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Techniques Issue!

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# MODERN RECORDING

SERVING TODAY'S MUSIC/RECORDING-CONSCIOUS SOCIETY

VOL. 3 NO. 11  
AUGUST 1978

## Hot August Mics

**The Making  
of a Record  
— Part III**

**Miking Effects  
for Amplifiers**

### LAB REPORTS:

BGW 750B Power Amplifier  
Nakamichi T-100 Analyzer  
Sound Concepts SD550 Delay

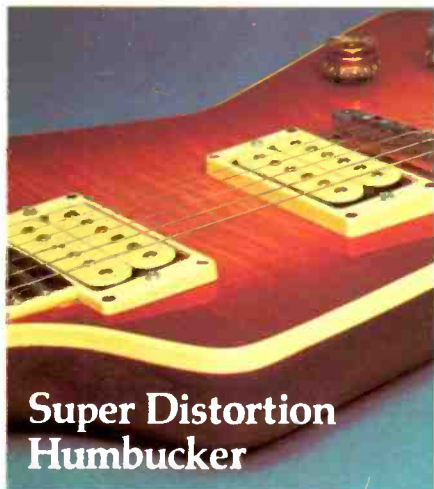
### NEW PRODUCTS

### RECORD REVIEWS

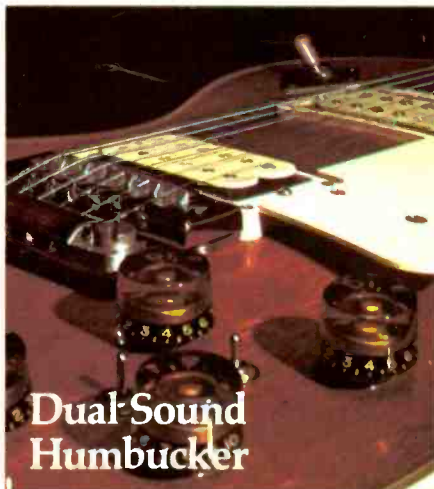


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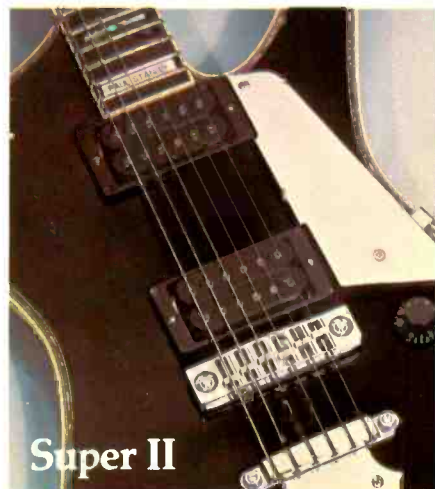
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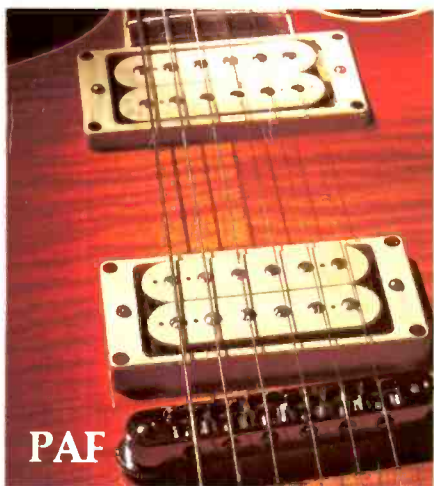
Super Distortion  
Humbucker



Dual Sound  
Humbucker



Super II



PAF

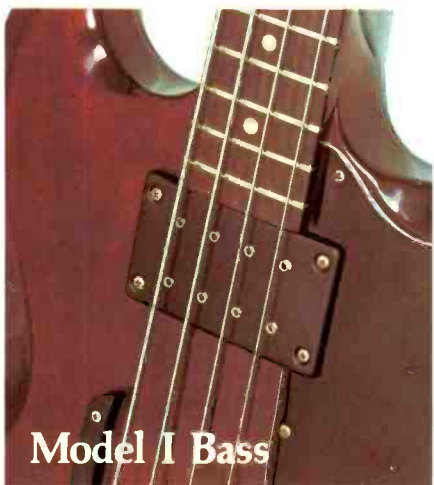


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For a free brochure on Studiomaster products please write to STUDIOMASTER, P.O. Box 211, Rowlett, Texas 75088; or call toll free 800-854-0348. In Canada contact RMS, 2271 Kingston Road, Scarborough, Ontario MIN-1T8; or call 416-264-2340.

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Our Tascam 40-4 has a suggested retail price of \$1600\*. That's more than most consumer decks, but it's designed to do a lot more.

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Okay. If you're just beginning, you can buy any consumer deck; TEAC makes the best around.

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# MODERN RECORDING

SERVING TODAY'S MUSIC/RECORDING-CONSCIOUS SOCIETY

AUGUST 1978

VOL. 3 NO. 11

## THE FEATURES

### SPECIAL EFFECTS (without the special effects)

By Craig Anderton

36

As small portable guitar amps become more and more popular, musicians will begin discovering how many effects they can create simply by using a microphone and a practice amp.

### THE MAKING OF A RECORD

—Part III

By David Moyssiadis

42

The third and final segment of this feature goes out in a blaze of glory by high-lighting the low-lives you are quite likely to run into when you try to sell that masterful tape. You always knew there was a business side to deal with in the recording game, so sit back and turn to page 40.

### HOT AUGUST MIKING TECHNIQUES

By Bruce Swedien

50

MR presents the first of several articles on miking techniques. In this first piece we discuss miking approaches for the rhythm section including bass, drums, piano, guitar and percussion. This feature is loaded with helpful hints which should aid you in choosing the technique that's best for all the instruments you choose to record.

### COMING NEXT ISSUE!

*How to Fool Your Ears and Make Bad Recordings*  
*A Special Studio Glossary*

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The notable and the new, with a comment on new items readable and useable.

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New products for the musician.

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Why not a 3¾ ips cassette deck? There's no reason why there shouldn't be, and therein lies this month's column.

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Nakamichi T-100 Audio Analyzer  
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Crown D150A IOC Power Amplifier

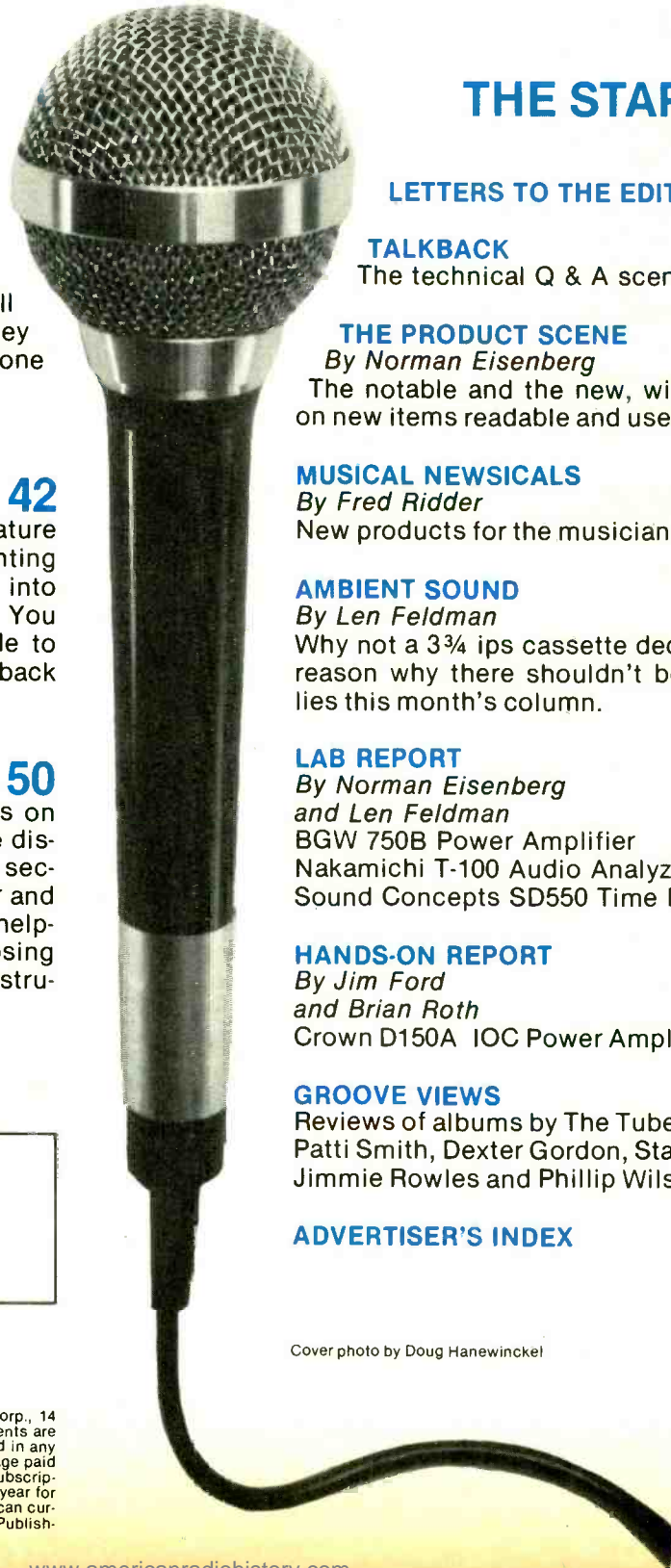
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Cover photo by Doug Hanewinkel

Modern Recording is published monthly by Cowan Publishing Corp., 14 Vanderventer Ave., Port Washington, N.Y. 11050. Design and contents are copyright by Cowan Publishing Corp., and must not be reproduced in any manner except by permission of the publisher. 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.

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Ave., Port Washington, N.Y. 11050. Unsolicited  
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# LETTERS TO THE EDITOR

## And Now a Word About Ground Loops

In reference to the article on grounding problems by Lothar A. Krause that appeared in the May 1978 issue (see "And Now A Word About Grounding Problems," page 36), I believe some errors in proper techniques have been suggested to your readers; the first error being in the definition of a ground loop. Yes, ground loops do often create a 60 Hz hum, but in audio a miswired junction box is called a miswired junction box, not a ground loop. A ground loop is defined as more than one path to ground for a piece of electrical equipment, i.e. an amp, preamp, or mixer, etc. (see *The Audio Cyclopedia* by Howard Tremaine and "Grounding and Shielding Techniques," Kevin Cousineu, reprinted from the Audio Engineering Society convention held in Los Angeles in May, 1977.

In the process of showing a typical AC distribution diagram, Figure 1 of the article (page 38), Mr. Krause has succeeded in showing us how to *connect* numerous grounds loops by connecting all mixers, amps, etc., to the green third wire electrical ground, as well as grounding all shielded output lines at both ends of the line. This process creates ground loops, which can be disastrous to both mixers and amps by not only picking up the 60 Hz hum, but by amplifying small RF signals picked up by these ground loops. Often high in frequency, thus out of hearing range, these RF signals can be amplified to the extent that they will blow a power amp for no apparent reason.

In the middle of the article, we are told to connect a water pipe to each individual piece of equipment along with all the individual equipment grounds. If a separate earth ground is run, then the individual grounds should be *lifted* to eliminate the ground loop possibility.

Although I am not an authority on this subject, I think an article that appears in a magazine should contain, at the very least, accurate information for the many readers that rely on a publication as their major source of information.

Not to seem a complete grouch, I'd like to add that I really do like *Modern Recording*.

—Larry Droppa  
Sound Technician  
Syracuse, N.Y.

[A copy of Mr. Droppa's letter was sent to L.A. Krause for comment. The following is Mr. Krause's reply.]

As you have pointed out, the correct definition of a ground loop can be debated from several different points of view. I will readily admit that a miswired junction box is a miswired junction box; however, if you do get the wiring (phasing) incorrect at a critical point, a ground loop and its characteristic hum will result.

As far as the correct connection of shielded input and output lines are concerned, this was not the main point I was trying to convey in the article. If you have a good ground return from all

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components in your system, it will not matter how many shields are connected. My main concern is for the safety of the operators and performers when using portable sound reinforcement systems. For additional information on the recommended techniques of low level signal grounding, I would suggest a thorough reading of *Noise Reduction Techniques in Electronic Systems* by Henry W. Ott, published by John Wiley & Sons. Mr. Ott goes into a great deal of detail as to the suggested grounding of low-level signal circuits. This is a point I intentionally omitted from my writings because if you have a proper AC ground, many of your problems will be eliminated. At some point in time, I will probably write an article on electromagnetic and electrostatic interference in low-level audio circuits and include all of the mathematics necessary to support the material submitted, but for now I will concern myself with the safety of operating personnel and performers.

—Lothar A. Krause, Jr.

Design Engineer

Peavey Electronics Corporation  
Meridian, Ms.

**The Choice Is Up To You**

Have you had, or do you plan on printing in the future, an article on microphones written by an engineer, citing which mics he recommends for certain applications and on what he bases these choices? For example, I once read a piece in which the author (an engineer) stated that he preferred to use an AKG C-515 on the cymbals because it could handle high-frequency transients better than a dynamic cardioid.

—Greg Noble  
San Jose, Ca.

*Since its inception, MR has printed a veritable wealth of information on microphone selection and application and there's still much to be said. What we've learned after all these accounts is that there are no hard and fast rules as to what to use—only guidelines arrived at after much experimentation and more than a little trial and error. The mic you choose depends on many things, including what your desired effect is, the acoustics of the room you're in, as well as the musician's playing techniques.*

*You can pick up hints from today's major recording engineers in each month's features and profiles as well as the sound reinforcement stories. You might also refer to *The Product Scene**



# Finally. Someone to fill you in on the blanks.

People tell us blank tape has their heads reeling. We know why. Blank tape is a jumble, presenting as many confusing options as a Chinese menu. Written in Chinese.

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Others try to make their customers into engineers. We'd rather make our engineers talk like our customers.

## 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 Iggy 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.

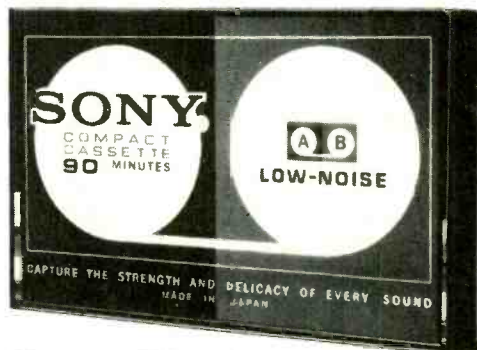
It combines Chromium Dioxide, to pick up the highs, with Ferric Oxide—so the lows reach new heights. There is no better tape to reproduce music.

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.

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## Basic Blank.



## Better Blank.



## Beautiful Music Blank.



## Best Blank.



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where new mics are often featured and improvements in old friends mentioned. Do not neglect Talkback where specific situations are explored and, in many cases, unique problems solved. For two valuable articles, look up the May 1977 issue which contained a fine piece by John M. Woram as well as a Hands-On Report by Jim Ford and Brian Roth on common sound reinforcement mics.

All in all, the best advice we can give you is to read everything you can on the subject and take it from there.

### Check It Out!

I have been reading your magazine for quite a while now and have recognized it to be the most informative in the field. Since I began reading it, I have become increasingly interested in the recording field, and in fact, I am pursuing a career in it. I have been in communication with several schools that offer courses in recording, but I was especially intrigued by a school called The College for Recording Arts in San Francisco, California.

I have never heard anything about this school and was hesitant to commit myself, fearing that it might be a "fly by night" operation. Is it a credible school,

and is it recognized by industry professionals? Anything you could tell me would be appreciated.

—Michael Weiss  
Indialantic, Fl.

*It is not our policy to comment on the professionalism of a private recording institute. In this case, we are not familiar with the school, but we do suggest that, as a matter of precaution, you call the Better Business Bureau in your area before you sign anything if you have any doubts.*

### An English Education

I am a recording enthusiast interested in attending a recording school in England. However, I cannot find any information on this subject. Do you have access to this type of information or can you tell me where I might find it?

—Jay Brown  
Skokie, Il.

*There is a delightful group of extremely helpful people in Manhattan who can tell you all about recording in England—as well as anything else you might care to learn about the U.K. Write or call the British Trade Development*

Office, 150 E. 58th St., New York, New York 10022, telephone number 212-593-2258. They are happy to supply info when they have it and if they don't, they'll know where to find it.

### Takin' Care Of Business

I am going to buy a small recording console in the near future and have been comparing specifications and features on different units. Thus, it was with great interest that I read the Hands-On Report by Ford and Roth on the Sound Workshop 1280B in the February issue (see page 78). However, there is still a question that I would like answered.

What are the total harmonic distortion and intermodulation distortion figures measured from the microphone inputs?

—Ed Morbius  
Hermosa Beach, Ca.

*We got in touch with Michael Tapes of Sound Workshop who brought out a very valid point—one good question usually prompts another. Rather than answer these questions here and perhaps raise new ones, we have forwarded your letter to Michael who will take care of it personally.*

### What Tomorrow Holds

With the onset of digital recording, can you offer the owners of small 8-track studios like myself some advice on what our future in recording might be? With two well-known 16-track studios in one small area of Rhode Island now (one with MCI equipment, one using Scully and 3-M machines) that most likely will have the money to go digital, would it be worth our while to consider buying their 16-track cast-offs or are we out the door either way?

—B. Montello, Jr.  
Warwick, R.I.

*Basically, the future is a gamble, but then, that's hardly news to anyone. Robert Angus, who dealt with the question of where recording is headed in his article "The Future of Recording—Is It Digital?" (see MR, Feb/Mar 1977, page 32), felt that all things considered, you should purchase the 16-track console, if indeed it is put up for sale. Not purporting to be a fortuneteller, Bob did, however, try to put your fears of extinction into proportion. While it's true that digital recording is making inroads into the larger studios even now, rest assured*



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that the analog equipment that we know and love is not yet to be marked for the trash. Just as there is no one way to equip a studio, there will never be just one set of demands put on a studio. You can be quite sure that analog and digital equipment will continue to coexist for many years to come, just as large and small studios do today.

### Acoustically Speaking

I am building a recording studio in my home using the garage (21' x 21' x 11') as the studio and an adjacent bedroom (10' x 21' x 8') as the control room.

Where can I find literature that will tell me specifically what materials to use and how to use them for good acoustic design and soundproofing?

I would like to make this studio as "unpermanent" as possible to facilitate relocating the studio should I move to another location.

I'd also like some info on what equipment I would need to measure room response, reverb time, etc.

—Don Ollis, Jr.  
Santa Barbara, Ca.

To our way of thinking, among the words synonymous with acoustics is the name Jeff Cooper. For his definitive piece "Building Your Own Recording Studio (For Under \$500) check out the Winter 1978 Modern Recording's Buyer's Guide (page 6). You'll notice that much of what is suggested to acoustically better a room comes under the heading of simple home improvements (storm windows, weather stripping and solid-core doors), and so you should not view an investment of this sort as "wasted" should you relocate.

Also check out his article in the July 1977 Modern Recording entitled "How Acoustics Affect Recording" (page 36). This article sparked a letter to Mr. Cooper which appeared in the February 1978 Letters To The Editor column (page 12). This letter—and Jeff's reply—can give you some more information on measuring a room's reverb and delay times. You should also refer to Len Feldman's November Ambient Sound column (page 52) for additional pointers on "Echo, Reverberation and Time Delay."

### Freedom Without Sacrifice

I am a vocalist in a rock band who would like more onstage freedom. Are there any professional quality wireless microphones that don't sacrifice frequency

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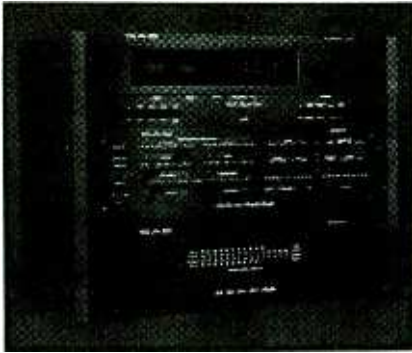
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response and output characteristics for mobility? I need some help in finding an appropriate one.

Keep up the great magazine. I didn't think anyone could print a magazine that I would read from cover to cover, month after month without fail—I was wrong.

—Timothy C. Bergquist  
 Council Bluffs, Ia.

*We can suggest two wireless microphone systems that we feel will satisfy your needs. One is manufactured by the Ken Schaffer Group, Inc, 10 E. 49th St., New York, New York 10022, telephone number 212-371-2335. From Berkeley, California comes the Nasty Cordless System. For info and specs, call them at 415-526-6745. (If we have neglected to mention other manufacturers, it was not intentional and we would appreciate hearing from you.) Also, keep up with the monthly Musical Newsicals column for information on pieces that will be useful to you.*

## A Matter of Simple Mathematics?

*Let's see, 10cc divided by two equals Lol Creme and Kevin Godley, right? Not necessarily—as we found out much to our chagrin in the May 1978 issue. The subjects of the photo on page 82 of Groove Views were mistakenly identified as Creme and Godley, whereas in actuality they are the other two members of the*



Masters of the Gizmo Lol Creme and Kevin Godley, courtesy of Mercury Records.

*original 10cc, Eric Stewart and Graham Gouldman. Our apologies to the artists involved, and for all of you who are still curious, we're happy to print this picture of Lol and Kevin, courtesy of Mercury Records.*  
 —Ed.

## Intriguing Devices

In the February 1978 issue, author Steve Whiting made references to both the Comara Fat Box and the Allison Research Kepex noise gate in his fine article, "A Session with Jefferson Starship" (page 54).

Do you have addresses for these manufacturers? I am interested in learning more about these devices.

I look forward to receiving each new issue of *Modern Recording*. We are currently building a 16-track studio from the ground up and your articles have proven themselves invaluable. Thanks for all your assistance.

—Art Pennebacker  
 Firehouse Studios  
 Seattle, Wa.

*For more on the Allison Research Kepex, direct your inquiries to Paul Buff, President, Allison Research, 2817 Erica Place, Nashville, Tennessee 37204. You'll be delighted to find out that there really is an Allison, too. (For a bit more background on this phenomenally creative mind, check out the profile of Frank Zappa in the March 1978 MR, page 46.)*

*The Comara Fat Box is a unique,*

# WIN A SOUND SYSTEM FROM TAPCO



2nd Prize

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3rd Prize

Here is how to enter the drawing for one of three professional sound systems to be given away this summer by TAPCO. Or one of 50 limited edition "Team Member" T-Shirts. Odds of winning are determined by the number of entries received. You must be 15 years of age or older to enter. No purchase is required. Each of the systems includes Anvil cases, AKG mics and E-V mics, and Electro-Voice \* speakers—the kind of professional equipment you might choose for yourself. To enter, visit your participating TAPCO dealer, complete the official entry form, and put it in the mail. That's all you need to do, but you owe it to yourself to try a hands-on demonstration of our new mixers and power amps—turning them on may just turn you on to TAPCO. We want you on our TAPCO team.

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**2nd PRIZE**—Worth over \$5570. 2 S15-3 E-V 3-way Stage Spkrs, 2 FM12-2 E-V 2-way Fir Monitors, 1 CP500 TAPCO Power Amp, 1 CP120 TAPCO Power Amp, 1 6100RB/EB TAPCO 14-Ch Mixer, 1 2200 TAPCO Stereo Graphic Equalizer, 2 ANVIL Rack-Mount Cases, 4 AKG Mic Stands, 2 C505E AKG Card E'tret Cond Mics, 2 D2000E AKG Card Dyn Mics, 2 D170E AKG Card Dyn Mics, 4 PL91 E-V Card Dyn Mics, 2 PL76 E-V Card E'tret Cond Mics, 1 PL6 E-V Super Card Dyn Mic, 1 K140 AKG Headphones.

**3rd PRIZE**—Worth over \$2686. 2 S12-2 E-V 2-way Stage Spkrs, 1 CP120 TAPCO Power Amp, 1 2200 TAPCO Stereo Graphic Equalizer, 1 6201 TAPCO Stereo Mixer, 1 ANVIL Rack-Mount Case, 2 AKG Mic Stands, 3 D2000E AKG Card Dyn Mics, 1 PL77 E-V Card Cond Mic, 2 PL91 E-V Card Dyn Mics, 1 K140 AKG Headphones.

#### OFFICIAL RULES

Complete the official entry form available at a participating TAPCO dealer, and put it in the mail so it is postmarked no later than August 15, 1978. Winners will be selected in a random drawing September 15, 1978 by persons not employees of AKG, Anvil, Electro-Voice, or TAPCO. One entry per name. You must be 15 years of age or older to enter. No purchase is required. The results of the drawing will be final, and the winners notified by mail. If a winner has TAPCO products duplicated by winning a system, the winner will receive his or her choice of AKG, Anvil, E-V, or TAPCO products of equal value. Odds of winning are determined by the number of entries received. State, Federal, and other taxes imposed on each prize winner will be the sole responsibility of that prize winner. Requests for winning names should be addressed to TAPCO, 3810 148th Ave. NE, Redmond, WA 98052. Employees of AKG, Anvil, Electro-Voice and TAPCO, affiliated companies, sales agents, and their families not eligible. Void where prohibited or restricted by law.

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### Failing Grades in Geography

It's obvious to us now that we need an atlas. Amanita Sound, which was mentioned in the March 1978 Product Scene (page 27), is correctly placed in Easthampton, Massachusetts, not in Maine as was erroneously stated. Apologies to the fine folks at Amanita, and for any confusion this might have caused our readers. —Ed.

### Audio Is A Five Letter Word

We were very happy to receive the letter from Joe Phillips, Vice President of the Pacific Radio Exchange of Hollywood, California which was written in reaction to the article "Inside a Soundman's Toolkit" (February 1978, page 60). However, in our haste to get his letter into our June 1978 issue (Letters To The Editor, page 9) the company name was unintentionally altered to read the

Pacific Audio Exchange. We regret this error and any inconvenience that it might have caused readers who were interested in contacting Mr. Phillips. —Ed.

### Repairs for Aging Amps

I have a problem. I have two Harmon-Kardon Galaxy 150 tube-type amps. They have served us well but now, due to age, they are in need of repair. I would like to know if it is possible for me to purchase the schematic and complete the necessary repairs myself.

—Wayne Dobson  
Sam Hill Band  
Auburndale, Fl.

While we can't assume that you "can make all the necessary repairs yourself," we do know that the schematics that you require are available from Harmon/Kardon and were being sent to you directly from their Customer Relations Department. If you find that you need additional information, consult a local sound engineer or technician, or write to Mr. Gainer, Customer Relations Dept.,

Harmon/Kardon, 55 Ames Court, Plainview, N.Y. 11803.

### A Higher Plane

As a musician (bass, guitar) for twenty-odd years, and an electronic technician (I currently hold an FCC First Class and an Amateur Extra class license, and I'm going for my D.O.E.) as well as being an avid listener to Seawind, I must heatedly contest your review of their album, *Window Of A Child* (Groove Views, April 1978, page 89). The statement that is particularly absurd is in the end paragraph, "Lyrically Seawind has nothing to say..." I live in Hollywood and spend a great deal of time listening to those groups and players that are not only beyond mere technique on their instruments and musically cohesive, but who are quite obviously "tuned in" to a musical plane far above the usual "chops" level.

It seems clear to me that the reviewer, Gil Podolinsky, cannot see the virtuosity of Seawind, either as individuals or a collective, and, if I had to guess, I'd say he knows little or nothing about music techniques or composition.

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\*Measured according to Leinonen/Otala/Curl  
method, AESJ, Vol. 25, No. 4.

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# fact: you can choose your microphone to enhance your productions.

Shure makes microphones for every imaginable use. Like musical instruments, each different type of Shure microphone has a distinctive "sound," or physical characteristic that optimizes it for particular applications, voices, or effects. Take, for example, the Shure SM58 and SM59 microphones:

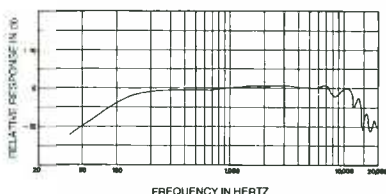


## SM59

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The SM59 is a relatively new, dynamic cardioid microphone. Yet it is already widely accepted as a standard for distinguished studio productions. In fact, you'll often see it on TV... especially on musical shows where perfection of sound quality is a major consideration. This revolutionary cardioid microphone has an exceptionally flat frequency response and neutral sound that reproduces exactly what it hears. It's designed to give good bass response when miking at a distance. Remarkably rugged — it's built to shrug off rough handling. And, it is superb in rejecting mechanical stand noise such as floor and desk vibrations because of a unique, patented built-in shock mount. It also features a special hum-bucking coil for superior noise reduction!

**Some like it essentially flat...**

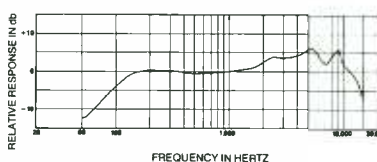


## SM58

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Probably the most widely used on-stage, hand-held cardioid dynamic microphone. The SM58 dynamic microphone is preferred for its punch in live vocal applications... especially where close-up miking is important. It is THE world-standard professional stage microphone with the distinctive Shure upper mid-range presence peak for an intelligible, lively sound. World-renowned for its ability to withstand the kind of abuse that would destroy many other microphones. Designed to minimize the boominess you'd expect from close miking. Rugged, efficient spherical windscreens eliminates pops. Lightweight (15 ounces!) hand-sized. The first choice among rock, pop, R & B, country, gospel, and jazz vocalists.

**...some like a "presence" peak.**



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If Podolinsky has any doubts as to the truth of what I'm saying ask him to catch Seawind "live" sometime. That should change his mind!

I do agree with him, though, that CTI surfaces aren't all they might be—but this is most certainly not the group's fault and they should not be shortchanged because of it.

—Jack Brooks  
Los Angeles, Ca.

## Exploring The Eventide Harmonizer

I read and enjoyed Len Feldman and Norman Eisenberg's Lab Report on the Marshall Time Modulator (see the April 1978 issue) and I'm curious to find out if they have reviewed the Eventide Clockworks Harmonizer in the past? If so, is it still possible for me to get a copy of the review?

I'd like to find out what the Harmonizer does. I'm vaguely familiar with it but I would like to have as much information on it as possible before purchasing one. I would appreciate any help you could give me.

Also, I think you should contemplate printing a collection of all the Lab Reports done to date. It would be a best-seller among those of us out here who are interested in information without the sales pitch!

—Roger Hoover  
Sweetsong Recording  
Parkersburg, W. Va.

*There was a review done on the Eventide Harmonizer Model H-910 in the Dec/Jan 1977 issue of MR. Although it's over a year old, we still have some dusty copies secreted in our archives that are available to you if you write and request one and include \$2.50 to cover the cost of the issue and postage and handling. Eisenberg and Feldman felt it had "un-explored potential" for the creative rec-ordist or sound show engineer.*

## Eye of the Photographer

*The photo of Ray Barretto which appeared on page 92 of our April 1978 issue as part of Russell Shaw's review of Barretto's latest work, Eye of the Beholder, was the work of the Jose Hernandez Photo Studio of the Bronx, New York. We regret neglecting to credit Mr. Hernandez's work when it appeared and hope that he will accept our apologies and thanks at this time.*

—Ed.



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In the past three years the semi-professional recording market has been buried with an avalanche of products. These products have been brought into the market to allow the budget studio to compete with the high overhead pro operations. However, none of the manufacturers of these devices have placed any emphasis on integrating these products into a professional working environment. As a result, the small studio owner is forced to place a substantial investment in the most unprofessional surroundings.

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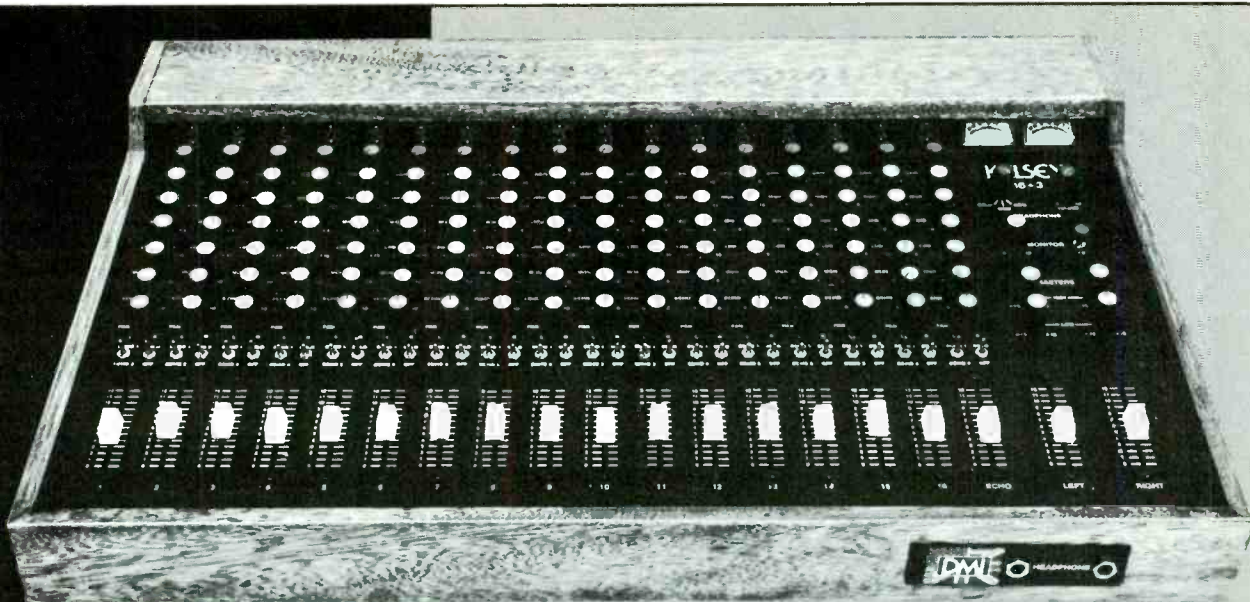
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**IMPEDANCES:** Hi Z = 50 K unbalanced; Low Z = 200 Ohm transformer balanced. **MAX. INPUT LEVELS:** Hi Z = +20dBm; Low Z = +8dBm. **GAIN:** Hi Z = 0-46dB, continuously variable; Low Z = 12-58dB, continuously variable. **EQ:** High ±15dB at 10K, shelving; 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 @ 1/2 Amp.

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# TALK BACK

"Talkback" questions are answered by professional engineers, many of whose names you have probably seen listed on the credits of major pop albums. Their techniques are their own and might very well differ from another's. Thus, an answer in "Talkback" is certainly not necessarily the last word.

We welcome all questions on the subject of recording, although the large volume of questions received precludes our being able to answer them all. If you feel that we are skirting any issues, fire a letter off to the editor right away. "Talkback" is the Modern Recording reader's technical forum.

## Some Primer Particulars

I found Jim Ford and Brian Roth's "P.A. Primer" to be an excellent article on P.A. systems. Usually this type of article is pretty useless, but their series was different. [For a complete reprint of the series, see the 1978 Winter

Buyer's Guide, page 112—Ed. However, I do want to take exception to a couple of points.

First of all, the illustration in Part Three, showing the speaker stack (page 129) seemed incorrect to me. The high-frequency horn layout will cause a lot of lobing problems as it is depicted. A better way to stack the speakers would be as shown below. I don't know if the authors meant it to look exactly as it does, or if the artist "neatened" the sketch up a bit.

Having separate components in a four-way system produces all kinds of phasing problems that have to be ironed out every time you set up. It might be better to use a "packaged" speaker system such as those designed by Tycobrahe or Clair Bros. This point is made by the authors—by implication—in Part Three.

Secondly, in "A True P.A. Story" (page 133) a problem with high frequency horns being destroyed by low frequencies is described. The blocking capacitor suggested as a so-

lution to this problem is an excellent idea, but that of dissimilar connectors is not so good. (It's a pain in the neck to have two or three different types of cables to work with.) If you are going to have a P.A. system with separate components, either use multi-pin connectors (4 or 6 pin) with 4 or 6 conductor wire and have the particular components wired so they take the signal from the desired pins; or use the XLR connectors in the unbalanced wiring practice and 600 Hz blocking capacitors, and hope that you don't hook up anything dreadfully wrong! Here again, I feel there is a lot to be said for the Tycobrahe system with 4-pin connectors and a bi-amp rack.

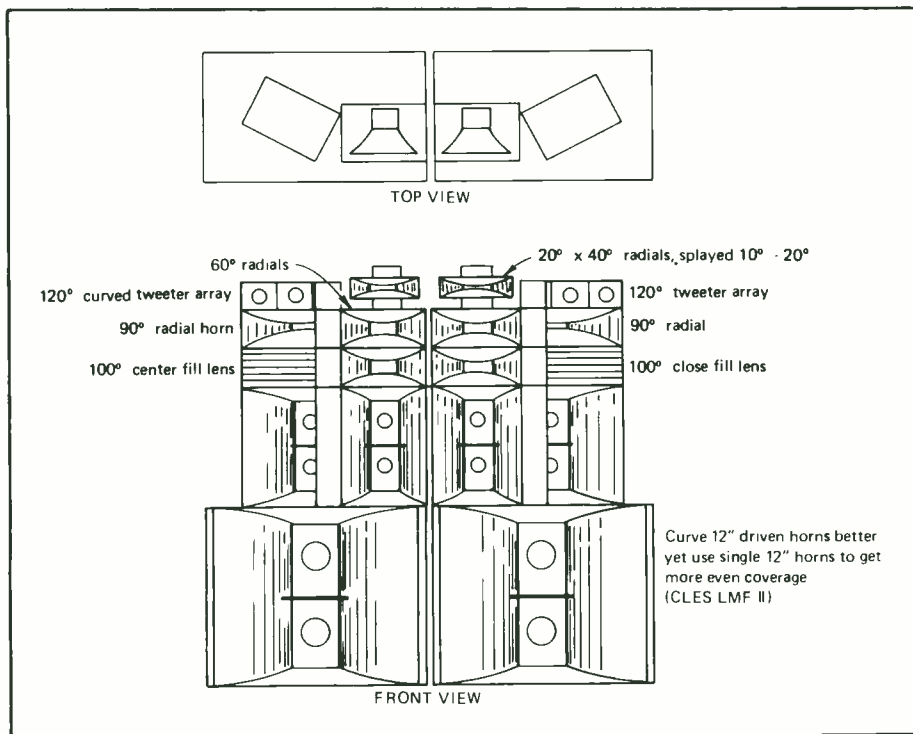
While on the subject of Tycobrahe, the picture on page 127 of the Guide looks like a large Tycobrahe system if I'm not mistaken.

Apart from these two points, the rest of the article was quite good. I can think of a couple of local sound companies that could benefit from reading it! I hope to see more articles of this caliber in *Modern Recording* in the years to come.

—Barry McKinnon  
Acoustec Sound Products  
Calgary, Alberta, Canada

Thanks for the question. We will take your points one by one and try to make our thoughts clear.

As far as phasing of large speaker clusters with multiple crossover points goes, you are right about the drawing. It was put together by an artist who did not consider phasing at all. When attempting to phase a system we follow the general rules of good cluster design. Group all of the components together as closely as possible to achieve a point source (or some resemblance of a point source). All the drivers (bass woofers and high frequency horn drivers) should be in the same plane or on the same arch of a semicircle. Now, this is where the problem gets tough. If the system has multiple types of speaker



components and has several crossover points then 1) each group of speakers should be in phase with its adjacent group of speakers at the crossover frequency, and 2) each group of speakers should be in phase within itself.

Actually there should not be any phase shift or time alignment errors within the whole system from the lowest to the highest frequency, but this is very difficult to accomplish even in the very best studio monitor speaker systems. As the systems get larger, and the distances between different speaker components and the number of crossover points increase, the phasing problem becomes more unmanageable. Your statement about having to iron out the phasing problems everytime you set up a large system is true, but we do not necessarily agree that a packaged system (full frequency range speaker boxes with one or more of each driver type in each box) solves the phasing problem. In fact it may become worse. We would appreciate any comments from persons who have done in-depth study or research in the area of phasing of very large concert sound systems.

Our reason for using multi-pin connectors is about the same as your suggestion of using a multi-pin connector with full range packaged speaker systems. A multi-pin connector that will insert in only one position assures that inexperienced set-up personnel will not make a disastrous error four hours before the big show. The use of XLR connectors for speaker line connection is questionable. The current carrying capacity of the contacts should be checked. With high power amplifiers and common speaker loads the current requirements can exceed ten amps.

Once again, thank you for your comments.

—Jim Ford  
Contributing Editor  
*Modern Recording Magazine*

### The Best of Both Worlds

I am interested in finding a better way of miking my acoustic guitar in "live" performance. In the past I've experimented with numerous highly recommended microphones (Shure SM-57 and the AKG D-202E). I have also worked with numerous transducer pickups (Barcus-Berry and Frap). I am most satisfied with the sound of the microphone but love the



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convenience of the pickups. I found, however, that the mellowness of my twenty-year-old Martin D-28 is destroyed by the pickups.

Recently, I have been told that I can have the best of both worlds by installing a Sony ECM-50 PS tie-tack condenser microphone just inside the sound hole of my guitar. I would then have the freedom of movement but also the high-quality of a condenser microphone. I would like to know if you have any information on this system and if you foresee any problems with it. I also understand that problems with low-frequency resonances can be eliminated by covering the sound hole of the guitar. I would appreciate your advice before spending the bucks on this microphone.

—Barry Drake  
Fleischmanns, N.Y.

The advice to use a Sony ECM-50 is excellent. Since it is an omnidirectional microphone, there is no proximity effect as with the cardioid pattern of the other mics you have tried. Also in addition to the excellent transient response of a condenser, the ECM-50 has a slight response peak around 5k Hz

which should compliment your guitar very nicely. The best results can be obtained by clipping the ECM-50 in such a manner that it is actually inside the hole of the guitar, parallel to the strings. This gives excellent isolation from feedback.

Covering the hole would probably be a mistake as the sound of the guitar would be destroyed. It would be much like eliminating the sound board of a piano. The muddiness encountered in the past was due to the interaction of the microphones used and their placement with respect to the instrument. The use of the Sony ECM-50 should eliminate this.

—Jo Hansch  
Assistant Studio Manager  
Kendun Recorders, Inc.  
Burbank, Ca.

### Predistortion Can Pay

[The following is another possible solution to the problem set forth in the February Talkback "Help For The Harp," (page 21).]

The basic problem is that your harp is too clean as it goes into your P.A. system. To distort it at the board is

unsatisfactory for it can't easily be controlled; so, logically, the solution is "predistortion."

One way of accomplishing this is to run the harp through a guitar amp, using it in much the same way a guitarist would. This will work fine if you can find the right amp and mic.

Another solution—one with which you stand a greater chance of success—is to use an inexpensive mixer which distorts easily (the Shure M68 is one you might try) to predistort your harp sound before the P.A. board. (This isn't to say that the M68 is a bad mixer, simply that it works well in this application.) This also means that the gain at the P.A. board will be lower so the harp player can get up close to the mic to distort the preamp. This results in a lot less leakage and an all-around better sound.

You can take the output of the mixer and use that for your stage monitor or guitar amp. This can be done by taking the output from the RCA jack on the back of the Shure into the lo-gain input of the guitar amp. (It might be advisable to use a resistive pad here for there's quite a strong signal present.) Your other route would be to split the low-impedance output and run that to your

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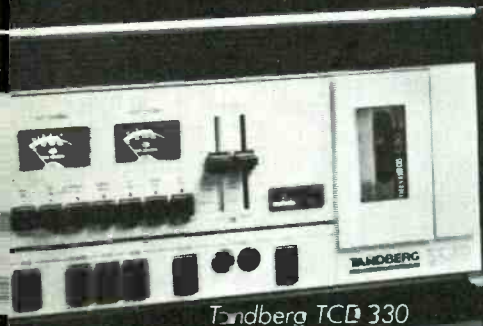
Gain .....	Unity
Bandwidth .....	20 kHz
Dynamic range .....	85 dB
Output Impedance .....	1 kohm
Input Impedance .....	500 kohms
Maximum Input level .....	2.5 V peak
Notch depth .....	Variable from 20-40 dB
Delay time .....	Variable from .5-15.0 msec
Auto flanging rate .....	Variable from .1-8 Hz
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stage monitor console, if you happen to be using one.

Mics that I might suggest include the Shure SM57 and SM58 and the Electro-Voice RE-10. They work well because of their shapes and which allow the harp player to get up real close and cup his hands around them. An added bonus on top of all this is that they sound good.

—Rick Chinn  
Product Specialist  
Tapco, Inc.  
Redmond, Wa.

### Calculating Your Capabilities Is there any way that I can measure the signal-to-noise ratio and headroom of my tape recorder without using a distortion analyzer?

—James R. Kraynak  
Coopersburg, Pa.


You can arrive at a good approximation of the signal-to-noise capabilities of your tape deck/tape combination without owning a distortion analyzer but you will require at least three other pieces of test equipment: an audio oscil-

lator capable of producing a clean 400 Hz signal, an oscilloscope (it doesn't have to be a fancy one—any model having a bandwidth great enough to cover the audio spectrum will do) and an AC meter that reads down at least 60 dB below 1 volt or so, and is calibrated in dB as well.

Start by making a brief recording of a 400 Hz test tone on your deck at a level which produces a 0 dB reading on your record level meters. If your deck is a three-head machine and is capable of true monitoring, you can observe the recorded results on the scope as the recording is being made. After a few seconds, remove the test signal and record a few moments of no-signal blank tape. Re-wind the tape and, with the output of the deck connected to your AC meter, play back the recording. Note the playback level on the meter and call that "zero." When the signal ends, read down on the meter, observing the number of dB that you observe below the reference zero level. That's the S/N ratio referenced to 0 dB record level of your machine.

Most professionals regard the ultimate S/N ratio as the number of dB that residual noise is below the 3% distortion level. To find this number, make additional recordings, each time increasing the record level by a dB or two and removing the signal entirely after establishing the new level. If the tape deck's record-level meters go "off-scale" you can still keep track of how many dB you've moved up by keeping the external AC meter connected to the output of the deck during these recording sequences and noting the number of dB that you have increased the input signal compared to your first test run.

You won't be able to determine exactly when 3% distortion is reached, but most tape decks and tapes exhibit rapidly rising distortion of reproduced sinewaves when maximum recording levels are reached, and the sudden increase in observed distortion on the 'scope will give you a pretty good clue as to when that point has been reached (the tops of the sinewaves will start to look rounded instead of sinusoidal). Using that recording level for your final test, read the new signal-to-noise ratio in dB on the AC meter and that is your "unweighted" signal-to-noise ratio. The number of dB above "0" on your record-level meters that you have been able to increase the amplitude of the test input signal then constitutes the available headroom of the tape machine/tape combination.



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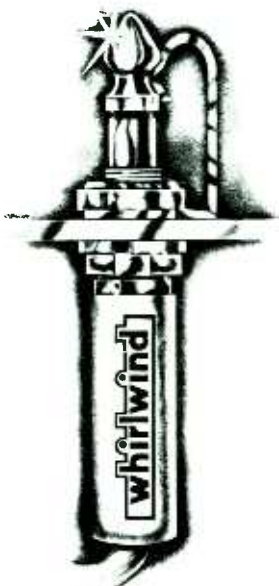
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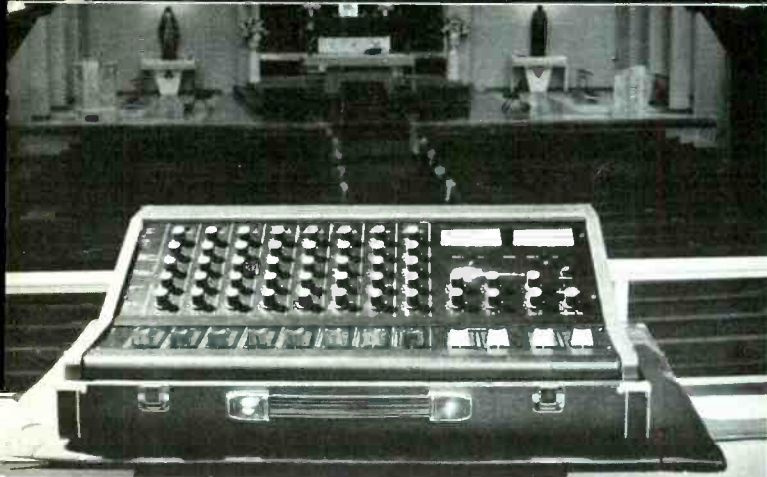
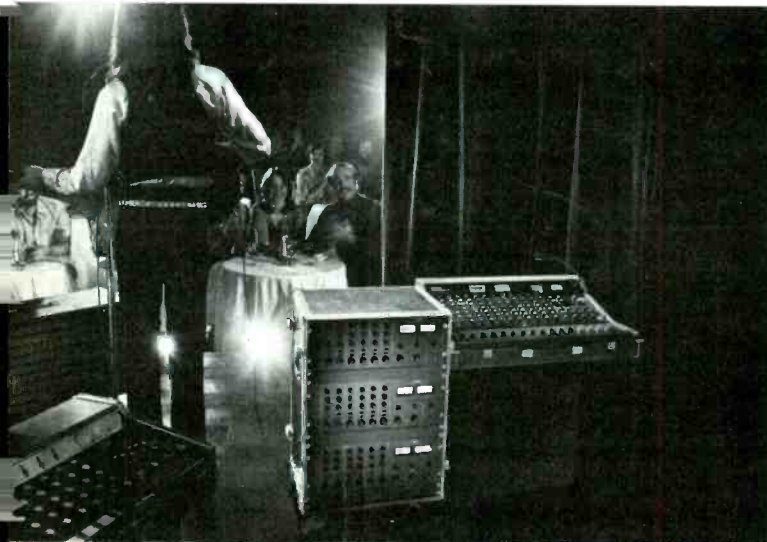
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If your deck is a two-head machine, these measurements will take a bit longer (you can't watch the recorded results while making each test run and have to rewind for each observation) but the procedure remains much the same otherwise.

—Leonard Feldman  
Audio Editorial Board  
*Modern Recording*

### Simple Solution

I would appreciate some advice as to the best way to clean old LPs (pre-1930 33s and 78s) so I can record

them with a minimum of noise. Is there a process to clean off the accumulation of dirt from a record's grooves without damaging the record's fidelity?

—J.D. Munns  
Great Lakes, IL

A solution of warm, soapy water or mild detergent, sometimes applied with a soft camel's-hair brush is useful for cleaning grooves. Rinse with cold water, dry (following the curve of the grooves) with an old handkerchief or a soft, paper towel, rinse again then allow to drain in a plate rack. This method is

as effective as any high-priced record cleaner on the market, but it will not, of course, repair damaged or worn grooves. If a record has a dig or a gouged groove, sometimes light application of a soft wax pencil will help tracking.

—Michael Brooks  
Producer, CBS Special Products  
CBS Records  
New York, N.Y.

### Sound Modification In A Wireless System

If a guitar player is using a wireless microphone system, is he still able to use sound modification devices? Assuming he is, how would they be patched into the system?

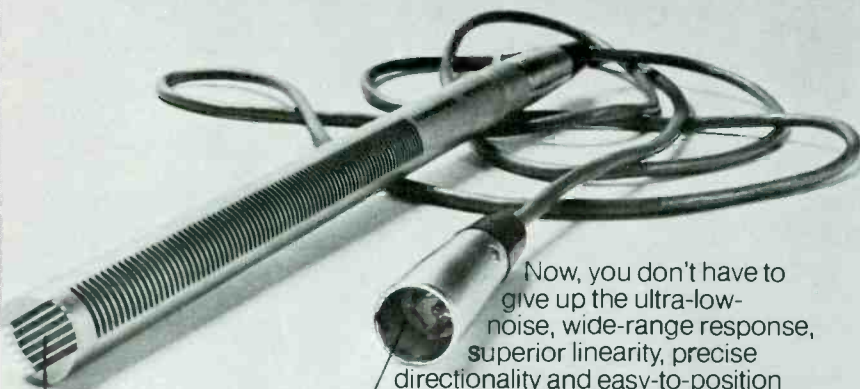
—Stan Calkins  
Trinidad, Ca.

There is nothing about a wireless system which would prevent you from using electronic sound modifiers. Functionally, a wireless system is just a very fancy guitar cord which doesn't use wire. This means that any signal processors you care to use may be connected between the wireless receiver's output and the input of your amplification system. The main disadvantage to using sound modifiers in this way is that they will physically be located with the receiver and amplifier rather than at the front of the stage where you can get at the controls more readily.

Additionally, it may be undesirable to use devices which have significant amounts of gain (amplification), such as boosters, compressors, and fuzz-tones, after a wireless system as they will tend to amplify the inherent background noise of the transmitter and receiver. The only alternative to connecting modifiers after the wireless system is to connect them before the transmitter of the system. But unless you use one of the small, battery-powered sound modifiers which connect directly to the guitar, or which can be carried in a pocket or on a belt clip, you will lose many of the advantages of a wireless system since you will have to run a cord from your instrument to the modifier and then from the modifier to the transmitter.

—Fred Ridder  
Engineer  
Record Plant Studios  
New York, N.Y.

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# PRODUCT

## NEW TECHNICS OPEN REEL DECK

A direct-drive tape deck, the Technics RS-1520US features the "isolated loop" for tape movement whereby the tape loop starts and finishes on opposite sides of the same oversized capstan. Supply and takeup reels are driven by separate servo-controlled DC motors. A strobe built into the recorder indicates speed accuracy. Pitch controls are variable by up to  $\pm 6$  percent. Heads include two-track erase, two-track record, two-track play and separate 4-track play. Azimuth alignment can be performed by the user. The transport uses full IC logic to permit direct switching from any mode to any other. Separate three-way bias and EQ selectors can be adjusted to accommodate all known tapes. The average-reading VU meters have switchable scales (+3 dB or +6 dB). Other features include an edit dial, mic attenuator, cue button, real-time tape counter, cannon connectors and a +4 dBm output for interface with standard line levels. Response at the 15 ips speed is spec'd as  $\pm 3$  dB, 30 Hz to 30 kHz; at 7½ ips, it is  $\pm 3$  dB, 30 Hz to 25 kHz.

CIRCLE 10 ON READER SERVICE CARD

## MINI MICS

Audio-Technica has announced its first miniature microphones, made for wearing on clothing in situations demanding "faithful but unobtrusive sound pickup." Both the AT803S and the AT805S are electret condenser types with omnidirectional pickup patterns. Included with each are accessories consisting of windscreen, battery, carrying case, lavalier neck cord, belt clip and tie clasp. Each mic has an on-off switch to preserve battery life. The AT803S, termed an ultra-miniature mic, is just 0.78 inches long and 0.4 inches in diameter. Response is spec'd as 50 Hz to 20 kHz. Maximum input is 130 dB; S/N is better than 50 dB. Price is \$80. The AT805S is two inches long and 0.59 inches in diameter. Its specs are the same except for top-end response, given as 15 kHz. Price is \$50. The smaller mic is powered by an AA-size alkaline cell; the larger, by a 1.3-volt mercury battery.

CIRCLE 11 ON READER SERVICE CARD

## TIME DELAY AMBIENCE SYSTEM

The SAE model 4100 is a time-delay ambience system that features a variable delay structure, a random phase pattern in the delayed signal and a multi-mix regeneration (decay) system. Input and output level controls, plus mode controls (direct, discrete and blend), are provided. Claimed to offer great flexibility and high performance, the SAE 4100 is priced at \$400.

CIRCLE 12 ON READER SERVICE CARD

## NEW SONY HIGH-END CASSETTE DECK



Featured in the new Sony TC-K8B cassette recorder are a ferrite-and-ferrite r/p head; Dolby noise reduction; a newly developed frequency-generator, servo-controlled motor for capstan drive and a separate spooling motor. The head material, claimed to be made from a special formula developed by Sony, is used both in the pole-pieces and in the surround portions. Improved high-end response, lower distortion and noise, and extended head life are claimed for it.

Level meters are liquid crystal, peak-readout types, each with 64 separate elements and with a range from -40 to +5 dB. There's also a meter peakhold capability. Separate switches for bias and for EQ, each with three positions, are provided. Mode selection is solenoid-assisted. The tape transport is logic controlled. Line and mic input mixing is provided. Some specs are: response of  $\pm 3$  dB, 30 Hz to 16 kHz; wow and flutter (WRMS) of 0.045 percent; S/N of 60 dB (Dolby off, ferrichrome tape). List price is \$850.

CIRCLE 13 ON READER SERVICE CARD

## REVERB-EQUALIZER

Intersound's model R100F is a reverb-equalizer that contains a frequency-compensated mechanical delay line, plus a four-band equalizer for  $\pm 20$  dB adjustments. Among its features are: a bisymmetric peak indicator in the reverb drive circuit that senses positive and negative peak levels; LED overload indicator; input level control; fader and 3-position switch (pre-EQ, OFF, post-EQ) for both dry and reverb signals. The separate faders control the relative mix, while the switches allow nine different signal routing options. In another version, the R100V, the center frequency of each EQ is continuously variable over three octaves. The R100F is priced at \$199; the R100V, at \$249.

CIRCLE 14 ON READER SERVICE CARD

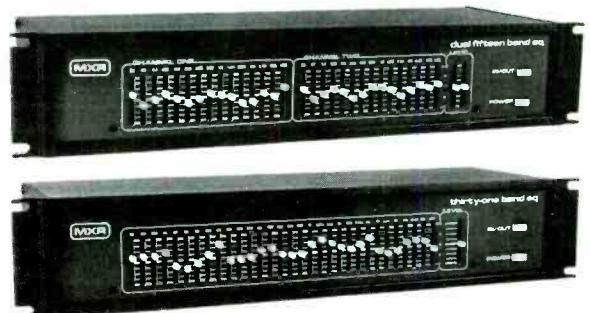
## NEW SCAMP AMPS

Spectro Acoustics of Richland, Washington has announced its 500 series power amplifiers, described as the second-generation series using the firm's SCAMP (self-contained amplifier) construction. This modular technique, used in all the firm's amplifiers, contains all of the electronic circuitry for a complete mono 250-watt amplifier from the balanced differential input stage through the multiple emitter, epitaxial silicon power output devices. The SCAMP's rugged construction utilizes a minimum of "distortion prone hard wiring" which is replaced wherever possible with military-grade printed circuit boards. Available in three models, the 50 series includes the 500R designed primarily for sound-reinforcement; the 500SR (Super Rack) designed for the pro user who requires gain control and output monitoring; and the 500 intended for the home hi-fi listener. Detailed specs are available from the manufacturer.

CIRCLE 15 ON READER SERVICE CARD

## MXR ADDS TWO UNITS

MXR has added two equalizers to its product line. One is the Model Dual 15-Band EQ; the other is the 31-Band EQ. Both units feature level controls, front-panel bypass and power switches, standard 19-inch rack-mount, 12-dB boost or cut on all controls; active balanced inputs. The "15" version is a two-channel device with 15 bands per channel. Frequency centers are alternate one-third octave (ISO). Lowest and highest center frequencies are 25 Hz and 16 kHz. The "31" version is a one-channel device with thirty-one ISO frequency centers, the lowest being 20 Hz and the highest, 20 kHz. Input and output connections on both units use phone plugs; in addition the "31" uses Cannon-type XLR. Prices are \$325 and \$350 respectively.



CIRCLE 16 ON READER SERVICE CARD

## YAMAHA SHOWS HIGH END CASSETTE DECK

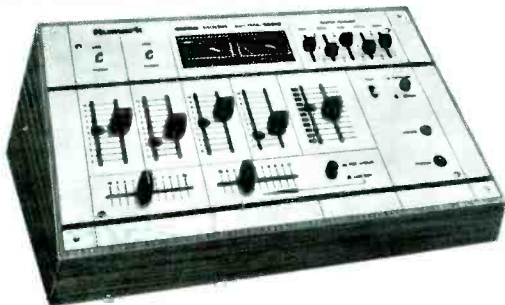
The Model TC-1000 is Yamaha's new top-of-the-line cassette recorder. It features "feather-touch" electronic mode buttons, peak-reading meters calibrated from -40 to +5 dB; Dolby noise reduction; a pitch control; a three-position tape selector (LH, chrome and ferrichrome) plus an associated front-panel bias fine adjustment. A phase-locked loop servo-control system in the transport is claimed to hold wow and flutter down to at least 0.05 percent (WRMS). The head uses sen alloy — the magnetic core is made of pure sendust, and the entire head assembly is treated with liquid sendust. R/P response, using CrO<sub>2</sub> tape, is listed as  $\pm 3$  dB, 30 Hz to 18 kHz. With LH tape, response is spec'd as  $\pm 3$  dB, 30 Hz to 16 kHz. Price is \$595.



CIRCLE 17 ON READER SERVICE CARD

## NUMARK STUDIO MASTER

From Numark comes word of its model DM 1500W "Studio Master" (Disco mixer and equalizer), said to be flexible enough to be used with almost any auxiliary input on a preamp, integrated unit or receiver. The unit has facilities for four stereo program inputs and two mic inputs. Its equalizer has five frequency ranges and an EQ defeat switch. Other features include two VU meters, memory indicators, cue-out and line-out monitoring and talk-over switch. Price is \$299.50.



CIRCLE 18 ON READER SERVICE CARD

## SPECIAL EFFECTS DEVICE

New from Eventide Clockworks is the model S1066 which is described as capable of producing "an amazing range of special effects" and which "is so revolutionary that no name has yet been found which will accurately describe its functions." The S1066 is essentially a 16-output delay line that uses a computer-programmed read-only memory (ROM) to select the time of each output as well as its amplitude and phase. From one input, the sixteen delays are spread to two outputs in a sequence determined by the ROM, enabling stereo effects to be achieved. Up to 32 different programs can be stored, accessible from front-panel switches or from an optional keyboard. The number of possible programs is claimed to be almost infinite, ranging from conventional delay effects such as doubling, discrete echo and slap echo to unique psychoacoustic time reversal (early delay taps having low amplitude and later ones, high amplitude, giving the illusion of transients occurring in reverse). Another possibility is imparting apparent motion to a signal source by combining time buildup in one channel with time decay in another. The reverb characteristics of a given size and shape of room also can be partially simulated. Added controls for even greater flexibility are a signal gate, feedback control, and a 2X switch. Of rack-mount size, the S1066 is suited for driving loads of 600 ohms or greater at +18 dBm.

CIRCLE 19 ON READER SERVICE CARD

## EXPANDER GATE

The Scamp F300, from Audio & Design Recording of England, is an expander gate for multi-track applications. According to the manufacturer, music can be expanded in dynamic range "in a very subtle manner or dramatically for effect" by means of either of two threshold ranges. The high threshold would be used for the latter effect as well as to restore over-compressed signals. A "key" input enables the F300 to be triggered from an external signal, and a range of attack and release parameters are available on the peak-sensing side-chain. The device is available as a single module or as a model F316-R (sixteen modules in a rack system), and as F308-RS (eight modules). Both of the latter systems come with a power supply unit.

CIRCLE 20 ON READER SERVICE CARD

## TWO SPECIALS FROM PIONEER



Pioneer's new model CT-F900 cassette recorder features an electronic microprocessor for record and playback level displays, an electronic digital tape counter and memory/repeat function and a three-head configuration with a tape/source monitor option. "Soft-touch" transport controls permit going from any mode to any other without going through the stop mode. While in the play mode, the machine can be put directly into the record mode by touching the record button. Digitron displays rather than conventional meters may be switched to read peak or average values, as well as to hold peak values. A front panel bias control is continuously adjustable. Another control permits the deck to automatically switch bias and EQ for chrome tape when chrome cassettes, with coded holes, are used. Dolby noise-reduction is built in. List price of the CT-F900 is \$475.



Also new from Pioneer is the model TVX-9500, an audio tuner for VHF and UHF television channels designed to take advantage of the recent network changeover to wide-range transmission lines that permit high-quality sound to accompany TV pix. Channel selection is via pushbuttons, each with an LED. The UHF button is used in conjunction with a fine-tuning knob. Price is \$250.

CIRCLE 21 ON READER SERVICE CARD

## KEEPING UP . . .

An assortment of newsy items this month for the audio-minded:

The latest phono cartridge to come my way is a new Japanese import called Accutex. It employs a tri-pole induced magnet design. Two armature poles pick up the stereo signal; the third pole fixes the cantilever so that stylus vibration is improved. The model I've tried — M320III-STR — puts out some very fine wide-range sound with ample stereo channel separation.

CIRCLE 22 ON READER SERVICE CARD

TDK is offering two audio goodies. One is a 48-page handbook called "The TDK Guide to Cassettes and Recording." It's priced at \$2.95, or included in the firm's second offering known as "The TDK Cassette Deck Survival Kit." The kit, at \$33.50, includes the book plus two normal bias TDK AD C-90 cassettes; a model HK-5 compact head-cleaning set; a model HC-1 head cleaner cassette; two stackable cassette storage modules (each holds up to eight cassettes); and literature on TDK's products.

CIRCLE 23 ON READER SERVICE CARD

Heathkit's newest catalog is out, and is yours for the asking (no. 820). Write to Heath Co., Dept. 350-590, Benton Harbor, Mich. 49022.

CIRCLE 24 ON READER SERVICE CARD

Among the items in Nakamichi's expanding product line are several microphones of various types, plus accessories. All are described in a handsome brochure available from the manufacturer.

CIRCLE 25 ON READER SERVICE CARD

Memorex is offering its new MRX-3 tape. An oxide formulation, it takes ferric bias and 120-msec EQ. However, wider dynamic range is claimed over previous ferric tapes. My own use tests seem to confirm this, along with a nice smooth top-end response.

CIRCLE 26 ON READER SERVICE CARD



# MUSICAL

# NEWSIGALS

## MUSICAL INSTRUMENT AMPLIFIERS

Cerwin-Vega has introduced a new, high-power bass amplifier, the model BG-250. As the model number implies, the new amp is rated at 250 watts continuous RMS into a 4-ohm load. The BG-250 has two input channels, one high sensitivity and the other low sensitivity, and each channel has both normal and attenuated input jacks for precise matching or amplifier sensitivi-



ty to instrument output level. Each channel has three tone controls, a bass control with  $\pm 15$  dB range, midrange with a +7, -10 dB range and a treble control with +15, -25 dB range, plus there is a six-frequency, octave-band graphic equalizer in the power amp section which provides  $\pm 12$  dB of equalization at nominal center frequencies of 75, 150, 300, 600, 1200 and 2400 Hz.

CIRCLE 1 ON READER SERVICE CARD

Sunn Musical Equipment Co. recently introduced a new line of guitar and bass amplifiers called the Beta Series. Beta Series amps are self-contained models with 100 watt RMS, solid-state power amps. The preamp sections in-

clude two separate channels each with Drive, Bass Mid, Treble and Level controls plus a single master volume control. Three input jacks are provided, one for each channel plus one jack which feeds both channels simultaneously. The two lead guitar versions also have reverb units with reverb level controls for each input channel. Available models include lead models 212 and 410 featuring 2 x 12" and 4 x 10" speaker configurations respectively and bass model 115 with a single

15" speaker. The identical cabinets are available minus the preamp sections but including the 100 watt power amp as Beta Power+ models at significantly lower prices.

CIRCLE 2 ON READER SERVICE CARD

Acoustic Control Corp. has updated their product line with several new amplifiers and speaker cabinets. The Model 114 is a compact guitar amp with a very non-compact sound. The 114 delivers 50 watts RMS into its two 10-inch speakers in their open-back enclosure. Electronically, the 114 has dual inputs, bright switch, bass, midrange and treble controls, foot-switchable master volume and reverb and a preamp out/power amp in patch point. The Model 320 is a sophisticated, new,

high-power bass amp which will deliver 300 watts RMS into a 2-ohm load such as the new Model 408 speaker cabinet. The preamp section of the 320 has two channels which may be used together, separately or as an A/B preset. Each channel has bass, mid, treble and bright controls, plus there is a five-band graphic equalizer which may be switched to either of the input channels and which may be bypassed with a footswitch. Three sets of preamp out/power amp in jacks are provided for insertion of signal processors on either input channel or the combined signal. Additional features include an input pad and a footswitchable power boost circuit, and indicator lights for instant readout of which functions of this versatile unit are being used at any given instant. The Model 408 speaker cabinet is an ideal mate to the Model 320 amp. The 2-ohm cabinet is rated at 300 watts RMS and contains four 15-inch speakers. Two of the four are front mounted to produce the popular crisp bass sound while the other two are internally loaded to produce solid bass fundamentals.

CIRCLE 3 ON READER SERVICE CARD

## MUSICAL INSTRUMENTS

A new, hand-built dreadnaught acoustic guitar and a new line of moderately-priced electric guitars are among the recent additions to the product line offered by Ibanez. The TG-80 dreadnaught is an entirely hand-built instrument which uses only natural materials throughout with the single exception of the pickguard. Even the decorative binding and sound hole purring are made of layered, dyed hardwoods, and the bridge pins are turned ebony with abalone decorative dots. The body is all solid wood, featuring aged, German spruce top, mahogany rims and back and hand-shaped spruce



braces. The neck is also mahogany with an adjustable truss rod and ebony fingerboard, and joins the body at the 14th fret. The Performer Series of electric guitars comprises five basic models which share a common body shape but differ in details of pickups and features. Each of the Performer Series models features a "1½" cut-away design which combines appearance of a single cutaway with most of the playing comfort of a double cutaway design. All five models come in a wide range of natural and painted finishes from white to black, and including Ibanez' striking Zebra Ash finish. Two other features common to all the Performer Series models are a new, fully-adjustable Gibraltar® bridge and Quik-Change® tailpiece.

CIRCLE 4 ON READER SERVICE CARD

## SOUND REINFORCEMENT

SFW Audio offers a line of fiberglass treble horns. Models are available for 1-inch and 2-inch entries in 60° and 90° radial designs plus a 140°x45° straight exponential horn for 2-inch drivers. An unusual feature of the SFW horns is the construction, which is fiberglass over a one-half inch balsa wood core to reduce resonances and coloration without appreciably increasing the weight of the horn. Also available from SFW are several models of bass cabinets and two-way systems built of solid plywood with fiberglass lamination on the external surfaces and heavy-duty hardware.

CIRCLE 5 ON READER SERVICE CARD

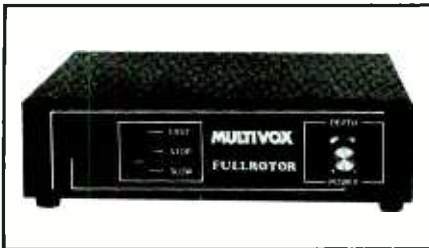
From Audioarts Engineering comes the Model 2100A, a tuneable, two-channel electronic crossover. Crossover frequency is continuously variable from 70 Hz to 8 kHz via a single knob. Separate output level controls for the high and low frequency outputs are provided and there is a unique crossover depth control which allows compensation for non-ideal driver roll-off characteristics in the crossover region. Crossover cutoff is at 12 dB per octave.

CIRCLE 6 ON READER SERVICE CARD



## MUSICAL INSTRUMENT ACCESSORIES

From Multivox/Sorkin Music Company comes news of the Multivox MX-2 "Fullrotor" effect unit. The MX-2 is an electronic device which simulates the sound of a rotating speaker system or produces a variety



of tremolo effects with any amplified instrument. All speed changes in effect rate occur gradually to simulate an accelerating or decelerating speaker. An effect depth control is included for a wider range of effects, and the unit has a jack for a remote on/off switch.

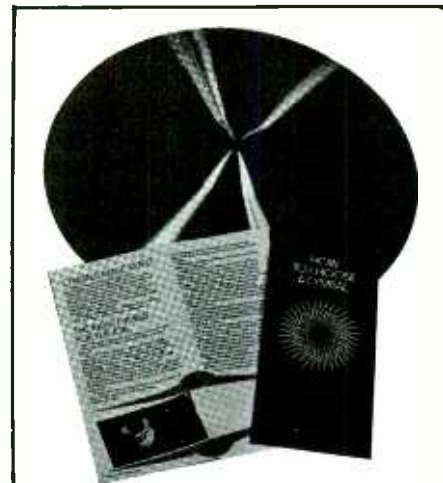
CIRCLE 7 ON READER SERVICE CARD

Rowe-DeArmond, Inc. recently announced a new optoelectric volume pedal, Model 1630. This model is AC powered and uses a light source and photoelectric cell to yield a smooth, noiseless operation and complete



freedom from potentiometer wear. The model 1630 is housed in a cast aluminum pedal with a black and chrome finish, and the pedal action has been designed to withstand something like one million top-to-bottom cycles.

CIRCLE 8 ON READER SERVICE CARD



For the drummers among us, Camber Cymbals offers a free, informative booklet entitled "How to Choose a Cymbal." Besides containing useful general information, the pamphlet also furnishes basic information on Camber's own extensive line of cymbals.

CIRCLE 9 ON READER SERVICE CARD

Transposing music from one key to another is not a pleasant task for most musicians, so the introduction of the Pocket Transposer by Allegro Aids should come as welcome news. The Pocket Transposer is a pocket-sized vinyl slide-rule device that takes most of the tedium out of transposing by showing at a glance the correct notes in the new key. The device is easy to use and carries a very modest \$2.98 retail price.

CIRCLE 27 ON READER SERVICE CARD

## MONITOR SPEAKERS

For even more precise monitor speaker placement, Galaxy Audio offers the Hot Spot, a super-compact (7"x11"x6") speaker system which can be placed almost anywhere to provide pinpointed areas of high-volume sound. The Hot Spot enclosure is made of ABS plastic for extraordinary strength and contains two 5-inch full-range loudspeakers. System impedance is 16 ohms and power-handling is rated at 100 watts RMS. At that power level, the Hot Spot produces 115 dB of sound at a distance of 1 meter which is enough for almost any application. Frequency response is given as 100 Hz to 15 kHz, ±6 dB. System weight is only 8 pounds, making microphone stand mounting a practical alternative.

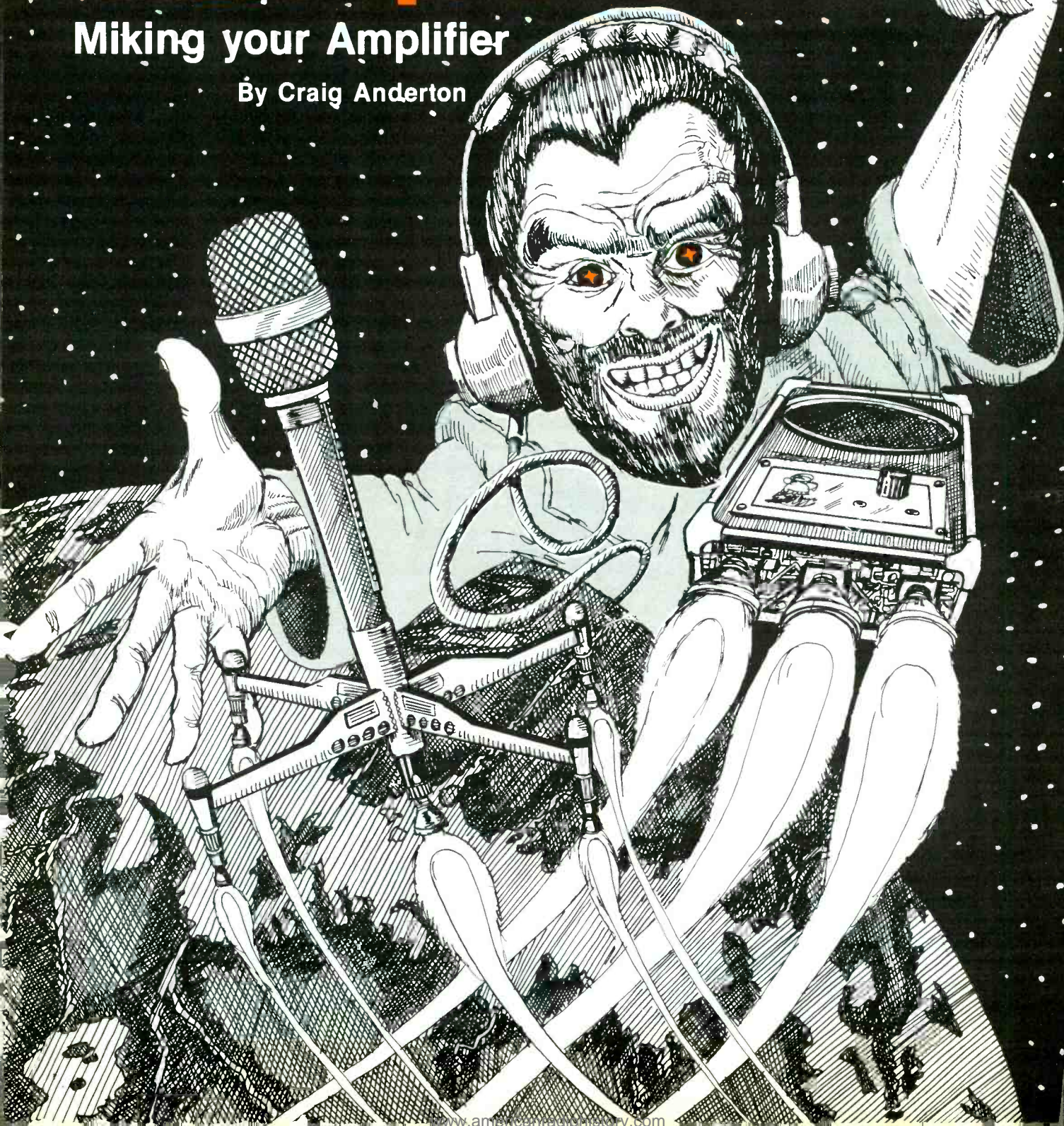
CIRCLE 28 ON READER SERVICE CARD

# SPECIAL EFFECTS

(without special effects)

## Miking your Amplifier

By Craig Anderton



More and more guitarists are discovering the advantages of using low power, portable practice amps in studio sessions instead of the large, high-wattage amps designed for "live" performance. Some of these advantages include:

- Less volume required for "dirty," overdriven sound, minimizing leakage problems.

- Less critical baffling requirements.

- Ease of transportation (the musician can easily carry around a familiar amp from session to session).

- Predictable long-term sound characteristics due to solid-state design.

- Simplicity of repair and maintenance.

- Generally low cost.

- Low noise compared to high-power amps; may be battery powered for an absolute minimum of hum.

Also, another benefit of the practice amp is that it is small enough—and flexible enough—to be miked in ways not possible with ordinary-sized amps. This article is a collection of the most useful miking techniques I've found so far; in all the following examples, I used an Electro-Voice RE-16 cardioid dynamic mic mounted on a gooseneck stand, and the PAIA "Pygmy" amp (although any Pignose, Dwarf or what have you will probably work equally well). Headphones also come in very handy for monitoring the results of your experiments.

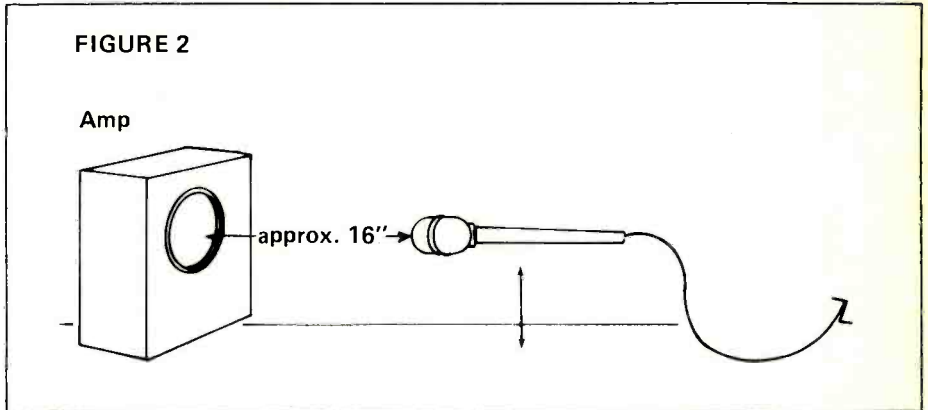
**Boosting/cutting bass** (figure 1). By pushing the mic as close as possible to the speaker, the proximity effect comes into play and gives a bassy, full sound, even to small practice amps. For reduced bass response, slowly back the mic away until you achieve the correct tonal balance. Aiming the

microphone off to one side or across the speaker can give additional changes in the basic sound.

**Phase change equalization** (figure 2). Introducing subtle reflection paths between the speaker and microphone can produce equally subtle tonal changes in your instrument. One way to create these changes is by placing the practice amp on the floor and the

notice some definite changes as you get closer to the floor.

There are a couple of wall games you can play for more phase-shift-type tonal changes. In figure 4, a mic hangs about 3 to 5 inches away from a wall and points down. Changing the distance between the amp and the wall—or between the mic and the wall—will alter the sound. Figure 5 shows



microphone horizontally above the floor, at the same level as the amp's speaker and pointing directly at the speaker. Slowly lower the microphone to the floor and notice the various tonal changes that occur . . . if you find a sound you like, stop right there. Note also that you will have different effects on carpeted and non-carpeted floors.

If you want a more dramatic effect, try the miking technique in figure 3. For this, the amp is again on the floor; but this time the mic hangs about 8 inches off the floor and points down at the floor, anywhere from about 3 to 16 inches away from the amp. Slowly move the mic up and down; you'll

another wall trick. In this one, you point both the mic and the amp at a wall. Varying the distance of either the mic or the amp (or both) from the wall produces quite a number of phase changes in the guitar sound. (I guess you could call this an off-the-wall guitar sound!)

An excellent application for these phase-change equalized sounds is in overdubbing and/or doubling of guitar parts. By introducing subtle tonal differences between the two guitars, you end up with a fuller, more diffuse sound. Some of these principles also work well on cymbal overdubs.

**Open back/closed back miking.**

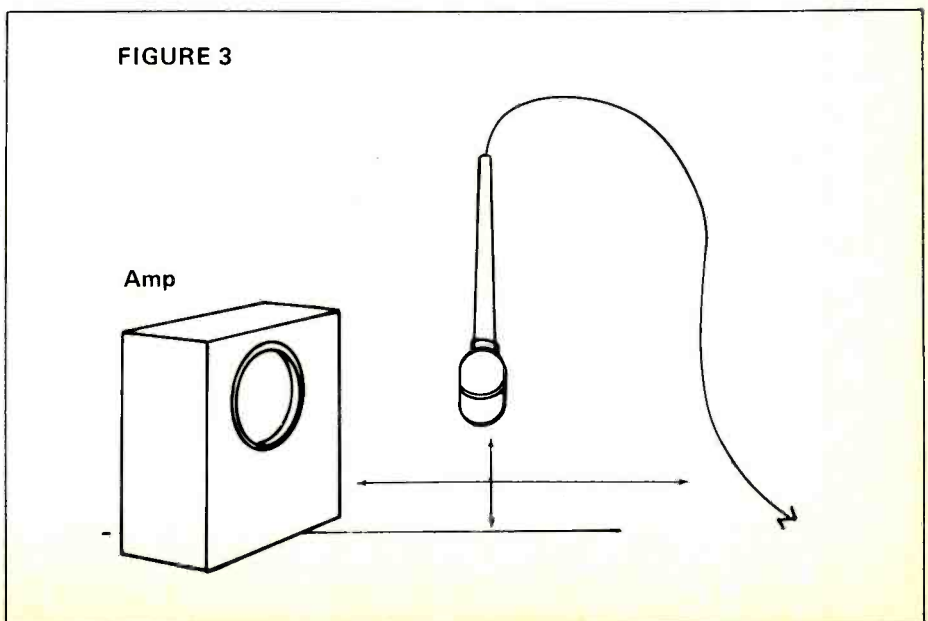
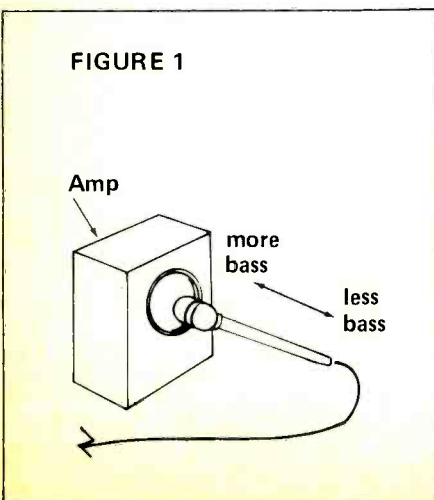
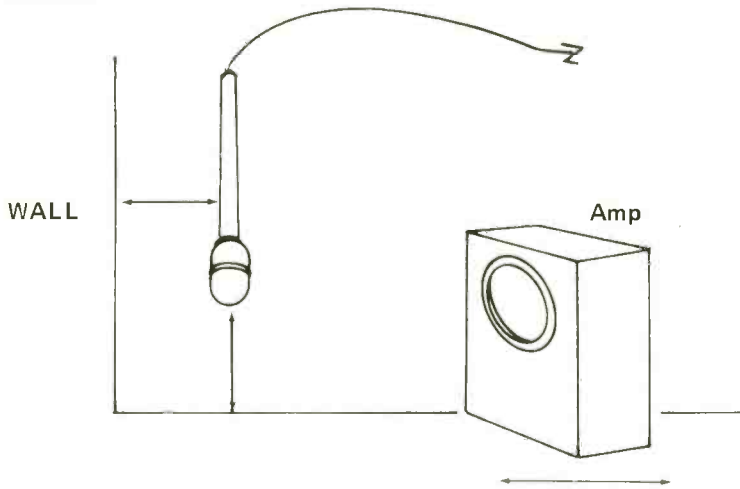


FIGURE 4



Some practice amps may be opened in such a way that you can change the speaker baffle from a (nominally) closed-back type to an open-back type. This opens up a few possibilities for different mikings; however, there is a less obvious application (see figure 6) that gives an excellent rock rhythm guitar sound. Point the mic towards the side opening; then *slowly* open the

two halves (the optimum point is pretty critical . . . a one-half inch opening sounded good in my case). The resulting effect is a low mid-range boost combined with a treble cut.

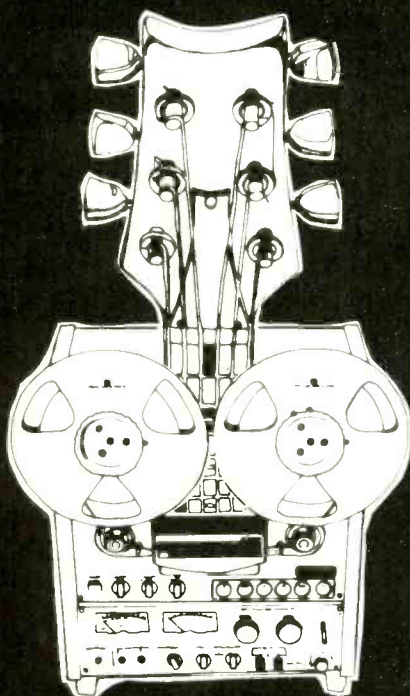
**High-end modification.** The next trick involves using a copy of this magazine. Put the magazine between the microphone and amplifier (see figure 7). Varying the number of pages

gives different sounds, most of which feature a reduced, "mellower" high end.

**Creating an acoustical environment for the amplifier.** The final miking technique involves another prop, this time a cardboard box. Find a box that's about two feet on a side (although the exact size is not even remotely critical; I just want to give you an order of magnitude in terms of dimensions). For an initial experiment, place the amp on its side (or with the speaker facing up) on the floor. Then place the microphone in the vicinity of the amp, but *not* pointing directly at the speaker. Now, place the cardboard box on top of both so that it covers the amp and the mic. The results are pretty interesting; changing the angle of the mic, cutting out parts of the box or punching holes in the box all create variations in the basic sound. You can discover some amazing guitar sounds this way, and if nothing else, trying all the possibilities can keep you occupied for many hours.

There are a few other points worth mentioning. First, all these techniques are very inexpensive and require no electronic equipment other than the

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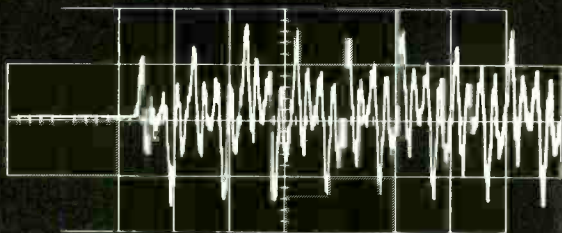
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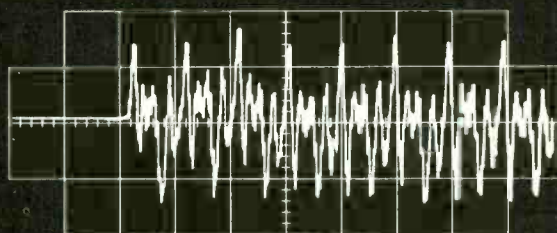
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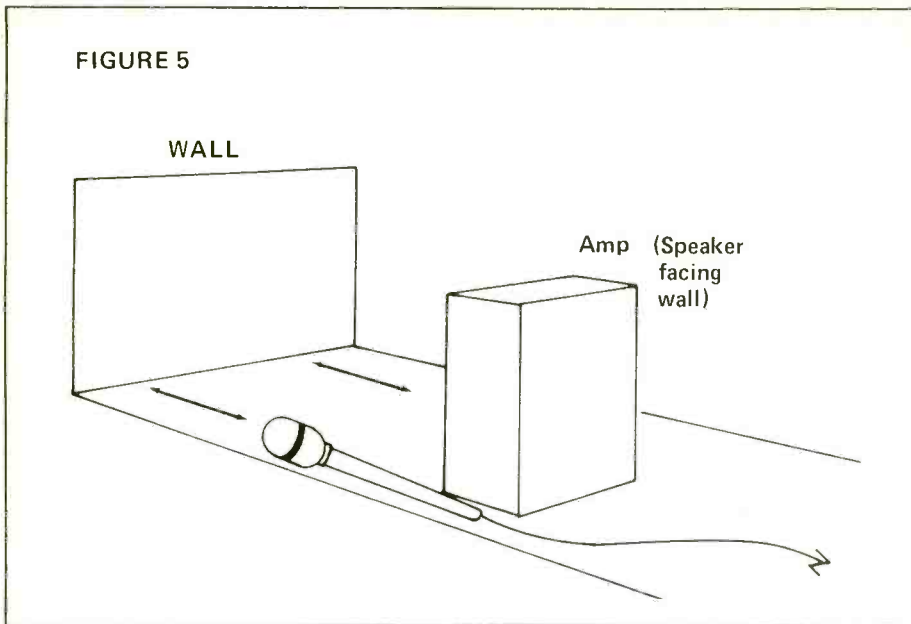
SB-7000A

SB-5000A

CIRCLE 77 ON READER SERVICE CARD

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FIGURE 5



mic and practice amp. Second, because these effects are generated acoustically rather than electronically, there is a marked difference in the sound of "acoustic equalization" compared to "electronic equalization." Although many of the described effects could be simulated with electronic equalization or delay lines, the complex and unpredictable nature of sound moving

through the air and hitting various surfaces creates a novel type of tonal effect.

Also, don't forget that you can use two practice amps with different mics on different amps; and there are other variations . . . but you get the idea. I hope you enjoy experimenting with these techniques.



FIGURE 6

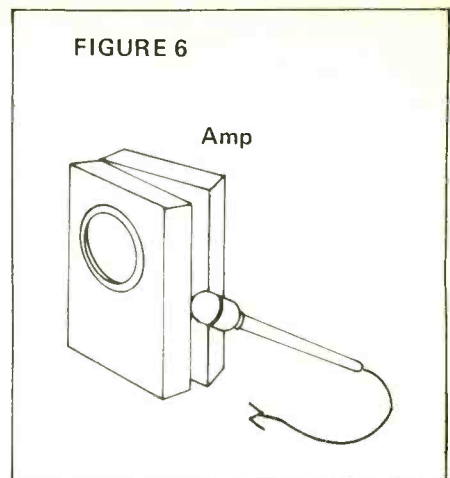
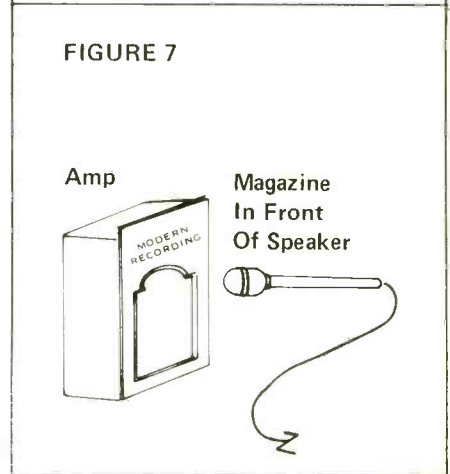




FIGURE 7






**AUDIOARTS ENGINEERING** Model 4200 Parametric Equalizer - Preamplifier




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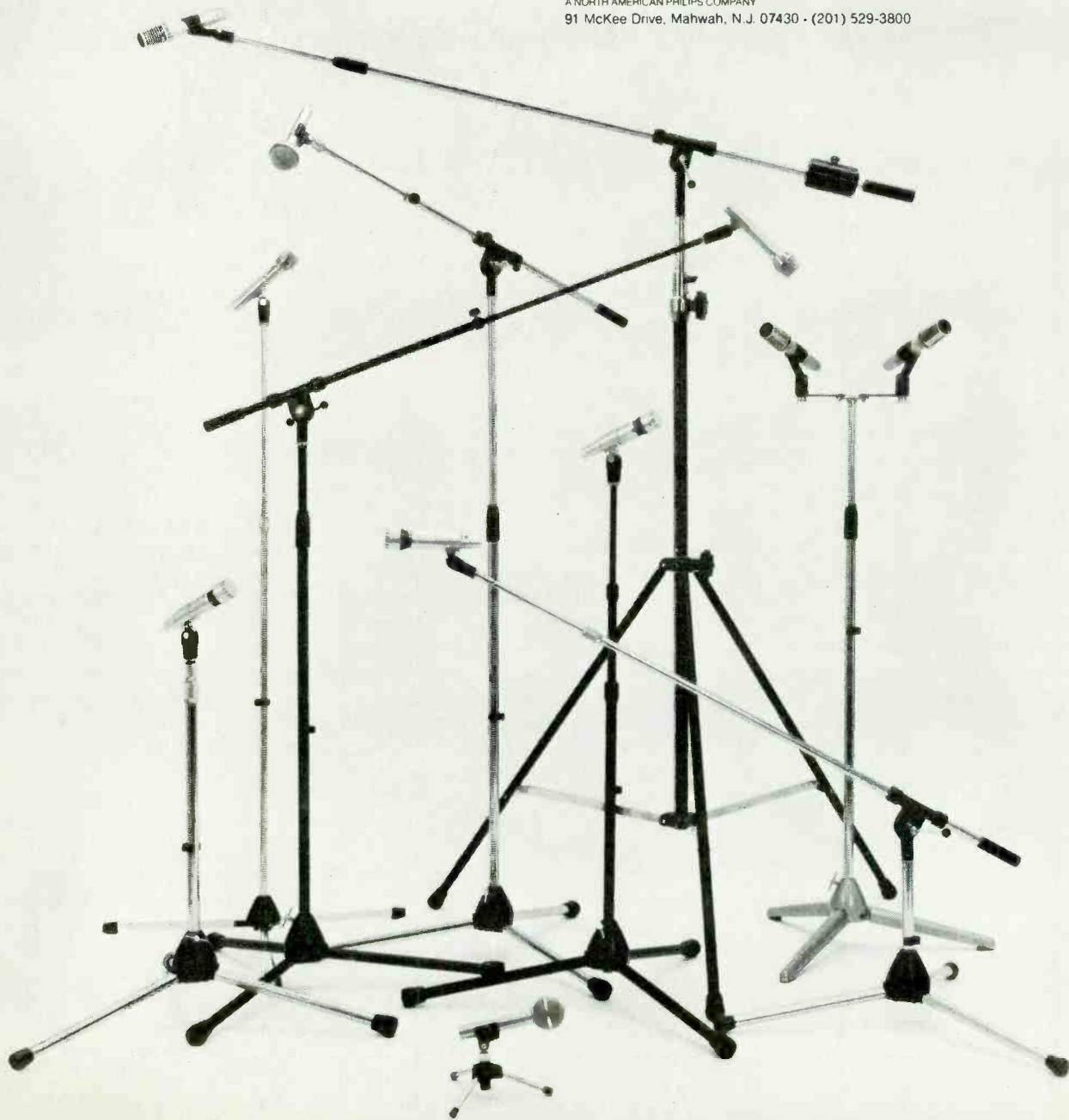


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# The Making of a Record -part III

By David Moyssiadis







*Well gang, you've arranged, rehearsed, secured copyrights, hired musicians, rented a studio, been pleasant to your engineer, produced (being careful not to over-produce), and, finally, created a master tape. Now what? As you'll see, all that past work may have just been the beginning on the way to the making of a record. . . .*

### After the Studio

If you thought you had problems before, believe me, that was heaven. Now you have to deal with the nitty-gritty and tangle more often than not with many low-lives. You have to wheel and deal in some pretty nasty circles. It's like getting into a knife fight in the ghetto. From here on you don't know which end is up; you still have to claw your way up while some of the people who know where it's at won't tell you. In the studio you at least had your ears with you and knew what went wrong when it went wrong. Now you must depend entirely on other ears to tell you what's wrong . . . if anything. And *anything* goes.

At this point you and your master tape can go in either of two directions. You can: 1) try to sell the record to a company; or 2) continue on independently. If you take the former route it will be just like trying to sell anything else in an overly-competitive marketplace. Be prepared to knock on hundreds of doors. Behind each door will be an android programmed to listen to the first bar of your record, lift the tone arm up, and say, "Boy this is a great record . . . *but* . . . at this time we can't add anymore artists to our repertoire." BULL!!! What he's saying is that he thinks it stinks. No one in the world would turn down a record if he thought it would sell even 100,000 copies.

The thing to remember is that these guys are no more qualified to pick a hit record than the "average" guy. So don't let him discourage you. It simply may not appeal to his personal taste. You may well have a platinum record in your hands. The day a record person says anything bad about a record to its producer will be the day Lucifer turns on the air conditioner. You will note that there almost always is a total lack of *constructive* criticism; this actually could be a tip off that your record is worth pushing for, because as soon as you run across someone who thinks it has got a good

chance he'll grab it. But here you must draw a distinction.

There are those who will string you along and do nothing. Then there are others who will be honest and tell you they think it's got a chance and be willing to make a deal. The distinction is simple—money talks. If the android says, "Yeah, great! We want it; sign here," be careful. He better have some bucks to back up his contract. If there is no front money or token payment, forget it. It's probably a rip-off. If you are dealing with an "honest" android be sure to bring your lawyer. I have seen contracts you wouldn't believe. The kind with which you literally sign your musical life away. (The sad part is that I have also seen some poor dopes actually sign them.) I've seen contracts that were so artistically binding and yet so liberal with the company that they [the contracts] were actually legally invalid.

When a contract is drawn up it can say *anything*. Don't fall for the "Oh, it's a standard artist's contract" line. It's only standard with that company. And any contract can be negotiated, *before* you sign. Take your time. If they're in no hurry before the contract they won't be after it. If they're anxious to sign—for the right reasons—they'll compromise with you. So just be hip to the different ploys and you should be fine. Remember the basic

law—if they really think you have something and they really want it they will *pay* for it. You don't need anyone who expects you to *give* them your record.

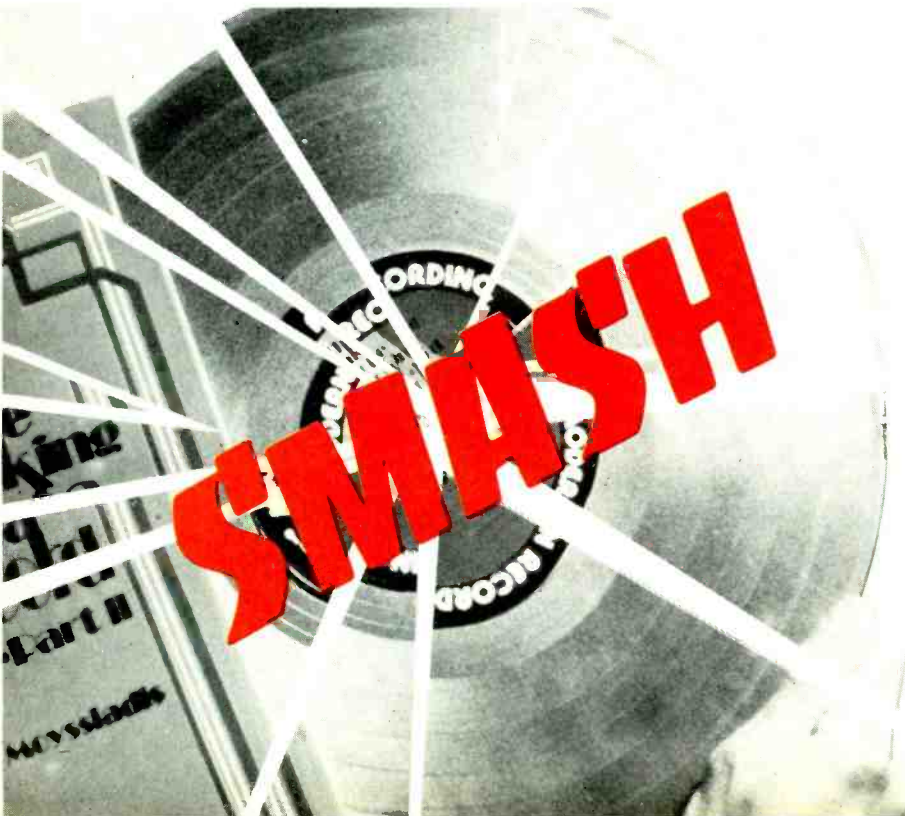
Now you can make any kind of deal from an outright sale of rights, artist and mechanicals, lock, stock and barrel, to retaining most of your rights to the song while they do all the work, or anything between. Actually the only reason you need a record company (other than your own record company) is for the promotional power that they have. You can do everything else yourself. But it's the promotion that sells the record; without sales you could have ten million copies ready to go that are worthless.

Should you go for a big company or a small one? The answer depends on the deal you make. A big company doesn't need any one artist so it can be independent and say take it or leave it as far as the terms of the contract go. A small company may be more willing to give you a better deal or a bigger slice of the pie. It might be hungrier. But why choose a small company, with its obviously limited promotional power, over a large company? Well, it may be the case of being a whale in a puddle or a shrimp in an ocean—i.e., the big company may have taken on so many new artists that they can't effectively promote each one, while the small com-

pany may well put its entire (however limited) promotional abilities behind your product. The small company's efforts may result in greater sales than the big guys' efforts. So that choice—if you have it—is yours.

So much for selling your record. Now if you want to do the whole number yourself, you've got your time pretty well tied up for the next few months. If you are going to get into pressing records it's a good idea to have your album jacket ready. If you think record manufacturing is an expensive hassle, you ain't seen nuthin' yet. First of all the jacket will cost at least twice as much as the record inside it (talk about wasteful packaging!). And it can cost as much as four or five times as much as the product it is designed to sell, and that is just for the printing. Initially you have to have a cover design. Then you need an artist or photographer or both and possibly models and a set. A photographer can cost you at least a grand for the cover shot. It might be less expensive to have an artist draw a picture than to have a photographer photograph one. Once you find an artist to design the cover and a photographer to shoot it you will need a printer to print it. The cheapest custom black and white cover of any quality may run from as little as \$1.15 per jacket up to \$4 or more for four color fold-out jackets. Then you have to go through the whole thing again for the labels. The easy way is to use stock jackets and labels, but that is not very impressive looking, and, after all, the jacket does sell the album in the store. There are a lot of surprises in the label and jacket artwork. For example, the design that looks good for an LP label may be horrendous looking on a 45 label. (The 45 label not only has a much larger hole but also is smaller in diameter than the LP label.) The printer has to use the right kind of paper and ink capable of withstanding the heat and pressure of being embedded in the record. As fate would have it the types of ink needed may not be compatible with the effect you want on the label. One can see where the packaging of one's product can rival the entire production of the record alone in the ulcer factor. To get into it very deeply doubtless would require another three-part series, but be prepared for this sort of aggravation from that completely unexpected direction.

Next you will have to get your master tape turned into records so



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

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Our "Tri-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).

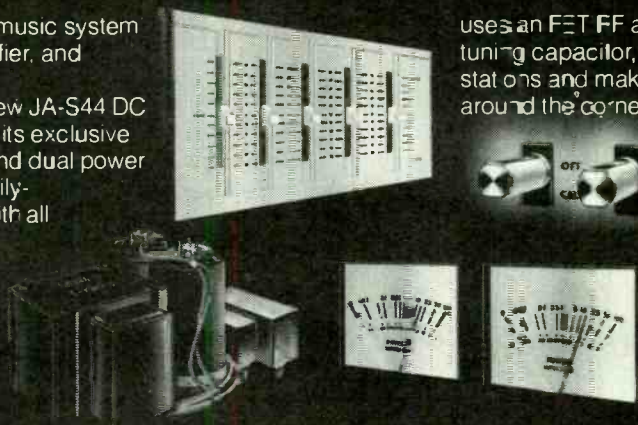
The new JVC JT-V22 AM/FM stereo tuner is a standout in its class. With an FM front end that

uses an FET FF 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.

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that you have a nice product to sell. This part starts at your friendly neighborhood disc-mastering house. The best way to find it is to get a reference from the studio that recorded your stuff. (At this point you have to have a pressing plant and a plating plant picked out. If you don't know of any good ones—good ones are hard to find—ask the mastering people for a recommendation.) Get the idea across that you want *good, quiet, flat, on-center* pressings, or you'll surely be back to darken their doorstep with much loud squawking. *Please note:* You have to be willing to pay a bit more at the better places. If you go looking for "a good price" you'll get the cheapest plastic going—laced with kitty litter. (As far as what can happen at these above-mentioned three places refer to *MR* issues August '77, September '77 and December '77.)

To make a long story shorter let's assume you have contracted reputable people in those respective stages of disc manufacturing and will come out with problem-free pressings. As this phase is being completed you should be lining up a distributor. This is like getting behind the eight ball on a crooked pool table, because you must give your copywritten product to someone who *may* not be trustworthy. Here you must trust that the distributor will not pirate your recording or somehow manipulate his books to

show that fewer records were sold and/or more records were returned than actually were. You have no way of knowing for sure unless you spot a pirated record or somehow catch the distributor in the act. Both of which are extremely difficult things to do.

From this point on you are subject to pirating, bootlegging and counterfeiting. All three amount to the same thing—some of your profits go into someone else's pocket, but for the record here is a definition of each of these terms:

**Pirating**—Simply taking more of the product than is authorized by the rightful owner. Such as if the distributor were to make a deal with the pressing plant to have more records pressed than were ordered by you or than were represented to you and then selling them on the side without your knowledge and, of course, without paying you for the extras.

**Bootlegging**—This is when someone makes an unauthorized copy of your song as you perform it. This can be done in many ways. They could get a tape copy of your master tape; they could walk into a concert and record the concert on a hidden tape recorder such as a cassette concealed in a purse as is commonly done (and is the reason most bootlegs are so crappy sounding); or they could even record it from the radio.

**Counterfeiting**—This involves buy-

ing the record and making a copy of the recording and having it re-mastered and pressed. The label artwork and album jacket are also copied. If the job is well done even you can have difficulty in spotting a counterfeit. It is the same as counterfeiting money. It often would take an expert to distinguish a good counterfeit from the real thing. This is the most expensive kind of rip-off, but the extra expense buys the cover of apparent legitimacy.

The bootleg is the next most expensive but is easily spotted. Finding where it came from is the hard part. The pirated record is the least expensive way to steal but leaves one with little cover if caught. All three are larcenous procedures, and you are totally unaware of being ripped-off unless you luck out. Obviously if you don't know a crime has been committed you can't look for the crook. As mentioned earlier even the giant record companies get ripped-off in this manner and they are all but helpless in stopping it. So your chances are poor at best. But just let's hope that your record is good enough to be worth being snatched.

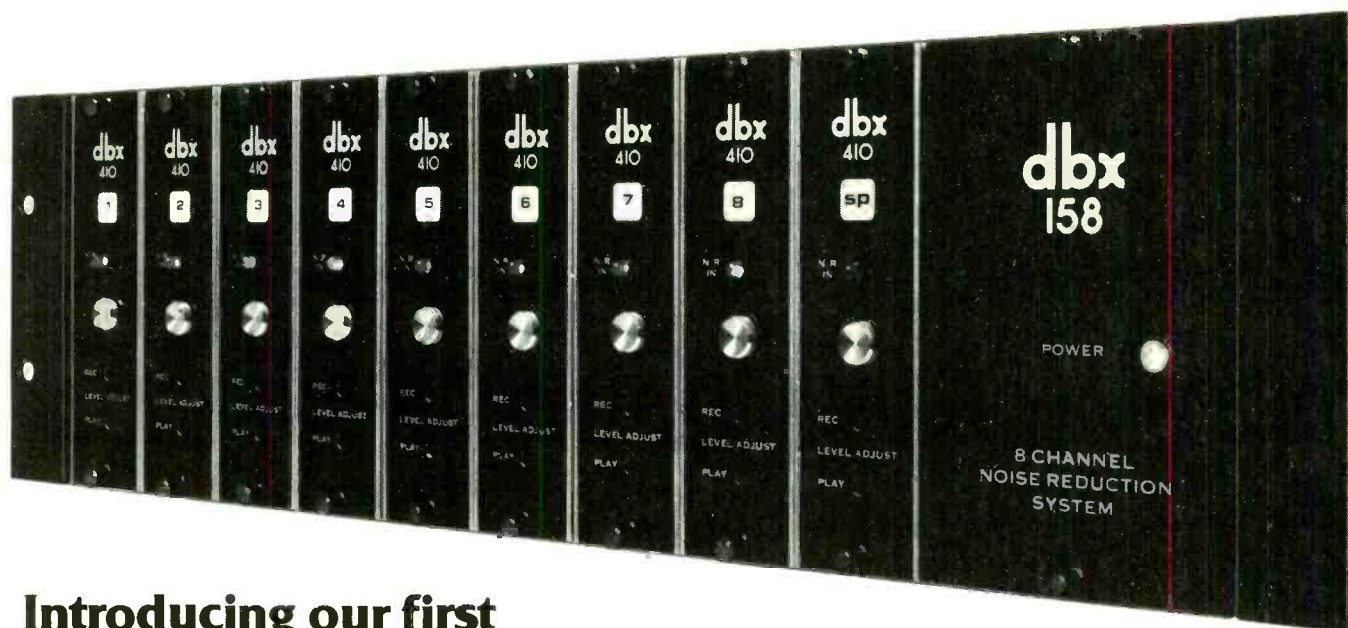
There is another oddball kind of rip-off that an artist or producer should be aware of and that is the record company pirating its own records (which might be your record). Now why would a company steal its own records? Well first it is very difficult to find a non-existent crook. Second, there is pure profit to be gained—no production costs, and the artist, writer and producer (unless they are in on the deal) don't have to be paid. Lastly, the biggest expense of all is eliminated—taxes. So all the sales receipts from the pirates go directly into the executive pocket. Neat, sweet, complete.

After you go through the distribution jungle you will be faced with the problem of promotion. All this means is getting your record on the air and getting the band booked up in clubs. Getting airplay for your record is simply salesmanship and luck and possibly the right connections. The last of which is the most important. "Salesmanship" can take many forms, from appearing at the station's door with a silly grin on your face to buying the jockey's wife a \$5,000 mink coat. It's all been done before but I wouldn't suggest the payola route. No one would take a chance on you.

Promotion is the toughest nut to crack, *and* the most expensive. There



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are thousands of other guys out there just like you, many with records much better than yours trying to make it just like you, and the jocks—many of whom are prima donnas to begin with—are constantly being hounded by the likes of you every day. So don't expect anyone to fall all over you. There are about three or four thousand recording studios in the country and if each of them cut only one record a week think of how many competitors you would have over the next couple of months. Many studios actually cut two or three records a day. Yet the national charts only handle 100 records each week and most of them last several weeks so you can figure your odds that way. You actually would be better off taking your entire recording budget and blowing it in Las Vegas, even there you have better odds.

It is not really necessary to make the charts. If you only sold something like fifty thousand copies you could make enough to try again. It is not how high up the charts you go but how long you stay in the game. A producer once said in passing, "I'd rather have my record stay at #100 on the charts for six months than to have it hit #1 for two weeks." Well, so much for your chances. You can wind up in any situation—from losing your last guitar


string to being an instant millionaire. Some people think it's worth taking the gamble.

The road is tough and it is an uphill push all the way. When you get about halfway to the top your struggle switches from intelligent maneuvers (picking the right song to cut and cutting it properly) to wheeling, dealing and pure luck (about 90% of the last ingredient). It is unfortunate that you have to deal with and depend on other people for the rest of the trip. Like the old saying, "If you want something done right . . ." You can of course do the promotion and distributing yourself if you don't mind staying on a small scale such as your home town, or, if you're really lucky, regionally, but if you want to have any small chance of hitting it big you've got to rely on the biggies, and once you do that you lose control. Even if the world were not a jungle you still would be helpless to push your record through to its end. Whether that end is your demise or a pot of gold can never be entirely up to you. This is evidenced by the fact that so much garbage turns to gold and so much (more) really good stuff goes down the tubes. You can do all the right things and still be beaten out by a klutz with the right industry connections.

In the end there is one final judge. After all the fencing with distributors, promoters, record companies, manufacturers, publicity people and such you still have to get by the final judge. The public. For it is the public who really decides which records make it and which ones don't. It is their dollars that go into your pocket . . . if *they* choose. So, you can have all the promotion going for you; you can have every jockey on the air in your pocket. But if the masses don't go for it, you lose. And likewise, if your record is one the public would want and they never get to hear it, obviously they won't/can't buy it.

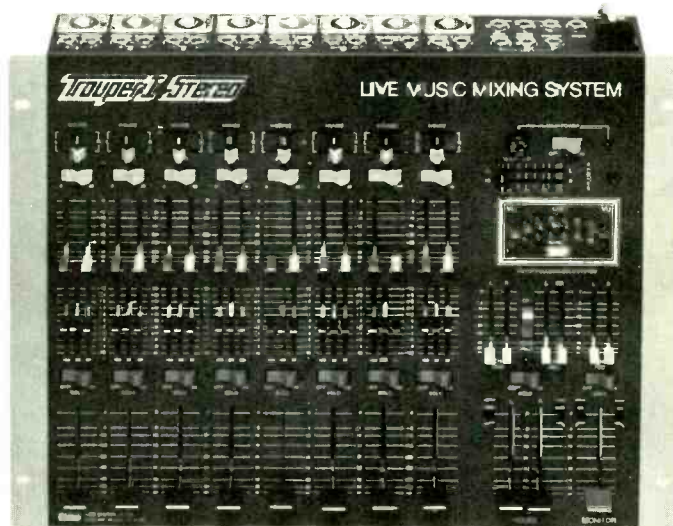
Remember when I said earlier that the android in the record company is no more qualified to pick a hit than the guy in the street? Well, it really is the guy in the street who makes the choice. But it is the android who has to guess what the public will want next. It doesn't seem possible to do that—predict the future, that is. Yet that is the only way record companies can function with any semblance of organization. They are forced to put their trust in an A&R man. It also lets them off the hook if he makes the wrong guess. That's why most A&R men only last a couple of years at any one place. That whole end of the business, when you get out of the technical area of the recording studio, is most unpleasant, but no more so than any area where the stakes are high and millions are to be made. But if that's the game you want to play you have to play on that game board.

So that is the story of making records. It is exhilarating, frightening, dirty, exciting, dangerous, enjoyable, frustrating, rewarding, confusing, educational, lucrative and disillusioning. It is all those things.

If you still want to play the game, a word of advice if you will permit. Don't ever convince yourself that you have a hit record, or you will be sorely disappointed. Believe in your record but never expect it to make it. Once you cloud your vision with the idea that you have a monster you will forget that your "monster" is, by itself, helpless. *You* must be the "monster" that propels the record. The record will never go anywhere by itself, and one bad move by you can reduce your records' chances to zilch. Of course there is no assurance that all the right moves will get results either. Be realistic or pessimistic, not optimistic or idealistic. But by all means try. 



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# Hot Air Miking Test



Photo by Doug Hanewinkel



# August Techniques

*In response to the many readers who have written and asked us to give them more exacting guidelines for miking techniques, we present this, the first of several articles concerning themselves with different miking approaches.*

*Modern Recording feels fortunate to have recording engineer Bruce Swedien involved in the writing of the series, which will cover the various aspects of miking from the not-so-basic rhythm section through to the final "sweetening" processes of horns and strings. Mr. Swedien, who began recording at the age of fifteen, has a list of credits which quite simply are much, much too long to include here; a partial listing includes: Quincy Jones (for over twenty years, and still ongoing); Eddie Harris; Natalie Cole; Buddy Miles; Oscar Peterson; Duke Ellington; The Four Seasons; Muddy Waters; and Curtis Mayfield. Also included is a list of commercials for what seems to be most of the major manufacturers (of just about anything) here and abroad.*

*Bruce Swedien has recently finished work on the latest Brothers Johnson album and is presently involved with the new Quincy Jones LP and the recording and mixing of the motion picture version of the Wiz.*

Multi-track recording gives the engineer and producer a great amount of flexibility; sections of the orchestra can be recorded and then over-dubbed on the same piece of tape. Parts of the music can be re-recorded until their performance meets everyone's satisfaction. Also, the instruments can be channeled to tracks on the multi-track master tape to allow maximum flexibility in re-mixing later.

After the rhythm section is recorded, usually the vocals are recorded next. Beginning with the lead, or solo vocal. After the solo or lead vocal is recorded, the vocal backgrounds are recorded. The orchestral instruments—strings and horns, percussion, synthesizers and so on—are then added.

## Track Assignments

I rarely assign instruments that contain a great deal of high-frequency information to the outside or perimeter tracks of a multi-track; the reason for this being, if there is any damage to the edges of the tape, the high frequencies will be the first to suffer. So generally what I do is assign the bass to track one on the multi-track.

I generally record the electric bass direct with a direct box of some sort. I have a favorite direct box of my own that I use. It utilizes a specially custom-made transformer—very large and heavy—which (to my ear) lends the least amount of coloration to the bass sound, and transfers the most energy of the electric bass onto the tape. There are many types of direct boxes. Some direct boxes use active components—such as transistors or such; these work very well. From my own personal experience, though, the direct boxes with active components are very subject to outside interference, such as RF fields, etc. You can come up with a bass sound with a lot of buzz or noise on it. An active direct box does a fine job if you are in an area where there is little or no electrical energy field.

Frequently I will mic the bass amp and assign that microphone to a track independent from the direct pick-up and later on combine the two into one using the microphone sound to get a little more attack from the bass sound. The miked bass technique alone usually does not work very well, primarily because there are very few bass amplifiers that will reproduce fundamental frequencies with any purity as low as

By Bruce Swedien

the electric bass goes in range. (In addition the extreme low frequencies have wave lengths that are so long physically that it is impossible in a small room with close miking techniques to record them accurately.) So what you end up with on the microphone track is a bass sound that is composed mainly of harmonics with very little of the fundamental or pure bass sound.

Recording the string bass is not so easy as it may at first seem. You must first consider the *type* of music, because classical music requires a different approach than does jazz. The string bass is rarely used in pop or rock music anymore unless it is part of the string section. Nevertheless one should be familiar with the approaches involved.

In classical music the string bass is almost always a part of the string section of the orchestra. It is usually placed to the right in the stereo image and rarely requires special miking because in classical music a natural acoustical balance is present. There usually are several string basses in the orchestra. It takes several basses to double the acoustical output of one string bass.

In jazz recording the string bass is always separately miked. My favorite mic is an Altec 21B condenser mic—wrapped in foam and placed in the bridge of the instrument. I own four of these vintage mics that I keep just for this purpose. You also can get a good

string bass pick-up with an AKG451 placed about ten inches away from the fingerboard and not too far above the bridge. This placement gives a nice, mellow, "not-too-close" sound.

The equalization and limiting that I use for recording bass is to generally boost the 600 to 800 Hz range about two to four dB and limit the bass during the recording using a UREI 1176LN limiter set for a four-to-one compression ratio, but only taking off two to three dB peaks maximum.

### A Combination of Instruments

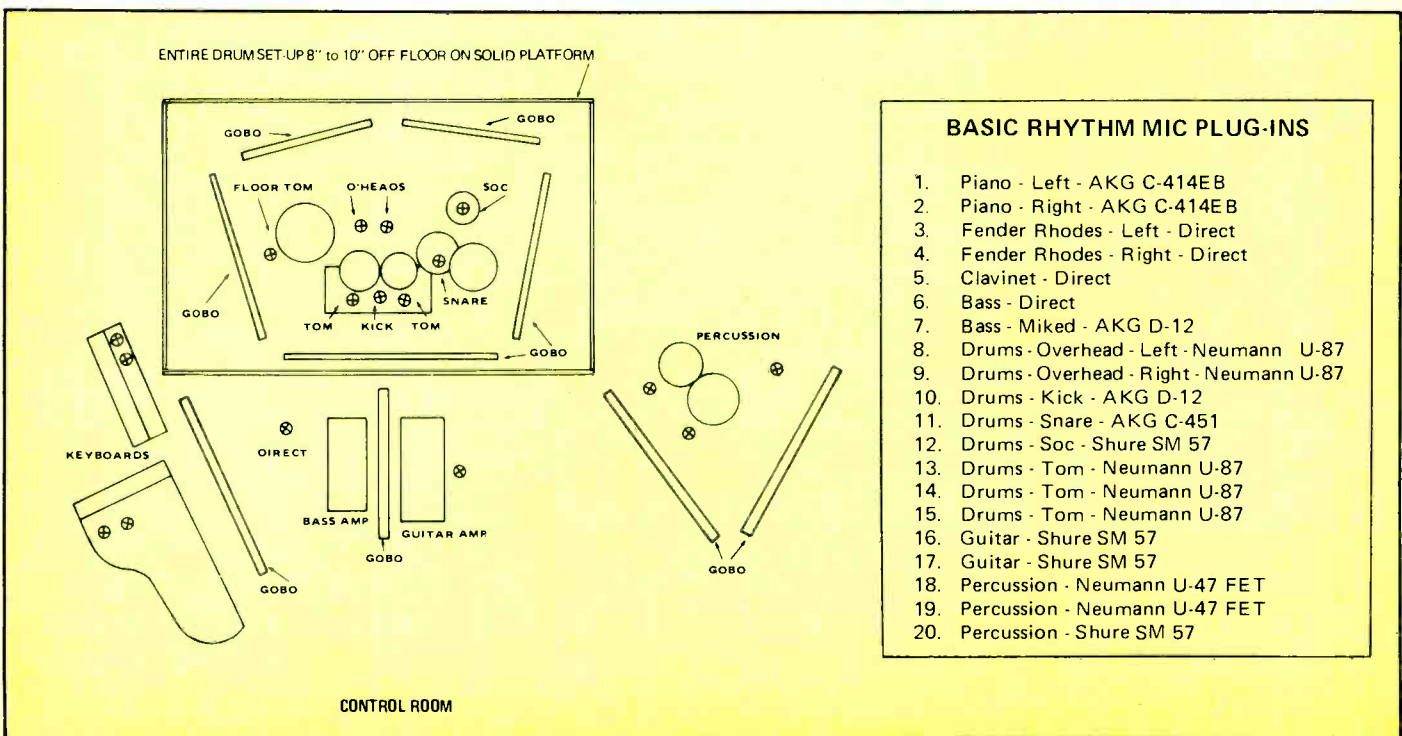
After wrestling with the bass sounds, we can move over to the drums. In a pop recording, generally speaking, the drum set should be treated as a combination of instruments. This is because many of the effects that the drummer desires—or the producer desires—in a drum recording have to be emphasized electronically. If the effects were heard in a natural acoustical balance, much of this sound would be lost. Multiple miking on the drum set therefore is the only answer.

I mic the overall set with a pair of high-quality condenser microphones about six feet in the air in a stereo configuration, sometimes referred to as the "X" position. These two microphones "hear" the drum set in a fairly natural acoustical balance and usually include a good pick up on the overhead cymbals. I place individual mics on the tom-toms around the drum set and

then these tom-tom microphones are mixed together with the two overhead microphones to form a left and right stereo image of the drum set. The choice of microphones varies considerably with the [original] sound of the drum set.

Consider first the overhead microphones. A good choice is the Neumann U-87 in cardioid pattern position. On the tom-toms this varies greatly with the sound of the drummer's tom-toms. If the drummer has really good quality tom-toms which are tuned to specific tonalities, usually a good, high-quality condenser mic such as a Neumann U-87 or KM84 will work best. The individual mics on the tom-toms are always in cardioid position. Place them about eight to ten inches away from the tom-toms. The closeness of the mic to the tom-toms depends on the low-frequency content of the tom-tom itself. If a drummer has tom-toms that have very little low-frequency content and need a lot of help the mic is generally placed closer. This utilizes the proximity effect present in many microphones to boost the low end of the sound source.

The stereo image or stereo placement of the drum set is usually a matter of personal taste. I mic and record the drum set viewing it from left to right as though you were looking at the drum set. In other words, if you were facing the drum set whatever appears physically on the left will come from the left speaker, etc., around to



the right. (Since not much of modern recording and the reproduction of music can be taken literally, this subject [drum placement] has been discussed as a matter of personal taste.)

In the original days of stereo recording when we were experimenting with stereo, the entire drum set was usually placed on your right as you faced the speakers. This made a lot of sense then and still does in that it retains the size of the drum set in a better perspective as far as the size of the rest of the orchestra. In modern pop recording with the drum set spread from left to right one could imagine a drum set about forty feet across. Of course, this is preposterous, but that is the way we do it now.

The bass drum, or kick drum or foot as it is often called, is miked very closely. Frequently the front head of the bass drum is removed and the microphone is placed inside along with some padding to minimize resonances and vibrations and rattles. I use a specially made drum cover with an elastic around it and a slot in the middle for the microphone.

The microphones that I use on the bass drum are usually one of the following: a Sennheiser 421, an AKG412 or an Electro-Voice RE20. All of the drum mics that I use I personally own and carry them from session to session. This, by the way, is a real pain in the neck but it is the only way that I have found that I can consistently come up with a really good drum sound from studio to studio or even in the same studio from session to session. The bass drum is usually assigned to its own track on the multi-track.

On the snare drum I use a miking technique that I developed many years ago in Chicago recording rhythm and blues records where a "hard" snare drum sound was necessary. I have modified it somewhat over the past years but it is still basically the same. My current choice of microphone is the AKG451 with a cardioid condenser capsule and 20 dB pad. I mic the snare drum from the side about eight to ten inches away from the shell of the snare drum, being very careful not to position the mic anywhere near the air hole on the side of the shell. The snare drum I always assign to its own track on the multi-track master tape.

On the soc cymbal or hi-hat I use two types of microphones depending entirely upon the sound of the soc cymbal in the drum set. One choice being an RCA77DX ribbon mic, second

choice being an AKG451 condenser mic. Occasionally I will use a Shure SM57 dynamic mic. Again this choice depends entirely upon the sound of the soc cymbal itself. Most of the time I will assign the soc cymbal to its own track on the multi-track, although frequently this can be mixed in with the left and right overhead (stereo) drum kit tracks.

During the recording of drum tracks I never use any limiting or compression, and very little equalization. The only mics in the drum kit on which I use any EQ would be the kick mic, usually boosting it about four dB at 1.5 kHz, maybe a two dB peak at 100. On the soc cymbal I will usually use a high pass filter set at 100 Hz.

## The Guitar

There are two ways to approach the recording of a guitar: the acoustic method or the electrical (direct) method. And your choice depends totally on the type of music and the overall effect that you are after. In pop recording of the electric guitar you frequently use a direct box which is inserted at the output of the pick-up of the guitar before the sound reaches the guitar amplifier. This eliminates any hum or noise that might be present in the amplifier, but it also eliminates any sound contouring or coloring that the musician may be putting into his amplifier. The next obvious choice therefore would be to mic the amplifier. My personal preference is this latter method and I use a Shure SM56 or SM57 to do the job.

Miking of the acoustical guitar also varies greatly with the music and the environment. In a concert hall situation a high-quality condenser mic will work quite nicely, providing it doesn't have to be placed too close to the instrument. The most satisfactory results I have obtained using this method is with two high-quality, large capsule condenser mics such as a pair of U87s about six feet back from the instrument. This gives a very natural sound, however it does present some problems when the acoustical guitar is part of an orchestra. You can't afford the luxury of moving the mic back that far. A good choice on an acoustical guitar would be a Shure SM56 or SM57 or even two of them in an X configuration for stereo. The guitar I always assign to its own individual track or tracks in the case of a stereo pick-up on the multi-track.

On the guitar I rarely do any limit-

ing during the recording. Never limit classical or acoustic guitar. On electric guitar, depending on the quality of the amplifier or pick-up, maybe add a little two to four dB peak between five kHz and ten kHz, depending on the range of the music.

## Pianos: A Difficult Task

Recording the piano is probably one of the most difficult tasks given to a recording engineer, and, in my opinion, it is only rarely properly recorded today. Most of the microphone technique that I see, is to place one mic over the high strings and one mic over the low strings and then call this a stereo pick-up. Nothing could be further from the truth. This type of recording is, while quite pleasing to the ear, not a good representation of what a piano really sounds like. The piano mics that I have been using for some time now are the AKG C414EBs. I place two of these microphones about twenty-four inches above the harp of the instrument in a X stereo configuration, positioned to favor the high frequencies of the instrument.

The reason is that the low frequencies are, of course, quite non-directional and reach the microphones more easily than the high frequencies. This is then recorded and assigned to two channels of the multi-track and presents a quite natural image. Both microphones are hearing the total range of the instrument, but in their position the phase differences of the frequencies provide an interesting stereo picture.

Many approaches to the isolation of the recording of the piano have been tried. These of course will vary greatly from studio to studio and will depend on which isolation materials are available. They can vary anywhere from a box around the piano to a separate room for the piano. A couple of the studios that I work in have very successfully designed a little cubbyhole into which the rear section of the piano fits to give it isolation, while the keyboard is in the room; it works rather well.

Again, the whole approach to recording the piano depends upon the music; this is probably more true with the piano than with any of the other instruments. A classical piano recording requires a far more conservative approach to the microphone technique. Generally what I do for classical piano is move the mics as far back as six to



Photo depicting the "X" configuration technique used for piano miking.

eight feet from the instrument.

The character of the piano sound is totally dependent on the color and character of the piano itself. It is impossible to get a bright, clear piano recording from a piano that has been voiced to sound dull and muddy. My personal choice of pianos is the Steinway, although I have had highly successful recording sessions with a large Yamaha. Baldwin also is a pretty decent recording piano. I cannot emphasize how important it is though, that no matter what make or brand or acoustical situation, the voicing of the piano contributes more than anything else, probably, to the sound of the recording.

During the recording of the piano—with an instrument that is properly voiced, and properly placed mics that are in good condition—you don't often need any EQ, however, that is not always the case. The range in which I usually EQ the piano is two to four dB

at ten kHz and another two dB peak at three kHz. If the piano sounds thin, about a two dB boost at 100 will help.

Piano recording requires an extremely steady and stable tape transport. In highly critical piano work I will almost always opt for a closed loop tape system and record at 30 ips to minimize speed variation.

### The Percussion Family

Recording percussion instruments is generally done in about the same manner as are the drums. They are, after all, members of the same family. The microphone technique involved depends, again, totally on the music. Classical recording of cymbals, gongs, tympanis, marimbas, xylophones, etc., are never close miked, but in a studio in a pop-style recording these instruments have to be miked closely.

The SM56 and SM57 [Shure] dynamic mics are a good choice where frequency range is not too important. If you want both extreme high-frequency response and low-frequency response a high-quality, large capsule condenser mic is a good choice, such as a U47FET or U-87. The Latin percussion instruments (such as conga, timbali, etc.) require some experimentation because they frequently are tuned so differently. Frequently a good dynamic mic is the answer.

Percussion instruments I rarely EQ, and never limit or compress percussion instruments during the initial recording session.

### The Rhythm Section and Positioning

Positioning the rhythm section in the studio varies enormously with the content of the music. Jazz for instance has to be treated virtually like classical music—the musicians have to have eye contact and must be in very close proximity to hear each other at all times. Pop recording is a different matter, there we strive for extreme isolation of sounds. Sometimes I'll take this to the point of setting the drums up in their own isolation booth or room, sacrificing the quality of the sound, but greatly improving the isolation. Generally speaking, though, rhythm players should be able to hear each other. Frequently in a pop recording this is accomplished through the use of earphones rather than acoustical support due to the fact that striving for isolation eliminates most of the acoustical support from one instrument to another. However, most good musicians that are used to being in the studio are also used to listening to the rest of the rhythm section on earphones. (The earphone mix is extremely important, just as important as the balance in the control room.)

I frequently see studio set-ups that amaze me, where instruments are placed physically so far apart in the studio that the time delays with secondary pick-up on the other microphones must be enormous. You can frequently achieve more isolation by moving the instruments closer to each other, thereby shortening the time delays and improving the apparent isolation. Just because instruments are physically far apart in the studio doesn't mean that they will be isolated from each other as far as sound goes.

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# Ambient Sound

BY LEN FELDMAN

## Cassette Performance Breakthrough

Ask any experienced tape recordist what he or she thinks about all those recent claims that “so-and-so’s cassette deck equals the performance of a reel-to-reel machine” and he or she is likely to give you a cold stare of disdain. Yes, there are a few decks that can record and play back “flat” (or at least to within  $\pm 3$  dB) from 30 Hz or so to 20 kHz but the standard practice (including ours, when we test cassette decks for *Modern Recording*) is to make the tests at a  $-20$  dB recording level. Try recording all frequencies at 0 dB (or even  $-10$  dB) with most any tape on most any cassette deck and you quickly run into tape saturation because of the high record EQ applied during the record process.

And why is the high EQ necessary? Because the wavelength of a high-frequency signal (at the slow 1½ ips tape speed of cassettes) is so small that it approaches the gap width of the playback head, not to mention the self-erase effect of the record head. And, of course, in most cassette decks these are one and the same head, so further compromises have to be made. So, to achieve “flat frequency response” (the specification that impresses most amateur recordists), manufacturers apply enormous amounts of record EQ (treble boost) and if you record at high VU readings, you quickly reach the maximum output level (MOL) or saturation level of the tape and the playback response rolls off from that cause as well.

It can, of course, be argued that making response measurements at a  $-20$  dB level is legitimate, because ordinary music has much less energy content at the high end of the audio spectrum than in the mid-range and bass end. To some degree this is true—with ordinary music. But there’s plenty of music around that’s partially or completely electronically produced. (How about all those keyboard synthesizers and other electronic instruments that have become as much a part of the performer’s bag of tricks as “natural” instruments?) There are plenty of recordings around which

contain as much “highs” as “mids” and “lows” and if you want to transcribe them on a cassette deck (even a high-quality machine) you had better “back off” on those VU meters if you want to stay away from that saturation region and really come up with the response figures claimed by the maker of the machine.

So, you back off on the master gain and what happens? Your average playback level is that much closer to the “noise floor” of the tape and down goes your signal-to-noise ratio (or, up goes the relative tape hiss, if you want to look at it that way).

There are other ways to “trick” the machine into flat response performance. You could, for example, use a tape that requires a high bias setting and record using a lower bias. Up will come the high-end response—along with the accompanying harmonic distortion caused by underbiasing.

The truth is that you have a lot more leeway as a recordist when you use a reel-to-reel machine, no matter what anyone tells you. So why have so many recording enthusiasts opted for the cassette format, with all its limitations? Simply because it is a convenient, compact, easy-to-use music storage medium whose performance has been pushed to the very limits that are physically possible (short of some new breakthrough in the tape itself, which seems imminent, as “metal particle” tape prepares to make its commercial bow in the immediate future).

Given the present state of cassette tape and cassette deck technology, then, there would seem to be only one thing that can move the cassette format ahead by one giant leap. Remember the Elcaset that was introduced with such great fanfare a few years ago? It had two major things going for it, and one major factor against it. The negative factor was price. The first units offered, were priced at the levels of the most expensive cassette decks but did *not* make full use of the built-in potential of the newly devised Elcaset tape format. The features (or the major ones) that the Elcaset had

going for it were *higher speed* (3¾ ips instead of 1¾ ips) and *wider tape* (for greater magnetization levels and hence better dynamic range). Either of these two features, if applied to the *standard* cassette, would significantly improve the three major performance characteristics of a cassette deck—frequency response, signal-to-noise ratio and distortion. As we'll see in a moment, the fourth performance parameter, wow-and-flutter, would also be *audibly* improved by an increase in speed.

### Why Not A 3¾ ips Cassette Deck?

There is absolutely no problem involved in moving the tape inside a cassette at 3¾ ips instead of at the slower 1¾ ips speed currently in use. If those low-fidelity 8-track cartridge abominations, with all their wow-and-flutter and hiss and internal friction can have their tape moved at 3¾ ips why can't cassette tape move at twice the speed? Of course, you would use twice as much tape, but with the cost of even high-quality cassette tapes as low as it is, very few serious recordists would be likely to object if improved performance could be gained by having a C-90 record only 22½ minutes a side instead of 45 minutes.

So, why hasn't anyone produced a cassette machine with a 3¾ ips speed up to now? The reasons are complex and confusing, and involve a host of legal agreements, patent considerations, licensing agreements and who knows what else? All I can tell you is that at the recent Consumer Electronic Show (CES) held in Chicago from June 11 through June 14 one company dropped a bombshell of a surprise on the rest of the industry by introducing not one, but *three* cassette decks, each of which operates at 3¾ ips as well as at the usual 1¾ ips. Don't ask me about the legalities, or the Philips patents and licensing agreements. All I can tell you is that this company, a heavyweight in the audio industry (though never before a producer of any tape recording equipment) assured me that they had every legal right to produce such machines and that their lawyers had "cleared the project" long before the units were announced.

If you design as best a cassette deck as you can and provide it with the best signal-to-noise ratio, lowest distortion and best frequency response that you can at the "normal" 1¾ ips speed, doubling that speed should, in theory, enable you to *double* the frequency response of the machine if all other operating parameters remain the same. So what do we have here, a machine that goes out to 36 kHz or 40 kHz? Of course not! Remember, all of these three specifications are interrelated and since there's not much point in extending record/play frequency response out to much beyond 20 kHz, the designers of these new machines traded some of their newfound "freedom" for a signifi-

cant improvement in signal-to-noise ratio and for lower distortion, all of which adds up to improvement in overall dynamic range capability—the one area where cassettes couldn't hold a candle to open-reel machines.

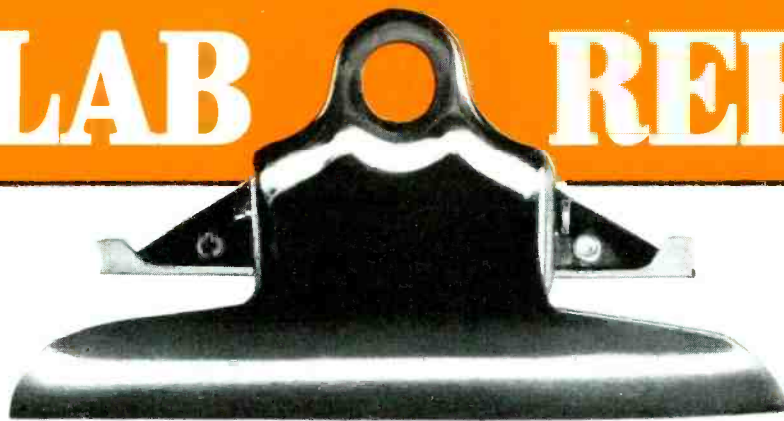
The company that has just entered the cassette tape deck sweepstakes with three 2-speed machines is none other than B.I.C./Avnet, the same company that produces a line of well-known turntable systems and a line of loudspeaker systems. The three models are identified as Models T-1, T-2 and T-3. The lower numbered models are 2-head machines while the T-3 is a full three-head machine permitting tape monitoring of recorded results. Pricing hasn't been completely firmed up, but the T-1 will definitely carry a suggested retail of under \$300 while the T-2 will come in at around \$350 suggested retail, with the T-3 slated for a \$400+ suggested price.

### Wow and Flutter

You will recall that we said earlier that doubling the speed will also cause an *audible* improvement in wow-and-flutter. In weighted wow-and-flutter measurements, emphasis is given to the metered readings at a center wow frequency of around 4 Hz because that is the most subjectively annoying rate of speed fluctuation as far as listeners are concerned. Now, given a certain percentage of unweighted wow-and-flutter in a cassette deck operating at 1¾ ips, if you double the speed, the total wow-and-flutter remains unchanged in an absolute sense, but the component wow-and-flutter frequencies are doubled at the higher speed. This can shift the "wow" components out of the most sensitive region (as far as listeners are concerned) and into the "flutter" region (above 8 Hz or so). So, the *weighted* (WRMS) wow-and-flutter reading at the higher speed turns out to be less than one-half as great as that obtained at the slower 1¾ ips speed. According to B.I.C./Avnet, they've combined the two-speed idea with exceptionally broad-band electronics and high-speed tape handling. (Fast forward or fast rewind of a C-60 cassette takes around 45 seconds, or about half the time required on most similarly priced machines.)

The surprise announcement by B.I.C./Avnet of this "breakthrough" has, no doubt, caught a lot of their cassette deck competitors by surprise and it may take some time for other manufacturers to get on the 3¾ ips bandwagon. You can be sure that just as soon as we can get our hands on one or more of these new machines we will test them in our laboratory and Norman Eisenberg and I will put them through their paces to let you know how they do perform in actual use. It occurs to us, too, that if the Elcaset has had a hard time getting off the ground, this new cassette speed may well mark its final, if premature, demise.





NORMAN EISENBERG AND LEN FELDMAN

## Nakamichi T-100 Audio Analyzer



**General Description:** The Nakamichi T-100 Audio Analyzer is a compact, lightweight device that incorporates the functions of an audio oscillator, vacuum tube voltmeter (VTVM), distortion meter and wow and flutter meter. Of high quality and ingeniously designed, the T-100 can be used to perform the following test or "diagnostic" functions on tape recorders: frequency response of record and play amplifiers, playback response (using a test tape), r/p response through the full deck, harmonic distortion, r/p level versus distortion, r/p saturation, noise level through different inputs and the playback section, speed regularity, wow and flutter, signal volume including peak and average metering.

In addition, the T-100 can be used to check out other audio equipment: output level of phono pickups, microphones and loudspeakers; frequency response of these devices; amplifier response including tone-control action, loudness contour effects, equalizers, filters, and crossover behavior; phono preamp overload; noise levels; power amp peak metering and VU metering. It also may be used to measure turntable wow and flutter using a 3-kHz test record signal. The speaker tests re-

quire the use of a calibrated microphone (how to calibrate your own mic is explained in the owner's manual). The T-100 finally can be used as a pink-noise source for subjective (hearing) evaluations of audio equipment.

To perform all these functions, Nakamichi has designed a complex device that looks like, and indeed is like, no other single audio product we have ever encountered. Except for the power switch and the power and signal connectors, everything used for operating the T-100 is laid out on its front panel. The left portion is given over to the readout scales which show speed percentages, dB levels, and percentages of THD and wow and flutter (as well as certain voltage values). To enhance the information presented, an auxiliary indicator face is supplied that may be placed over the panel face to show voltage levels from 1 to 30, and wattage levels with reference to 8 ohms from 0.1 to 100. Indications are separate for two stereo channels and are created in bar-graph form by the use of "zero-mass" tiny individual plasma (gas-filled) cells which, when suitably stimulated, provide an instantaneous linear display.



The righthand portion of the front panel contains operating controls. There is a nine-position function switch, and the switch for the built-in oscillator which has twenty-two positions—twenty-one being for discrete test frequencies, and one for selecting pink noise. The test frequencies available are: 20, 40, 63, 100, 160, 250, 400, 630, 1K, 1.5K, 2K, 3K, 4K, 5K, 6.3K, 8K, 10K, 12K, 15K, 18K and 20K Hz. Between these two controls are two toggle switches. One has two positions for meter range; the other has three positions for input level. In addition there are four small rotating knobs for calibrating the speed indicator, the input sensitivity on each channel and the output of the oscillator.

The left side of the device contains the inputs and outputs, including a separate stereo pair for feeding an oscilloscope. The normal outputs are suitable for line-level inputs on tape decks or amplifiers. The righthand side contains the power on/off switch and the AC line cord connector, which, like the cord supplied with the unit, is a three-terminal device with grounding plug. A fuse holder is at the rear apron of the chassis, and across the top is a block diagram of the circuit.

Also on the sides, near the front, are fasteners for attaching a carrying strap. The strap is supplied with the unit, as are a carrying case, signal cables, the indicator substitute face, a detailed owner's manual, and several blank response graphs for use with the unit. The graphs are marked for frequency in numbers as well as with arrows that pinpoint the exact frequencies available from the unit's built-in oscillator.

**Test Results:** To "test the tester," *MR* put the device through most of its intended uses, and also measured its "vital statistics" against published specifications. We also opened it up to examine its innards, and we verified some of its performance with oscilloscope checks. In general the T-100 confirmed or exceeded claimed performance and thus shapes up as a device that is not only ingenious, but also excellent.

Two different tape recorders, several phono cartridges, a couple of amplifiers, microphones, and speakers were checked out using the T-100. With the accessory wattage scale we were able to monitor peak power levels of the amplifiers up to the 100-watt level. Readouts on all the other components came on very quickly and as far as we could determine those readouts were all accurate.

One of our 'scope photos shows the pink-noise output of the T-100 with its amplitude characteristic that attenuates at a rate of 3 dB per octave. Happily enough, the T-100's signal-to-noise measurement section includes an "A" weighting filter network, which is the precise network specified in the new IHF Standards of Measurement for Audio Amplifiers (discussed in Feldman's "Ambient Sound" column a couple of

issues back [May 1978]). The response of this network also was verified by a 'scope photo.

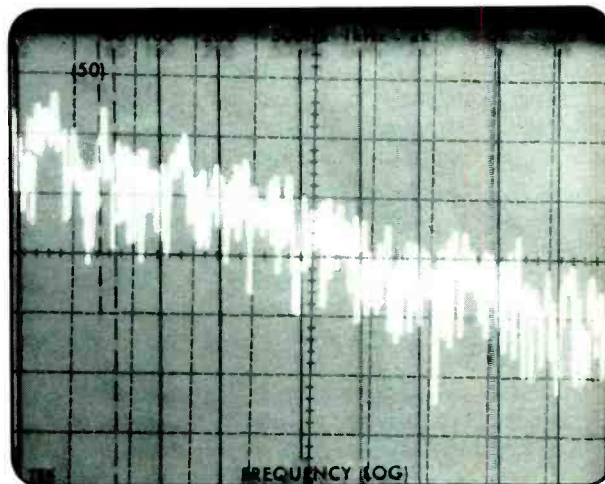
The "plasma panel" bar-graph displays were judged easier to read than a conventional meter. They have ballistic characteristics that are set electronically (0.3-second rise and fall time for average readings, 10-millisecond rise and 2-second fall times for peak readings). Besides greater accuracy vis-a-vis mechanical meters, the dB scales on the T-100 are set out linearly which enables you to read, say, a -18 dB level with as great precision as you can read a +10 dB level.

While extremely versatile, and more than competently designed for its intended uses, the T-100's emphasis is definitely on tape equipment. As may be seen from our table of "Vital Statistics," the THD of the oscillator's spot frequencies (except for the single 400-Hz signal tied into the distortion analyzer) is nothing to write home about, and the only distortion measurement that the T-100 can make is at 400 Hz—useful for tape THD measurement, but hardly adequate for measuring amps, preamps, and so on at other frequencies and at the ultra-low THD levels claimed for many of those components.

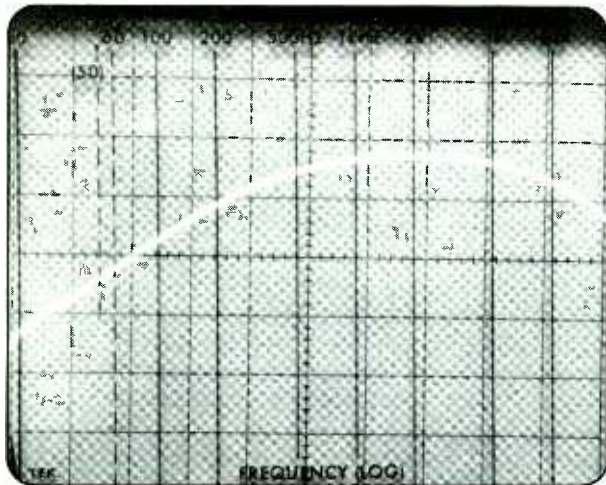
Aside from this limitation, the T-100 stands as a remarkable device that could prove of great interest and usefulness to recording personnel (studio and semi-pro) as well as to serious audiophiles in general.

**General Info:** Dimensions are 13½ inches wide; 3 inches high; 9½ inches deep. Weight is 9.5 lbs. Price of the Analyzer is \$800.

**Individual Comment by N.E.:** This unique and innovative device crams a lot of useful instrumenta-



**Nakamichi T-100:** Output of pink-noise generator follows required 3 dB/octave slope to provide "equal energy per octave" test signals.



**Nakamichi T-100: Response of built-in "A" weighting network in noise-measurement section.**

tion into one very compact and well-planned unit. With its supplied cables, meter scale substitution card, blank response graphs for plotting test results, carrying case and strap, I can see many a tech striding into a studio ready for "diagnostic action" as the waiting personnel cry: "Ah, the man with Nakamichi is here."

But before you fantasize yourself in this Macho role be prepared—in addition to spending \$800 for the T-100—for some heavy studying of the device, its controls and features, and its twenty-six (large-size) pages of instructions (plus, if you really want to know how this incredible thing works, an additional six-page technical supplement). Time did not permit me to perform more than a few of the many tests the T-100 is capable of, but I did check out r/p response on a cassette machine, measured playback of a new phono pickup, and fooled around with some speed and voltage checks. After a while you get set on a routine—e.g., record a test tone for 15 seconds; stop the recorder; advance the tape for about the amount of time it takes to advance the oscillator frequency knob; go back to record; etc. The T-100 seems to have a natural affinity for tape recorders; it interfaces very well with them, but you can also use it for measuring other devices including microphones, phono cartridges, speakers (you will need to calibrate a mic for this chore, and the manual tells you how to do so), amplifiers, sections of amplifiers and turntables. For the last item you will need a test record with a 3-kHz signal recorded on it; for pickup response measurement you will need a test record with all signals recorded on it (I used CBS STR 100 for my tests).

Of course, a well-equipped service lab probably has all the facilities offered by the T-100, assembled no doubt at considerably higher total cost. Even such a shop might welcome the T-100 because of its handy versatility. Certainly, the serious sound activist who owns no test gear, beyond say a VTVM and who really wants to know how his equipment is doing, might take a long look at the T-100.

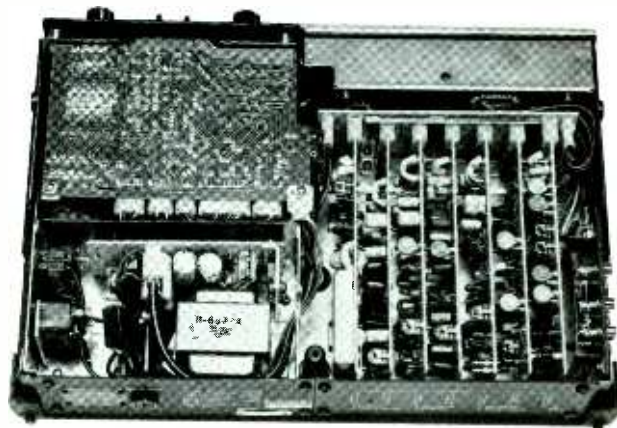
**Individual Comment by L.F.:** When I first saw the T-100 at a recent press showing, Ted Nakamichi told me that he hoped to sell the device to "serious audiophiles who want to know how their systems are performing." I suggested then that he might sell a few to such people but that he would be missing the boat if he didn't make a real effort to acquaint professional (and semi-pro) recordists with the T-100. Now that I have had a chance to play with the unit in my own lab, I can only say that if you really care about your recording system, professional or otherwise, you would do well to go right out and pick up this marvelous "portable test bench." No bigger than a small-sized preamp, this instrument combines an incredible number of functions, and it is so compact and relatively light in weight that it can be carried around, which is made fairly easy by the carrying case and strap supplied with it.

Some idea of how crammed full of precision test gear this unit is can be obtained from the internal view (see photo), but as a recordist you will only come to appreciate its value when you put it through its paces, as I did. On my own Nakamichi 1000 cassette recorder (now about three years old and never having needed any servicing) I checked the following: frequency response of the line amp, response and EQ of the record amp, playback response using a calibrated test tape, r/p system response, THD at 400 Hz, r/p level versus distortion for several different tapes, headroom or saturation levels, "A" weighted noise levels, tape speed accuracy and wow and flutter.

Incidentally, if you want to make some meaningful A-B tests between program source and recorded versions of that source, try recording some pink-noise signal from the T-100 and switching between source and tape on the monitor switch (of a three-headed recorder). You may be surprised. Very few open-reel decks (let alone cassette models) can pass this test.

There is much to really admire in this device, including its "A" weighted S/N measurement and its superior readout panel with that fast-acting, accurate and easy-to-read "plasma" display.

In case by now you have got the idea that for \$800



**Nakamichi T-100: Internal view.**

you can go into competition with me and start your own audio lab testing service, hold on a moment. As explained in our report, distortion measurements are pretty well limited to tape equipment and while the T-100 can analyze a great deal about other types of audio gear it is not suited for real analysis of today's sophisticated electronic components. It can, however, tell you just about all you need to know about a tape recorder. So while I am reasonably confident that the

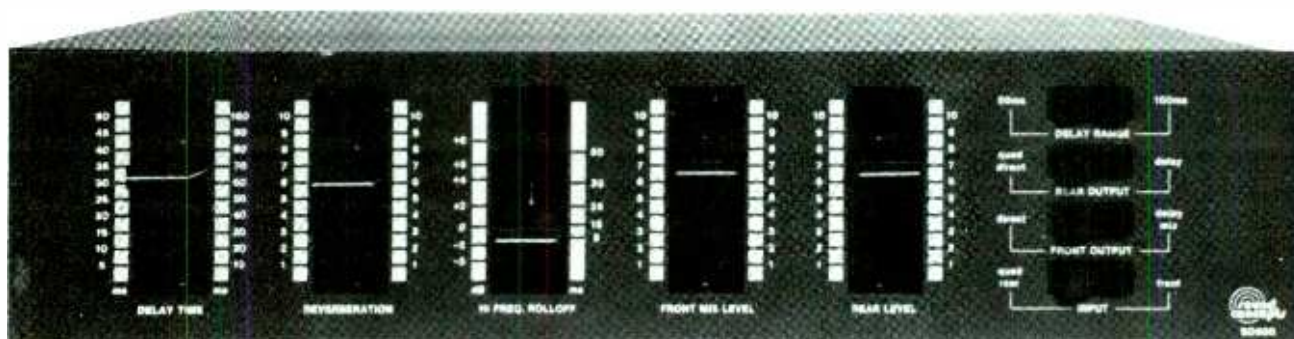
T-100 is not going to put me or my colleagues out of the product-testing business, it certainly will make a welcome (make that necessary) addition to any semi-pro or professional recording studio operation, at a price that is currently impossible to beat or equal. Come to think of it, my own studio in the basement is so far removed from my lab upstairs that most of my recording gear hasn't been checked and calibrated in over a year. See you later . . .

**NAKAMICHI T-100: Vital Statistics**

PERFORMANCE CHARACTERISTIC	MANUFACTURER'S SPECIFICATION	LAB MEASUREMENT
<b>OSCILLATOR SECTION</b>		
Spot frequencies (Hz)	20, 40, 63, 100, 160, 250, 400, 630, 1K, 1.5K, 2K, 3K, 4K, 5K, 6.3K, 8K, 10K, 12K, 15K, 18K, 20K, pink noise	confirmed
Max output voltage	1.2 V rms	1.15 V rms
Level deviation	± 0.2 dB (20 Hz to 20 kHz)	± 0.1 dB
Distortion	<0.3% (20 Hz to 20 kHz) 0.01% at 400 Hz (for THD meas.) ± 2%	0.25% (worst case) 0.01% 1.2% worst case
<b>WOW AND FLUTTER SECTION</b>		
Center frequency	3 kHz	confirmed
Input level range	3 mV to 30 V	confirmed
Indication	DIN peak wtd or unwtd	confirmed
Cal. test signal	3 kHz ± 4.5 Hz	3002 Hz
Tape speed range	± 3%	confirmed
<b>DISTORTION METER SECTION</b>		
Measurement frequency	400 Hz	confirmed
Input voltage range	100 mV to 30 V	confirmed
Fundamental rejection	400 Hz ± 3%, 100 dB 400 Hz ± 5%, 70 dB	cannot measure confirmed
<b>NOISE LEVEL SECTION</b>		
Freq. characteristic	IHF "A" weighting	confirmed
Indication	average value	confirmed

CIRCLE 29 ON READER SERVICE CARD

## Sound Concepts SD550 Time Delay System



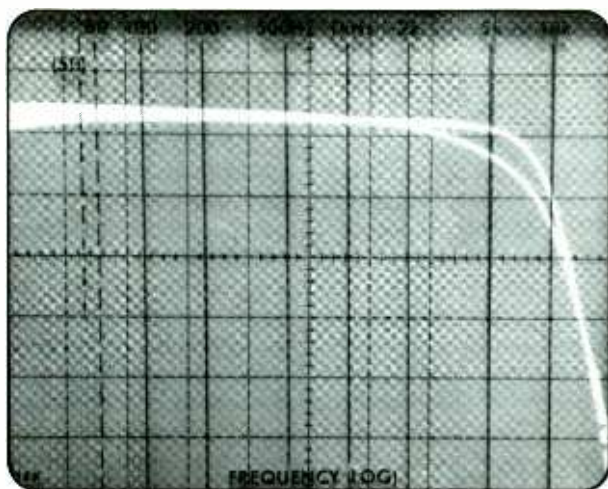
**General Description:** The SD550 is a "second generation" time delay system designed to introduce ambience recovery and hall simulation into reproduced sound. Its use, and design philosophy, are based on the concept—to quote from the owner's manual—that in a "live" performance "the hall 'processes' a portion of the original sound; delaying its arrival at the listening

position, adding echo or reverberation, and reducing the high-frequency content." Accordingly, these qualities are built into the SD550, and suitable controls provide for their relative use in a sound system. Although intended primarily as an enhancement for playback, the SD550 also can be used with a tape recorder to make one's own "reprocessed stereo" dub-

blings from mono sources. In this application, the SD550 may be patched into either channel input into the recorder. On a tape recorder that has multi-track facilities and sound-on-sound or sound-with-sound or simulsync, the SD550 can be used to enhance the spatiality effect of stereo tapes since delayed signals can be mixed with the original and re-recorded. It also can be patched into a "processor loop" at a mixer to add ambience while recording. The delay system can be applied to four-channel recordings by processing their rear channels.

For use in playback the SD550 may be patched into a sound system in several alternate ways, depending on what kind of equipment is owned; however, all the suggested hookups in the owner's manual do involve the use of rear speakers driven by a "rear channels" amplifier to carry the acoustic effects contributed by the SD550.

Five sliders and a group of switches at the right comprise the front panel operating controls. The delay time slider adjusts the delay applied to signals going through the SD550 and is described as "in effect, your hall-size control" since its settings relate to the sense of the size of a simulated hall. Next to it is a reverb slider which may be adjusted to set the amount of delayed information that is sent from the output of one delay channel to the input of the opposite channel where, of course, it is again delayed. A third slider adjusts the amount of high-frequency rolloff. Some rolloff is applied automatically in proportion to the delay time, but this control provides additional range to affect the "liveness" of the simulated hall. A special scale with this slider permits matching to the delay time control setting for what is described as a flattened response suitable for recording or professional applications.



**Fig. 1: Sound Concepts SD550: High-frequency rolloff of rear-channel outputs varies depending upon delay time chosen and setting of high-frequency rolloff control.**

A fourth slider adjusts the amount of delay-processed signal added to the front channels (when the front output switch is placed in the "delay mix" position). The fifth slider adjusts the output signal level of the SD550. It may be used as a rear-channel volume control, or in place of input-level controls on a rear-channel stereo amplifier. When the rear-output switch is in the "quad direct" position, this slider is out of the circuit.

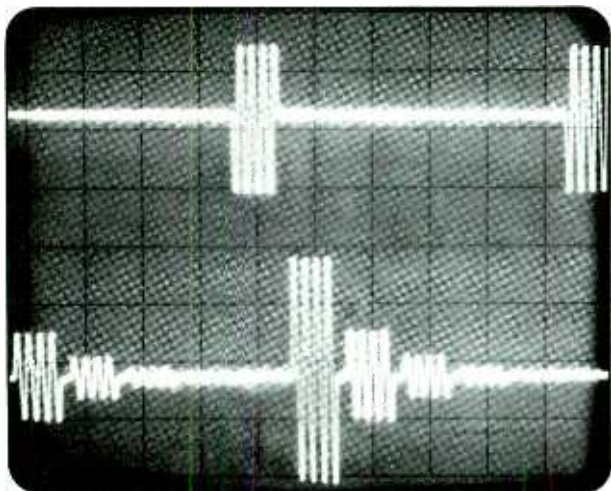
The switches handle delay range, the rear output, the front output and the input. The delay range selects the span of the delay time slider—5 to 50 milliseconds, or 10 to 100 milliseconds. The rear-output switch chooses either the SD550 processed signals (in delay position) or other rear-channel signals from the input terminals (in quad direct position). The front-output switch selects either "direct" or "delay mix." In the former mode, no processing is added to the front channel signals. In the latter mode, a variable amount of delay-processed signals may be added to the front channels via the front-mix slider. This position also allows delay-enhanced headphone listening at the front amplifier output. The final switch for input selects signals to be processed from the front inputs (for mono or stereo sources), or from the quad rear inputs for adding delay processing to the rear channels of other four-channel sources.

The rear of the SD550 contains four stereo pairs of signal jacks for front in, front out, quad rear in, and quad rear out. There also are two screwdriver adjustments (pots) for input level control. These are factory preset and not normally intended for readjustment by the user.

**Test Results:** Except for a slight difference between *MR*'s measurement of the rear channel response, published specs for the SD550 were either met or exceeded in our lab tests. In addition to these measurements, *MR* studied some of the device's performance by means of oscilloscope patterns as shown in the accompanying photos. To get some idea of the range of rolloff adjustments provided for the rear-channel outputs, we swept frequencies from 20 Hz to 20 kHz for 5-millisecond and 50-millisecond extreme settings of the delay control. Results are shown in Fig. 1, with each vertical division equal to 10 dB change of amplitude.

Using a tone-burst signal, we then observed the effect of varying the reverb and time delay controls, and photographed the input signal along with the output (rear signals) for one of the most dramatic and illustrative control setting combinations (Fig. 2). Note the clean and precise appearance of the primary delayed output, as well as that of the succeeding lower-amplitude reverberant signals that follow. In *MR*'s view, this is superior to what might be obtained from any "mechanical" delay and reverb unit, even one using a tape loop.

In use tests, the SD550 was employed for simulating



**Fig. 2: Sound Concepts SD550:** Upper trace shows input tone burst. Delayed burst at rear outputs plus reverberation components can be seen in lower trace.

the “hall size” effect, for creating synthesized stereo mixes from mono sources and for making and recording four-channel ambience programs from two-channel sources. In all instances, the SD550 worked very much “as claimed.”

**General Info:** Dimensions are 15½ inches wide; 3½ inches high; 9 inches deep. Weight is 7 lbs. Price of the delay system is \$600.

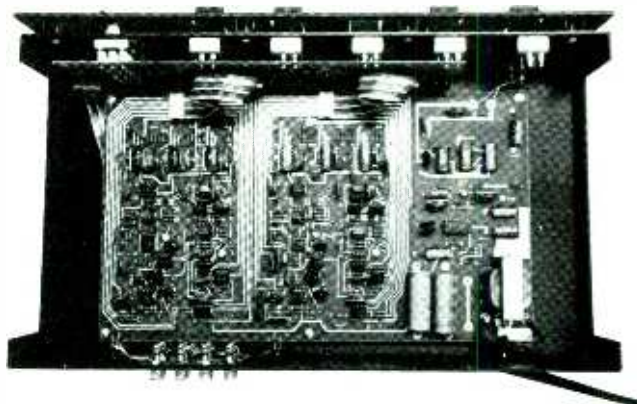
**Individual Comment by L.F.:** Even a cursory look at the SD550’s front panel shows that this unit is far more sophisticated in its control functions and versatility than the earlier device of this type from Sound Concepts. Readers of *MR* hardly need a primer on the virtues of adding time delay channels to a home sound system or, in certain applications, to a recording studio console or to P.A. sound reinforcement systems. Hall ambience is a missing ingredient in most playback systems and if the end goal is to reproduce the “feeling of the hall” then a good audio time delay unit coupled to an extra two channels of amplification and a moderately priced pair of “rear” speakers can do much to supply that missing ingredient.

So what does the SD550 offer that is unique, and how does its price compare with that of other time delay devices? To answer part one of that question, Sound Concepts has added some very worthwhile control features to this new model. The front output mix feature permits you to add delayed and reverberant information to the front channel mix. Among other things, this contributes to an enhanced form of stereo headphone listening which must be heard to be believed.

As is generally known, the reverberant sound field in a “live” listening situation does not have a “flat frequency response” across the audio spectrum. Instead,

reflected sounds roll off at the high end at a rate determined by the size of the hall and its acoustic character. The variable rolloff control on the new SD550 allows you to provide the correct amount of rolloff for any amount of time delay, or—in effect—to any “hall size” you care to simulate. And if you want the ambience to sound a little “brighter,” you can do that too—this control, in effect, lets you vary the “construction materials” of which your imaginary auditorium is made. The continuously variable reverb control lends additional flexibility to the unit. Cross-coupling (from channel to channel) is used in adding the reverb information and, while you may argue whether reverb signals should be coherent or incoherent (in the case of the SD550 they are coherent), a brief listening test will convince you that Sound Concepts’ approach to this aspect of time delay is effective and realistic.

So while getting excited about the unit’s sophisticated bucket-brigade circuitry is one thing, listening to its effects in an “average” size room (mine is 14 feet by 20 feet) is quite another thing. My enthusiasm for this well-engineered device was enhanced when I put it through its paces by hooking it into my reference listening system (which is equipped for 4-channel playback and thus has four speakers in place). I found I could easily duplicate the ambient sense of any concert hall I pleased, and—after a few moments of experimenting—I got to know just where to set the controls for my preferred “room size.” To confirm the claim



**Sound Concepts SD550: Internal view.**

that rear speakers need not have the same high-end response as the front speakers, I substituted a less expensive pair for the rear ambience channels and, sure enough, there was hardly any lessening of the overall effect.

When you consider that this second-generation unit costs no more than the earlier model, the intrinsic worth of the more flexible and better-built SD550 seems even higher.

**Individual Comment by N.E.:** There is no doubt that added “space” and often an enhanced “ambience” can prove fun and enjoyable in playback, and can help

"sweeten" a tape recording of an otherwise overly dry original. It should be pointed out, however, that this technique does not necessarily contribute to what might be called a "cleaner" or "purer" sound. As for simulating *any* hall, I feel—that while the range and capabilities of the SD550 are indeed great—it may be the actual presence of the listener in a given hall that contributes to the "living experience" effect, or certainly as much as any added electronics after the fact.

Be that as it may (and admittedly this is a very debatable area and one in which we tread the uncertain ground of psychoacoustics as much as of straight-forward electronics), there is no doubt that this updated version of the Sound Concepts system is significantly improved in terms of what it can do over the former model. Since the price has not been increased,

the new version represents a commendable product offering.

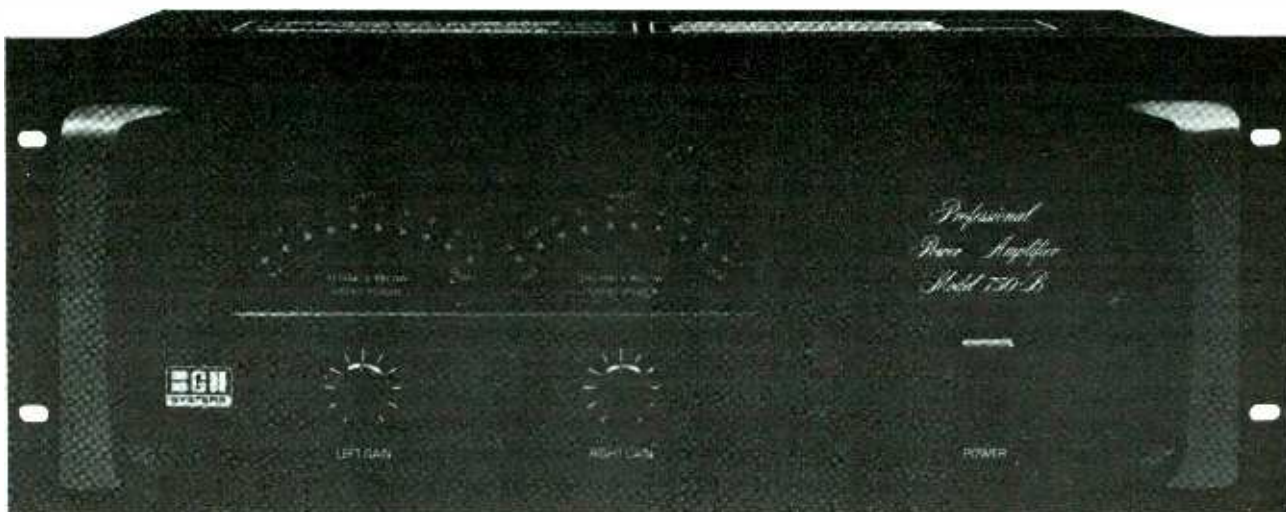
On the question of the rear-channel speakers, by the way, it is true that, as the owner's manual states, it may not be necessary to use an extended high-end response since the SD550 does roll off the highs. The manual, however, also points out that good bass response is required for the "rolling bass effect" of larger halls. I do not think, in view of this recommendation and my own listening experience, that "cheap" speakers will do—since with most commercial speaker systems, if the high end has been limited chances are that the bass response has also been restricted. What this does mean to me is to use normally good speaker systems for the rear channels, but preferably those with high-frequency adjustments that can be cut back.

#### SOUND CONCEPTS SD550 TIME DELAY SYSTEM: Vital Statistics

PERFORMANCE CHARACTERISTIC	MANUFACTURER'S SPECIFICATION	LAB MEASUREMENT
Delay range	5 to 50 msec. $\pm 3$ , or 10 to 100 msec. $\pm 5$	confirmed
Input impedance, front	60 K ohms minimum	70 K ohms
Gain	1 (unity); may be set to other values	confirmed
Frequency response (rear, delayed)	$\pm 1$ dB, 20 Hz to 5 kHz at 5 msec. delay, and 0 dB rolloff setting $\pm 3$ dB at 8 kHz, rolloff set to match delay	$\pm 1$ dB, 22 Hz to 4.7 kHz under these conditions -3 dB at 7.5 kHz under these conditions
S/N ratio	85 dB min. ("A" weighted)	89 dB "A" weighted re: 1-volt input
Distortion	1% max at 1 kHz, 1-volt in	-0.65% and 1% depending on delay and reverb settings.

CIRCLE 30 ON READER SERVICE CARD

## BGW Model 750B Power Amplifier



**General Description:** The Model 750B from BGW Systems of Hawthorne, California is a high-powered professional-grade power amplifier for stereo or mono applications. In stereo, it is rated for an output of 400

watts per channel into 4-ohm loads, or 240 watts per channel into 8-ohm loads. In mono, the 8-ohm load rating is 800 watts. These power figures are with reference to the 1-kHz midfrequency at no more than

0.1 percent total harmonic distortion. For average continuous power across the 20 Hz to 20 kHz band, the corresponding ratings are: 360 watts at less than 0.2 percent THD; 225 watts at less than 0.1 percent THD; and 720 watts at less than 0.1 percent THD.

Of rack-mount dimensions, the amplifier is fitted with handles. The front panel contains two LED power output displays, one per channel. There also are separate gain controls for each channel, and the unit's AC power off/on switch. The power display for each channel consists of ten indicators, marked in dB below rated power:  $-\infty$  (idle),  $-33$ ,  $-27$ ,  $-21$ ,  $-15$ ,  $-12$ ,  $-9$ ,  $-6$ ,  $-3$  and 0 or clipping level. The gain controls are continuously variable "pots."

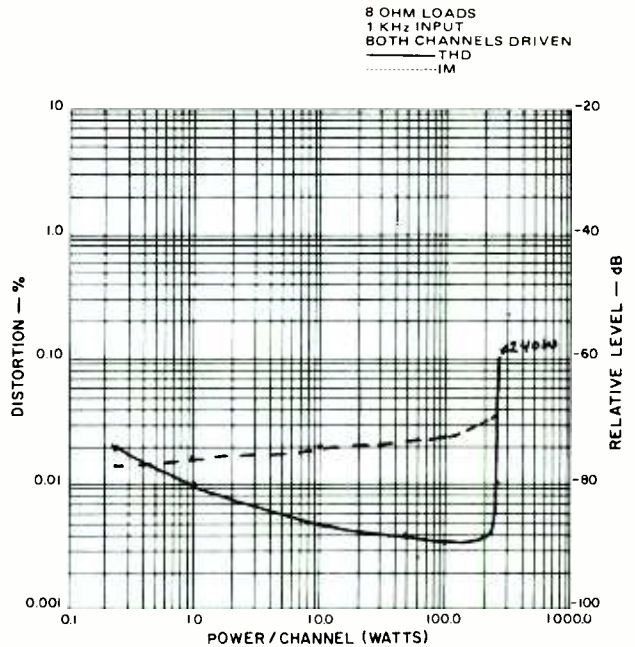
Inputs and outputs are at the rear. There are color-coded speaker binding posts (standard-spaced GR connectors), and two sets of inputs—one being phono jacks, the other being 3-pin XLR connectors. Both chassis ground and "earth" ground terminals are provided. There's the switch for changing from stereo to mono operation, and another switch to convert from 8 ohms to 4 ohms. Behind a large circular covered opening on the rear panel is the amplifier's fan. The power cord is fitted with a three-prong (grounding) plug.

The circuitry employs a full complementary output design; two dozen output transistors are used. These are arranged in banks of six for each side of each complementary output channel. The 8/4 ohm changeover switch is unusual—since solid-state amplifiers can deliver power into either load, most amplifiers are designed so that the optimum matching impedance of the output circuit is approximately 6 ohms (for maximum power transfer). As a result they normally "take a bit of a licking" at one or the other of the two popular impedances. BGW obviously elected to change circuit parameters via the switch in order to provide optimum power match at both impedances, a worthy design touch and doubtless one that contributes to the "high power/size ratio" of this amplifier.

The amp may be operated on 100, 120, 200, 220, or 240 volts AC, 50-60 Hz. Conversion, however, from the voltage indicated with a particular unit requires an internal wiring change.

**Test Results:** Most of the published specifications for the BGW 750B were either met or exceeded in *MR's* lab tests. Exceptions were the 4-ohm continuous power per channel at mid-band (400 watts claimed; 364 watts measured), and the very slightly-higher-than-claimed IM measured. Even so, the power output of the BGW 750B—in any mode and at either impedance—is enormous, and its distortion is very low. Power bandwidth exceeded the amplifier's spec's as did signal-to-noise.

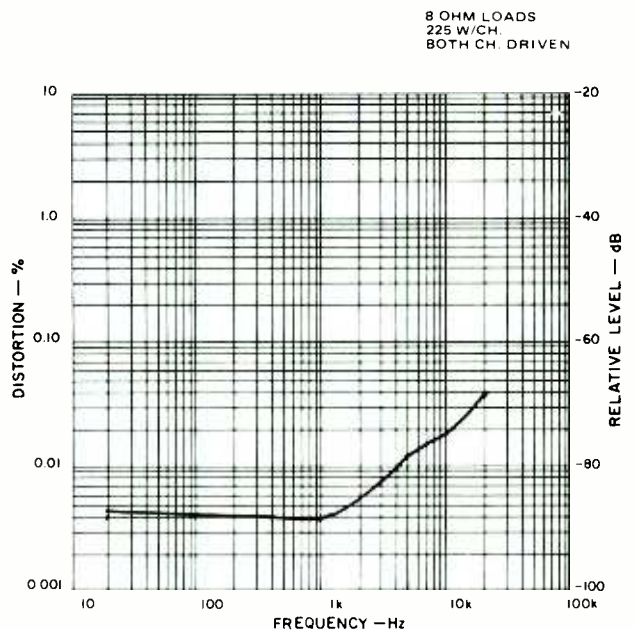
When strapped for mono operation, the amplifier will deliver better than 760 watts into 8-ohm loads. Interestingly, that works out to be a voltage of about 76 V rms, which means this amplifier can be used as part of a "70-volt line" distribution system in sound-reinforcement applications, probably without requiring a step-up transformer at the amp end of the chain.



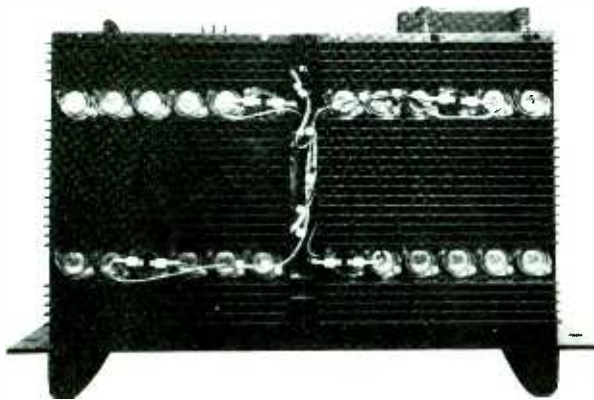
**BGW 750B: Power output vs. distortion.**

The LED display was found to be extremely accurate and, in *MR's* view, worth the added cost (the same amplifier, less the LED display, costs \$100 less). In addition to its obvious uses, it could serve as a warning in the event the associated speaker systems are not rated to handle the high power this amp can deliver.

In *MR's* view, the unit is well suited for sound reinforcement work as well as—thanks to its high-performance and very clean sound—for serious studio monitoring.



**BGW 750B: Distortion vs. frequency.**



**BGW 750B:** Removal of top cover reveals twelve power output transistors per channel, two of which are fitted with thermal sensors.

**General Info:** Dimensions are 19 inches wide, 7 inches high, 12 inches deep. Weight is 55 pounds. Price, \$1099; same unit as model 750C, without LED display, \$999.

**Individual Comment by N.E.:** Although relatively compact for such a high-powered amp, the 750B is quite heavy. Unless you have a stronger back than mine, you'd do well to get someone to help lift it. Once installed and plugged in (we ran the line cord to its own main outlet rather than take a chance using the convenience AC outlet on an already well-tapped preamp) however, this amp performed beautifully. There were no annoying thumps during power turn-on or turn-off; the LEDs seemed to come on or off somewhat more "precisely" than on other amps; the fan was surprisingly quiet under normal operating conditions. As for sound quality, I felt it was at least as good as the best I have yet heard, when driving the particular speakers I happen to have on hand right now and with which I am quite familiar. Clarity from top to bottom of the audible spectrum was excellent;

the bass end seemed especially clean and well-defined. In terms of construction and workmanship, the unit appears to be first-rate.

**Individual Comment by L.F.:** Considering the power output ratings of this heavyweight, I was rather taken aback by its compact size (although it is a heavy thing to lift). I have encountered amplifiers that deliver less power but are nearly twice the size of the BGW 750 B. Obviously, the unit's size is no hindrance to its top performance; the engineers who designed it have managed to cram all that power into it without sacrificing cool performance or reliability. The two-speed fan went into high gear during our static bench tests, which is understandable since we put the amplifier through an FTC pre-conditioning test before starting our measurements. While this one-hour routine is not strictly required by the FTC for a unit such as this (it is, after all, a professional amplifier that, theoretically, is not intended for "home entertainment" use), I soon surmised that there must be a number of audiophiles who are going to want better than 225 watts per channel (or even higher at 4 ohms), and will make this device part of a home music listening system (even if it means they may have to install it in such a way as not to be bothered by the fan noise).

The claimed damping factor of 500 or more was virtually impossible to confirm or refute in our tests. Even our heavy buss wire, which interconnects between the outputs of the amplifier and our test instruments, tends to lower that apparent damping factor. From our brief listening tests, though, we would conclude that no speaker system would "dare" exhibit any bass hangover when tied to this "almost-zero-impedance" source. Overall sound balance was good, and the amp showed no audible tendency to "labor" when delivering power at or near its maximum ratings. For serious high-powered studio monitoring or sound-reinforcement work, this amp impresses us as well worth its asking price. Do not be misled by its small size, however. Wait till you try lifting it. Better yet, ask a friend to help, as I did.

**BGW 750B AMPLIFIER: Vital Statistics**

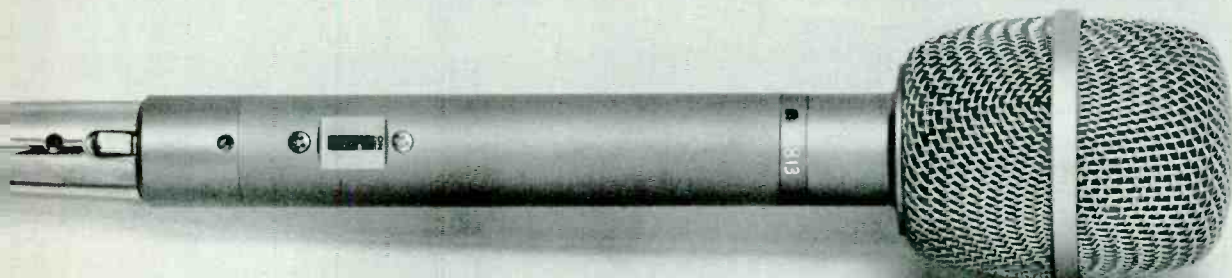
PERFORMANCE CHARACTERISTIC	MANUFACTURER'S SPEC 8 ohms/4 ohms	LAB MEASUREMENT 8 ohms/4 ohms
Continuous power/channel		
1 kHz	240 watts/400 watts	240 watts/364 watts
20 Hz to 20 kHz	225 watts/360 watts	227 watts/360 watts
Power bandwidth	20 Hz to 20 kHz	15 Hz to 25 kHz
Frequency response	NA	+ 0, - 1 dB, 4 Hz to 60 kHz
Damping factor	>500	Unmeasurable
Rated THD	0.1%/0.2%	0.004%/0.02% (at 1 kHz)
Rated IM	0.02%	0.026%/0.05%
Residual hum & noise	- 106 dB (unweighted)	- 110 dB (unweighted) - 115 dB (weighted)
Input sensitivity (8 ohms)	NA	2.1 V (for 225 watts output)
Input impedance	>6 K ohms	confirmed

CIRCLE 31 ON READER SERVICE CARD

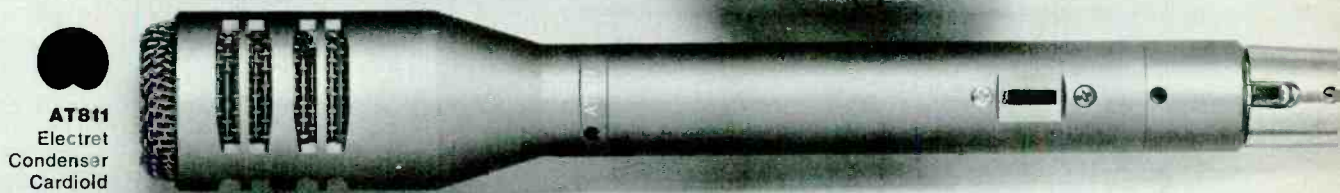




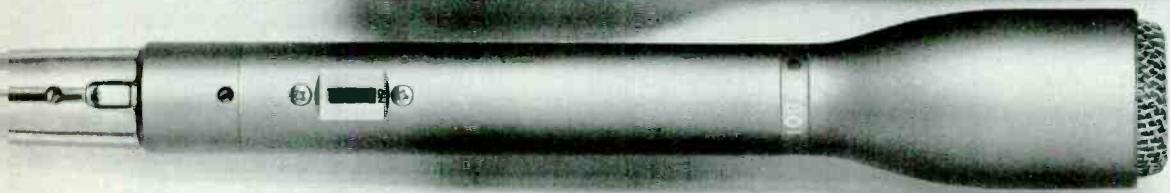
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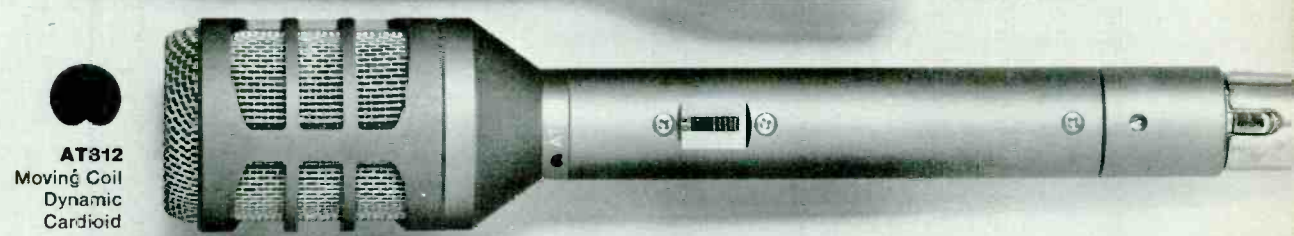
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**AT811**  
Electret  
Condenser  
Cardioid



**AT801**  
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Dynamic  
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## CROWN D150A IOC POWER AMPLIFIER

By Brian Roth and Jim Ford

**General Description:** Crown International is probably the most widely known brand of power amplifiers in the professional audio industry. Their original DC300 (introduced in the late 1960s) established the initial standards for high-powered, solid-state amplifiers. The D150A under review is basically a little brother to the latest DC300A series.

Rated at 80 watts per channel with an 8-ohm load, the D150A qualifies as being a basic, no-frills amplifier. The extruded aluminum front plate serves as the mounting surface for a pair of input volume controls, a rotary power switch, a power indicator lamp and a LED labeled "IOC" above each of the channel volume controls.

The rear panel provides quarter-inch phone jacks for audio input to each channel and dual banana jacks for the loudspeaker connections. A slide switch located above the input jacks converts the D150A from the normal dual channel (stereo) mode to monaural operation with a higher output power rating. A fuse holder and a permanently affixed power cord are the remaining features on the rear.

The main chassis of the amplifier is a U-shaped aluminum extrusion that is attached to the front panel extrusion by means of six screws. Protruding from the rear of the chassis are two metal cages—one covers the printed circuit card and the other pro-



jects the power transformer and the power supply electrolytic filter capacitors (which are rated at 9400 mfd each). Two extruded heat sinks that are secured to the main chassis are also visible from the rear. Ease of disassembly and internal access for servicing is very good.

The output power transistors are attached to the main chassis which, along with the front panel and other metal parts, serves as a heat sink. Thus, it could be stated that the entire amplifier is a heat



sink; a rather novel approach to the heat dissipation problem inherent in any power amp.

As we mentioned earlier, a pair of LEDs labeled IOC (which stands for Input/Output Comparator) are mounted on the front panel. These are designed to illuminate if the output signal and input signal are significantly different as would happen during overdrive or similar conditions. Many amplifiers contain clipping indicators that typically are activated if the output signal exceeds a preset voltage that is (hopefully) at or just below the point at which the amplifier clips. Unfortunately, this type of sensing circuit will not detect an overdrive condition if the amplifier's protection circuitry (which automatically reduces the maximum output voltage to avoid smoking the power transistors) has been triggered by an excessively low impedance speaker load. Thus, with standard clipping indicator designs, it is possible for the amplifier to be generating gross amounts of distortion without any hint from the LEDs.

Crown's approach eliminates this type problem by means of its comparison action. If the output signal is not a good replica of the input, regardless of the cause, the IOC recognizes this and the LED will flash. This is accomplished by monitoring the internal overall negative feedback loop. Under abnormal conditions, an error signal that represents the difference between the input and output signals is generated on the negative feedback line as the amplifier attempts to correct the output signal. If this error signal is of sufficient amplitude, the IOC circuit detects the condition and trips the LED. This is an excellent approach to overload indicator design since it utilizes an already existing error signal line that is a basic part of the amplifier's normal circuitry.



The owner's manual is quite thorough and includes not only operating instructions but schematics, parts lists and printed circuit board component layout diagrams.

**Field Test:** We have had considerable experience with the D150A series due to the fact that we regularly utilize it as the high-frequency amplifier in our road P.A. system. An examination of the circuit diagram of the D150A IOC revealed few, if any, changes from previous models. Nonetheless, we connected the amplifier to JBL 4315 and 4343 monitors for A-B comparison with several other highly regarded power amps. At moderate listening levels, the D150A compared favorably with the other amps. We detected a slight amount of "roughness" on the top end with complex program material even though the IOC indicators were extinguished, but this was a minor defect. Compared with the other amplifiers of the same or higher power output, we found that the D150A could often be driven into a higher amount of clipping before the sound quality became totally unacceptable.

The action of the IOC lights was quite interesting. They were positive in operation with sufficient "memory" to remain illuminated long enough to be visible. They triggered before any excessive amounts of distortion were audible, which makes them quite useful.

With 8-ohm loads on each channel and high-listening levels, the amplifier became only moderately warm. Double 4315 loads on each channel (4-ohm nominal impedance) caused the D150A to become much warmer, but not to the point of excessive tem-

perature. We had noted from our earlier examination that the amplifier includes an overheat sensor by the output transistors to disconnect power in the event of excessive heat build-up. However, we were unable to shut the amp down due to overheating even with a 4-ohm-per-channel load.

Next, we evaluated the D150A performance as a high-frequency (above 1.5 kHz) amplifier in our 3-way P.A. system. With a 4-ohm-per-channel load, the amplifier ran only slightly warm, although we should point out that our amp racks include several fans to eliminate heat build-up.

Since we do not feel that a sound system should be used as a distortion generator (like some we've heard!), the IOC feature was judged to be most useful in operating the system properly. Clipped waveforms, particularly in the high-frequency region, are not only sonically unpleasant, but also extract their toll in the form of blown diaphragms in horn drivers.

Initially, the IOC frequently informed us of amplifier clipping (this was verified by monitoring the amplifier output with an oscilloscope). To avoid feeling guilty about producing distortion (practicing what we preach), we made a slight reduction in overall volume. Not only did the LEDs settle down, the sound quality improved! It dawned on us that if more sound companies used amplifiers with *effective* output overdrive indicators perhaps the fidelity of "live" sound would dramatically increase. After all, what self-respecting soundman would want to watch all the overload indicators on his power amps stay continuously lit?

The IOC indicators also demonstrated the extent of transient peaks in the program material of a "live" performance. Even though the average output level of the D150A was well below clipping, the IOCs nevertheless would flash from time to time.

We did have one complaint with the design of the amplifier. The input phone jacks did not hold their mating phone plugs very securely. During normal handling, the plugs backed out of the jacks with the subsequent result of no output! This situation could clearly be improved.

Other than that, we were quite pleased with the D150A. The strong mechanical design and quality audio performance were definitely above average.

**Lab Test:** As usual, we tested the amplifier with a 115 volt power line voltage since we feel that this represents normal field conditions as opposed to the commonly utilized 120 volts (which will naturally result in a higher output power before clipping).

The D150A easily met its rated harmonic and intermodulation distortion levels as indicated in the

tables. At middle and high frequencies we noted the presence of crossover distortion "spikes" from the output of our distortion analyzer. These were not much stronger than the other harmonic distortion components which generally were 3rd harmonics.

Frequency response was not quite so good as claimed; at 52 kHz the response was down 1 dB although this should not be objectionable.

Square-wave response with an 8-ohm load was excellent, although it exhibited some ringing when a 2 mfd capacitor was added in parallel with the 8-ohm resistor.

We were able to induce thermal shutdown of the D150A by operating into a 4-ohm-per-channel load with a sine-wave input. This is probably the reason why Crown does not specify power output ratings at 4 ohms since the amplifiers must comply with the FTC power measurement method to be sold on the home entertainment market. However, the continuous sine-wave signals are not particularly representative of actual program. Thus, we feel that even under worst case conditions the D150A can be successfully operated with a 4-ohm-per-channel load if sufficient air movement is provided around the amplifier.

The protection circuits were quite effective. No harm was done even when using a large screwdriver as an output load! We found that the protection mode was entered at slightly higher than a 2-ohm load which should preclude its activation with a nominal 4-ohm-output load impedance.

We checked the performance of the D150A when operated in the monaural mode. In this status, both channels are utilized to drive a single load. Output power under this condition measured an impressive 290 watts RMS with an 8-ohm load.

While we had the amplifier on the bench, we attempted to fool the IOC circuitry, but to no avail. At high output levels at 75 kHz when slew rate limiting reduced the maximum output power, the IOCs faithfully reported the condition. Any time the amplifier's THD exceeded about .05% the LEDs would flash. Short duration narrow pulses also failed to trick the IOC. This is a most effective overload indicator.

We have not yet mentioned the low-frequency characteristics of the amp which extends all the way to DC (0 Hz). While this insures minimal phase shift in the bass range, the user must be aware that the D150A is capable of amplifying DC from a malfunctioning piece of equipment driving the amp's input. This can cause burn-outs of loudspeaker voice coils. Thus, it is very important to be sure that all equipment driving the D150A has circuit arrangements (output transformer or coupling capacitors) that will not allow DC to pass into the amplifier's input. We would have been happier if the D150A had included a speaker load disconnection relay that is activated by the presence of DC at the output.

The electronic components used in the D150A were definitely above average, and should help minimize breakdowns.

All in all, we were very pleased with the overall performance, both in the field and on the bench.

**Conclusions:** It seems that at least once a week someone introduces a new power amplifier. Invariably, the sales force of these companies makes comparisons between their products and the Crown line.

We have recently heard several amplifiers that sounded a little cleaner than the D150A. However, we have yet to find another amp in this power range that sounds *significantly* better. Additionally, very few other amplifiers can match the D150A's sturdy mechanical and electrical design. We feel that the strongest point of the D150A is its durability which has been proven by a multitude of users (and abusers). The IOC indicators should also prove to be a most useful feature that will assist in proper operation of the amplifier.

The D150A should be seriously considered whenever a reliable workhorse of moderate power output is required.



#### CONTINUOUS SINE WAVE POWER AT CLIPPING, 1 kHz

Load Impedance	One Channel Driven	Both Channels Driven
4 ohms	163 watts RMS	150 watts RMS
8 ohms	90 watts RMS	88 watts RMS
16 ohms	56.25 watts RMS	52.5 watts RMS

#### TOTAL HARMONIC DISTORTION AT VARIOUS POWER LEVELS AND FREQUENCIES, 8-OHM LOADS, BOTH CHANNELS DRIVEN

Power Output	Frequencies		
	20 Hz	1 kHz	20 kHz
80 watts	.003%	.003%	.018%
20 watts	.003%	.004%	.02%
5 watts	.004%	.0045%	.035%
1.25 watts	.008%*	.01%*	.05%

\*Mainly Noise

#### INTERMODULATION DISTORTION PER SMPTE METHOD (60 Hz AND 7000 Hz MIXED 4:1) 8-OHM LOAD, BOTH CHANNELS DRIVEN

Power Output	Intermodulation Distortion
80 watts	.004%
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#### OUTPUT NOISE (dB LEVELS ARE REFERENCED TO 80-WATT OUTPUT AT 8 OHMS OR 25.3 VOLTS RMS)

Test Condition	Output Noise 20 Hz — 20 kHz Unweighted
Ch. 1 Vol. Max	40 microvolts or .0002 microwatts (-116 dB)
Ch. 1 Vol. Min	45 microvolts or .00025 microwatts (-115 dB)
Ch. 2 Vol. Max	40 microvolts or .0002 microwatts (-116 dB)
Ch. 2 Vol. Min	35 microvolts or .00015 microwatts (-117 dB)

#### CROSSTALK (dB LEVELS ARE REFERENCED TO 80-WATT OUTPUT LEVEL AT 8 OHMS OR 25.3 VOLTS RMS)

Ch. 1 driven, Ch. 2 under measurement		
Frequency	Ch. 2 Vol. min	Ch. 2 Vol. max
20 Hz	-107 dB	-106 dB
1 kHz	-103.75	-99 dB
20 kHz	-88.75 dB	-79 dB
Ch. 2 driven, Ch. 1 under measurement		
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## POPULAR

**THE TUBES: *What Do You Want From Live.*** [Pete Henderson, Rikki Farr, producers; Pete Henderson, engineer; Bob Bullock, assistant engineer; recorded "live" at the Hammersmith Odeon, Lon-

don, England, using the Island Mobile Unit (Division of Island Records).] A & M Records SP 6003.

Performance: **Better than most "lives"**

Recording: **"Ditto"**

It was only a matter of time before the multi-media Tubes would have to try

their hand at a "live" recording and here it is. The Tubes have managed to capture much of the energy and excitement that is always present in their "live" performances on this two-record set. They have also managed to keep the pace up consistently throughout the recording which is often difficult to do with "live" albums. First of all, there are no self-indulgent solos. Even Prairie Prince and Mingo Lewis' cooperative drum solo is concise and well planned (only four minutes, twenty seconds). Between-song dialogue is also kept to a minimum and is only used when pertinent to the music.

A real treat for me were the five new pieces of material present here—certainly not a common occurrence on "live" albums. Most "live" albums are made up of past hits (a safer move) so this departure is a welcome one. Roger Steen plays a very tasty guitar break in his own "Show Me A Reason" and the Tubes' punk treatment of Lennon & McCartney's "I Saw Her Standing There" is interesting to say the least. Other new material includes "Got Yourself A Deal," the fight song of every Rock & Roller trying to make it to the big time; "I Was A Punk Before You Were A Punk," part of their 'punk parody' (obviously a very convincing and misunderstood skit since I recently saw the Tubes' albums classified in the Punk section of a local record store) and a short instrumental, "Special Ballet" which is used on this album set as a lead in to "Don't Touch Me There."

The actual recording has both its good and bad points. The drums have nearly studio separation and the sound in general is seldom muddled. However, the drums and bass are too far up front at times, especially in "Overture" and "Crime Medley" and there are numer-



TUBES: Captured "live" excitement

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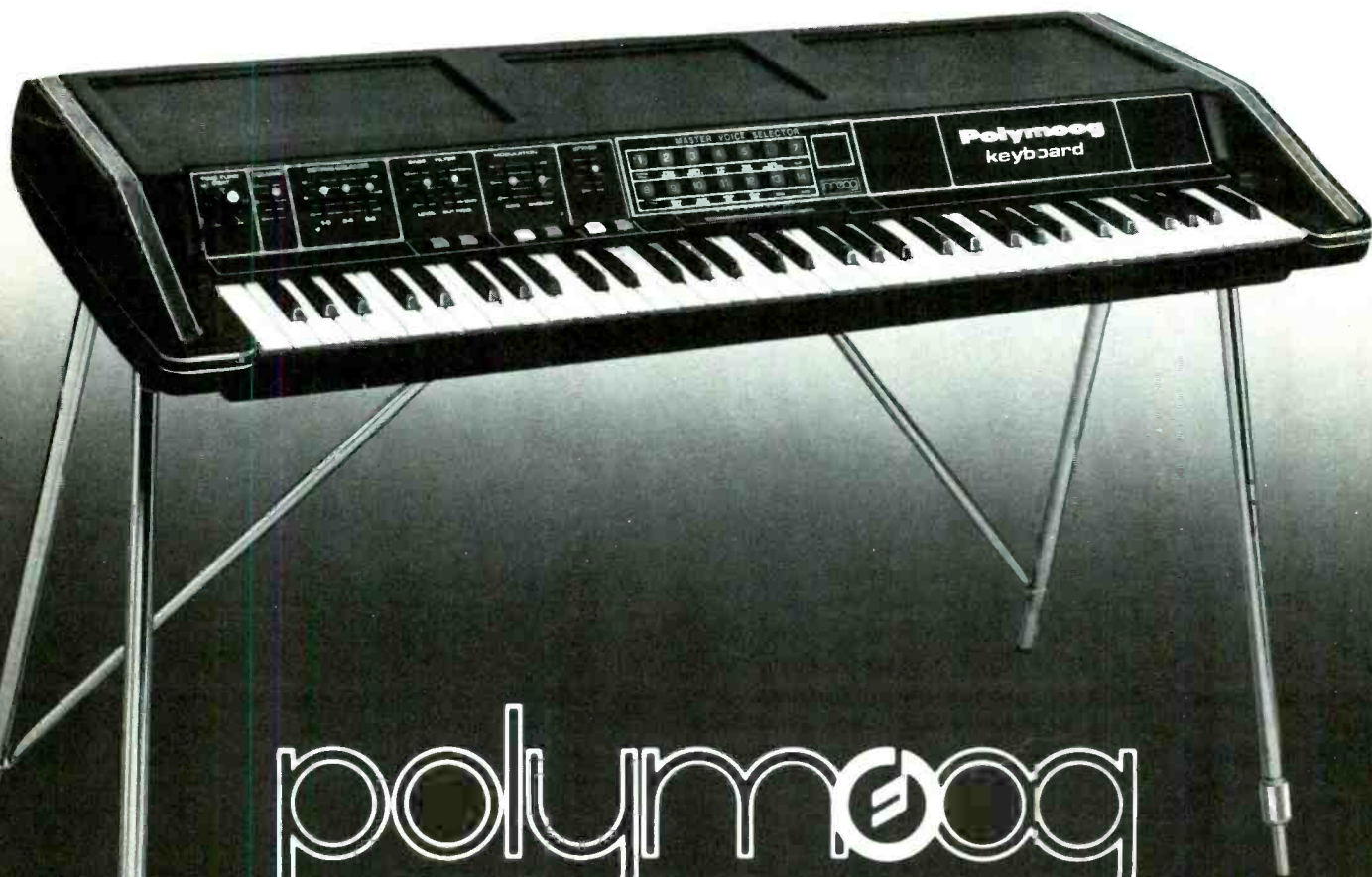
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ous occasions when the keyboards, both Cotten's and Welnick's, were in need of more volume. Of course, in a "live" situation it's hard to decide who's to blame for such problems: the musicians can turn up or down, equipment can go on the blink, the sound man can blow it, the "live" engineer could miss a cue (not likely in this case with Pete Henderson in the seat) or it can be blown in the final mix. However, the vocals, including the background vocals, are right up front and clear which is important with a band like the Tubes whose lyrics are such a vital part of their performance.

All in all, the Tubes have given us a well planned album which is very representative of this multifaceted band. Those who have never seen the Tubes will get a very good idea as to what they can expect at a Tubes concert. As for me, the Tubes are definitely "what I want from 'live'."

C.K.

#### IAN DURY: *New Boots and Panties*.

[Producer and engineer not credited, recorded at The Workhouse, Old Kent Road, England.] Stiff Records STF 0002.

Performance: **Not thrilling**

Recording: **Anonymous—and rightly so**

New label, new artist but still the same limited, repetitious sound. One is immediately tempted to turn pundit and say that Stiff Records is an apt label for the talents of Ian Dury. Why do I constantly have the feeling that nine out of ten punkies are Mel Bay drop-outs? While punk rock may be consid-



IAN DURY: Stiff's the word for it

ered the new social consciousness in England, its relative importance in this country is nil.

"My Old Man," a slow-moving, impressionistic portrayal of his father, starts with electric guitar right, drums and bass center. The vocal, a thickly accented talk/sing, is centered, backed by an occasional Vox or Farfisa organ chord left, as well as sax, both left and right of the vocal. At the break, a very clean electric guitar solo replaces the vocal. A few more verses and the sax and solo guitar take over center in a slow fade-out. Drums throughout consist totally of hi-hat and snare. It's dull.

G.P.

**PATTI SMITH: *Easter*.** [Jimmy Iovine, producer; Thom Panunzio and Charlie Conrad, engineers; mixed by Shelly Yakus and Jimmy Iovine; recorded at The Record Plant, New York City, N.Y. and The House of Music, West Orange, N.J.] Arista AB4171.

Performance: **Passionate**

Recording: **Bold**

When I saw Patti Smith close-up in the flesh for the first time, backstage at the Palladium in New York at a birthday party for Charlie Daniels, I didn't quite make the connection between the avant-punkish Smith and Southern boogie. But *Easter* makes it even clearer than her first two releases, *Horses* and *Radio Ethiopia*, that Patti Smith does believe in boogie-ing; only hers is a kind of lyrical boogie. It's evident Patti worships word jams.

*Easter's* "Babelogue" portrays Patti Smith's "live" performance as a stream of consciousness ramble filled with statements of the artist's right to engage in such fare, outside the mainstream of tightly-knit melodic structures. Blending "Babelogue" into the potent "Rock N Roll Nigger" proves that performers of Smith's caliber can successfully translate the urgency of a stage show into the studio experience and counter the pitfalls of the control room's implied sterility.

*Horses*, Smith's debut album, combined her lyrical powers with the forcefulness of her band. *Radio Ethiopia*, unfortunately, collapsed under the weight of Aerosmith producer Jack Douglas's attempt at heavy metal excursions; while heavy metal's tension is cathartic, Patti's political affirmations ask for involvement. *Easter's* production by Jimmy Iovine, strong enough to



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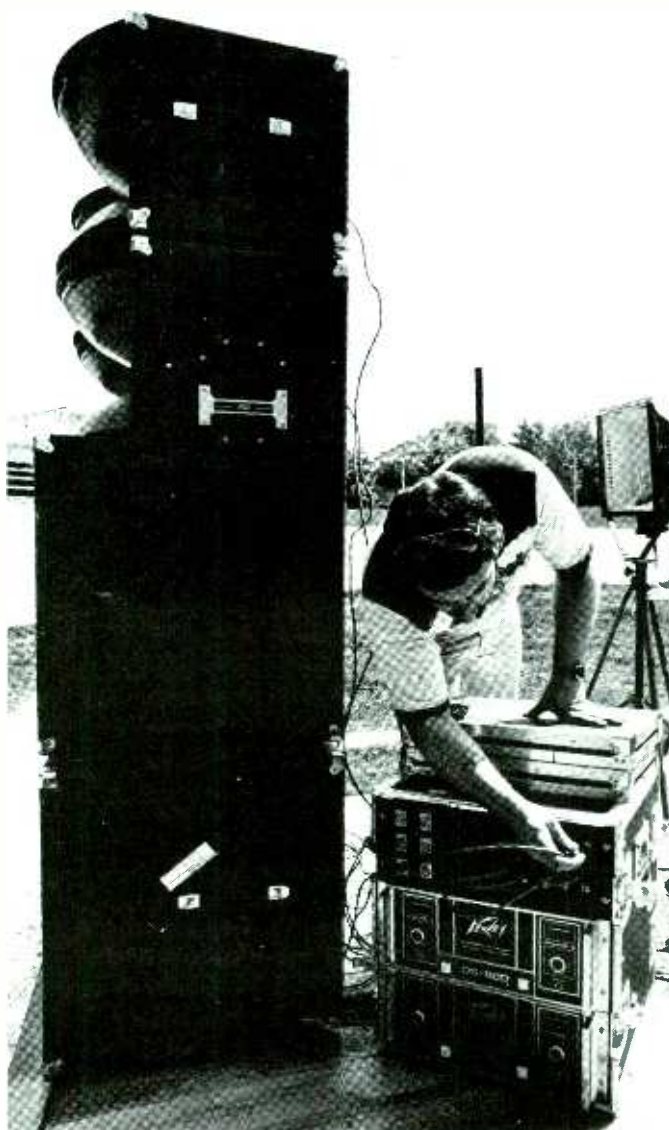
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Gary Mullen  
Dirt Band sound man

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support Smith's music without sacrificing her presence as its focal point, is propelled by songs that move beyond the three-chord rockers of *Horses* into the realm of complex musical redemption only hinted at in *Radio Ethiopia*.

"Because The Night," co-written by Smith and Bruce Springsteen, is producer Iovine's mixing masterpiece. The acoustic piano intro and Patti's end-of-the-pier reverbed vocals are cracked wide open by drums whipping across the back of the mix with a Spectorish tambourine. Like the Shangri-las before her in the sixties, Patti carries on the tradition of the tough female rocker whose only weakness is a propensity for romance. The everpresent Lenny Kaye guitar work of most of Smith's arrangements is tastefully downplayed in "Because The Night," giving his solos the chance to flesh out the spaces with a maximum amount of attention. On the strength of the entire album, after a long struggle, Patti Smith has found commercial success in *Easter*—without compromising her commitment to the business of pursuing art as life. S.S.

JAZZ

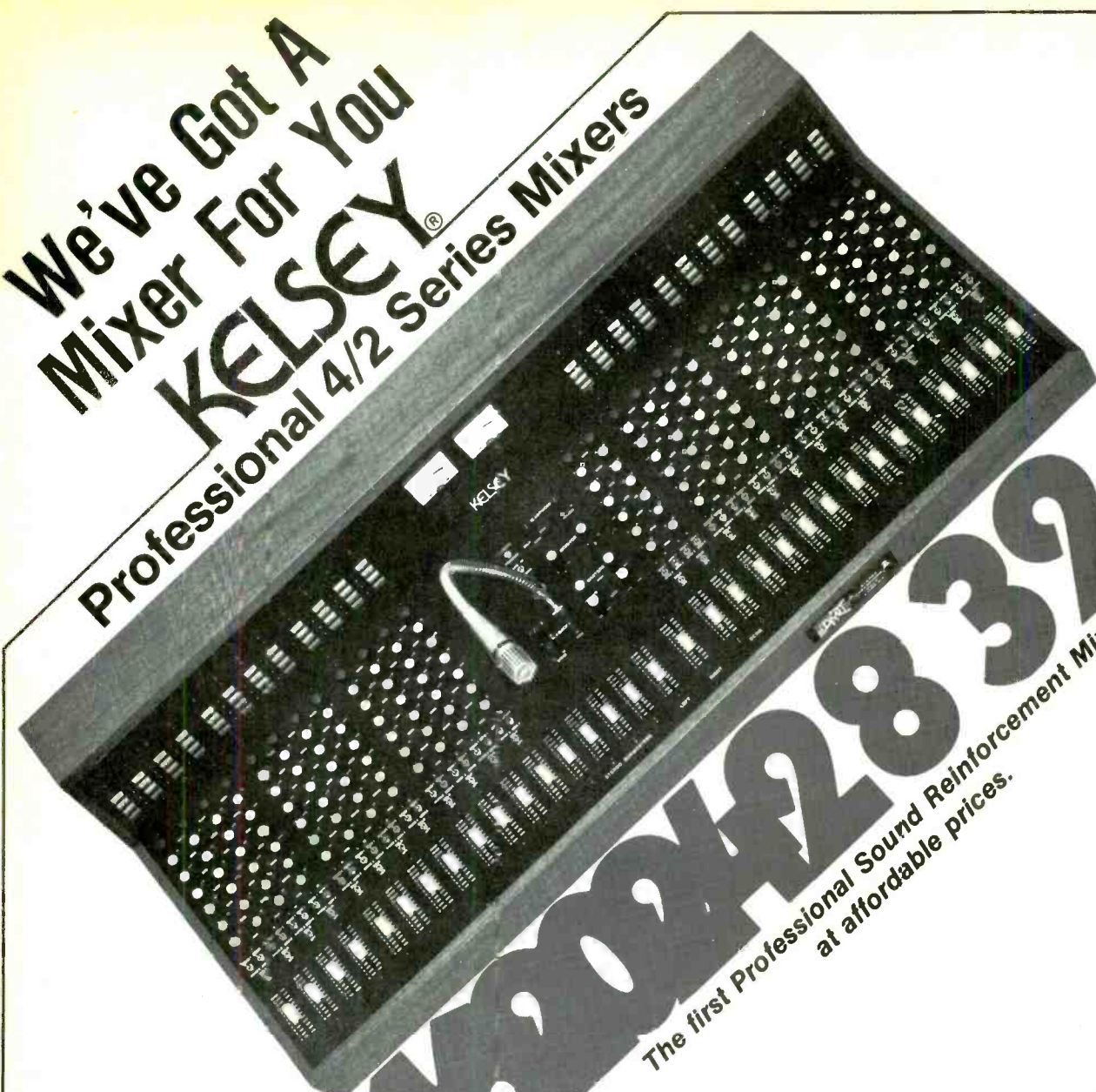
**DEXTER GORDON AND WARDELL GRAY:** *The Hunt*. [Bob Porter, Steve Backer, reissue producers; original recordings made by Ralph Bass at the Elk's Club, Los Angeles, Ca., on July 6, 1947.] Savoy SJL 2222.

Performance: **West Coast Bop at its best**  
Recording: **A great improvement over the originals**

I remember a series of some five or six ten-inch 78 rpm records on some long-forgotten, obscure, independent label that marked my first acquaintance with "The Hunt." While the other tracks from this session, "Disorder At The Border," "Cherokee" and "Byas A Drink," have previously been issued, it was "The Hunt" which came to my attention at the time. Dex and Wardell were two different kinds of tenor saxophone players—Wardell with his light Prez sound and Dex with his heavier deeper-toned Hawkins influence—but that's only scratching the surface. What it *was* was a good old-fashioned after hours jam (see Ross Russell's liner notes) with a built-in cutting contest for the two tenor titans. Somehow or

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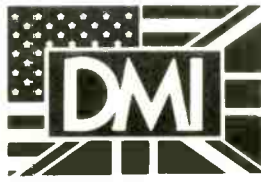
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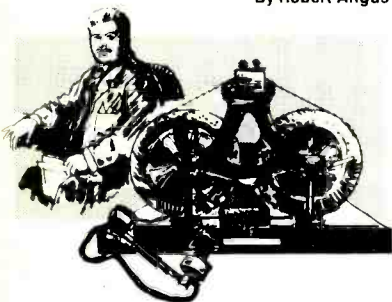
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## the art of commanding attention: a duet and all alone

By NAT HENTOFF

Although I approach each new recording with anticipation of pleasure—being a chronic though much disappointed optimist—the prospect of a trumpet-percussion duet gave me pause. The likelihood was either much “experimental” flailing about by both participants or a series of virtuosic exercises. Since the dialogue, however, was between Lester Bowie and Phillip Wilson, I should have known better. Their *Duet* on IAI (Improvising Artists Inc.) is continually absorbing, surprising, stimulating, and above all, abundantly pleasurable to the senses.

Bowie, who first became widely known among jazz explorers as an organizer of the Association for the Advancement of Creative Music in Chicago—and later of the Art Ensemble of Chicago—not only has total command of the horn but also has a most singular, multi-colored imagination at his disposal.

Wilson, who first met Bowie when they were in high school in St. Louis, is also an alumnus of AACM and has worked with an instructive diversity of musicians, ranging from Paul Butterfield to the latter-day Anthony Braxton. In this duet ambience, Wilson does not so much keep time as create an extraordinarily flexible soundscape of intersecting rhythms—and silences—which allows Bowie enormous freedom while also providing him with just enough outer limits of time-form so that he doesn't stray into the quicksand of anarchy. And Wilson, like Bowie, is an inventive colorist—one of the most subtle blenders of textures in post-modern jazz percussion.

In the forefront of much of the proceedings, however, is Lester Bowie. Capable of a burnished, jazz-classic, singing tone, he is also expert at the

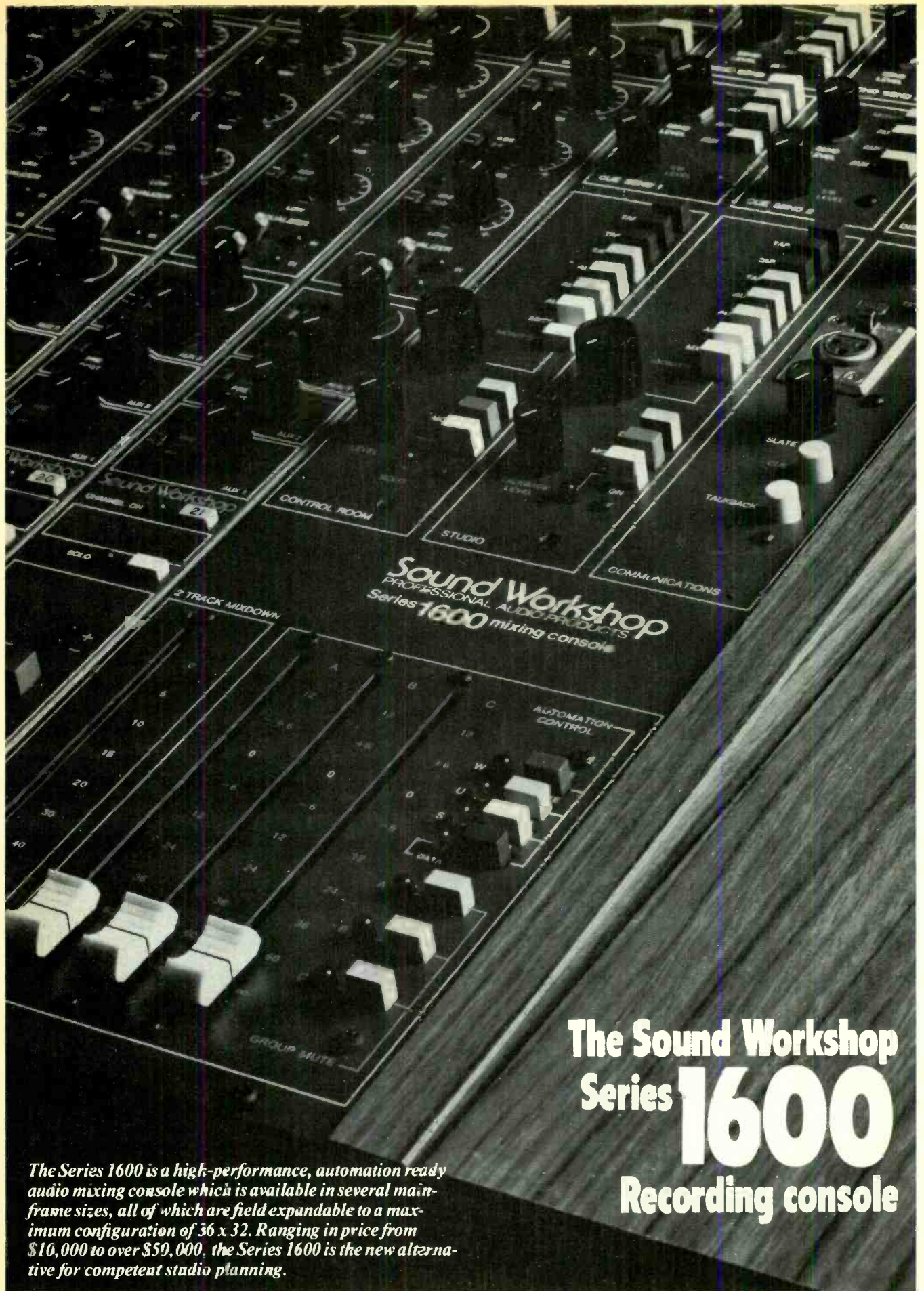
kind of cocky, strutting “half-valve” sound and thrust that characterized Rex Stewart's work with Duke Ellington. (In fact, there are variations here on Rex's “Boy Meets Horn.”) In addition, Bowie explores, often with wit, a diversity of other sound potentials on the trumpet. And it's all done with such strong, implicit swinging time that even though the pulse is often not explicitly stated, it is *there*. Add Bowie's sure, graceful sense of dynamics and his ease with vast space (he doesn't feel he has to fill it all up), and you have an uncommon creator.

Also on IAI is Ran Blake's *Solo Piano*. Blake, on the faculty of the New England Conservatory of Music, has long been a searching, devoted ecumenicist. His expertise ranges from black gospel music to Thelonious Monk to sectors of contemporary classical music. But in his playing, Blake is truly an original—reflective, continually surprising in his turns of imagination but never obtrusively “different.” There is a deep coherence to his improvising and at its core is a romantic but disciplined sense of wonder at what sound can do to the emotions.

Pianist Paul Bley, co-founder of Improvising Artists Inc., produced both these albums, and the sound is what one would expect of this demanding musician—clear, without a trace of electronic gimmickry, and full of immediacy, as befits a company of improvisers.

**LESTER BOWIE/PHILLIP WILSON:** *Duet*. [Paul Bley, producer; David Baker, engineer.] IAI Records 37.38.54.

**RAN BLAKE:** *Solo Piano/Breakthru*. [Paul Bley, producer; David Baker, engineer.] IAI Records 37.38.42.



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**DEXTER GORDON:** Enjoying himself

other musicians don't do that much any more. Nowadays it's mostly an "after-you-my-dear-Alphonse-after-you-my-dear-Gaston" sort of camaraderie even in the jam session situations. Even in the case of Wardell and Dexter it wasn't so much of a fight for supremacy as each man prodding the other to give a little more than the customary excitement to the proceedings. Nobody wins. Everybody wins. They both play great and, in my opinion, better than they would have without the external stimulus of the contest.

Let's not forget the other players on these sides... a brilliant young Barney

Kessell, not nearly so well known then; Trummy Young, still with his roots from the Jimmie Lunceford band but blending in well with the modernists; Sonny Criss, an alto sax player who had heard Charlie Parker but heard him his own way and the as yet little-known drummer Connie Kay who established himself later with the Modern Jazz Quartet and more recently with the traditional band at the Eddie Condon III Club in New York. It was a band mostly made up of young turks who were out to have a good time enjoying themselves and each other. It was fortunate that Ralph Bass and his recording equipment were there to let us eavesdrop.

The mono sound on these records is far from today's quadrasonic standards yet it is considerably cleaned up from the messy fade in/fade out beginnings and endings of sides on those 78s. Bob Porter includes a lengthy note about the recording techniques in the liner notes so there's no point in going into the problems here. Suffice to say, that the sound certainly is an improvement over the original records as I remember them... and I do remember them and I'm glad to have "The Hunt" plus the other selections available again.

J.K.

**JIMMIE ROWLES AND STAN GETZ:**  
*The Peacocks.* [Stan Getz, producer;  
Stan Tonkel, engineer; recorded at CBS



**STAN GETZ:** At his most lyrical

Photo courtesy of Charlie Bourgeois

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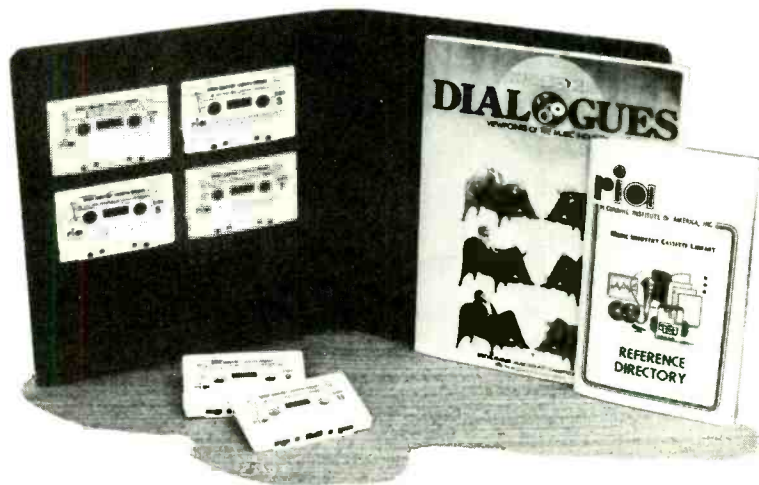
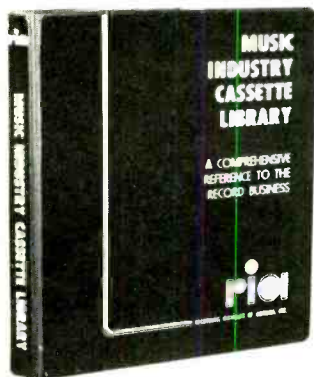
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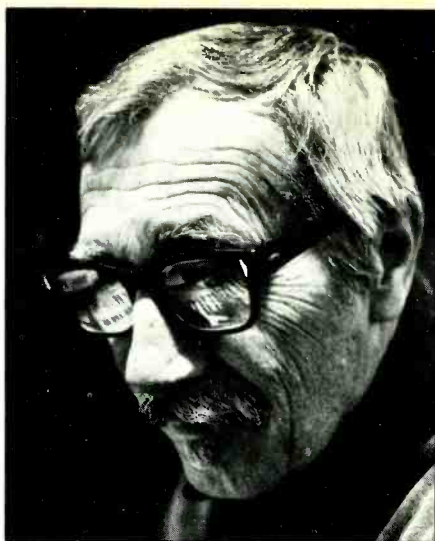


Photo courtesy of Charlie Bourgeois

### JIMMIE ROWLES: Excelling

Studios, New York City, N.Y. (1974-75).] Columbia 34873.

Performance: **Simply wonderful and wonderfully simple**  
 Recording: **A little slick, but not contrived**

In April of 1974 Duke Ellington was in the hospital. He was only to live a bit more than a month. That same month, George Wein and the New York Jazz Repertory Company staged a marathon concert at Carnegie Hall which lasted till well after midnight. Somewhere in this program tenor saxophonist Stan Getz and pianist Jimmie Rowles came out and did a duet on one or another of Duke's compositions and it really shook the audience. It was probably soon after this that Stan Getz and Jimmie Rowles went into Columbia's recording studios to begin work on this eagerly awaited album.

It is Jimmie Rowles, bar-room singer and pianist par excellence, along with Mr. Getz at his most lyrical that makes for some mightily fine music. At times a bass and drum and a series of more sophisticated singers intrude on the scene but basically the album amounts to a dialogue between Rowles and Getz. It's lights down low, cozy listening music even in its more "up" moments, such as Wayne Shorter's "Lester Left Town." But the main mood of the album is those soft lush ballads which Getz has always played so effectively and at which Rowles also seems to excel. And whether it's Stan and Jimmie playing Duke Ellington's "Serenade to Sweden" or Jimmie singing "My Buddy," it's beautiful.

Stan Tonkel is an engineer with ears

that tell him where the music's at. He doesn't need to depend on dials and switches. His taste and his ability to listen gave Stan Getz the freedom to move out of the control room even though he is producer of this record and join Jimmie Rowles in the studio.

I don't care to get into a dispute with the liner notes by Dan Morgenstern or the back jacket statement by Stan Getz about the merits of bassist Buster Williams and drummer Elvin Jones. While grounded in truth, I do feel they are extraneous. When two such witty and erudite gentlemen as Stan Getz and Jimmie Rowles are conversing, who needs running commentary? J.K.

## CLASSICAL

**RESPIGHI: Feste Romane; The Pines of Rome.** The Cleveland Orchestra, Lorin Maazel cond. [Michael Woolcock, producer; Kenneth Wilkinson, engineer; recorded May 1976 in Masonic Hall, Cleveland, Oh.] London CS 7043.

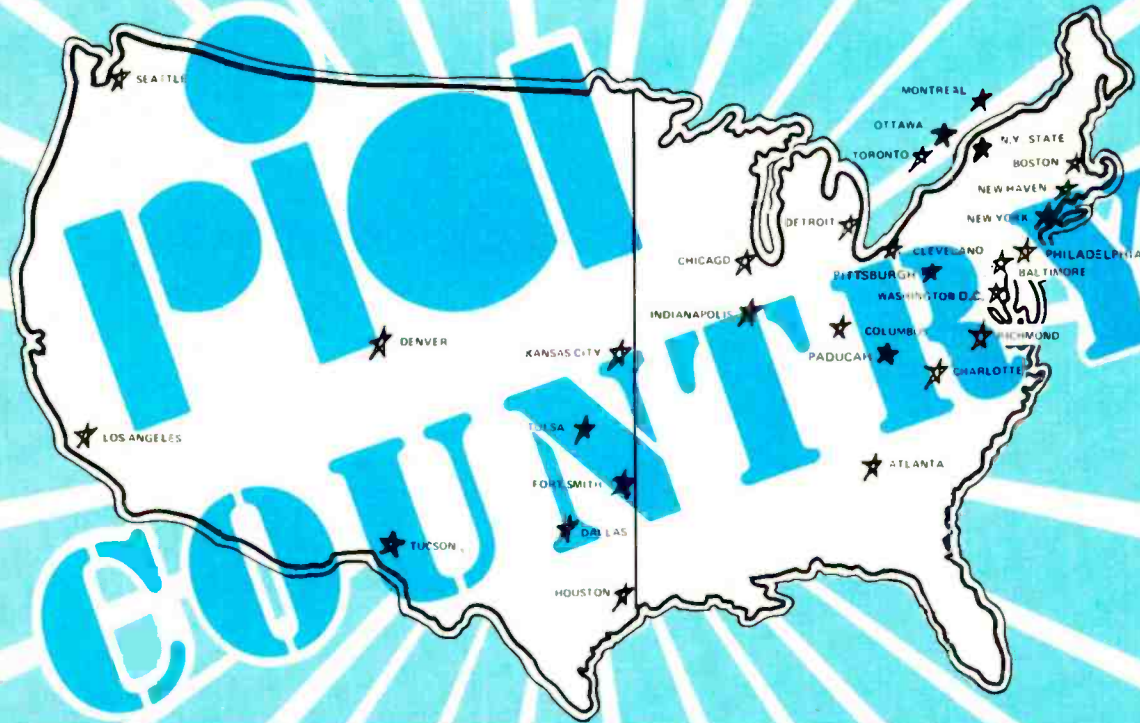
Performance: **Excellent**  
 Recording: **Stupendous**

Wow! London is famous for its sound, but here the color and opulence of the music combine to produce an especially impressive demonstration disc. Respighi has never been accused of subtlety, but he rarely fails to please an audience. His orchestrations glisten and resonate, utilizing all the instruments to their brightest advantage. The deep, rich melodies of a work like *The Pines of Rome* take second place to none for their kaleidoscopically hued beauty and poetry. On the other hand, his effort to outdo a previous formula—such as the last of the Roman Trilogy, *Feste Romane*—can result in mindless bombast. (I wish that Maazel had recorded *The Fountains of Rome*, instead, which is the *Pines'* usual disc-mate.) If one ever wants to hear *Feste Romane*, however, I can't imagine a better way than with Maazel. *Pines* is Respighi's most popular work, and all the shimmering poetry and bone-crushing *fff tuttis* are superbly rendered by orchestra, conductor and engineers. Perhaps the Phase-4 Munch (Lon. 21024) and Ormandy's second stereo recording for Columbia (M-30829) are comparable, but hardly better.





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