4-ohm loads: 0.030%
Rated IM	0.025%	8-ohm loads: 0.006%
		4-ohm loads: 0.017%
Residual Hum & Noise	−100 dB	−115 dB ("A" wtd)
Input sensitivity	1.25 volts	1.25 volts

CIRCLE 27 ON READER SERVICE CARD

Marantz Model 5030 Cassette Recorder



General Description: The Marantz 5030 is a three-head stereo cassette recorder in which the record and play heads (permalloy) are combined physically in one housing, although they function electronically separately. The ferrite erase head is in its own housing. Signal meters are VU calibrated; there are individual peak level LED indicators for each channel. Dual concentric level control knobs handle input signals on each channel individually; there are separate pairs for the microphone and line inputs, and mic/line mixing is possible. In addition there is a master input level control for final recording level settings. No output level control is provided.

A front-loader, the model 5030 has a swing-out "door" with a transparent cover and a back panel, between which the cassette is inserted. The door is then moved back into place. Six transport levers are grouped below the cassette area for the functions of record, rewind, play, fast forward, stop/eject and pause. To the left of the cassette compartment are a three-digit tape counter and reset button, and a memory rewind button. Left of the transport keys are the left- and right-channel microphone input jacks, and a stereo headphone output jack.

The meters, numbered from −20 to +6, dominate the upper righthand section of the front panel. Just below and centered between them are four LED indicators for record mode, left- and right-channel peak levels and Dolby system on. Six pushbuttons are grouped below these indicators. Three select bias and EQ simultaneously for normal, CrO_2 and ferrichrome tapes. The fourth button switches in a signal limiter, the fifth activates the Dolby noise-reduction system, and the sixth is the tape/source monitor selector. Next to it are two more LED indicators for source and tape. The level controls mentioned earlier are below these buttons, and the power off/on button at the extreme lower right completes the front-panel array.

The rear panel contains the stereo pairs of jacks for line in and line out signals, a multiplex filter switch, a grounding terminal and the unit's AC line cord. The deck is supplied in a metal case fronted by a gold-tinted heavy and good-looking dress panel. The transport is powered by a single DC servo-controlled motor; the tape is moved by a single capstan drive system.

Test Results: Aside from a question regarding high-end response with chrome tape, *MR* found that the Marantz 5030 performed quite well for a machine in its price class. Indeed, with standard or "normal" ferric-oxide tape (in this instance we used TDK type AD), response extended beyond the manufacturer's specifica-

tion, making it to 15.5 kHz within the normal ±3 dB tolerance. Signal-to-noise also was better than claimed. Distortion (no spec is given) was judged to be quite low at 0.8 percent, and ample headroom was available.

The record/playback response for standard tape, plotted by using our spectrum analyzer, is shown in Fig. 1 and indicates that things were lined up very nicely for this tape. The response using chrome or equivalent tape is shown in Fig. 2. It begins to roll off gradually above 2 or 3 kHz, and is down by −3 dB at 6 kHz with reference to the 1-kHz level. At 10 kHz it is down by about −4; at 15 kHz it is down by at least −6 dB (each vertical division represents 10 dB).

Examining this curve in detail made it clear that we were not dealing with a head or tape limitation here. Rather, *MR* believes that the bias setting for the TDK-SA tape used in these tests was considerably higher than it should have been. Just to make sure, the tests were repeated using 3M "Scotch" Master II, which also takes chrome bias and EQ, and we obtained virtually the same results. Since there is no user adjustment for bias on this machine (nor would we expect there to be one for a recorder in this price bracket), that added up to a machine best suited for use with the better grades of ferric-oxide tape.

Further indication that we were dealing here with a mis-biasing problem came from the S/N ratios obtained using the chrome-biased tape. The difference between the S/N figures obtained for this tape (63 dB without Dolby) and those obtained with the standard tape are more than one would expect. A further clue is found in the THD figure for 0 dB record level. It is lower than usual. So, as we have said many times before, these three parameters are all interrelated, and you can make one or two of them look "super good" at the expense of the third—in this instance, apparently, the frequency response for chrome bias.

Wow and flutter was extremely low for a single-capstan, single-motor machine. The peak LEDs were well calibrated, and the limiter circuit worked quite effectively and would be useful for "live" mic recordings. The input mixing facility is a plus factor, as are the tape/source indicators, the memory rewind, and the automatic shutoff which is total and works from any transport mode. The fact that the record and play heads are contained in one "package" obviates the need for azimuth alignment facilities which would add to the cost of the machine. This arrangement, by the way, should not be confused with the setup found in some cassette decks in which a separate low-fidelity "monitor" head is counted as the "third" head, while the better head serves as a combination r/p head. In the Model 5030, the record and playback heads are electrically separate, and both are designed to do their respective jobs optimally. The unit qualifies as a true three-head machine.

General Info: Front panel dimensions are 16⅜ by 5²⁵⁄₃₂ inches. Depth behind panel is 11½ inches. Total depth, including front panel projections, is 12½ inches. Weight is 16 pounds, 5 ounces.

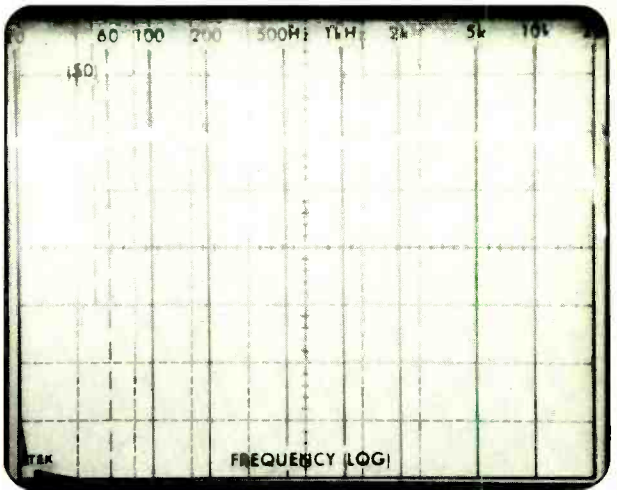


Fig. 1: Marantz 5030: Record/play response, −20 dB level, using TDK AD tape.

Individual Comment by L.F.: I am always pleased when I have to measure and report on three-headed cassette decks. For one, they're a lot easier to measure than two-headed decks. One can take a frequency plot response as one goes along, thanks to the monitoring capability of the three-headed machine. With two-headed decks we have to record a series of test tones (at the usual −20 dB level), a few seconds of each at a time, and then rewind and play back the tape, keeping careful note of the series of frequencies.

So much for generalizations concerning three-headed cassette decks. As for this Marantz unit in particular, it is pretty clear from our test data that something was wrong with our sample—specifically, the bias setting for chrome tape. Perhaps someone goofed in lining up this sample. Based on an examination of the machine and the way it performed with standard ferric tape I have every reason to believe that, properly

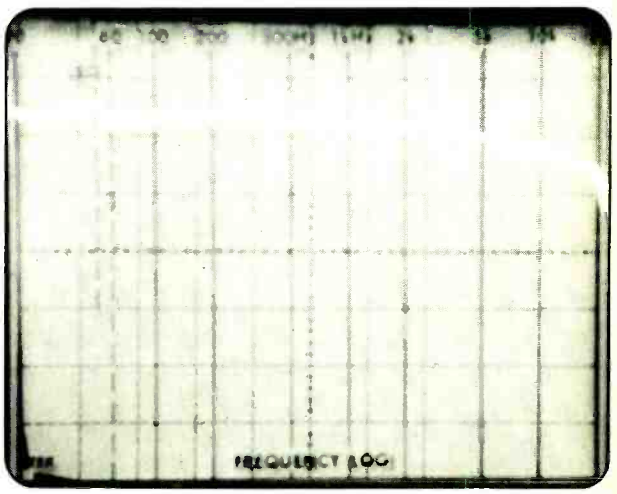


Fig. 2: Marantz 5030: Record/play response, −20 dB level, using TDK AD tape.

aligned, it should have done as well, or better, with chrome or chrome-equivalent tapes. It's just that my sample did not.

Individual Comment by N.E.: If our report serves to alert the manufacturer to a possible need for some correction in lining up circuit parameters to make better use of chrome tape, it may have served a useful purpose. I made some additional measurements —on another sample—of response above 1 kHz and, allowing for errors in my own readings, it does appear that there is a rolloff in the highs when chrome bias is switched in, although I do not feel it is as pronounced as in the first test sample.

MARANTZ MODEL 5030 CASSETTE RECORDER: Vital Statistics

PERFORMANCE CHARACTERISTIC	MANUFACTURER'S SPEC	LAB MEASUREMENT
Frequency response		
ferric-oxide tape	±3 dB, 35 Hz to 14 kHz	±3 dB, 22 Hz to 15.5 kHz
chrome or equiv.	±3 dB, 35 Hz to 17 kHz	±3 dB, 21 Hz to 6 kHz (see text)
Wow & flutter (WRMS)	0.05%	0.05%
S/N, ferric-oxide tape, w/o Dolby	54 dB	59 dB
w/Dolby	64 dB	68 dB
S/N, chrome or equiv., w/o Dolby	NA	63 dB
w/Dolby	NA	71.5 dB
THD at 0 VU, ferric-oxide tape	NA	0.8%
chrome or equiv.	NA	0.8%
Record level for 3% THD		
ferric-oxide tape	NA	+9.5 dB
chrome or equiv.	NA	+7.5 dB
Mic input sensitivity	0.16 mV	0.24 mV
Line input sensitivity	50 mV	75 mV
Line output level	800 mV	550 mV
Headphone output level	43 mV	28 mV/8 ohms
Fast-wind time, C-60	105 seconds	100 seconds
Power consumption	13 watts	13 watts

CIRCLE 25 ON READER SERVICE CARD

Tandberg Model TD 20A Open-Reel Tape Recorder

General Description: The Tandberg TD 20A is an open-reel 10½-inch capacity stereo tape recorder of advanced design mechanically and electronically. In the former area, the TD 20A has a unique transport built around a logic-controlled four motor system that does away with solenoids, gears, and other mechanical transmission hardware. Electronically, the recorder incorporates Tandberg's newly developed "Actilinear" system which is designed to offer a 20-dB improvement in signal headroom capacity over conventional recording systems while also enabling the deck to handle the impending new metal-particle tapes.

A three-head design (separate heads for erase, record and play), the model TD 20A has a built-in "sel sync" feature for multi-track recording. Front-panel facilities include input mixing, and left- and right-channel bias adjust (for use with tapes other than Maxell UD-XL for which the machine is factory-adjusted). The transport buttons handle the usual functions; they also permit manual rocking-of-the-reels for precise signal location, and "flying start" recording (from playback to record without stopping the tape). The model TD 20A is available in either of two 2-speed combinations: 3¾ ips and 7½ ips; or 7½ ips and 15 ips.

The four motors handle the two reels, the capstan drive and the pinch roller and tape guides. The Actilinear circuitry (which apparently replaces Tandberg's former cross-field recording system) is credited not only with significantly improved response using presently available tapes, but also with ensuring the recorder against future obsolescence due to the anticipated emergence of new, higher-coercivity tapes such as the metal-particle types.

The tape is threaded from the feed reel past a swinging guide and a fixed guide into a slot between the two-piece head assembly cover where it passes over the heads and several other guides, emerging from the slot and engaging another swinging guide before it goes

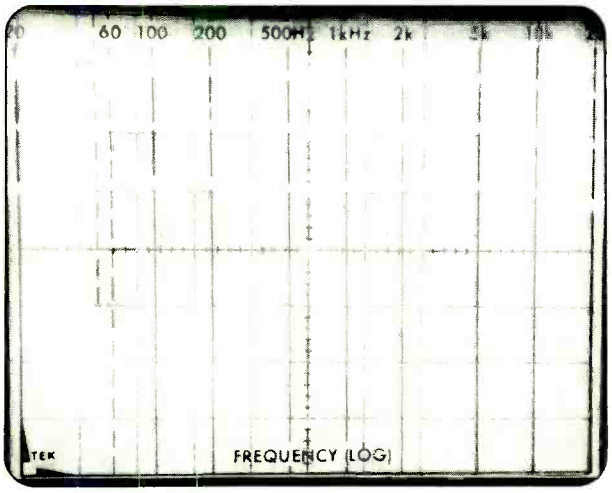


Fig. 1: Tandberg TD 20A: Record/play response at 0 dB, −10 dB and −20 dB, 7½ ips (see text), using Maxell UD-XL tape.

onto the takeup reel. The head covers are removable for access to the heads and guides. Below the takeup reel is a four-digit tape counter and reset button.

Left of the head assembly are three pushbuttons for power off/on, speed selection and reel size selection. Under these buttons are output level control knobs, separate for each channel. Under these are four switches. One selects playback mode (left channel, stereo or right channel); another handles tape/source monitor; another activates the sel sync function; the fourth is an edit/cue control. With this last switch turned on, the tape remains in contact with the heads

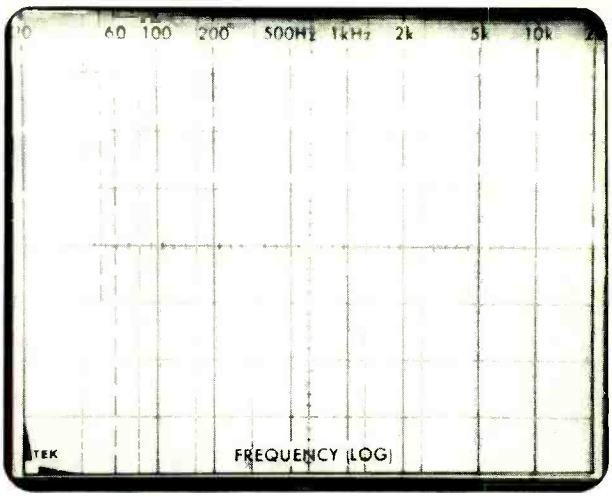


Fig. 2: Tandberg TD 20A: Record/play response as in Fig. 1, but at 3¾ ips.

during fast wind; with this switch turned off, the tape is lifted away from the heads in fast wind.

Directly under the head assembly are the equalized peak-reading meters. Calibrated from −24 to +3, they are illuminated during use and they function on both record and play. Below the meters are three phone jacks: a stereo headphone output, and left- and right-channel microphone inputs.

To the right of the head assembly are five transport buttons that can be manipulated to perform seven functions which are labeled, each with its own LED indicator. The functions are: record, standby, rewind, stop, free, wind (fast forward) and play. The standby indicator comes on when the deck is ready to record (i.e., when either or both of the record-channel switches below are activated and the deck is in play or stop mode—the latter position permitting setting of levels prior to recording). Actually, you can "fool" this indicator and go into recording from fast wind by pressing both the record and play buttons (as long as either or both of record-channel switches is activated). The "free" mode is engaged by holding down the stop button, pressing the wind button, and then releasing both. This removes the braking on the reel turntables so that, with the edit/cue switch activated, you can manually rock the reels for precise cueing or for locating a specific section of recorded material.

Under the transport buttons are five input level control knobs. One pair handles mic/radio (DIN)/Line 2 inputs, separately for each channel. Another pair handles the Line 1 inputs, separately on each channel. The fifth knob is a master input level control which has an adjustable reference marker tab that may be rotated against a scale numbered from below −30 to above 0 dB. The arrangement of course permits input mixing on each channel, and then setting final overall levels. Combined with the sel-sync option, this makes for many "creative recording" possibilities.

Below these knobs are the record-channel selector switches already mentioned. Between them are the bias adjustments, recessed in the front panel and re-

quiring the use of a narrow-blade screwdriver. Finally, there's a microphone sensitivity switch that may be used to reduce the sensitivity of the mic input by 25 dB, or the "radio" (DIN) input by 6 dB.

At the rear are two stereo pairs of line inputs, the DIN socket, the line outputs and the recorder's AC line cord.

The TD 20A is supplied in a dark wooden case, and with two NAB reel hub adapters. Styling is neat, crisply contemporary and attractive. The deck is nominally intended for upright or vertical installation, although there are four "feet" on the large rear that could permit it to be installed horizontally, with the cables and wires trailing out from underneath.

Test Results: The Tandberg TD 20A has the kind of high-performance specs one would expect from this manufacturer and for a recorder in this class, and in *MR*'s tests they all were met or exceeded by very ample margins. Electrically and mechanically, the TD 20A is a superior open-reel recorder offering excellent performance that can be attributed to its several unique and advanced design and circuit features.

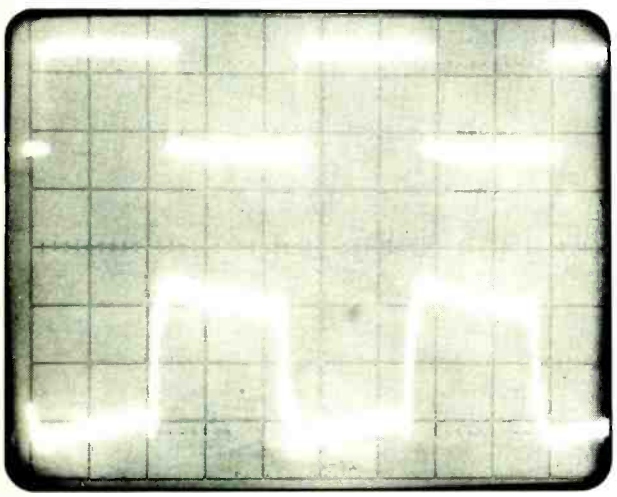


Fig. 3: Tandberg TD 20A: Reproduced 1 kHz square wave (lower trace) demonstrates fast transient response of this machine.

Response in general surpassed Tandberg's claims at both speeds, but to achieve at 3¾ ips a response within ±2 dB out to 24 kHz is remarkable. At 7½ ips, the deck made it to beyond 30 kHz, and with lower wow and flutter, and lower distortion than spec'd, and with an excellent signal-to-noise ratio of 66 dB.

Inasmuch as "0 dB" on Tandberg's meters is 9 dB higher than the NAB reference level of 185 nanoWebers/meter, we measured frequency response (as reported in the accompanying table) at a −30 dB meter indication, or about 20 dB below NAB reference level. Published specs were exceeded at both speeds by wide margins, but "just for fun" we also plotted a series of frequency response sweeps with the aid of our spectrum analyzer. Fig. 1 shows results obtained at 7½ ips, with the lower trace representing the −20 dB level, and the successive higher traces taken at levels of −10 dB and 0 dB. Bear in mind, once again, that the "0 dB" results are equivalent to a +9 relative to 185 nanoWebers/meter! At the lower speed (Fig. 2), tape saturation takes over at the extreme high frequencies, as might be expected. (The tape used was Maxell UD-XL for which the machine had been biased. Readjustment of bias, for use with other tapes, may be made via the front-panel screwdriver holes; the available range from the factory-set point is −2 to +3 dB.)

One of the attributes ascribed to Tandberg's new Actilinear recording electronics is the ability to reduce amplifier slew rate effect and thereby improve handling of transient signals. It also reduces the intermodulation interference from the bias oscillator, and provides about 20 dB of additional signal-handling capability as compared to conventional recording systems. According to Tandberg, when the new metal particle tapes become available in open-reel format, the TD 20A will be able to be easily adjusted to handle the new tapes, and the built-in Actilinear system has been designed to accommodate the added signal levels that can be applied to such tapes.

To check the improved transient signal handling ability of the TD 20A, we recorded a square-wave test signal at 1 kHz. The input signal is shown in the upper trace of Fig. 3. The output, read from the tape playback, is shown in the lower trace. The horizontal tilt of the reproduced waveform is a function of low frequency limitations; the important thing to observe here is the steepness in the rise and fall of the reproduced waveform. We seriously doubt that most present open-reel recorders can do as well.

Praise also is due the mechanical functioning of the Tandberg TD 20A which is extremely responsive, smooth, noise-free and very gentle in handling tape. The logic-controlled four-motor system does an excellent job in all modes, and in fast-buttoning from one mode to another, swiftly and silently.

General Info: In wooden wraparound, dimensions of the TD 20A are 17¾ inches high; 17$^{3}/_{32}$ inches wide; 7¼ inches deep. Rack-mountable with optional rack mount kit. Price: $1300.

Individual Comment by L.F.: Tandberg's new TD 20A open-reel tape deck incorporates a great deal that is new and different. Some of the innovations were obvious from operating the machine. Others took a bit of digging into. One of the most welcome new features is the "free" tape mode which, with the aid of the edit/cue switch, permits about the easiest and quickest editing I've had the pleasure to use. The well-calibrated level meters, with their post-equalization, while not new to this machine, have always been a favorite of mine on other Tandberg recorders. I like to know where I'm at, as far as signals reaching the tape are concerned, and this type of metering provides that information regardless of the frequency content of the program being recorded.

The not-so-obvious features of the TD 20A include Tandberg's new Actilinear recording electronics (about which you can learn more by reading my "Ambient Sound" column in this issue of *Modern Recording*). Briefly, however, this technique minimizes the effect of amplifier slew rate and thereby makes for better transient response. It also reduces any IM interference form the bias oscillator, and it adds around 20 dB of signal headroom. Finally, this system guards against obsolescence in terms of the anticipated new metal particle tapes, since it can be readily adjusted to handle them.

Tandberg must have been pretty well convinced that they've come up with something special with Actilinear to have abandoned their well-known cross-field recording principle which was, in part, responsible for the excellent response their former machines achieved at the slower recording speeds. From the results we obtained at the 3¾ ips speed in the TD 20A, we must conclude that dropping the cross-field approach has not hurt overall response one bit.

In my opinion, the performance of the TD 20A is, at present, limited only by the quality and capability of the tape with which it is used. And from an operational standpoint, the TD 20A is one of those machines that can be appreciated fully only by a hands-on trial. Frankly, I'm reluctant to get my "hands off" of it!

Individual Comment by N.E.: Every so often in the past few years something comes along that dramatically and significantly reminds us that as good as cassette recording can be, the open-reel format can be demonstrably better. Right now, the audio spotlight is deservedly focused on this new Tandberg which "does its thing" in a way that is both new and better, while at the same time embodying built-in assurance for being adaptable to future needs in terms of the impending entry onto the scene of the new metal-particle tapes. The relative compactness, weight and general "handiness" of its format are also plus factors, not to mention its apparent ruggedness which is backed (if need be) by a conscientious and reliable service facility for which Tandberg has been justly esteemed over the years.

In addition to the usual bench tests of the TD 20A, we used two samples for making recordings, mixing, and so on with a broad assortment of program material and at both speeds. Even on direct-disc dubbings, we could discern no degradation of the signal at the slow speed which, with levels properly adjusted, sounded as good as the faster speed. We recorded a lot of percussives, both very low and very high in frequency, and at relatively high input levels, and the taped versions sounded as good as the original sources. The "fast-buttoning" capabilities of the TD 20A operated smoothly and the points on the tape where we introduced sudden changes of mode, and even of speed, were utterly noise-free. Fades up and down were accomplished smoothly and effectively via the four input level controls and the fifth master control.

The recorder has a built-in sel sync feature for multitrack work. The deck also may be used with a wireless (PCM infrared) remote-control optional accessory (not tested).

Our measured test results on the TD 20A speak for themselves. But the sheer "beauty" and sophistication of this machine can best be appreciated by a demonstration or hands-on trial which you should try to experience if you are interested in a superior version of the quarter-track open-reel format.

TANDBERG MODEL TD 20A OPEN-REEL TAPE RECORDER: Vital Statistics

PERFORMANCE CHARACTERISTIC	MANUFACTURER'S SPEC	LAB MEASUREMENT
Record/playback frequency response		
7½ ips	±2 dB, 20 Hz to 22 kHz	±2 dB, 11 Hz to 32 kHz
3¾ ips	±2 dB, 20 Hz to 18 kHz	±2 dB, 10 Hz to 24 kHz
Harmonic distortion, 7½ ips		
at 0 VU	2.0%	1.5%
at +3 VU	NA	3.0% (actually, +12 dB re NAB levels).
Best S/N ratio, std tape, 7½ ips	66 dB	66 dB
Input sensitivity, line (max)	50 mV	42 mV (re 0 dB on meters)
microphone (max)	0.2 mV	0.2 mV
Output level, line	1.5 V	1.4 V
headphone	5 mW/8 ohms	5 mW/8 ohms
Bias frequency	NA	125 kHz
Erase ratio	> 70 dB	> 70 dB
Wow and flutter, 7½ ips	0.06%	0.012%
3¾ ips	0.10%	0.04%
Rewind time, 2500-ft reel	NA	70 seconds
Speed accuracy, 7½ ips	±0.5%	"perfect" (±0.0%)

GROOVE VIEWS

Reviewed by:
SEDGWICK CLARK
NAT HENTOFF
CHAS KIMBRELL
JOE KLEE
GIL PODOLINSKY
RUSSELL SHAW
STAN SOOCHER

JIMMY BUFFETT: *Son Of A Son Of A Sailor.* [Norbert Putnam, producer; Marty Lewis, engineer; recorded at Bay Shore Recording Studios, Coconut Grove, Fl., and Quadrafonic Sound Studio, Nashville, Tn.] ABC AA 1046.

Performance: **Functionally droll**
Recording: **Excellent**

One of the greatest things about our social setup here in the United States is the infinite amount of subcultures prospering within the overall fabric of American life. Jimmy Buffett has, through his six albums, carefully delineated one of the least known strata, that of the Caribbean and south Florida *bon vivant*, a carefree individual whose main concerns are (not necessarily in the following order) staying drunk, consuming and occasionally selling controlled substances, sailing, fishing, and, of course, relentlessly pursuing tanned distaff specimens.

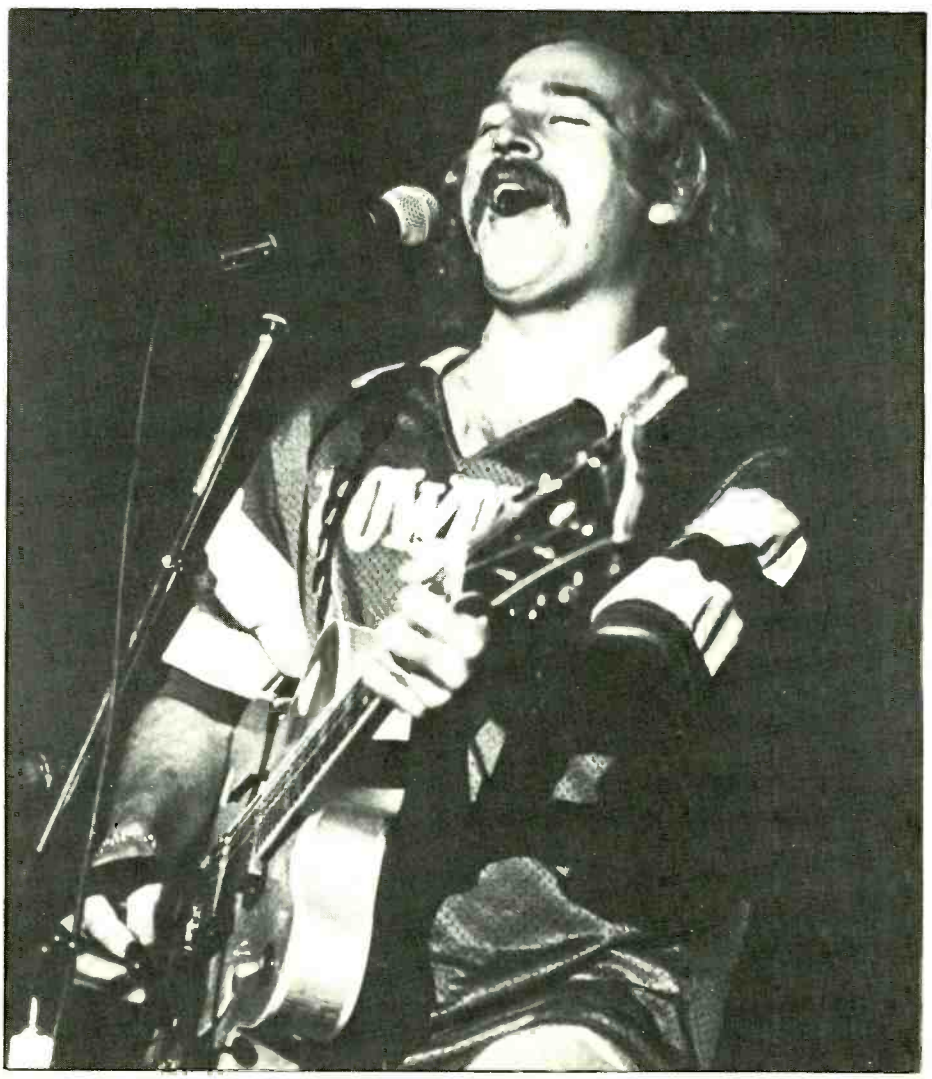
Perhaps as a testament to his lyrical legitimacy is the admitted fact that Buffett's life style has at time encompassed a good number of the things about which he sings. There are those who say that constant preoccupation with such hedonistic topics grows a little tiresome, hoping all along for some variety in Jimmy's approach, yet rather than risk topical adventures on unfamiliar ground, he sticks close to the things he knows well.

Logically, since his main subjects revolve around sand and sea, Buffett's musical scenarios utilize geographically similar textures—mainly calypso and Latin rhythms gleaned from the same area of the world as are his stories. Occasionally, as in "Manana," something of a reggae beat is used.

Producer Norbert Putnam operates comfortably within this narrow niche. This one-time Nashville studio bass player has made the transition to Latin timbres quite easily, and steers performer and band through a series of somewhat limited, yet highly listenable approaches. R.S.

U.K.: *U.K.* [U.K. producer: Stephen W. Tayler, Reno Ruocco, Steve Short, Colin Green, engineers; recorded at Trident Studios, Soho, London, England.] EG Records/Polydor PD 1-6146.

Performance: **Definitely talented**



JIMMY BUFFETT: Hedonistic life

Prime Time™

Digital Delay Processor

professional quality delay plus special effects

Lexicon's new Model 93 "Prime Time" digital delay processor gives recording studios and entertainers an easy-to-use professional quality rime delay with special effects and convenient mixing all at a price you can afford. It combines a degree of flexibility and versatility never before offered in equipment of full professional quality.

- Two delay outputs independently adjustable from 0 to 256 ms
- Complete mixing for delay and reverb processing, freeing up main console channels and tape tracks
- Integral VCO for special effects like vibrato, doppler pitch shift, flanging and automatic double and triple tracking
- Long delay special effects — up to 2 seconds
- All dynamic functions can be footswitch controlled
- 90 dB dynamic range, total distortion below 0.08% at all delay settings

lexicon Lexicon, Inc., 60 Turner Street
Waltham, MA 02154 (617) 891-6790

Export: Gotham Export Corporation, New York, New York

CIRCLE 66 ON READER SERVICE CARD

U.K.: Slightly premature

Recording: **Definitely not that noteworthy**

U.K. is a most promising jazz/rock fusion ensemble whose members come from some of the most adventurous groups in rock: Yes (Bill Bruford, drums), King Crimson (John Wetton, bass and voice), and Soft Machine (Allan Holdsworth, guitar). What had originally begun as a trio with Bruford, Wetton and Rick Wakeman suddenly derailed as Wakeman rejoined Yes. The addition of Holdsworth on guitars is a definite plus. Eddie Jobson rounds out the group on keyboards.

There are a few problems on this debut, all stemming fromsong structure. Allan Holdsworth is simply not given enough room to solo, which is a crime for he is a guitarist who has much to say musically. With Jobson having a hand in the writing of all eight pieces, multiple keyboard work is the story here, with a style strongly reminiscent of Genesis. There is no counterbalance for that as Holdsworth's ample abilities are negated and Bruford's excellent drumming is not enough to set the band upright. Wetton's voice lacks versatility and the lyrics need work. Nevertheless, this is still a good album for it will serve as an excellent reference point for what is, hopefully, to come. The production effort here is all straight ahead with the only really noteworthy point being the tone and clarity achieved on the acoustic guitar passages throughout the album.

The problems are easily eliminated. U.K. needs greater rehearsal time, a change in their song structure, more input from Bruford, and possibly the addition of a vocalist and/or a new keyboardist. The potential of this group is quite exciting and easily overcomes any disappointment resulting from this slightly premature debut recording.

G.P.

BILL BRUFORD: ***Feels Good To Me.***
[Robin Lumley, Bill Bruford, producers; Steve W. Tayler, engineer; recorded at Trident Studios, Soho, London, England.]
EG Records/Polydor PD 1-6149.

Performance: **Solid**
Recording: **Steadfast**

In contrast to the recent U.K. debut album, drummer Bill Bruford's debut solo album is much more consistent with nothing lacking. With the same engineer, studio and guitarist (Allan Holdsworth) involved, the difference in the two must be seen in terms of the material and its execution. Bruford wrote all of the material here and the bridge between jazz and rock seems less strained than with U.K. The question arises as to whether Bill might have held back material as well as production input from the U.K. effort for his solo venture. His writing demonstrates not only great care taken for each instrument, but for the individual musicians as well. The most marked improvements are the solos made available to Holdsworth, as well as the selection of Dave Stewart on keyboards. There are no ELP/Genesis overtones on this album. The use of Annette Peacock on vocals is brilliant, for she adds such an airiness and free-form feel to the proceedings that you end up amazed at the hidden talents Bruford possesses.

Apart from the writing—which is superb—this album excells in the recording of acoustic instruments and vocals, something that was only hinted at on the U.K. debut. It was the jazz element of Bruford's drumming that added that

BILL BRUFORD: Fulfilling expectations

airy dimension to the early Yes material, a feature that has been sorely lacking since his departure. While this LP shows that he does have an imagination and allows himself room for experimentation, it also shows that he has taste for there is no digressionon this album.

One can't say enough for the personnel selected, for their collective contributions make for a going concern. This is in no way the usual drummer's solo LP. Bruford can write, play and direct. I, for one, have been waiting for years for him to do a solo album. Now that it's been released, it has fulfilled my every expectation. What else need be said but to listen and enjoy. G.P.

DAVID JOHANSEN: ***David Johansen.*** [Richard Robinson and David Johansen, producers; David Thoener, engineer; recorded at The Record Plant, New York, N.Y.] Blue Sky JZ 34926.

Performance: **No talent**
Recording: **Demo-like**

If David Johansen were a house, he'd be in dire need of renovating. The opening track, "Funky But Chic,"

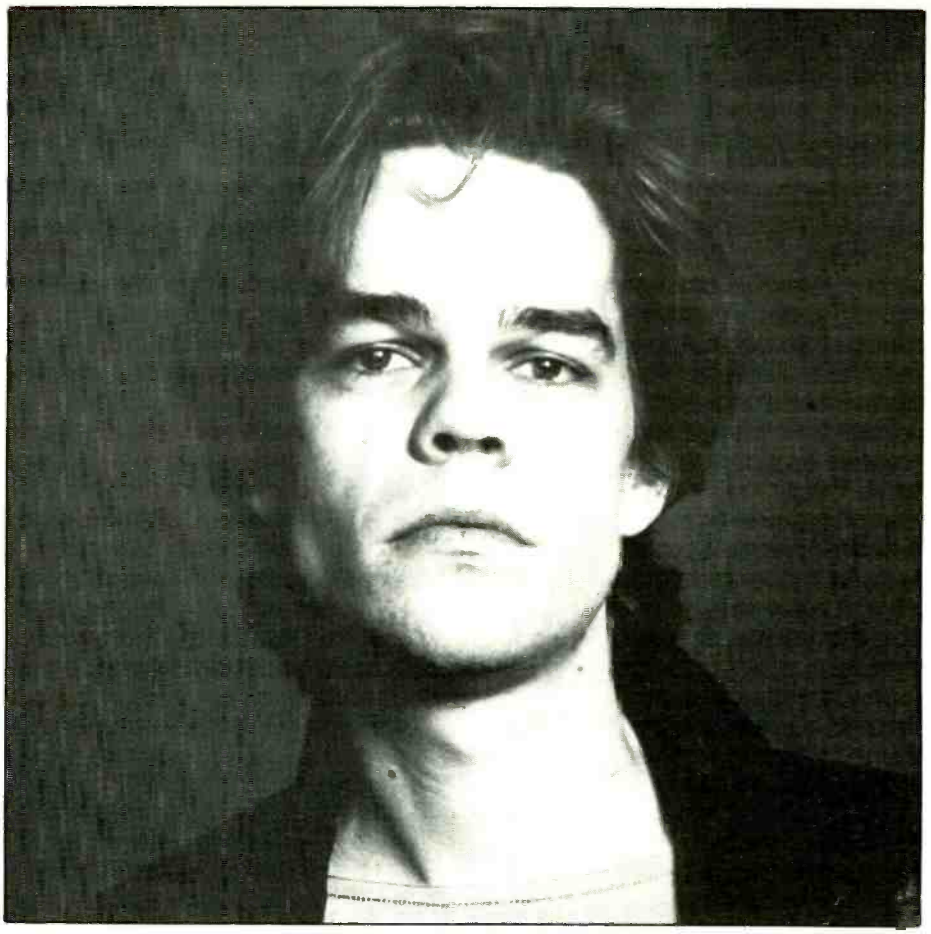
sounds like a poor take-off on Steve Martin's "King Tut." Once you get that idea stuck in your head, it's hard not to laugh at the rest of the album.

The whole thing's primitive. Everything's got that "live"-in-one-take feel, which would be interesting if this guy had something to say. Judging by his lyrics, I think David is just discovering English. Even guesties like Felix Cavaliere, Joe Perry or Scarlet Rivera can't save this recording from being the armpit of recorded music. Some call it rock, some call it punk. I call it garbage. G.P.

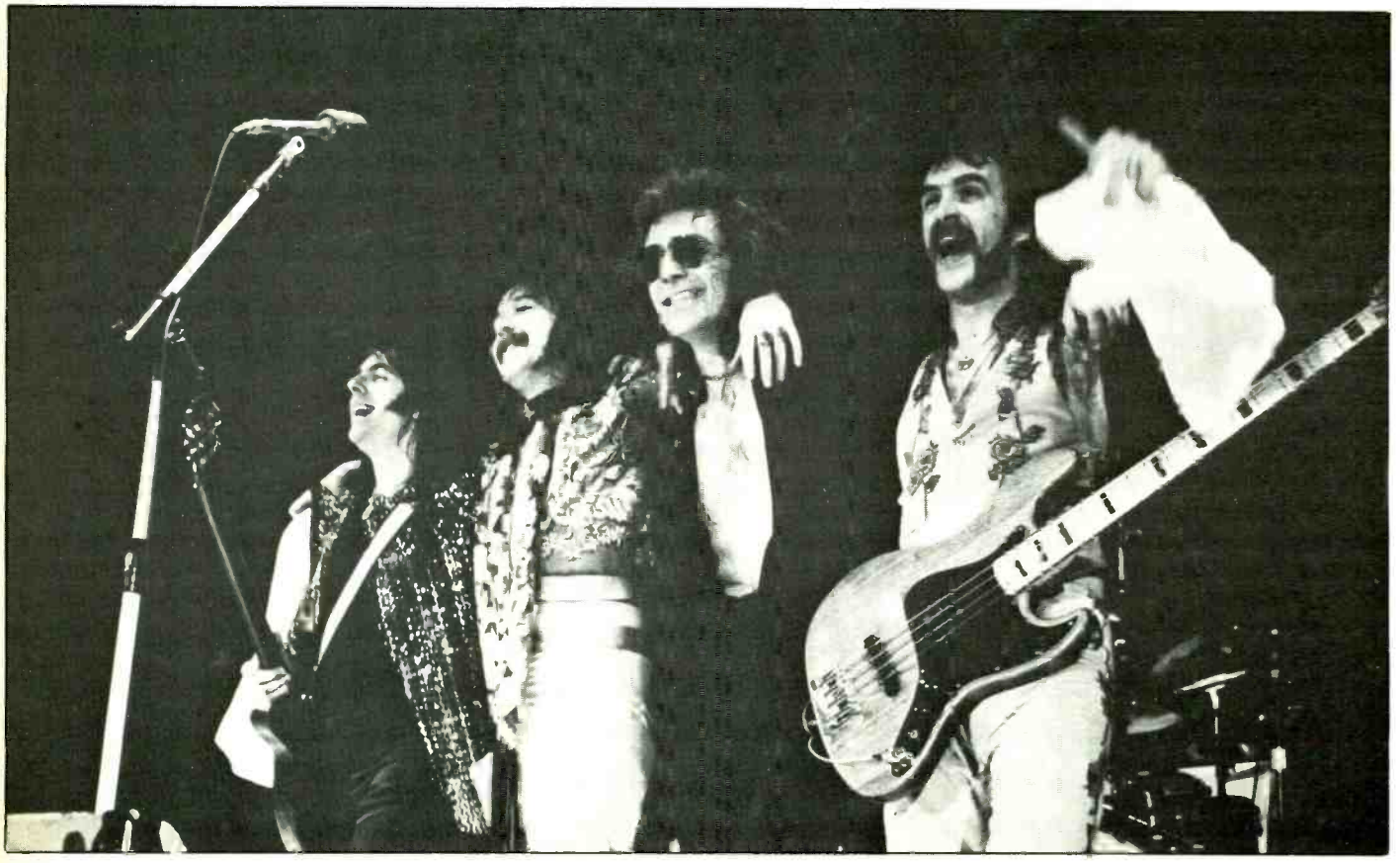
FOGHAT: *Stone Blue.* [Eddie Cramer and Foghat, producers; Don Berman, Bob Ludwig, Niel Dorfsman, engineers; recorded at The Power Station, N.Y.] Bearsville Records BRK 6977.

Performance: **Good rock 'n' roll**
Recording: **Okay**

Foghat is one of the very rare groups that takes some of the money it makes and puts it back into music for others to enjoy. That gesture entitles them to special consideration in my book.



DAVID JOHANSEN: Primitive



FOGHAT: Deserves respect

"The Sansui AU-717 is a superb amplifier. We like it with no ifs, ands, or buts." (Julian Hirsch) It offers "as much circuitry sophistication and control flexibility as any two-piece amplifying system."

Everyone says great things about the new Sansui AU-717, but the experts say it best.

The Sansui AU-717 DC integrated amplifier is "Sansui's finest .... It incorporates a fully direct-coupled power amplifier section whose frequency response varies less than +0, −3dB from CHz (D.C.) to 200 kHz. The amplifier's power rating is 85 watts per channel (min. RMS) from 20 to 20,000Hz into 8-ohm loads, with less than 0.025 per cent total harmonic distortion .... If any amplifier is free of Transient Intermodulation Distortion (TIM) or any other slew-rate induced distortion, it is this one .... The slew rate ... was the fastest we have measured on any amplifier, an impressive 60 V/μsec.

"The preamplifier section of the AU-717 .... has very impressive specifications for frequency response, equalization accuracy, and noise levels ... The AU-717 has dual power supplies, including separate power transformers, for its two channels ... [and] exceptionally comprehensive tape-recording and monitoring facilities .... Good human engineering ... separates this unit from some otherwise fine products....

"The Sansui AU-717 is a superb amplifier. We like it with no ifs, ands, or buts." (Reprinted, by permission, **Stereo Review** Magazine, Feb. 1978. Julian Hirsch Test Report. Copyright © 1978. Ziff-Davis Publishing Company. All rights reserved.)

"One clear advantage of DC design is apparent. Even at the low 20Hz extreme, the amplifier delivers a full 92 watts — the same value obtained for mid-frequency power — compared with its 85 watt rating into 8 ohms....

"The equalization characteristic of the preamplifier was one of the most precise we have ever measured, with the deviation from the standard RIAA playback curve never exceeding more than 0.1dB....

"Sansui claims that this unit has reduced transient intermodulation distortion — a direct result of the DC design, and, indeed, the model AU-717 delivered sound as transparent and clean as any we have heard from an integrated amplifier....

"... worth serious consideration — even by those who prefer separate amplifiers and preamplifiers." (Reprinted in part from Len Feldman's test report in **Radio-Electronics,** January, 1978.)

Listen to the superb sound of the Sansui AU-717 at your Sansui dealer today. And be sure to ask him for a demonstration of the matching TU-717 super-tuner.

SANSUI ELECTRONICS CORP.

Woodside, New York 11377 • Gardena, California 90247 • SANSUI ELECTRIC CO., LTD., Tokyo, Japan
SANSUI AUDIO EUROPE S.A., Antwerp, Belgium • In Canada: Electronic Distributors

Sansui

CIRCLE 50 ON READER SERVICE CARD

Granted, they sound just like the next band. Their sound is good, definitive, basic rock and roll. Now and again a tune will really stick out, such as "Midnight Madness," which features great guitar work and some very pretty chord changes.

The recording of groups like Foghat are never really that interesting or challenging, for their sound and instrumentation do not lend themselves to sophisticated interpretation. You'll get the nice, deep-sounding set of tubs and the blow up/out guitar, but that has all become standard. Occasional mental lapses, like leaning heavily on reverbed vocals on "It Hurts Me Too" tend, when coupled with average-to-plain lyrics, to slow down the proceedings.

One must also take into account the fact that as such, the music is geared towards a younger audience and therefore fits the prescription down to the last 4/4 number. There's no question that they're good at what they do, and since they don't set their sights too high, they succeed in achieving them. They'll never make The All-Time Great List, but I can't help but come away with respect for them. G.P.

RICHIE FURAY: *Dance A Little Light.* [Jim Mason, producer; Eric Prestidge, engineer; recorded at Davlen Sound Studios, Producers Workshop, and Wally Heider Recording, Los Angeles, Ca.; mixed at Producers Workshop.] Asylum 6E-115.

Performance: **Vivacious**
Recording: **Clean vocals; cluttered view**

" 'That voice, that voice!' everyone says, 'That voice,' " a hoarse Richie Furay whispered backstage at his commendable Bottom Line gig. "I've thrown it out so bad tonight, I can hardly talk." The reviews were good, but just like his checkered career, Richie's full potential remained untapped at the New York club. And even though the audience responded as much to the songs from his second solo album, *Dance A Little Light,* as the old songs, they knew they weren't witnessing the re-emergence of a major influence upon every vocal harmony group to spring from the West Coast since the late sixties.

From his days in the Buffalo Springfield and Poco to Souther, Hillman, and Furay and his solo career, Richie's melodic and harmonic spirit has rarely been equaled. He hasn't written a lot of hit singles, but almost any of his original songs, given the right promotion, would surely move to the top of the pop charts. The Buffalo Springfield, along with the Byrds, were prime movers in the early days of country rock. Stephen Stills and Neil Young were the "rock" in the Springfield while Richie provided that pleasing "country" touch with back porch charmers like "Kind Woman" and "Sad Memory." When Richie formed Poco, the steel guitar of Rusty Young took a prominent part as a counterpoint to the soothing, yet lively harmonies. Poco didn't sell as many records as it should have, but they gave one of the best "live" shows in rock with Richie ecstatically shaking on stage.

Souther, Hillman, and Furay was meant to launch solid solo careers, but Crosby, Stills, and Nash they were not. Instead, each SHF alumnus has released mildly interesting solo work that lacks the excitement and tension of dominating personalities. Richie's first solo album from last year, *I've Got A Reason,* contained several impressive songs like "Mighty Maker" but a loose, unfocused production. The title song gave the LP a *raison d'etre* while winning few new fans.

Dance A Little Light has shown lean chart action, but points to Richie's understanding of the solo album as equally a child of producer and artist. Firefall producer Jim Mason has harnessed Richie's energies, both vocal and songwriting, and surrounded them with complete, yet eclectic musical environments. "Yesterday's Gone" is melodically reminiscent of Poco's cover of "Honky Tonk Downstairs;" "It's Your Love" of SHF's "Fallin' In Love." The heavy line up of guests doesn't hurt either. Former Poco associates Timothy B. Schmit, George Grantham, Jim Mes-

RICHIE FURAY: Mentholated rush

THE JVC SEPARATES.

Sensitive tuners, plus DC amplifiers that help eliminate sonic backlash.

If you've ever listened to a JVC music system with a separate tuner and amplifier, and thought, "One of these days . . ."

Well that day is here. The new JA-S44 DC integrated stereo amplifier, with its exclusive built-in SEA graphic equalizer and dual power meters, provides clean, uncannily-accurate music reproduction, with all the power you're ever likely to need.*

Our "Ti-DC" design in the JVC JA-S55 and JA-S77 further eliminates distortion-causing capacitors within the DC phono equalizer, DC tone control and DC power amplifier sections, providing frequency response from 5Hz to 100kHz (+0, −1.0dB). And they have dual power supplies—not one for each channel, as in conventional designs—but one for the Class A-operated preamp/tone control section, and a second which performs even heavier duty for the Class B-operated DC power amplifier section. This unique design practically eliminates both inter- and intra-channel crosstalk and distortion, or what we call "sonic backlash." The results: increased tonal definition and brilliance, especially with high-level transient signals.

The new JVC JT-V22 AM/FM stereo tuner is a standout in its class. With an FM front end that uses an FET RF amplifier, combined with a 3-gang tuning capacitor, the JT-V22 brings in the most timid FM stations and makes them sound as though they're just around the corner. Or, if you're in an area where FM stations are a hairline away from each other on the dial, it delivers clear, interference-free reception. Then, to help you make sure you're on target, it has both signal strength and center-channel tuning meters.

Probably the most significant advance in recent FM tuner technology is JVC's Phase Tracking Loop circuitry in our new top model—JT-V77. This advanced circuit provides high signal-to-noise ratio as well as excellent interference rejection and freedom from multipath effects and adjacent channel interference. It's still another example of JVC's innovative engineering. But sounds speak louder than words. See and hear these magnificently-designed separates at your JVC dealer soon.

JVC High Fidelity Division, U.S. JVC Corp., 58-75 Queens Midtown Expressway, Maspeth, N.Y. 11378. Canada: JVC Electronics of Canada, Ltd., Ont.

JVC

Top: JA-S22 Bottom: JA-S55 Top: JT-V77 Bottom: JA-S77

JT-V22, JA-S44

*45 watts/channel, min. RMS, 8 ohms, from 20Hz-20kHz, with no more than 0.02% THD. Rack-mount handles and wood-grain cabinets optional.

CIRCLE 49 ON READER SERVICE CARD

sina, and Rusty Young contribute along with SHF's Al Perkins and Chris Hillman. Even David Cassidy adds vocal sweetener. Surprise pans or Virgil Beckham's sudden lead guitar attack that bites into Richie's vocal at the end of "It's Your Love" are tight, but pungent horns that move forward and back unexpectedly or the shortened tremolo guitar solo in "This Magic Moment" are confusing. The record's mix contains lots of intricate percussion and lead notes, and manages to overcome the many peaks and valleys as numerous as those of the Rocky Mountains where Richie lives, without sacrificing its overall splendor. If anything, *Dance A Little Light* will open the spaces between your ears, something like the rush of a good mentholated cough drop.

S.S.

GENERATION X: *Generation X.* [Martin Rushent, Phil Wainman, producers; Alan Winstanley, engineer; recorded at TW Studios, Fulham, England.] Chrysalis CHR 1169.

Performance: **Dull**
Recording: **Too clean—self defeating**

I hate punk for basically one reason: it's a throwback to a very basic period in rock's development. In comparison, why do we need the biplane when we now have jets? The problem is that today's studios are too advanced for this, this . . . stuff. Given the image of punk rock, to use a million dollar studio is self defeating. Just give them a two-track Revox and a garage. Seriously, the more primitive the recording technique, the more it enhances the effect. By being so clean, the flaws become overly obvious. Measuring punk against other forms of music in terms of musicianship, punk can't compete. It also doesn't do much for the English language. If Generation X were recorded any way other than "live," money's being wasted. With the exception of Elvis Costello, Tom Petty, Mink DeVille and Patti Smith, the rest of the new wave has barely caused a ripple. Generation X ? Pass on them.

G.P.

DELBERT McCLINTON: *Second Wind.* [Johny Sandlin, producer; Kurt Kinzel and Tom Flye, engineers; recorded at Capricorn Sound Studios, Macon, Ga.; the Record Plant, Los Angeles, Ca., and the Record Plant, Sausalito, Ca.] Capricorn CPN 0201.

Performance: **Inspired yet reserved**
Recording: **Very overproduced**

With all the reams of trendy hype being visited upon modestly talented white r&b rockers like Mink DeVille, Elvis Costello and Graham Parker, one tends to lose sight of real blue-eyed soul singing and the attributes inherent in

GENERATION X: Wasting technology

the best $3000 two channel recorder for under $2000*

all-new MX-5050-B

EVERYTHING'S NEW about the MX-5050-B, except the price. We've held that at $1795. You owe it to yourself to compare this all-new MX-5050-B with any recorder selling for up to $3000, or more.

Besides all proven MX-5050 features, it's got:

- **New:** TTL/IC logic for noise free punch-in and punch-out.
- **New:** Three calibrated record levels, switch selectable: 185, 250, or 320 nWb/m.
- **New:** 24 dB headroom with 28 dBm maximum output.
- **New:** Dc capstan servo standard, with ±7% speed control in record *and* reproduce.
- **New:** Three speeds, in field selectable speed pairs, 15/7½ or 7½/3¾ ips with automatic equalization switching.
- **New:** Peak reading LED's plus standard VU meter.
- **New:** Pulsing LED indicator in Record ready.
- **New:** Return to zero memory feature for mix down.

And there's more. To get the full story, see your nearest Otari dealer or contact us today.

*$1795, complete with Dc capstan servo.

OTARI

Otari Corporation
981 Industrial Road, San Carlos, Calif. 94070
(415) 593-1648 TWX: 910-376-4890
MANUFACTURED BY OTARI ELECTRIC CO. TOKYO, JAPAN

CIRCLE 63 ON READER SERVICE CARD

DELBERT McCLINTON: Blue-eyed soul

worthy performances in this idiom. One yearns for voices that relate to the pain of broken love affairs, the fire of mental revenge, and the joy of consummated amorous adventures with more than the charted, programmed wailings of some artistes, and with a timbre creating the unavoidable impression that the artist has, in fact experienced these feelings in the past.

One personally recalls witnessing a "live" McClinton performance in which a song was rendered expressing the wish that he could keep his lady from seeing other men. Right when a key phrase was uttered, in walks this scribe's belle with a rival lover. It was only then that I began to realize how many of Delbert's tunes pertain so, so directly to life.

On this album, real adventures are described with kinetic vividness. In successive tunes, he's picked up by two girl hitchhikers, he "lets the line of least resistance lead him on," he moans for a lady lost to wanderlust. Other songs, among them two blues classics, "Spoonful" and "Corinna," deal poignantly with possessiveness and loneliness.

Delbert's voice is great—a whiskey-drenched wail which does, however, possess technically fine, resonant qualities. Unfortunately, the production is, in a word, quite lame. The backing of the Muscle Shoals Rhythm Section is apathetic at best. A blazing horn section on "Corinna" is supported by a lazy drummer who does nothing but ride his high hat. Guitar passages throughout lack any true fire, and the female choruses on several cuts seem like misplaced wanderers from a disco session. Only when kindred soul Bonnie Bramlett is imported to sing partial lead on "Maybe Someday Baby" does anything start to happen musically.

The weak backing tracks are something of a paradox, because Delbert has a "live" band as hot as the sausage on a smokehouse wall. Maybe his next album ought to be recorded with that fine aggregation. R.S.

STEVE HACKETT: *Please Don't Touch.* [John Acock, Steve Hackett, producers; engineered by John Acock, Chip, Rob, Mark & Raffe; recorded at Cherokee Recording Studios, Hollywood; Record Plant Studios, Los Angeles, Ca.; Kingsway Recorders Ltd., London, England and De Lane Lea Studios, Wembley, England.] Chrysalis CHR 1176.

Performance: **Strong**
Recording: **Consistently good**

This is ex-Genesis guitarist Steve Hackett's second solo album and the one which marks his departure from that group. The question that usually arises is whether the solo venture was worth the drastic step. In most cases the answer is no for the solo efforts almost always simply echo the group's sound, thus making the issuance redundant. Some excellent examples of this are the solo albums made by the various members of The Moody Blues.

In this particular instance, the answer is yes—to a point—the album is worth the break. Having been a follower of Genesis over the years I can note the difference since Hackett's departure. Hackett's contributions or involvement in Genesis were, I felt, hard to judge, for the group projected a sound

Would you believe a real-time spectrum analyzer with a 60dB dynamic range?

And a 16Hz to 20KHz bandwidth? At $2595?

It's all true. We've already demonstrated these facts about the new Crown RTA-2 to sound contractors and engineers. They believed—and ordered.

The RTA-2 is a tool designed for accurate evaluation of frequency response. The engineers who built it also design Crown audio components. They know exactly what a real-time analyzer should do.

The RTA-2 is complete. It includes a 5" scope with lighted graticule, a display generally recognized to be less fatiguing than LED's. It also includes a pseudo-random pink-noise generator for more accurate real-time readout at all frequencies.

The RTA-2 is convenient. The front panel includes pink-noise unbalanced line/mic and balanced mic outputs, and line and balanced mic inputs. Full or ⅓ octave readouts are switch selectable.

The RTA-2 is rugged. Ready to travel, and easier to carry because it weighs only 39 pounds with its optional carrying case.

The RTA-2 is versatile. You can equalize sound reinforcement systems more quickly with it. Or monitor power amp performance with the rear pane X-Y inputs. Or demonstrate the frequency response of speaker systems.

Order today. At this price, our supply may soon be limited.

Note: The scope traces in the illustration have been simulated because photography of an actual trace would not accurately report what the human optic system would perceive.

crown

1718 W. Mishawaka Road, Elkhart Indiana 46514

American innovation and technology...since 1951.

that did not emphasize any instrumental solos; on the contrary, a solo was really out of the ordinary in their context. So, since Steve had no vocal spotlight either, one was left to wonder—what exactly *can* he do? This album helps unravel the mystery. He is a better guitarist than one might expect, going for tasty bits of music of various roots rather than blasting, churning guitar solos. His interest and abilities in classical music did take me by surprise, however.

I find the direction of the album most interesting. Using guest musicians and singers it does have that aura of an Allan Parsons Project, only without the concept context. It might best be expressed as being "A Visit To a Photo Gallery," for numerous moods and images run rampant throughout. As to be expected, there are parts that resemble the works of Genesis. The blending of the vocal and instrumental segments as well as special effects win for *Please Don't Touch* my Best Edited Album of The Year Award.

We do get a better idea of who Steve Hackett is through this album, as the writing and arranging are very good, the guitar ability surprisingly capable, but thanks to the use of four featured vocalists, his vocal ability is still a mystery. The use of Richie Havens is a nice off-set to the proceedings, but I could have done without Steve Walsh and Phil Ehart of Kansas, for since Hackett does not possess a strong individual identity, their performances tend to make those tracks sound like something off a Kansas LP.

Why this music wasn't possible within the confines of Genesis is beyond me, for it sounds like the fruition of many of the seeds planted in earlier Genesis albums. While this is a good album, I don't see it as being road-worthy material. Only time will tell. G.P.

ROBERT PALMER: ***Double Fun.*** [Tom Moulton, producer; Phil Brown, Arthur Stoppe, engineers; recorded at The Hit Factory and Media Sound, New York, N.Y. and Sigma Sound, Philadelphia, Pa.] Island ILPS 9476.

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

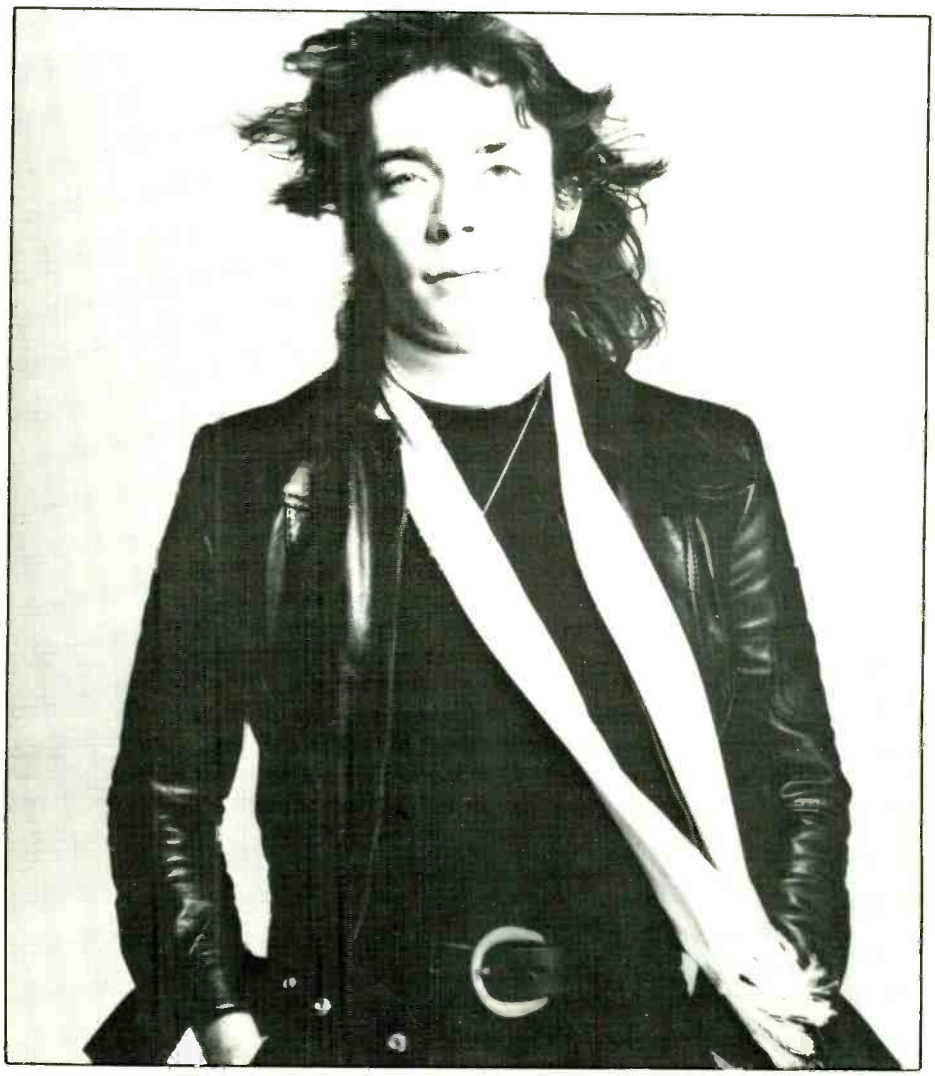
With the release of each of Palmer's three previous albums, I came away excited about one or two tunes but not too impressed with the remainder. In short, he struck me as a great singles

ROBERT PALMER: Take him home

artist. Poor material seemed to be a constant shortcoming.

I'd heard good things about *Double Fun* when it was first released, but it was some time before I was able to review a copy myself. Now, friends have ceased stopping by as this record is invariably played every day. Keeping true to from, he has a *great* single in "Every Kinda People." However, this time the rest of the LP follows suit. His writing continues to improve as the six self-penned vocals here indicate. An established rhythm merchant since his first release, Palmer is surrounded by lavish arrangements incorporating everything from Rhodes to strings and horns. Nothing is lacking or overdone. Impressive is a good three syllable description for the work here.

Robert Palmer has been building up to this level of proficiency with each release. If it seems strange to you that after four albums Palmer still seems to be waiting backstage career-wise, I have to concur and point an accusing finger at management/label. The answer to a promotion man's dreams, this recording has "bring me home" written all over it. G.P.



STEVE HACKETT: Surprising revelations

JAZZ

BUTTERBEANS AND SUSIE: *Butterbeans And Susie.* [Herb Abramson, producer; no engineer listed; recorded March 15, April 8 and April 12, 1960 in New York City.] Classic Jazz CJ 29.

Performance: **The real thing**
Recording: **True and simple**

Butterbeans (Jody Edwards) and Susie (Susie Edwards) were a vaudeville team. They never pretended to be anything else. They toured the TOBA during the heydey of black vaudeville and their routines really cracked up the audiences. Like many of their contemporary vaudevillians, Butterbeans and Susie had considerable recording success. Their first recordings were made for Okeh in New York in May of 1924. Accompanied by pianist Clarence Williams, they sang some of the hits from their vaudeville act such as "When My Man Shimmies," "Get Yourself A Monkey Man" and "A Married Man's A Fool." All three are rerecorded here with accompaniments by various all-star groups knit together by the piano of Eddie Heywood, Jr. whose father accompanied Butterbeans and Susie starting in 1925. It's all here—the fun, the humor, everything that goes to make up one of the old Butterbeans and Susie acts. Their comic exchanges on "Ballin The Jack" and "Get Yourself A Monkey Man" are preserved along with some original material and tunes like "There'll Be Some Changes Made" written especially for them by other composers.

The bands, especially on the March session, were truly all-star units. Clarinetists like Eugene Sedric, trombonists Dicky Wells and Benny Morton and trumpeter Sidney De Paris contributed much to the success of this record. Especially noteworthy is Benny Morton's superb trombone work on "Get Yourself A Monkey Man."

The sound (stereo was still very young in 1960) is surprisingly not that dated. It all comes through—the singing, the band and the patter. It may lack the spectacle of some of the ping-pong type of early stereo recordings, but it's the kind of record that wears well in regard to both sound and music.

The sad thing is that both Jody and Susie Edwards passed away since this recording was made, as have Gene Sedric and Sidney De Paris. Benny Morton is still alive but too ill to play. Some like Dicky Wells and Earl Warren, continue their creative careers. It is fortunate, indeed, that at some point in time they all got together and made this LP. It is even more fortunate that Classiv Jazz acquired the rights to this music and has put it out for everyone to enjoy.

J.K.

KENNY DAVERN and FLIP PHILLIPS: *John & Joe.* [Hank O'Neal, producer; Bruce Gerstein, engineer; recorded at Downtown Sound, New York, N.Y., October 23, 1977.] Chiaroscuro CR 199.

Performance: **Lives up to great expectations**
Recording: **A bit hot for jazz but that's what they wanted**

Dan Morgenstern makes the point in his liner notes that Joe "Flip" Phillips has a good twenty years on John "Kenny" Davern. But the fundamental difference between them goes deeper than that. There is a singular lack of similarity of repertoire between a musician whose main credentials come from the era of the "Caldonia" Woody Herman band of the mid-forties and a player

whose main experience has been the New York traditional jazz scene as typified by Eddie Condon, etc. Of the tunes involved here, the only one I would have predicted as a common ground would have been "Sweet Lorraine" which traditional bands played because the tune was associated with Jimmie Noone. Woody Herman's band probably played the tune because it was well suited to Woody's singing style. It was also the kind of tune that Red Norvo, the band's vibes ace, loved to play chorus after chorus on.

Yet, with players the caliber of Flip and Kenny you don't worry too much about age or repertoire. Artists in that class (the few there are) can play and/or relate to whatever comes up or goes down. And when the giants get together the chips fall where they may but it's always in good form. It's not really a cutting contest. It's two players urging each other on to greater artistry by inspiring each other. If I'm more moved by Kenny's solo on "If Dreams Come True" than anything else on the album, it's just that I prefer that punchy jabbing style that Kenny plays to perfection to the more subtle smoothness that is Flip's stock and trade. Those points which Flip may lose to Kenny in drive and verve he gets back when it comes to class and sophistication.

This is one of Hank O'Neal's better sounding disks but it does have its problems. Those listeners who enjoy rock recording techniques will just wallow in the hot bass sound that George Duvivier has on this recording. And it's no wonder. George is one of the premier bassists in the business and this is one of his better recordings. George even dug it so much he stayed around for the playback which he hardly ever does. As far as jazz listeners are concerned, the balance seems a bit too heavy on the bass side. I asked Hank O'Neal about this and he assured me that Kenny Davern (who was present at the mix) wanted it that way. It certainly is a controllable sound since Chiaroscuro not only plugs Duvivier's Barcus-Berry pick-up right into the board but also picks up the bass acoustically with a second microphone. Therefore, in the mixing they can go to a totally electric sound or a totally acoustic sound or anywhere in between.

It's a delicious album. Kenny Davern brings his C Melody Sax along as well as his soprano and clarinet and Flip adds soprano sax to his constantly expanding armory of instruments including tenor sax, bass clarinet, etc. It's all topped off by the sensitive accompaniment of Dave McKenna on piano, George Duvivier on bass and Bobby Rosengarden on drums. Luscious. J.K.

SYLVIA SYMS: *She Loves To Hear The Music.* [Don Sebesky and Dick Duane, producers; Neal Ceppos, recording engineer; Jay Borden, asst. engineer; recorded at Sound Mixers Studios, New York City, N.Y. during Jan., Feb., March, 1978.] A&M SP 4696.

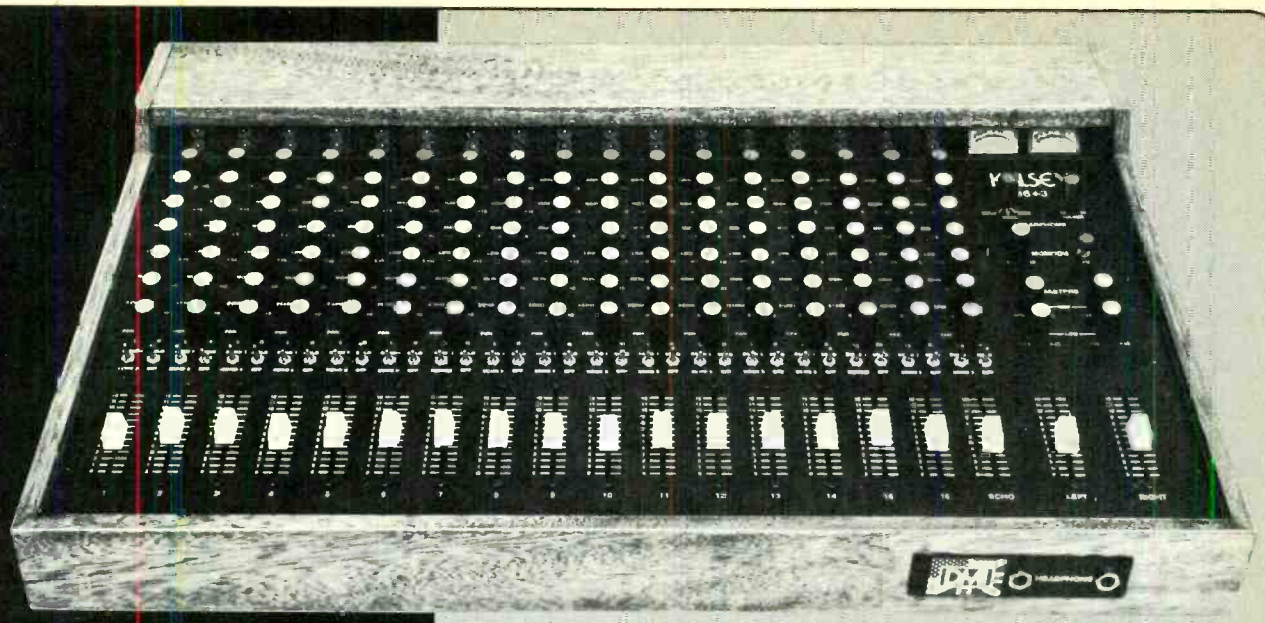
Performance: **Jazz/disco delight**
Recording: **Typical Hollywood slick**

I don't know who invented the term crossover but there's been a lot of it done lately. One of the most recent and most musically successful examples of this concept is this effort by Sylvia Syms. Sylvia is no stranger to crossover. Although she is generally thought of as a jazz singer, she had a commercial hit in the mid-'50s with her recording of "I Could Have Danced All Night." Now, evidently, it's time to get contemporary again and there's a disco type beat throughout most of this LP with contemporary background charts by Don Sebesky (the same man who helped Esther Phillips with her crossover hit, "What A Difference A Day Makes").

Sylvia (like the late Lee Wiley and the late Teddi King and the, fortunately, still with us, Mabel Mercer) is a superb interpreter of a good lyric. She is also a good judge of what lyrics are worthwhile. She turns up some gems here such as Peter Allen's "She Loves To Hear The Music" and Alan Bernstein's "After The Lovin'." She adds such fine well-traveled standards as "Teach Me Tonight," "It Had To Be You" and "Sweet Georgia Brown" done disco style. It is the lattermost pop tune of the '20s, done complete with verse, that has hit written all over it as far as I'm concerned.

As for the sound, it's all very typical of A&M records. Despite being recorded and mixed in New York City, the producers and engineers have conformed to the glossy West Coast sound that has characterized the label for as long as I

SYLVIA SYMS: But is it really jazz?



We've got a mixer for you

Each mixer is created especially for your personal needs by our skilled craftsmen

If you want a 24 channel console with 4 sub-masters, we've got it! Or just 8 channels mono with no frills. We make all kinds of different mixers, but with one thing in common—super quality at affordable prices.

Let us know what kind of mixer you want!

It's simple— we want to be your mixer company!

KELSEY®

8, 12 & 16 CHANNEL

If we were to try to tell you about all the features and specifications of our new **Kelsey 8 - 12 - 16 Channel Mixers,** we'd have to take out four-page advertisements. So we're just going to tell you that each input channel has transformer balanced low impedance connector and high impedance jack; gain control; two LED indicators; 3 equalizers; monitor send; 2 effects sends; stereo pan; and on/off/solo switch. And there's an additional effects channel with all the controls of an input channel plus "spin". On the outputs, 2 VUs switchable between main and monitor; left and right faders and tone (high/low) controls; monitor volume; and switchable headphones between solo, main and monitor. And check our specs:

SPECIFICATIONS:

INPUT

IMPEDANCES: Hi Z = 50 K unbalanced; Low Z = 200 Ohm transformer balanced. **MAX. INPUT LEVELS:** Hi Z = +20dBm; Low Z = +8dBm. **GAIN:** Hi Z = 0-46dB, continuously variable; Low Z = 12-58dB, continuously variable. **EQ:** High ± 15dB at 10K, shelving; Middle ± 9dB at 2K, peaking; Low ± 15dB at 100 Hz, shelving. **MONITOR:** Pre-EQ, unaffected by off switch. **ECHO:** Post-EQ, Post-fader. **LEDS:** Green lit from −10 to +21; Red lit from +15 to +21; 6dB headroom left when Red lit. **EQUIVALENT INPUT NOISE:** −110dBm from Hi Z input; −122dBm from Low Z input. **T.H.D.:** @ 1kHz, any level up to clipping typically less than 0.1 percent.

OUTPUT

IMPEDANCE: Nominal 600 Ohm unbalanced. **MAX. OUTPUT LEVEL:** 8.8V RMS @ 10K Ohm (+21dBV). **GAIN:** Mike in to line out +60dB. **EQ:** Hi ±15dB @ 3.5 kHz; Low ±15dB @ 35 Hz. **V.U. METERS:** "0 VU" = +4dBm at output of buss amp., switchable from stereo mix to monitor mix. **FREQUENCY RESPONSE:** Mike in to line out — ±1dB. 30 Hz - 20kHz. **SIGNAL TO NOISE:** Mike in to any output — typically 70dB. **T.H.D.:** Any output 1kHz any level up to clipping typically less than 0.1 percent. **POWER REQUIREMENTS:** ±15V DC @ ½ Amp.

The Mixers have a separate power supply, a solid mahogany cabinet, and come complete in an SMF Tour Series Road Case included in the price. What Price? $4,000.00? No Way!

8 Ch. Stereo-$1,350 list • 12 Ch. Stereo-$1,700 list • 16 Ch. Stereo-$2,100 list (1977 Prices)

It's for real. Professional stereo mixers incorporating high-reliability, ultra-low-noise integrated circuits and state-of-the-art design. A top quality mixer at a price you can afford.

Write or call:

DMI

Dallas Music Industries

301 ISLAND RD., MAHWAH, N.J. 07430 201-327-6300

• SMF STEREO 150 POWER AMPS • SMF ROAD CASES • KELSEY SNAKES • SMF DIRECT BOXES

Send $5.00 for your Kelsey/SMF T-Shirts

CIRCLE 58 ON READER SERVICE CARD

can remember. It's not a hot sound, in fact it's the kind of texture usually associated with middle-of-the-road fare. I don't know how much overdubbing and sweetening was used here, but considering the past reputation of A&M, it's a good bet it wasn't all done "live" in the studio.

As far as the band is concerned, Don Sebesky has written some fine accompanying charts leaving room for some good solos by sax man Mike Brecker on "Sweet Georgia Brown" and the best I've heard yet from John Faddis' fluegelhorn on "When It Was Done."

This is the kind of record about which critics used to add the phrase "but is it jazz?" Frankly, I'm not sure what it is. It has elements of jazz, pop, disco and whatever else may have crossed Sylvia Syms' mind during the recording date. Whatever it is, it's good, so let's not split hairs. Just sit back and enjoy a new Sylvia Syms record. It doesn't happen frequently enough. J.K.

HERBIE HANCOCK: *Sunlight.* [Herbie Hancock and David Rubinson, producers; Fred Catero and David Rubinson, engineers; Chris Minto and Cheryl Ward, asst. engineers; recorded at the Automatt in San Francisco, Ca.] Columbia JC 34907.

Performance: **Synthetic but good**
Recording: **Electrically electric**

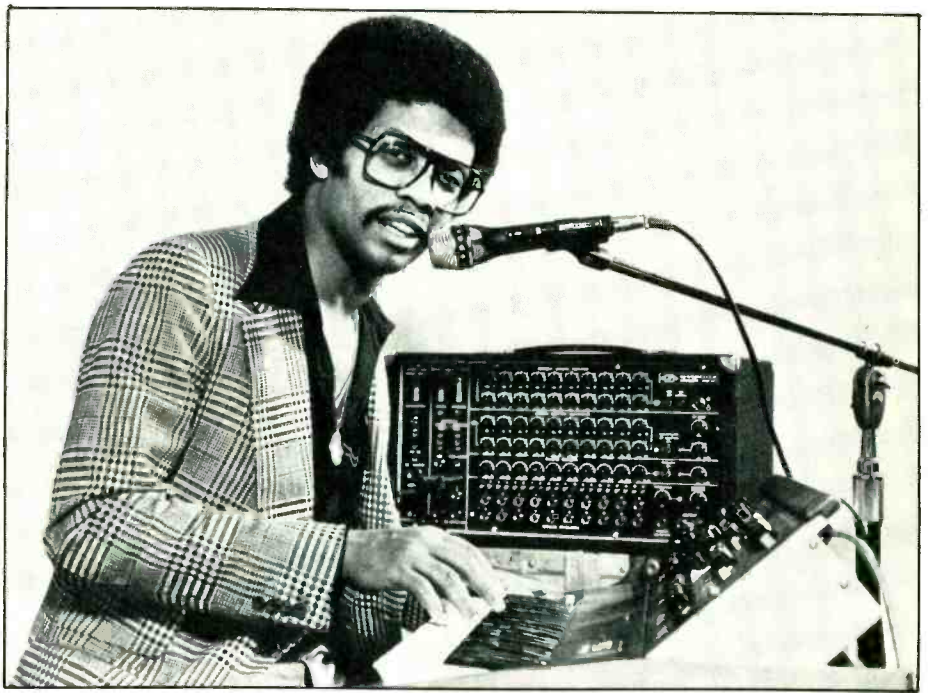
The photo on the back of the album tells the story—Herbie Hancock surrounded by eleven different keyboard instruments. The names of the different synthesizers and other electronic keyboards are listed for informational purposes. One instrument, which is not seen but is listed, is the Sennheiser Vocoder and it's this instrument which makes me a bit apprehensive about the direction Herbie Hancock seems to be taking. It is a keyboard instrument on which can be encoded the vocal characteristics of the individual's voice and which can then be played as a keyboard instrument with the voice coming out totally synthesized. I don't understand exactly how it works but it would seem to indicate a dehumanization of the music and the musician and this bothers me somewhat.

As if to offset the electronics, Herbie Hancock has written some very warm and human music for this album and included "live" players, mostly a rhythm section, on all tracks. The big exception to this rule is soprano saxophone virtuoso Bennie Maupin who solos on the title track. There are also background choirs of strings, brass and woodwinds but, existing as after-the-fact overdubbings, they only serve to increase the feeling of super-electronics. It is surely the presence of Maupin that makes the title track, "Sunlight," stand out as the most enjoyable of the cuts presented here.

Herbie's written some nice charts for this album—three with lyrics, two without—yet I think I'm fairly safe in predicting that he's not going to have the kind of success with any of these tunes that he deserved and enjoyed with "Watermelon Man."

It's a good album and it should be of particular interest to those involved in the electronic making of music. I hope it is only a side trip for Herbie Hancock rather than a direction he intends to pursue. His recent acoustic piano concerts along with Chick Corea would seem to indicate that it is not a permanent part of Herbie Hancock's routine. Yet he is taking this music and all those synthesizers, including the Sennheiser Vocoder, on tour so it's anyone's guess where Herbie Hancock's headed.

J.K.



HERBIE HANCOCK: A new direction

HORACE SILVER: *Silver 'N' Percussion.* [Horace Silver, producer; Rudy Van Gelder, engineer; recorded Nov. 12 and 17, 1977 at Van Gelder Studio in Englewood Cliffs, N.J.] Blue Note BNLA 853 H.

Performance: **Touches of Silver**
Recording: **Shades of Van Gelder**

Horace Silver and Rudy Van Gelder make a good team. One reason is that they've worked together often over the past few decades since Horace became a recording artist. Another is that they each have their identifiable style of doing things. One listen to just about any Horace Silver record and you can tell it's Horace. He doesn't often try to surprise you. And one listen to just about any recording engineered by Rudy Van Gelder and you can spot the Van Gelder sound. This uniqueness can also make for a sameness that requires the greatest artistic care and versatility to prevent the artist from falling into a bagged stereotype. One of the ways that Horace Silver has solved this problem is to record in different formats (*Silver 'N' Brass, Silver 'N' Woodwinds* and now *Silver 'N' Percussion*). Actually the formats are merely ornamental. So are the vocal segments which occur on this record. What really matters is Horace Silver's Quintet. Horace has had a functioning band for so many years that it seems as though nearly every post-bebop trumpet and saxophone player has come through one Horace Silver Quintet or another. The current group has Tom Harrell on trumpet and Larry Schneider on tenor sax. Neither of them seem like anything to rave about. They are good players but not in the same class as such ex-Silver men as Randy

JOURNEY

Tours with Peavey Sound Gear...

"For the sweetest stage sound there is."

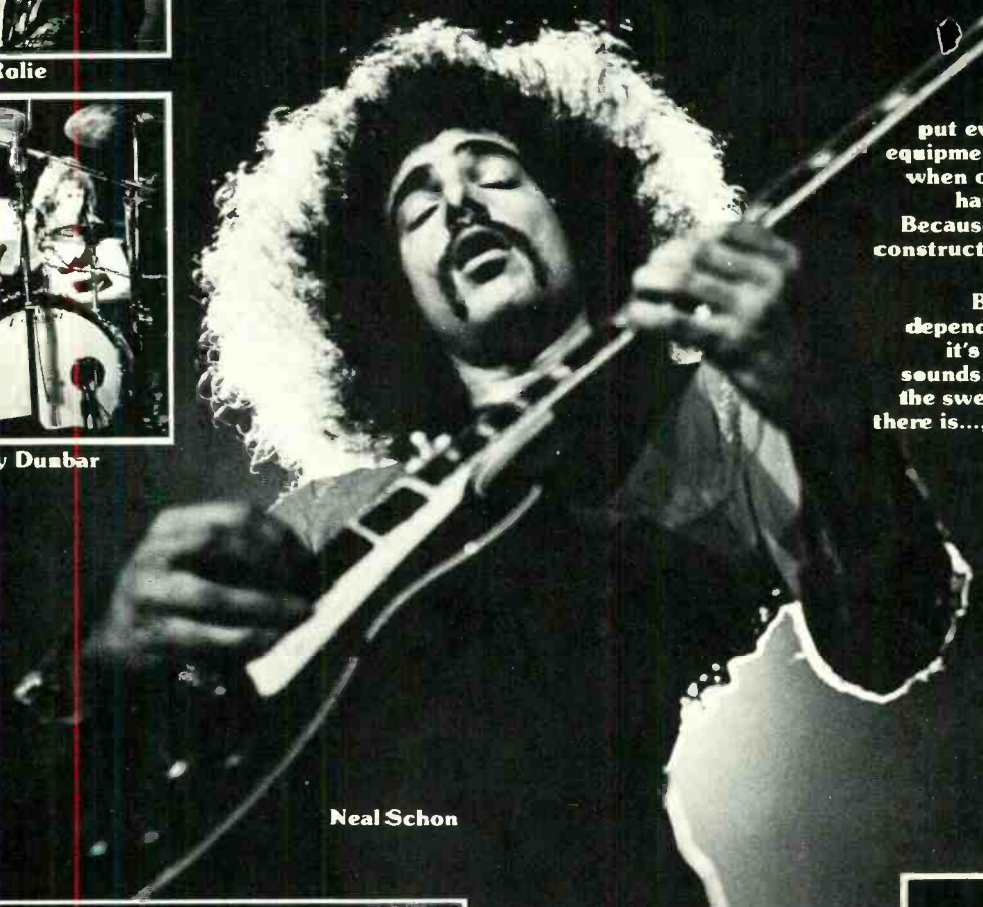
Gregg Rolie

Aynsley Dunbar

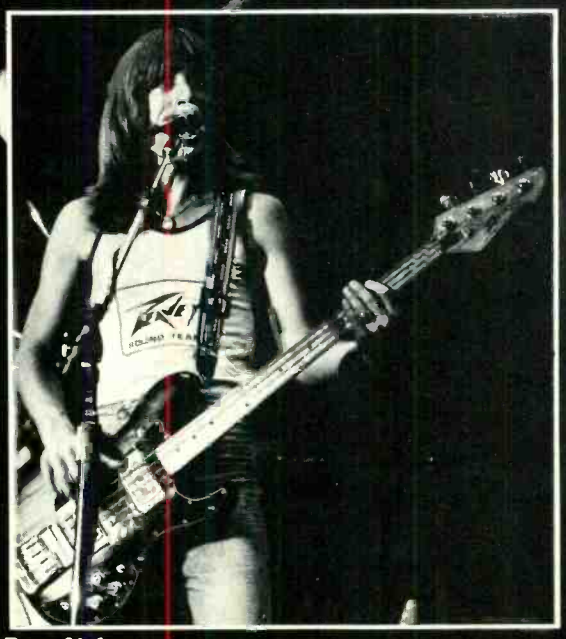
The red hot sound of Journey has echoed across America to the thunderous appreciation of literally millions of enthusiastic fans. And Peavey sound gear has been right there with them from the very start. Day after day, month after month, constantly being set up and torn down, loaded and unloaded under the most extreme conditions.

This kind of treatment can put even the best made equipment to the test. But when others fail, Peavey hangs right in there. Because Peavey's rugged construction thrives on the road life.

But no matter how dependable your gear is, it's only as good as it sounds. Journey says it's the sweetest stage sound there is..., we couldn't have said it better.



Neal Schon



Ross Valory

Steve Perry

PEAVEY®

Peavey Electronics Corp.
711 A Street
Meridian, Mississippi 39301 ©78

CIRCLE 70 ON READER SERVICE CARD

HORACE SILVER: Funky/perky, with magnificent moments

and Mike Brecker or Art Farmer and Hank Mobley. This album does include the fine bass of Ron Carter and the fine drumming of ex-Miles Davis drummer Al Foster.

Horace has put together two rather loosely constructed suites each consisting of three pieces of his funky/perky music. Whether he calls it "African Ascencion" or "The Great American Indian Uprising," Horace Silver's bag is funky/perky tunes out of bebop. Another thing that Horace is known for are those funny little quotes that he tosses off in much the same way that Art Tatum and Charlie Parker did before him. The piece called "The Aztec Sun God" includes explicit references to Irving Berlin's "Everybody's Doin' It" and Edward Grieg's "Anitra's Dance" from *Peer Gynt*. Both are dances which may say a lot about Silver's conception of "The Aztec Sun God."

There are, like in all Horace Silver records, magnificent moments in this album. Many of them come from Horace himself, certainly one of the better modern jazz pianists around. J.K.

TEDDI KING: *This Is New.* [Sam Parkins, producer; Edward T. Graham and Elvin Campbell, engineers; recorded Oct. 20, 1977 at Columbia 30th St. Studios in New York City, and Jan. 12, 1978 at CI Recording, New York City, N.Y.] Inner City IC 1044.

Performance: **The King of song still reigns**
Recording: **Best possible under the circumstances**

The first time I heard Teddi King "live" was at the Newport Jazz Festival in New York during one of its tributes to American Song (1973, wasn't it?). I marvelled at the miracle of a pop/jazz singer who could bring the same intelligence and understanding to a show tune that Lotte Lehman could bring to Schubert lieder (p.s. I hadn't heard Mabel Mercer yet at the time). I also was shocked that nobody had caught Teddi King on record singing as well as I heard her that evening. My next experience hearing Teddi King was a bitter disappointment. None of us were aware

of it at the time, but she'd been suffering for some years from a disease called Lupus, which can leave you fine one day and completely unglued the next.

Fortunately, October 20th, 1977 was a good day for Teddi King. That was the day she and Dave McKenna, piano accompanist *par excellence,* and Sam Parkins, a recording producer with the ears of a musician, being a fine clarinetist himself, took less than two hours of studio time to put down eight songs with lyrics by Ira Gershwin. It was to be used as a demo to create record company interest in an LP. Sam Parkins must have had some sixth sense about this session for he had it taken down in four-track just like a final product. A later session was to add five tunes to the album. Sadly, Teddi didn't live long enough to record them. Dave McKenna recorded them as piano solos at a later date and they make up most of the second side of this album. Like all McKenna's solo piano recordings that I have heard they are wonderful, with an air of elegance that few other pianists can touch.

Another thing I love about this album is that the tunes are not the same half dozen Gershwin tunes everybody does in Gershwin tributes. I rejoice that I've been spared yet another version of "Embraceable You," "The Man I Love" or "I Got Rhythm." They are certainly fine tunes but they're not the only songs that the Gershwins wrote. Here we have some little-known gems such as "Isn't It A Pity" and "I Can't Be Bothered Now" plus some songs Ira Gershwin wrote with other composers such as "My Ship" with Kurt Weil and "Fun To Be Fooled" with Harold Arlen and Yip Harburg.

As for the recording job itself, the 30th Street Studio is a wonder of wonders. That echo on the piano doesn't come from an echo chamber. That's the natural sound of the room. The gorgeous warmth of piano sound that Parkins and Graham manage to get at 30th Street only makes the contrast with the sound of CI studios more dramatic. CI is a fine studio and the recordings Dave Brubeck and his two generations of Brubeck band made there are classics in their own way, but there's no way that the brittleness of the piano sound at CI can be made to match the warmth of 30th Street, although Parkins and Elvin Campbell worked hard and came up with a closer match than I'd have thought possible.

I'm sorry if I've slighted Dave McKenna in this review. All his playing, behind Teddi and in solo performance, is marvelous but there will be other times to hear and evaluate Dave McKenna. This is the last record we have by which to remember Teddi King. I'm happy that it's this good. I prefer happy memories. J.K.

DON ELLIS: ***Live At Montreux.*** [Don Ellis, producer; Raymond Silva, A & R coordinator; Gene Paul, engineer; recorded at Montreux, Switzerland, 1977.] Atlantic SD 19178.

Performance: **Tightly professional**
Recording: **Preserving the concert performance**

Don Ellis has been a force on the big band jazz scene for quite some time now. His band of the '60s which specialized in unusual time signatures gave way to his era of screen scoring which brought us sound tracks for films like *The French Connection.* His latest effort includes elements of both his provocative innovative quality and his more accessible cinematic descriptive style of composing. Best of all it's "live." This is the band that went to Montreux and recorded what went down there without benefit of overdubbing and studio sweetening, but then again, Don Ellis never was one to do on record what he couldn't repeat on stage.

There is music on this new album as potent and exciting as anything Ellis has done in the past. I'm especially taken with the fugal section that begins "Future Feature" and also with the beauty of "Loneliness" as portrayed by Ellis on fluegelhorn. There are other excellent soloists here such as saxophonist Ted Nash (a member of the early Les Brown band) and an exciting young trombonist named Alan Kaplan. And far be it from Ellis to be the only trumpet soloist in his own band. Jack Conn plays excitingly and enthusiastically on trumpet if a bit too indiscriminately for his own good at this point.

One major difference between this Don Ellis band and the band of the '60s is a string quartet, amplified courtesy of Barcus-Berry. There is something artificial about even the best equipment for amplifying stringed instruments but Ellis, Barcus-Berry and Gene Paul have done the best possible job of minimizing the artificiality of electrically amplified strings. In fact, as far as the sound is concerned Gene Paul has managed to give us a good, ungimmicky representa-

Jazz Fire: Diz, Roy, J.J., and Brother Nat

By Nat Hentoff

At Jimmy Carter's Jazz Festival in June of this year—the first full-scale White House celebration of our down-home art music—two of the most fiercely energetic improvisers were Dizzy Gillespie and Roy Eldridge. Both are exuberantly competitive in any milieu, but the chance to overwhelm the President and members of his Cabinet spurred Diz and Roy to engage in particularly exhilarating flights. And Gillespie, moreover, wound up the Presidential jazz rites by recruiting Jimmy Carter to take the vocal on "Salt Peanuts." (Asked by Diz whether he'd join him on the road, the President said, "After this, I might have to.")

I wished only that Diz and Roy Eldridge had been in the same set that afternoon, for when they do cross horns, the excitement that each generates on his own tends to triple and quadruple, as on their new set, *Jazz maturity—where it's coming from* (Pablo)—the most thoroughly invigorating of all their duet sessions through the years. From the volcanic "Quasi-Boogaloo" to a wondrously rejuvenated "When It's Sleepy Time Down South," the two hornmen are abundantly, incisively inventive while swinging with deep joy. It takes a powerful rhythm section to truly complement such oversize spirits; and Oscar Peterson, Ray Brown and Mickey Roker are precisely suited for the challenge. The recorded sound is bright, clear, and vivid. This is the very *presence* of jazz.

Another, and rather surprising, Pablo set is *The Yokohama Concert* with J.J. Johnson and Nat Adderley. Recorded in Japan in 1977, this session is dominated by a J.J. Johnson playing with more fire and visceral drive than I have ever heard in his work before. As the first virtuoso of modern jazz trombone, J.J.'s playing was characterized by astonishingly fluid and flawless technique. But his solos—especially during his later association with Kai Winding—often sounded somewhat bland. He rarely surprised you into surprising yourself by just shouting in sheer pleasure.

The new J.J., however, has come unbuttoned—soaring and diving and always driving, covering the full range of his horn with such zest that it's as if he's learned how to grow young. It may be that a key stimulus to this infusion of soul in J.J. is the cracklingly emotional appearance in this set of Nat Adderley. The trumpeter—long considered a valuable but secondary fixture in the combos headed by his late brother, "Cannonball" Adderley—may finally be coming into recognition on his own. Intense but disciplined, persistently attentive to dynamics, with a temperament as urgent as that of Diz and Roy, Nat may not be of their stature, but he never lets up—and he really speaks through his horn.

As on most recent Pablo location dates, the sound is spacious but is also realistically focused on the interplay between the two horns and the rhythm section—and the bold, present-day J.J. Johnson comes through in all his explosive warmth.

ROY ELDRIDGE/DIZZY GILLESPIE: *Jazz maturity—where it's coming from.* [No producer credit; Bob Simpson, engineer.] PABLO 2310 816.

J.J. JOHNSON and NAT ADDERLEY: *The Yokohama Concert,* [J.J. Johnson, producer; Katsuyuki Handa, engineer.] PABLO LIVE 2LP Set 2620 109.

DON ELLIS: Potent and exciting

tion of the current state of the art of the Don Ellis Orchestra. At times the percussion section (no less than four drummers involved) gets a bit overpowering and it would be easy to blame Gene Paul's mic placement for the problem. One should keep in mind, however, that when you're recording "live" at a concert performance you have to work with the acoustics and sound set-up you encounter when you get to the job—all too frequently with little or no time for trial and error—so you set up your stuff where you can and do the best you can with what you've got. The recording here is good enough for all intents and purposes and it resulted in wonderful record that's a pleasure both musically and technically. J.K.

MAX MORATH: ***Living The Ragtime Life.*** [Seymour Solomon, producer; Charlie Repka, Mark Berry, engineers; recorded September 29, 1976 at Vanguard Recording Studios, New York City, N.Y.] Vanguard VSD 79391.

Performance: **A musical documentary**
Recording: **No gimmicks, but not much presence either**

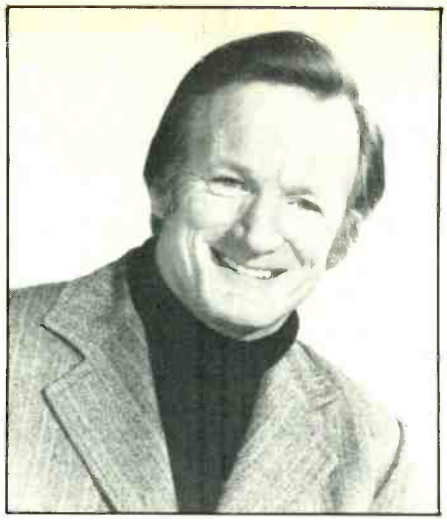
Max Morath has been doing a one-man show for some time now, mixing his piano playing, his intimate song style, his knowledge of the ragtime era and his repertoire of long-forgotten popular tunes with his unique ability to communicate with an audience. That's something we've known about for years—ever since his landmark show on early TV where he made the twenties come alive again for those of us who weren't there or are too young to remember. So, it was logical of Vanguard Records to invite a small audience to their studios for a recording of Max singing, playing and talking about the ragtime life.

To begin with the positive side, nobody puts a song over better than Morath. Had he been born in an earlier day, he probably would have been a song and dance man—and he probably would have done very well at it, too. Add to this his vast library of material, which must contain every pop song ever written. No other singer has the sort of repertoire that contains songs like Ernest R. Ball's "Saloon," Albert Von Tilzer's "Alcoholic Blues" and "Cubanola Glide," written by Von Tilzer's brother, Harry. Don't look for them on other LPs, you probably won't find them. His comments about the songs and the times are accurate and communicated with the kind of casual air that Max has been known for throughout his career. At first, I resented these spoken intrusions but once you imagine what must have been going down "live" in the studio, it all becomes part of the picture and emerges as Max Morath casually entertaining some of his friends and whether it's in a theatre, in his parlour or in a recording studio becomes immaterial.

Unfortunately, my reaction is not all positive. I find the joy and free spirit evident in Max's singing conspicuously lacking in his piano work. In the pieces where he accompanies himself he gets by, for the pieces themselves don't demand much life or fire. But when Max attempts Eubie Blakes' "Charleston Rag," Zez Confrey's "Dizzy Fingers" or "Heliotrope Bouquet" by Scott Joplin, the gaiety these pieces need to carry them off is sorely missed. Also, all of these have been previously recorded on other LPs with more fun and style ("Charleston Rag" by its composer, as a matter of fact).

I've come to the conclusion that Vanguard Recording Studios have a peculiar sound all their own. It's rather flat-sounding—dry and metallic—and, with an instrument as tough to record as an acoustic piano, there's a lack of presence that is rather bothersome.

But, why complain? Here we have two sides of Max Morath doing for the most part what he does best—singin' them old songs that you can't hear any-



MAX MORATH: One-man show

where else. Maybe someday someone will record these tunes under better circumstances (after learning them from Max, of course). But by then, Max will probably have recorded another album of material from the twenties and will still be ahead of the game. J.K.

CLASSICAL

STRAVINSKY: *Le Sacre du printemps.* New York Philharmonic, Zubin Mehta cond. [Andrew Kazdin, producer; Bud Graham, Andrew Kazdin, Milt Cherin, Ray Moore, engineers; recorded in Manhattan Center, New York, N.Y., September 1977.] Columbia XM 34557.

STRAVINSKY: *Le Sacre du printemps.* Berlin Philharmonic Orchestra, Herbert von Karajan cond. [Michel Glotz, producer; Gunter Hermanns, engineer; recorded in the Berlin Philharmonie, Berlin.] DG 2530 884.

STRAVINSKY: *Le Sacre du printemps.* Concertgebouw Orchestra of Amsterdam, Colin Davis cond. [No production credits listed.] Philips 9500 323.

Performances: **Mehta the best**
Recordings: **See details below**

This is the second time around for each of these conductors with *Le Sacre*, stretching the catalogue listing to a total of twenty four. Long gone are the days when this work caused a commotion. To our ears—inured to Everests of 20th-century dissonance—it seems almost a quaint notion that a full-scale riot actually occurred at the premiere on May 29, 1913.

The scenario describes a "rite of spring" in which a sacrificial virgin dances herself to death. Stravinsky's immediately preceeding work, *Petrushka,* provided only momentary hints of the revolution to come. *Le Sacre* virtually exploded in musical history, spewing forth complex rhythms, bleak harmonies and fractured melodies, the like of which had never before been heard. Today, the work is in every orchestra's repertoire. Stravinsky's own recording (1960) with the Columbia Symphony and Boulez/Cleveland (1969) still retain top place in my affections, but Mehta's quite different interpretation—while never really challeng-

ZUBIN MEHTA: Excellent alternative

ing these two—provides an excellently produced alternative.

Mehta's 1968 recording on London was a failure in almost every respect, mostly due to the blowzy playing of the Los Angeles Philharmonic and a style of multi-miking that rarely permitted any sense of ensemble blend. He leads the New York Philharmonic this time, an orchestra trained down to the most minute detail in this score by former music director Pierre Boulez. Mehta also has Columbia's virtuoso producer Andrew Kazdin on his team, a man as obsessed with details and the creative possibilities of mixing and splicing as any to wield a razor blade.

This *Le Sacre* definitely harks back to the 19th century. Its power and sheer animal passion are surpassed in edge-of-seat excitement only by Igor Markevitch's manic interpretation (available in England on Classics for Pleasure CFP 129 and should be reissued here on Seraphim) and Leonard Bernstein's raucous New York Philharmonic recording—both from the late fifties. The concluding "Danse Sacrale," in particular, is a real blood bath, with Mehta brawling ahead full steam into the fray.

Producer Kazdin's contribution seems more conspicuous than usual, since Mehta is a musician who concentrates on the sheer emotional sweep of a performance at the expense of instrumental subtleties. The big sonority is still paramount, but with a clarity and differentiation of texture that rarely (if ever) graces a Mehta recording or "live" performance. Among the welcome details: the chugging bassoons at figure 66, marked *piano* and nearly always overwhelmed by the sustained *forte* brass; the tart punctuation of the oboes at figure 68; the clearly audible bass clarinet pedal underscoring the "Evocation of the Ancestors" fanfare beginning at figure 121; the bass viol harmonics at one bar before figure 93. Yet, Kazdin's search for "hidden treasures" never results in obtrusive spotlighting. On the other hand, several details *may* be ascribed to Mehta alone: the exaggerated appoggiaturas in the uniquely languorous introduction to the work; the vulgar emphasis on the brass *glissandi* after figure 53; the elephantine "Spring Rounds" tempo (quarter note equals 48 instead of 80, as marked). One could not conclude a review of this disc without mention of the Philharmonic's superb timpanist Roland Kohloff. His forceful, yet always sensitive, playing is an absolute dream.

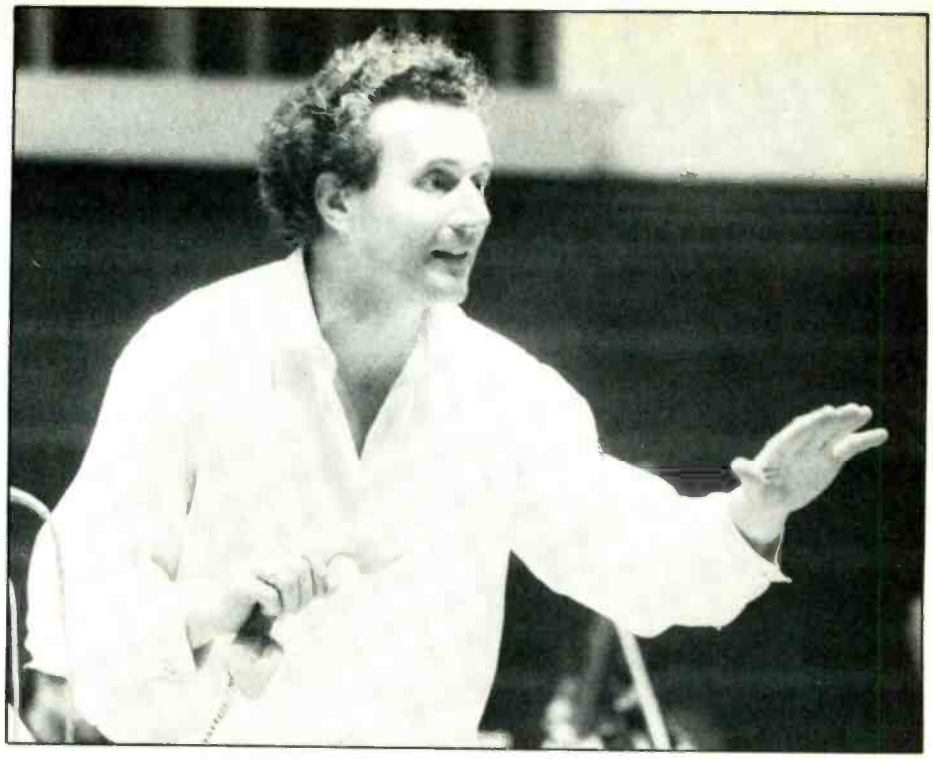
The language of *Le Sacre* is obviously

HERBERT VON KARAJAN: Persuasive, with satisfying solution

alien to Karajan and the Berliners. Nevertheless, this latest interpretation is more persuasive than his 1964 recording, and many individual touches are fascinating. The performance has sweep and drive, and those interested in a *Sacre* in the Beethoven tradition may purchase this well-recorded album without hesitation. For my taste, lack of detail mitigates against full enjoyment. From the outset, Karajan's literal treatment of dynamics buries instrumental interplay in a constant homogenization that may be perfect for Bruckner, but is counter-productive to Stravinsky's starkly independent inner lines. He only takes the composer's biting accents and slashing orchestration to heart in the final "Danse Sacrale," even though it still lacks the serpentine poise of the best versions.

Karajan has, however, provided a very satisfying solution to the troublesome final two chords of the work—*rapido* appoggiaturas preceding a sixteenth-note screech on high strings and flutes, and followed by a conclusive eighth-note thud of brass and lower strings. Karajan's emphasis of the flute appoggiaturas produces a sound like the death shriek of a skewered canary, and his spacing of the two chords is admirably timed.

The ending of *Le Sacre* concerned Stravinsky right up to his final revision in 1967 (Boosey & Hawkes score). On his 1960 recording, he augments the second-to-last chord with the brass of the final chord. But his revised score of seven years later shows no brass on that penultimate chord. In his 1940 New



COLIN DAVIS: Detailed but passionless

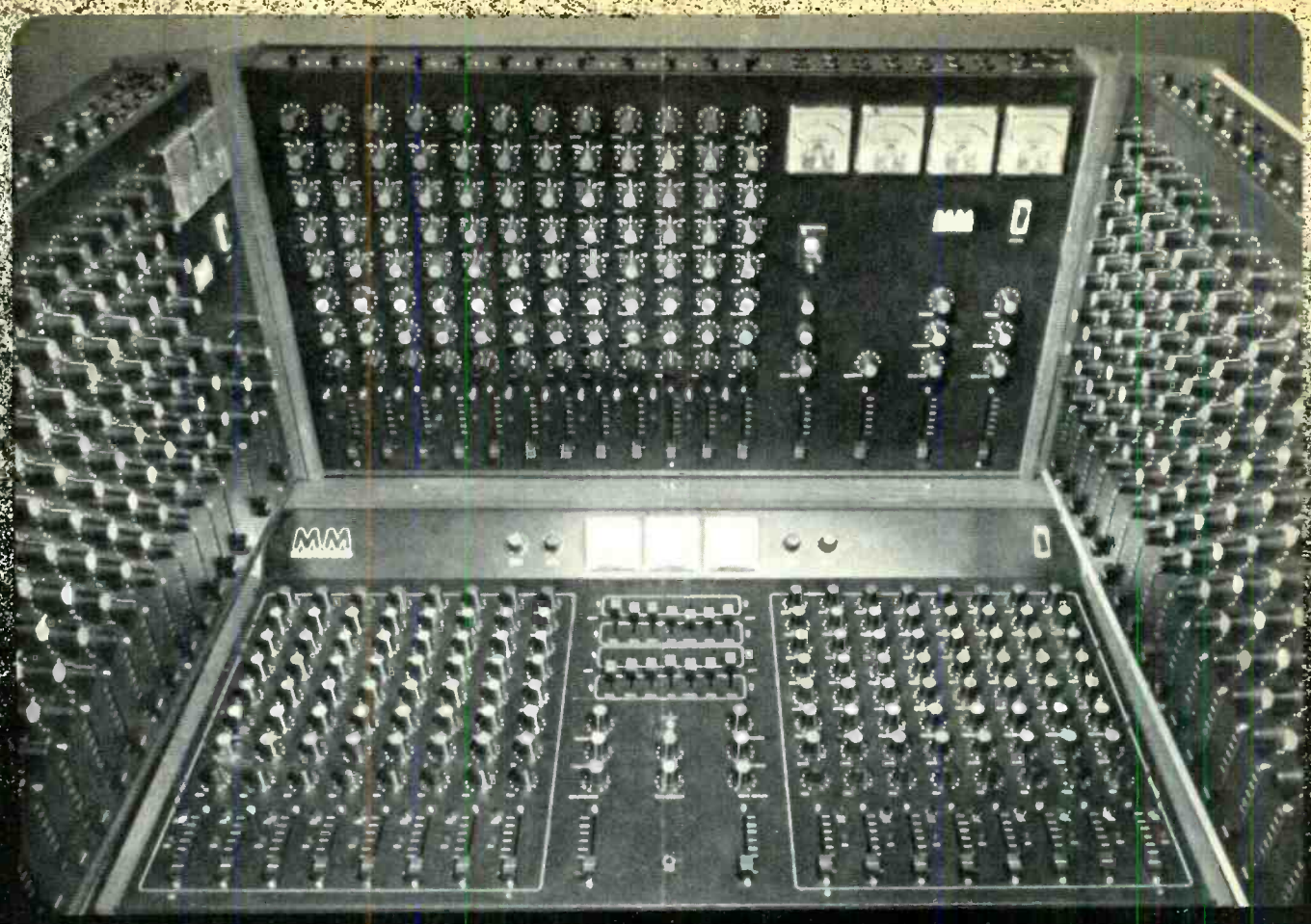
York Philharmonic recording (a shambles in the "Danse Sacrale," by the way), the composer ran the two chords together as one—a solution to the *rapido* marking also adopted by Pierre Monteux in his disappointing 1957 Paris Conservatoire recording on London's Stereo Treasury Series. Monteux, the work's first conductor, probably initiated this practice. Mehta also follows suit. Most conductors play the chords very quickly, making the sixteenth note sound almost like a grace-note. Boulez, in his Cleveland recording, goes the opposite direction, playing the chords in a clumsy, lumpish fashion—the one major disappointment of his recording.

Colin Davis can't win. His recently deleted 1964 London Symphony Orchestra recording on Philips had the last sixteenth note missing from the second bar after figure 186. In an odd manner of recompense, Philips' tape editors have allowed the four bars after figure 192 to be repeated in his new Amsterdam Concertgebouw recording. Philips will replace the defective Concertgebouw album with a properly edited one if you write to their offices at 810 Seventh Avenue, New York, N.Y. 10019. *Le Sacre* mavens may want to hold on to both discs, however, since the bad splices are the most distinguished elements of both recordings.

Davis' LSO recording was rather crudely played and drily recorded, but had a certain unrefined excitement. The new Concertgebouw performance is mostly well played, clearly recorded (except for instances of backwardly balanced timpani), scrupulously detailed—and frightfully dull. The orchestral palette is gray and there is little urgency or passion. The only moment clearly superior to all other recordings is the 11-chord outburst in the second part of the work, where Davis galvanizes the orchestra into attacks of terrifying weight and power. After that, inertia once again settles in.

Beside the Stravinsky/Columbia Symphony, Boulez/Cleveland, Markevitch/Philharmonia and Mehta/New York Philharmonic recordings, two other discs may be safely recommended: Michael Tilson Thomas with the Boston Symphony Orchestra (an excellent performance, somewhat compromised by distant sonics) on DG and Seiji Ozawa with the Chicago Symphony (well played and recorded, if a bit over interpretively glib) on RCA. S.C.

BRITTEN: *Four Sea Interludes* and ***Passacaglia from "Peter Grimes"*; VAUGHAN WILLIAMS: *Fantasia on a Theme by Thomas Tallis.*** The Philadelphia Orchestra, Eugene Ormandy cond. [Jay David Saks, producer, Paul Goodman, engineer (in the Britten), Peter Dellheim, producer, Bernard Kelville, engineer (in the Vaughan Williams).] RCA ARL 1-2744.



MIXING CONSOLES

MP 175	8	into 2	incl 4 band e.q., foldback, echo send & return, hi-lo imp switch.
MP 175	12	" 2	" * "
MP 175	16	" 2	" * "
MP 185	16	" 2	(Super 16) inc. two way 'x' over, stereo graphic, pfl, ppi.
MP 285	16	" 2	(Super 16) as 185 plus flightcase & cannons.
MP 275	12	" 2	(Export) ncl. flightcase & cannons.
MP 175	8	" 4	PFL talkback, 4 limiters.
MP 175	12	" 4	" * "
MP 175	16	" 4	" * "
MP 175	20	" 4	" * "
MP 295	16	" 4	Foldback mixer.
MP 385	16	" 8	Jacks, pfl, 8 VU meters, 8 limiters, stereo pre-fade monitor mix.
MP 485	16	" 8	As above but with cannons

OPTIONS

Cannon connectors, pfl + ppi (not ppi on 4 track desks), multi-pin connectors, talkback (via any channel), balancing transformers, flightcase.

PERFORMANCE

HUM & NOISE	Better than −125dBm referred to each input.
DISTORTION	Better than 0.05% (0.01% typically)
OVERHEAD LEVELS	+22dBm into 2KΩ or greater impedance +19dBm into not less than 60CΩ
OUTPUT IMPEDANCE	50 unbalanced
SENSITIVITY	At maximum gain, −74dB 0.15mV input for 0dBm (775mV) output

MM ELECTRONICS

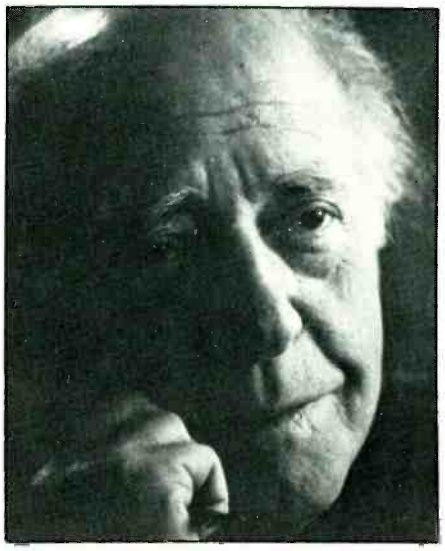
BRITISH MUSIC IMPORT SERVICES LTD.

342 MADISON AVENUE, SUITE 400, NEW YORK, NY 10017

CIRCLE 51 ON READER SERVICE CARD

Performances: **Rich and warm**
Recordings: **Sonorously blended**

Giulini, Bernstein, Previn and the composer each characterize the *Sea Interludes* with greater vibrancy than Ormandy, but the Philadelphia maestro still has his magnificent orchestra to shine in his never-less-than sympathetic reading. Only two details bother: The accented *fortissimo* tam-tam in the climax of the first interlude, "Dawn," and the important timpani part in the final interlude, "Storm," are too backwardly balanced. Ormandy's commanding performance of the *Passacaglia* is suitably austere and dynamic, the bass line projected with daunting inexorability.



EUGENE ORMANDY: Well-attuned

The Vaughan Williams Tallis *Fantasia* receives a simply gorgeous performance—just as one would expect from this orchestra's string section. There have been performances of greater urgency (Marriner), some on a grander scale (Stokowski), and of course the traditional, understated nobility of Sir Adrian Boult. But Ormandy's perhaps less individual approach is at all times attuned to the composer's inspired lyricism and some may prefer this recording for the breathtaking tone and unanimity of the playing. Another plus is that the engineering clearly distinguishes the three string groupings—large orchestra, small orchestra and quartet. One might ordinarily complain of the short, 15-minute side, but the wide groove-spacing is undoubtedly a large factor in the rich, clean string textures. And what a pleasure to report that RCA's surfaces were nearly perfect! S.C.

SHOWS and SOUNDTRACKS

RÓZSA: *The Thief of Bagdad.* Royal Philharmonic Orchestra, Elmer Bernstein cond. [Elmer Bernstein, producer; Keith Grant, engineer; recorded at Olympic Studios, London, in January 1977.] Warner Bros. BSK 3183.
BERNSTEIN: *To Kill a Mockingbird.* [Same credits, except recorded in October 1976.] Warner Bros. BSK 3184.
HERRMANN: *Torn Curtain.* [Same credits, except no recording date listed.] Warner Bros. BSK 3185.

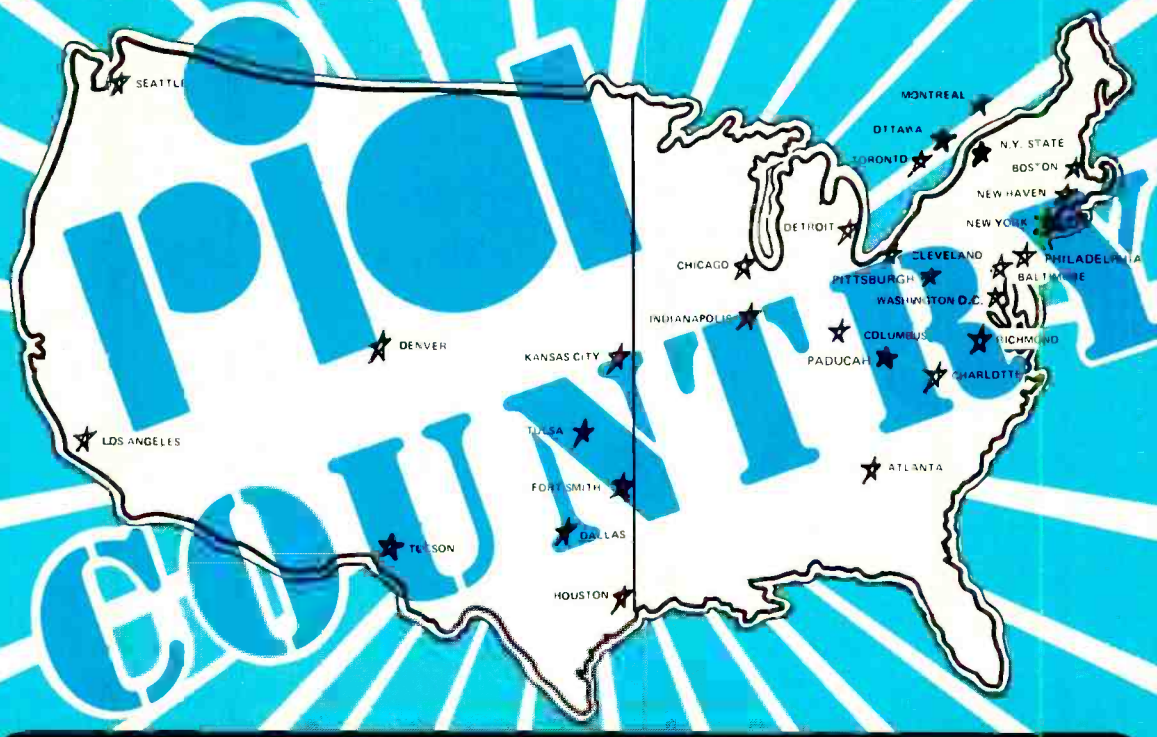
Performances: **Ideal**
Recordings: **Disappointingly pop-style**

What an extraordinary bounty for film score fans! In one fell swoop, Warner Bros. has released three important albums from a series that was never to be made available commercially. The members of Bernstein's Film Music Collection may justifiably be angry—considering the lifetime membership of $10 and $8.60 cost of each record—but non-members should be forgiven for hoping that the previous seven and any further recordings in the series will also be released commercially.

The "Recordings" comment above had best be explained right off. Unlike Charles Gerhardt's Classic Film Scores series on RCA, recorded in opulent symphonic splendor by producer George Korngold and Decca/London's superb engineer Kenneth E. Wilkinson, these three discs sound as if closely miked in a dry studio environment with artificial reverb added later to (unsuccessfully) flesh out the sonority. Time and again, the breathy prominence of unnaturally spotlighted instruments distracts. The lack of air around the orchestra in heavily scored passages (such as "Duel with the Spider" in *The Thief of Bagdad)* consistently results in puny, reined-in climaxes when the acoustic should open up. The patently electronic reverb at the end of the latter disc and *Torn Curtain* is simply unmusical. That grouse out of the way, film music fans should bolt for the nearest record store immediately. Only die-hard classical listeners are liable to be annoyed by the sound, anyway.

Miklós Rózsa composed almost nonstop music for the 106-minute *Thief of Bagdad* (1940), his tenth film score.

RECORDING INSTITUTE OF AMERICA, INC.



When today's music conscious society made recording the new art of self-expression, the RIA created the nationally acclaimed ten week course, entitled Modern Recording Techniques, in the art of multi-track recording. All classes are conducted on location at 16 and 24 track recording facilities. Under the guidance of professional recording engineers as instructors, the students see, hear, and apply the techniques of recording utilizing modern state of the art equipment. The course includes: mono, stereo, multi-track (4, 8, 16 track) magnetic tape recorders-theory and operation: microphones-basic theory and operation; control console-function and operation; overdubbing principles, echo techniques, equalization and limiting principles, multi-track "mixdown" principles (16 track to 2 track stereo); and tape editing techniques. The course concludes with live recording sessions so that the student may apply the techniques learned. The RIA is the largest and most respected network of studios offering musicians and creative audio enthusiasts the chance to experience the new world of creative recording.

FOR INFORMATION ON RIA'S MODERN RECORDING TECHNIQUES COURSE, CALL OUR LOCAL REPRESENTATIVE IN THE FOLLOWING CITIES:

AMES, IOWA
A & R Recording Studio
(515) 232-2991

ATLANTA, GA.
Axis Sound Studios
(404) 355-8680

BALTIMORE, MD.
Sheffield Rec's Ltd., Inc.
(301) 628-7260

BIRMINGHAM, AL.
Solid Rock Sound
(205) 854-4160

CHARLOTTE, N.C.
Reflection Studio
(704) 377-4596

CHICAGO, ILL.
Universal Recording Studios
(312) 642-6465

CLEVELAND, OHIO
Agency Recording
(216) 621-0810

COLUMBUS, OHIO
Mus-I-Col Rec'g
(614) 267-3133

DALLAS, TEXAS
Sound One
(214) 742-2341

DENVER, COLO.
Applewood Studios
(303) 279-2500

DETROIT, MICH.
Recording Institute
(313) 779-1380

HOUSTON, TEXAS
Wells Sound Studios
(713) 688-8067

INDIANAPOLIS, IND.
TapeMasters
(317) 849-0905

KNOXVILLE, TN.
Thunderhead Sound
(615) 546-8006

L.A./ORANGE COUNTY, CA.
United Audio
(714) 547-5466

NEW HAVEN, CT.
Trod Nossel Productions
(203) 269-4465

NEW YORK, N.Y.
RIA
(212) 582-0400

NORTHERN N.Y. STATE
Michele Audio
(315) 769-2448

PADUCAH, KY.
Audio Creations
(502) 898-6746

PHILADELPHIA, PA.
Starr Recordings
(215) 925-5265

PHEONIX & TUCSON, ARIZ.
Lee Furr Studios
(602) 792-3470

PITTSBURGH, PA.
Audio Innovators
(412) 391-6220

RICHMOND, VA.
Alpha Audio
(804) 358-3852

SEATTLE, WASH.
Holden, Hamilton & Roberts Recording
(206) 632-8300

TULSA & OKLA CITY, OKLA.
Ford Audio and Acoustics
(405) 525-3343

HAWAII
Audissey Sound
(808) 521-6791

CANADIAN REPRESENTATIVES

MONTREAL, ONT.
RIA
(212) 582-0400

OTTAWA, ONT.
MARC Productions
(613) 741-9851

TORONTO, ONT.
Phase One Recording Studio
(416) 291-9553

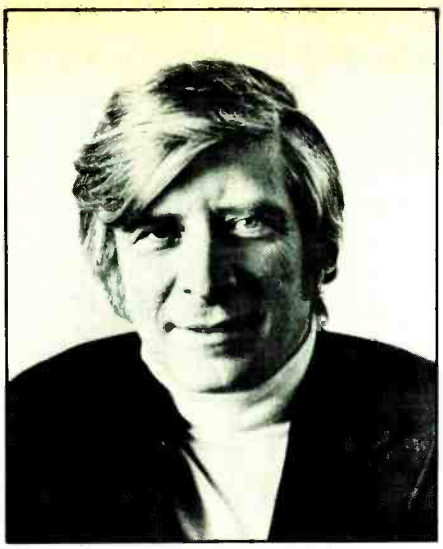
CIRCLE 101 ON READER SERVICE CARD

After hearing this new 40-minute disc, one regrets that a double album was not recorded. Some of the music not included here is available on a dim-sounding English United Artists mono disc (UAS 29725), coupled with Rózsa's suite from *The Jungle Book*. Perhaps the composer will eventually get around to a more complete recording in his London Phase-4 series.

The music is Rózsa in his richest oriental vein, brimming over with memorable tunes and a surprising (for him) amount of Straussian musical depiction ("The Chase," "The Sultan's Toys," "The Skeleton Room"). Much of the music hints at Rózsa scores to come—the fanfares to the biblical epics, "Fight and Capture of Achmad" to *The Lost Weekend*, "The Blue Rose" to *Spellbound*—and moments of exultation are heightened by the addition of a chorus (The Saltarello Choir on this recording). Three brief vocal selections may well serve as documentary value for some listeners; they only seem intrusive to my ears, especially the one in the first band. Furthermore, they are wretchedly sung and too closely balanced. But all criticisms are outweighed by the music's charm and melodic appeal.

Elmer Bernstein's chamber-like *Too Kill a Mockingbird* is on a par with the best efforts in the "Americana" *genre* by Aaron Copland or Jerome Moross. Bernstein's most obvious—and gratefully acknowledged—debts are to Copland (the "Roll in the Tire" sequence is undisguisedly from *Appalachian Spring*) and Stravinsky (the harmonies of the eerie night music sequences are strikingly similar to the 1914 *Three Pieces for String Quartet*). Yet, like that other musical Bernstein, Leonard, who also borrows unashamedly from Copland and Stravinsky, Elmer Bernstein's eclecticisms combine to form a voice all his own.

The first *Mockingbird* recording on the defunct Ava label (not an original soundtrack) has long been a collector's item. This new composer-conducted recording adds three new selections, as well as brief connective passages not on the Ava record; wisely, the syrupy M.O.R. arrangement of the haunting main theme is excluded. The sensitively phrased solo piano opening (hampered by unatmospheric miking, however) is only the first instance of superior musicianship. The night music effects are also better played. Yet, the distant miking on the Ava disc was more *sympatico* to the wistful period aura of the film. The thin, splintery brightness of the



ELMER BERNSTEIN: Eclectic voice

massed *forte* strings in the "Boo Who?" cut of the new record cannot compete with the matted warmth of the strings on the Ava disc.

Bernard Herrmann's *Torn Curtain* is the most fascinating of these three albums for many reasons—not the least of which is that the music was never used for the film! Hitchcock apparently wanted a "theme" that could be exploited commercially as a hit tune or song; but Herrmann steadfastly produced a grisly score with the strangest combination of instruments he had ever assembled: twelve flutes, sixteen horns, nine trombones, two tubas, two sets of timpani, eight cellos and eight basses. Hitchcock rejected the score, terminating a friendship and collaboration that had included eight of the director's most highly acclaimed films.

Torn Curtain is one of Hitchcock's lesser efforts—beginning with the miscast pair of stars, Paul Newman and Julie Andrews. Oddly, the film lacks purpose, and the music eventually used (by John Addison) contributes little. Perhaps Herrmann's music could have added fibre to the celluloid: The opening "Prelude" is one of the most ferocious things he ever composed (and, actually, the main "theme" is a more immediately recognizable melody than in many of his scores). "The Killing," which opens side 2, is incredibly savage music; yet Hitchcock's decision to use no musical underscoring for this scene was wiser than Herrmann's. The director's intention is to show how difficult it is to kill someone—not to play it as an action scene—and the absence of music allows the necessary objectivity. Although this album will be a "must" for all of the composer's admirers, many of the cuts are rather uninteresting mood pieces on their own. In the instances where he creates a novel effect—such as the horns in "The Corridor"—he seems content on repetition rather than development of the idea.

Bernstein's conducting and the playing of the Royal Philharmonic on these albums is top-notch and Christopher Palmer's notes are, as always, well-written and highly informative. Surfaces on the Bernstein and Herrmann discs were substandard, however, and the record jackets became unglued.

S.C.

ROZSA: *Ben-Hur*. National Philharmonic Orchestra and Chorus, Miklós Rózsa cond. [Ray Few, Tim McDonald, producers; Stan Goodall, engineer; recorded in Walthamstow Town Hall, London, in September 1976.] London Phase-4 SPC 21166.

Performance: **Straightforward**
Recording: **Resplendent**

London was involved in a project of composer-conducted film scores with Bernard Herrmann when he died on Christmas Eve, 1975, the day following completion of recording sessions for his score to Martin Scorcese's *Taxi Driver*.

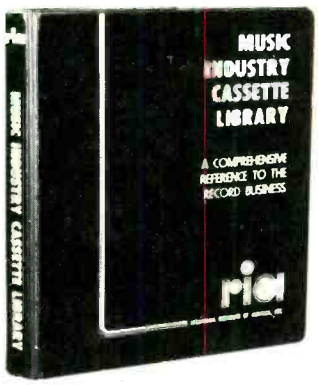
Fortunately, London lost no time in engaging Miklós Rózsa to document his superb scores in Phase-4's famed 20-channel technique. The *Ben-Hur* (1959) record is the first result, and *Quo Vadis* (1951) has already been released in England, presumably due for U.S. release in the fall.

Rózsa absorbed himself in the *Ben-Hur* score for nine months, with two hours of music ending up in the completed film. The new recording contains 46 minutes of music; as in Elmer Bernstein's *Thief of Bagdad* recording, one wishes that two records had been devoted to Rózsa's score. That apart, this disc may be recommended with no qualms. Indeed, many may want this sumptuously recorded album primarily to show off the stereo set. The sonics are everything Bernstein's Film Music Collection should be, with wide-open expanses of brass, lustrous string textures, winds always registering fully yet with natural-sounding front-to-back perspective. Rózsa's broad tempi are occasionally a trifle stolid, but nothing to worry about in lieu of the record's many rewards. A fine beginning to what one hopes will be an extensive series.

S.C.

MODERN RECORDING's PRO SHOP

Here's A Guide To The Record Business By The Pros!



Compiled from Recording Institute of America's interviews with key executives and "hit-makers", plus Reference Directory and Dialogue's Viewpoints of industry "stars"

Listen to the industry "pros" describe the workings of the Music Business. Hear the most respected attorneys of the entertainment field define and discuss the legal terminology of Recording Contracts, Songwriter Contracts, Professional Management Contracts. Over 3½ hours of professional reference . . . could be the most important 200 minutes of your life!

Plus . . . RIA Reference Directory, including sample songwriter affiliation forms, sample artist contracts, writer contracts, etc., in addition to a Directory of Record Manufacturers, Music Publishers, Personal Managers, Producers and Booking Agents. Also **Record World's "Dialogues"** with over 50 candid interviews from **Record World** magazine, and a cross-section of "star" personality interviews.

You get all the above (regularly $49.95) for only $39.95 for MR readers.

Home Recording Course

—a must for every *creative* tape recorder owner!

HOME RECORDING TECHNIQUES is three hours on two 7-inch, 7½ ips, 4-track tapes, including a booklet of diagrams on:

- sample microphone placement
- instrument set-up
- console and machine patching for special effects
- and MUCH MORE!

ONLY $19.95

ORDER FORM — MAIL TODAY 810C

MODERN RECORDING Magazine
14 Vanderventer Ave., Port Washington, N.Y. 11050

☐ Please send [ ] copies of "Music Industry Cassette Library" at $39.95 each
☐ Please send [ ] copies of "Home Recording Techniques" at $19.95

Please Print

Name _____

Signature _____

Address _____

City _____ State _____ Zip _____

Total Amount _____ Check/Money Order for $ _____

10 Day Money Back Guarantee DATE ___ / ___ / ___

Advertiser's Index

CLASSIFIED ADS

FOR SALE: Mavis 15/4 road boards with road cases and snakes. SPR System (616) 392-2379.

ATTENTION RECORDING STUDIOS: Get a *free* listing in RIA's Studio Directory. Send your studio's name, address and track facility (4, 8, 16 or 24 track) to: RIA, 15 Columbus Circle, New York, N.Y. 10023.

A 140-page comprehensive directory listing names, addresses, and phone numbers of every major record company, publishers, booking agents, managers and independent record producers. Also, sample contract forms for each. All for $4.95. R.I.A., 15 Columbus Circle, New York, N.Y. 10023.

If you have an 8 or 16 track studio, and are interested in becoming a licensed representative for R.I.A.'s Modern Recording Techniques courses, call or write: Mr. P. Gallo, R.I.A., 15 Columbus Circle, New York, N.Y. 10023 (212) 582-3680. A Large profit potential with low operating costs.

Tascam, Teac, Sound Workshop, Nakamichi, Otari, dbx, MXR, Dynaco, ADS, Eventide, EV, Shure, Maxell, Ampex, AKG Pro, Beyer, UREI, Stax, Sennheiser, Tapco, Crown, Orban/Parasound and more! Send for price quotes. ZIMET PRO AUDIO, Dept. MR, 1038 Northern Blvd., Roslyn, N.Y. 11576.

Semi-pro and consumer tape equipment, headphones. Teac/Tascam, Technics, dbx, Maxell. Best prices! Prompt Delivery! WDI, P.O. Box 340, Cary, N.C. 27511. (919) 467-8122.

FOR SALE: Amber 4400A multipurpose Audio Test set. New, in carton, from authorized dealer. $2550 delivered. (Current professional net price is $4500.) Alpha Audio, 2049 W. Broad St., Richmond, Va. 23220 (804) 358-3852.

FOR SALE: Complete film mix, Sound Studio equipment: 3 single phase 16mm Amega Dubbers and pick-up recorder with modified 16mm projector; Auditronics Grandson 6 × 4 console; 3 Scully 280-B recorders in console, FT, 2T, 4T; AKG stereo echo chamber; UREI 1176 limiter, "Little Dipper" filter; SAE 50/50 amp; Tapeheads Impulser; microphones; JB speakers; accessories. Fran Hunt (314) 965-0714.

24 track Datamix Consoles in excellent condition—for sale. Contact H. Selby (212) 477-7500.

ENGINEER WANTED to invest time, resources and inspiration into birth of Southern N.H. recording studio. Strong references essential. Saunders/Frothingham, McCurdy Rd., New Boston, N.H. 03070. (1-603) 487-3314.

MARKETING IN THE MIDDLE EAST. Musical instruments, audio, recording equipment. Creative pro seeks top corporate position. Ten years sales experience, excellent education in music, foreign language—Arabic. Phone (212) 429-0630 or write: P.O. Box 336, Elmhurst-A-New York 11380.

One 360° Systems Slave Driver with pick-up. For interface of guitar to synthesizer. Excellent condition. $600.00. Robin Evans, R.R. #1, Penberville, Ohio. (419) 352-2623.

ATTENTION
RECORDING STUDIOS:

Get a free listing in RIA's Studio Directory. Send your studio's name, address and track facility (4, 8, 16 or 24 track) to: RIA, 15 Columbus Circle, New York, NY 10023.

Ultimately It's Marantz.
Go For It.

Now, professional 3-head monitoring in a cassette deck.

Up to now you had to choose between a cassette deck for convenience. Or, reel-to-reel for professional recording features. Now have it both ways in the Marantz 5030 cassette deck.

Here's how:

The Marantz 5030 has separate record and playback heads...the same as reel-to-reel. This gives you an instant check of the quality of your recording as you record. And, like some of the most expensive reel-to-reel decks, the record and playback heads on the Model 5030 are super-hard permalloy—a long-lasting metal alloy that gives better frequency response and signal to noise ratio than Ferrite material.

For precise azimuth alignment, both the playback/monitoring and record heads are set side-by-side within a single metal enclosure. They can't go out of tracking alignment.

Complementing this outstanding "head-technology" is Full-Process Dolby* Noise Reduction Circuitry. It not only functions during record and playback...but during monitoring as well.

What drives the tape past the heads is every bit as important as the heads themselves. For this reason the Model 5030 has a DC-Servo Motor System. The steadiest, most accurate tape-transport method. Speed accuracy is superb, with Wow and Flutter below 0.05% (WRMS).

To adapt the Model 5030 to any of the three most popular tape formulations, press one of the three buttons marked "Tape EQ and BIAS." There are settings for standard Ferric-Oxide, Chromium Dioxide (CrO_2) or Ferri-Chrome (FeCr) tape.

With Mic/Line Mixing, two sources can be recorded at the same time, combining line and microphone inputs. The Master Gain Control lets you increase or decrease the overall volume of the total mix.

What else could we pack into a front load cassette deck?

More features. Like a 3-digit tape counter with memory function. Viscous Damped Vertical-load Cassette Door. Switchable Peak Limiter. Fast-response LED Peak Indicators. 3" Extended-range Professional VU Meters. Locking Pause Control for momentary shut-off in record or play...and Total Shut-off in all modes when the tape ends.

And, of course, the unbeatable Marantz 5030 is front loading. Easy to stack or fit on a shelf. The styling is clean and bold. The sound is the truest recreation of what was put on tape. If you want the best—then do what you really want to do—go for it. Go for Marantz.

25th Anniversary marantz®

More Than Great Specs, Great Ideas.

For the past three years we've been telling you about the benefits of using graphic equalizers; now we've made it even easier to appreciate them. Introducing the MXR Dual Fifteen and Thirty-One Band Equalizers. Two equalizers designed with the imagination and understanding to solve your toughest equalization problems. Designed for use in either studios or sound reinforcement situations, our new eqs offer features not previously available at any price.

The Dual Fifteen Band Eq features two channels of equalization with the bands set two-thirds of an octave apart. By breaking the frequencies down further than conventional octave equalizers, you now have the flexibility to contour your music with much greater selectivity. As most musical information occurs in the midrange, this is where you need even more definition, and the Dual Fifteen Band Eq gives you six bands of contour in this area rather than the usual four. In addition, each channel has its own level control.

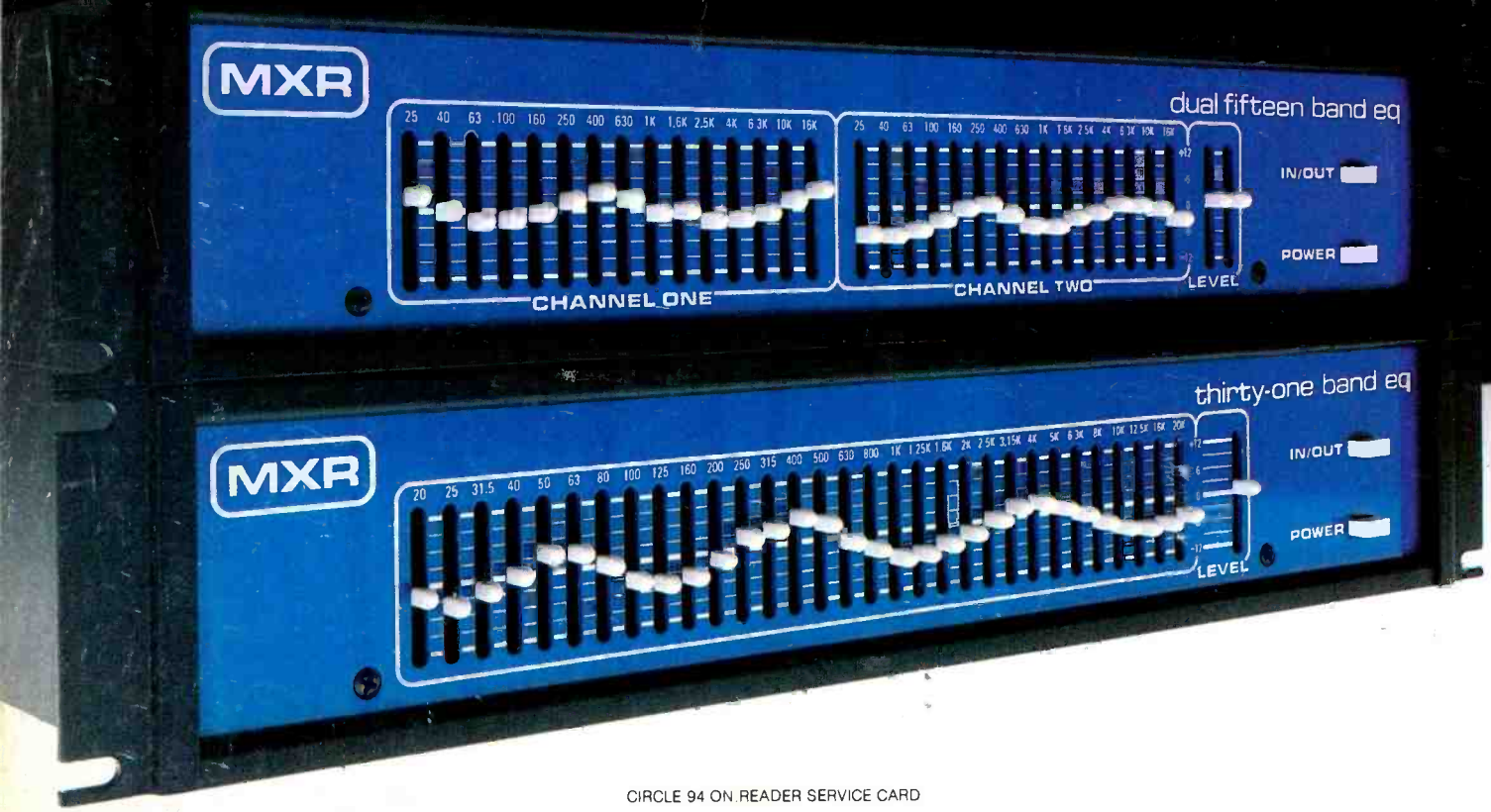
The Thirty-One Band Eq divides the frequency spectrum even further. A single channel unit, the Thirty-One Band features frequency bands set one-third of an octave apart, generally regarded to be the optimum amount of resolution.

When used in conjunction with any PA system, our equalizers can make a bad environment sound good, and a good performance sound great. Unlike parametric equalizers, the frequency response change is immediate and easily visible, so that when you shape a response curve you know what it's going to sound like.

Both units feature a range of −12 to +12 decibels on each band, standard 19" rack mount, and the rugged construction you always get with an MXR product. Both units also feature phone plug input/output connections, (the Thrity-One Band also features Cannon type XLRs), high slew rate (7V/microsecond), and incredibly low noise (better than −90 dBM). But not only do we offer great specifications, we produce great ideas... you wouldn't expect any less from us.

MXR Innovations, 247 N. Goodman Street, Rochester, New York 14607, (716) 442-5320.

MXR Professional Products Group



CIRCLE 94 ON READER SERVICE CARD