

Profile:
Producer
TOM DOWD

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MODERN RECORDING & MUSIC

Vol. 7 No. 2
November 1981

a session with
Hall & Oates

**CONSTRUCTION
PROJECT:
BUILD A
NOISE GATE**

**LAB REPORTS:
Gold Line
Real-Time
Analyzer
Phase Linear A60
Power Amplifier
Yamaha K960
Cassette Deck**

**NOTES:
Zeta Systems "Little FEANC"**



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RECORD REVIEWS**



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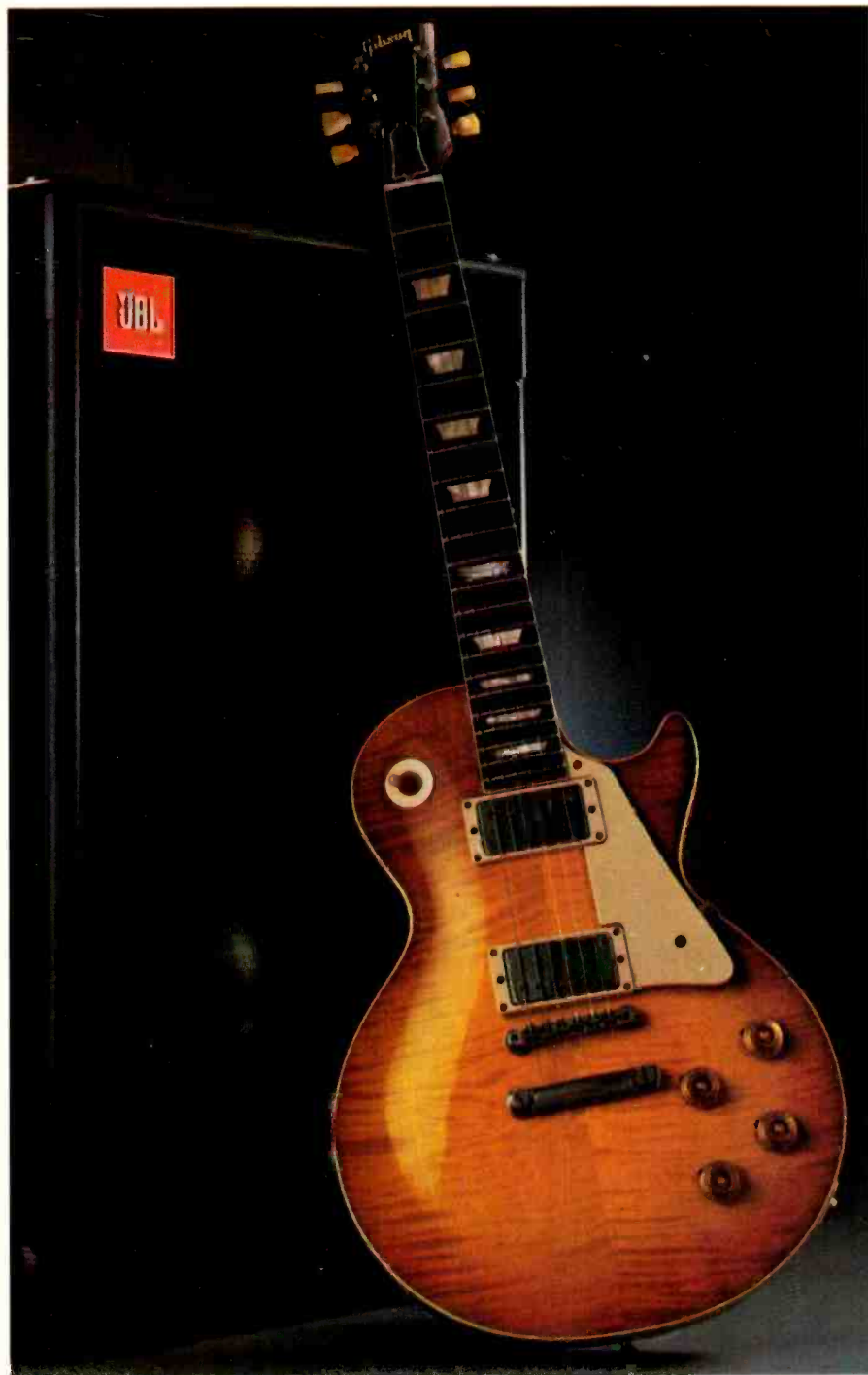
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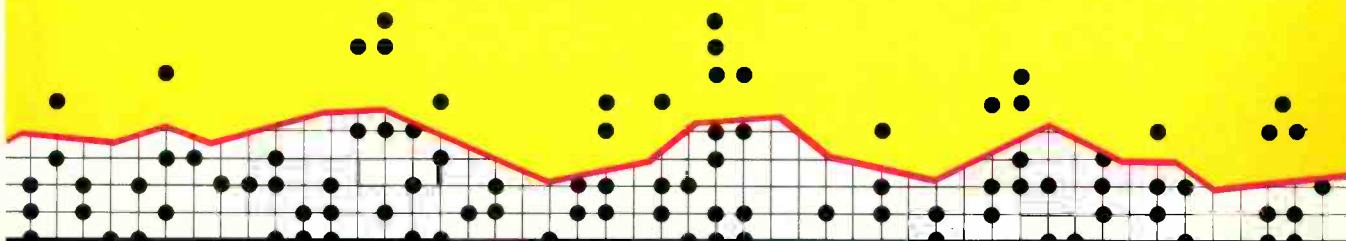
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Playing

A total of 32 different rhythm patterns can be written into the TR-808. Rhythms are played by selecting one of the 16 switches along the bottom of the front panel. These can be switched while a rhythm is playing to change from a straight beat to a fill, or another rhythm.

LEDs indicate which rhythm is playing, and a Prescale feature makes sure all rhythms are in time with each other, even while switching between odd and even time signatures.

Composing

A feature that sets the TR-808 apart from any other rhythm device is its ability to record an entire composition's percussion score, which we call Composing the Rhythm Track. This is accomplished in exactly the same way as the unit is played, by switching from one rhythm to another, only this is done while in a Compose Mode. When the song is over and you switch from Compose to Play, every change has been recorded, every fill, straight beat and break, up to 768 measures in length.

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MODERN RECORDING & MUSIC

NOVEMBER 1981
VOL. 7 NO. 2

THE FEATURES

CONSTRUCTION PROJECT: BUILDING A NOISE GATE

By Jon Gaines

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If your aim is a tight, professional sound, a noise gate can help bring your goal a little bit closer. This device is simple to build, durable, and can perform many functions that will really clean up your act, whether you take it on the stage or into the studio.

A SESSION WITH HALL & OATES

By Jeff Tamarkin

40

Used to commercial success almost from the start, Daryl Hall and John Oates first felt true artistic satisfaction when they produced their smash album, *Voices* (RCA). At work at Electric Lady Studios in New York City on the follow-up, *Private Eyes*, Daryl and John took time out with *MR&M* to share their feelings on producers, success and unique vocal exercises!

PROFILE: PRODUCER TOM DOWD

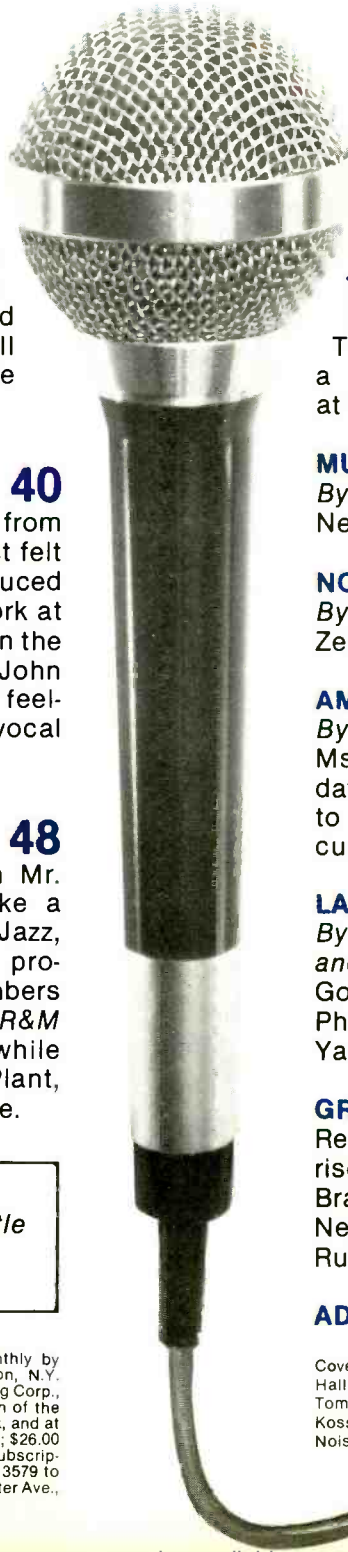
By Steve Caraway and Dan Forte

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That's producer with a capital "P" in Mr. Dowd's case. His biography reads like a history of the recording industry itself. Jazz, R&B, rock—Tom has engineered or produced the very best of them and remembers each with a special smile or story. *MR&M* was happy to be able to talk with Tom while he was at work at the Sausalito Record Plant, completing Pablo Cruise's latest release.

COMING NEXT ISSUE!

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Profile: *Junior Walker*
Studio Notebook #4



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LETTERS TO THE EDITOR

There's No Limit to the Limiter

What follows is a letter from a reader addressed to Craig Anderton, concerning...yes...the famous limiter.

May I first start by adding my expressions of thanks to an evergrowing list of "expressions" with regards to the PAIA limiter (11/79 *MR&M*). I've used it in P.A. applications to keep shouters and P-poppers from sending my speakers to the graveyard. I've also used it in a low budget 4-track setup to keep the drummer's more explosive fills on the VU meters. In any case, I've never encountered any problems with distortion. Those guys that are doing all the complaining may have legitimate gripes, or they may have fried a component when wiring, or they may be trying to get a \$50.00 (with power supply) limiter to perform like a \$500.00 compressor/limiter. Those LED's aren't pilot lights; they're not supposed to be on constantly. And I salute you, Craig Anderton, for your continued loyalty to this subject, and to the letters from those guys who want "gold-foil" sound from tin-foil pocketbooks.

However, my reason for writing is to ask you to consider another project or direct me to an existing one. I am searching for a notch filter, and at this point have been somewhat unsuccessful. I have come across only two such animals manufactured by UREI and Audioarts, both of which are too expensive for me and I'd be paying for things I don't need. The UREI is a two-band model, each variable from 20-20,000 Hz with a notch of -50 dB, Hi & Low pass filters, variable notch width ('Q'), etc., for which you pay over \$700.00. Certainly an excellent piece of equipment but more sophisticated than I need, and more than I can afford. The Audioarts is a five-band model, variable from 52-7,300 Hz, 1/6 octave notch width but only -16 dB notch depth. Not near as good as the UREI, but not far above a parametric equalizer, for which you pay over \$300.00 and I don't need five bands. (Bogen incorporated a tunable notch filter in an old powered mixer.) Would it be possible to come up with a notch filter with only one band, variable from around 50-5,000 Hz with at least a -25-30 dB notch, with relatively narrow (1/6 octave) or even variable 'Q,' that would suit the need and the pocketbook, as does the PAIA limiter. One could buy as many filters as desired (1,2,3, etc.) without being forced into hi & low pass filters or five bands, etc. Maybe I'm asking for too much of a good thing, but it never hurts to ask.

Also, while I'm asking...is there a good line-amp kit taking an unbalanced signal at -10 dB (TEAC model mixer) and boosting to a balanced +4 dB level (to interface with pro gear)?

Thank you for your attention!

—Stephen P. Ditmer, Music Bureau
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120 W. 14th Street
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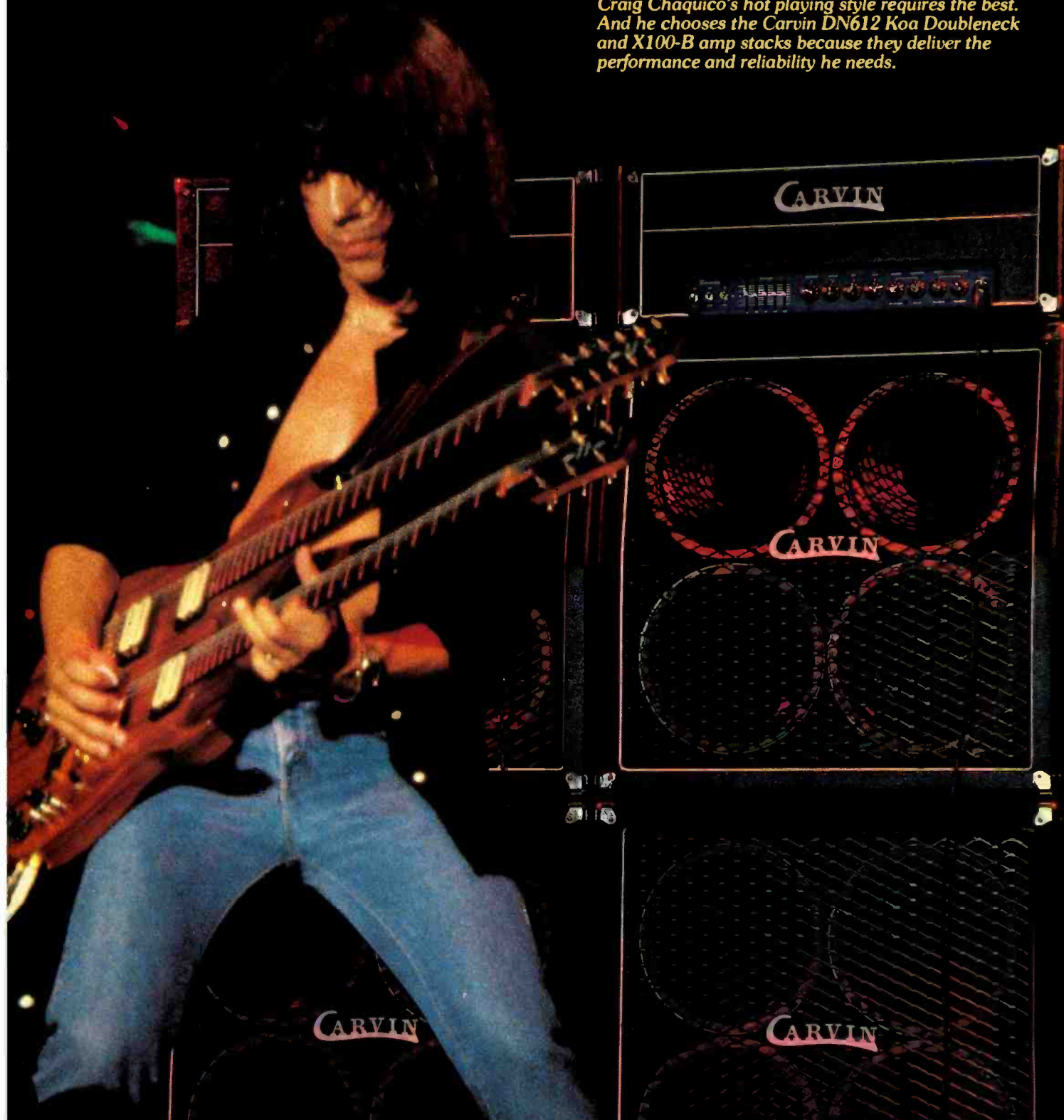
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Craig Anderton replies:

Thank you very much for your letter of June 17, 1981. It was a great consolation to know that someone out there is capable of correctly assembling the limiter *and* capable of using it correctly as well.

With regards to a notch filter, there are a couple of options. I ran a project for a parametric equalizer stage in the April '81 issue of *Contemporary Keyboard* magazine; it does what you want it to do. Also, project #17 in the revised version of "Electrical Projects for Musicians" is a parametric-like filter that gives notch, lowpass, bandpass, and highpass outputs. I think you would find it most useful. Either one will meet your needs (single channel, 50 Hz to 5 KHz response, variable Q, and inexpensive).

Re line-amp kit: There is no such kit that I know of, however, your letter indicates a need and maybe if I ever get some spare time I'll develop something along those lines.

Thanks again for your kind comments. Very best,

—Craig Anderton
Contributing Editor
Modern Recording & Music

Sound History

Maybe *Modern Recording & Music* could settle an argument. Some friends and I were talking about "modern" musical devices, and someone brought up the question of when synthesizers originated. He said that they weren't that modern at all, being around since the 1920s. Someone else thought that the 1940s was more like it. Could you give us a little background? The bets have already been placed and now we're waiting with bated breath.

—Joe Richards
Jersey City, NJ

Our sources give the year 1896 as the very first appearance of a synthesizer. The first synthesizing device was Thaddeus Cahill's telharmonium. It weighed over 200 tons. In 1920 the first work was done on the theremin, a pole which generated musical sounds when hands were waved around it. It was invented by Leon Theremin, who was also responsible in 1931 for creating the first electronic rhythm device. The inventor of the electronic organ (1935), Laurens Hammond, also developed the Novachord. The Novachord was com-

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The SO410H is an efficient 2-way system with four 10" JA2511 woofers and a JA4204 combination short horn and driver in a lightweight, ported reflex enclosure. This particular system offers what we feel is surely the best sound of any column-type system on the market. Regardless of price.

The SO112T speaker system utilizes two woofers (a 12" Yamaha JA3061 and a 10" JA2507) and four 2" Yamaha JA0554 tweeters in a portable bass reflex cabinet.

The SO110T utilizes a 10" Yamaha JA2511 woofer and a JA0556 tweeter in a heavy-duty ported enclosure offering high sensitivity and very compact size.

The S2115H stage monitor system uses the same components as the S4115H in a low-profile enclosure. The 100 watt RMS power rating handles all the power needed for most monitoring situations.

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monly found in recording studios in the 1950s and led to the development in 1964 of the Moog synthesizer by Robert Moog. Moog had been manufacturing and selling a do-it-yourself theremin kit and then presented a paper before the Audio Engineering Society in which he proposed combining features of the theremin, the Novachord, the Ondes Martenot, which is a device invented by Maurice Martenot in 1929, and the RCA synthesizer Mark II in a single, compact device. It can imitate almost any other musical instrument and can create new sounds of its own.

Now, as the money changes hands...

Not Exactly Snap, Crackle, & Pop

I've heard the expression "crisp" used, but don't really understand what is trying to be said. It's one of those expressions that I think means a particular thing, but I'm not sure. Please tell me what it means in the recording terminology.

—Jack Reasoner
St. Paul, Minn.

Our sources say that the term "crisp" refers to "good bite" or percussive edge. In other words a system (recording, playback or sound reinforcement) that is crisp, has a good percussive edge, and an appropriate amount of high frequency energy. The example is given that one might want a system where "the brass is crisp," but not "too crisp."

The Rest of the Story

In our September 1981 article on Teddy Pendergrass, we referred to Joe Tarsia as "Chief Engineer at Sigma Sound Studios." Though he is indeed chief engineer, we neglected to mention that Joseph D. Tarsia is also owner, founder and president of Sigma Sound Studios in Philadelphia and New York. Now, that's a bit more complete!

Speaker

It is not very often that I'm moved enough to write a letter to the editor of a magazine. But after reading one written by a Mr. T. Young that appeared in your September 1981 issue, I became

thoroughly enraged and grabbed a pen. Mr. Young has the nerve to suggest that he has a "captive collection" of speaker cabinet plans that are worth some 20 to 30 dollars apiece. He somehow justifies that outrageous plan fee with his ten years of experience. The rude fact is that horn loaded systems and all speakers in general find their design roots some 30 years ago. Admittedly there have been refinements in years since, but the basic design remains the same AND IS FREE!!

Most raw speaker manufacturers (namely Electro-Voice, Altec, JBL and others) offer free or near free plan services to their customers. It's good for business! And take note, these are field proven designs! I personally have heavily tapped the files of Electro-Voice.

Any regular "concert sound system watcher" or even a regular reader of *Modern Recording & Music* has spotted a great deal of similarity amongst the systems the big timers are using. Part of what they are using is because "that is what everybody else is using," but as well because experience has shown them success with a particular

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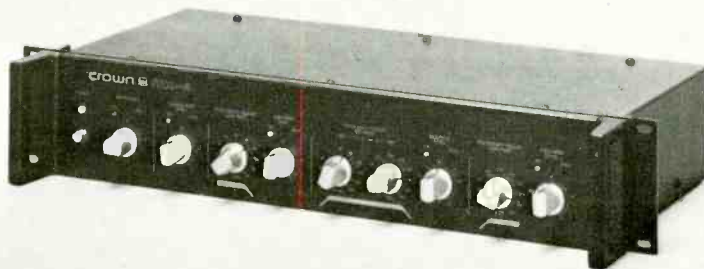
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fact: These 10 problem solvers in your toolbox are like 10 new tricks up your sleeve. Or 10 hours of saved time. Or money in the bank. They make molehills out of troubleshooting mountains, without soldering, or splicing, or internal equipment modifications.

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Input Overload	A15AS Microphone Attenuator—prevents overload.
Phasing	A15PRS Phase Reverser for balanced lines.
Low-Frequency Noise	A15HP High Pass Filter—reduces low-frequency noises and proximity effect.
High-Frequency Noise	A15LP Low Pass Filter—reduces objectionable high-frequency noises.
Lack of Presence	A15PA Presence Adapter—adds intelligibility and brilliance.
Sibilance	A15RS Response Shaper—sibilance filtering, plus flattened response.
Line Level to Mic Input	A15LA Line Input Adapter—converts balanced low-impedance mic input to line level input.
Matching/Bridging/Isolating	A15BT Bridging Transformer—matches balanced or unbalanced devices of different impedances.
Trouble-shooting	A15TG Tone Generator—700 Hz signal helps check levels, connections, mixer inputs, and cables.
Microphone Impedance Matching	A95 and A97 Series Line Transformers—make it possible to connect low-impedance lines to mid- and high-impedance inputs (or vice-versa.)



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combination of established designs and products. These designs have stood the test of time and concerts, and are found in every contractor's design file. I have my file and since I make a business of selling raw frame speakers, my file is open to all comers. It's good for business! A plan list is available for the asking. Each set of plans costs five dollars which for the most part goes for printing costs and handling. The experience is free.

—Carl Huff
Karlton Sound Co.
P.O. Box 144
Owosso, Michigan 48867

More

The following is another letter directed to contributing editor Craig Anderton.

I built the PAIA Limiter described in your November 1979 article. I am one of the unlucky ones that have failed to get a clean sound out of the unit. I have read every column that has been written on the limiter since the 1979 article. The problem I was having was unique to anyone else's, until I read the letter from Burton Hardin in the February 1981 issue of *Modern Recording & Music*. Alas, someone with a problem identical to mine! I, too, can count the ticks or pops once the unit starts limiting. The unit works exactly as you said it would all except for the "ticks," which are extremely noticeable. So I am writing to you to find out how Burton solved this problem. If there are two of us with the same problem, there surely are many more of us. Please reply with the enclosed self addressed, stamped envelope as soon as possible. I am anxious to finally put the limiter to use, which has just been sitting on a shelf idle since it was first built.

—Geoff Stoner
New York, N.Y.

Craig replies:

I refer you to the *Modern Recording & Music* magazine, May 1981, where there appears the Ultimate Limiter Letter on page 4. Also, see the letter appearing in this issue from Stephen Ditmer. (You may already have seen the Ultimate Limiter Letter, but just in case...) Also, experiment with the values of C11/C12 if 100 uF gives too long a decay time; 50 uF might do the job in your instance, or you can add a

switch to choose a variety of decay times. Those limiter owners with click problems who have made the mods I suggested have no more click problems.

Maybe your limiter is already "On the Air," but if not, the enclosed information should do it. I've been using my limiter a lot on mixdown and it sure seems to work fine. I hope you feel the same way about the unit after you modify it. Very best,

—Craig Anderton
Contributing Editor
Modern Recording & Music

Berlant?

About a year ago I purchased a used reel-to-reel (transport and amps) at a ham radio fest. I was looking for an older machine and that's what I got. My major problem is setting up a wiring harness to connect the transport's heads to the amps. I've tinkered with it and I have gotten it to play back, but I'm still working on the erase and record functions. I was hoping that you or your readers might have known of a Berlant Series 30 Recorder. The unit was made in Los Angeles, California by Berlant Instruments. I hope that someone has some good advice (besides "junk it"). Any information, especially schematics, would be most helpful to me.

Please send your information to: Ivan Baran, Rd 2 Hometown Box 106, Tamaqua, Pa. 18252. All help will be greatly appreciated. Thank you.

—Ivan Baran
Tamaqua, Pa.

We've tried to locate Berlant Instruments with no success. So we're throwing the question out to our readers. If anyone has any information regarding Berlant Instruments, please write to us or to Ivan Baran at the above address. In fact, write to both of us. We'd like to have the information on file. Thanks to whoever can come up with the mystery address.

These Are Your Rights

I'm a little confused as to what rights are actually granted to a songwriter by the new copyright law that went into effect in 1978. Actually, I've always been a bit confused by the rights granted by ANY copyright law, and would appreciate it if you could explain

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No doubt you've heard of Super Avilyn before. It's the remarkable formulation that goes into TDK's outstanding SA and SA-X audio cassettes and Super Avilyn videocassettes. Now TDK's advanced Super Avilyn technology has been applied to open reel.

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CIRCLE 67 ON READER SERVICE CARD

what these rights are. I've written some songs and would like to publish them and have them copyrighted. Thanks for your help.

—Cathy Tanzer
Newton, MA

The Copyright Law which went into effect on January 1st, 1978, grants rights to songwriters whether or not they register with the Federal Copyright Office. These rights include the following: 1) The right to publish the song; 2) the right to record and distribute copies of it; 3) the right to perform the song in

public, and 4) the right to make different arrangements of the song, and 5) the right to display the song in the form of a lyric sheet, for example, or a picture disc. For songs published after January 1st, 1978, the rights belong to the songwriter for his lifetime plus fifty years.

To make sure your rights are protected, you should register your rights with the Copyright Office in Washington, D.C. To register your songs, write to the Register of Copyrights and ask for form PA, Application for Copyright Registration, for a Work of

the Performing Arts. Ask for a form PA for every song you wish to register. While you're at it, ask for a copy of the Copyright Law and copies of regulations information that applies to copyright of musical works.

Soundproof

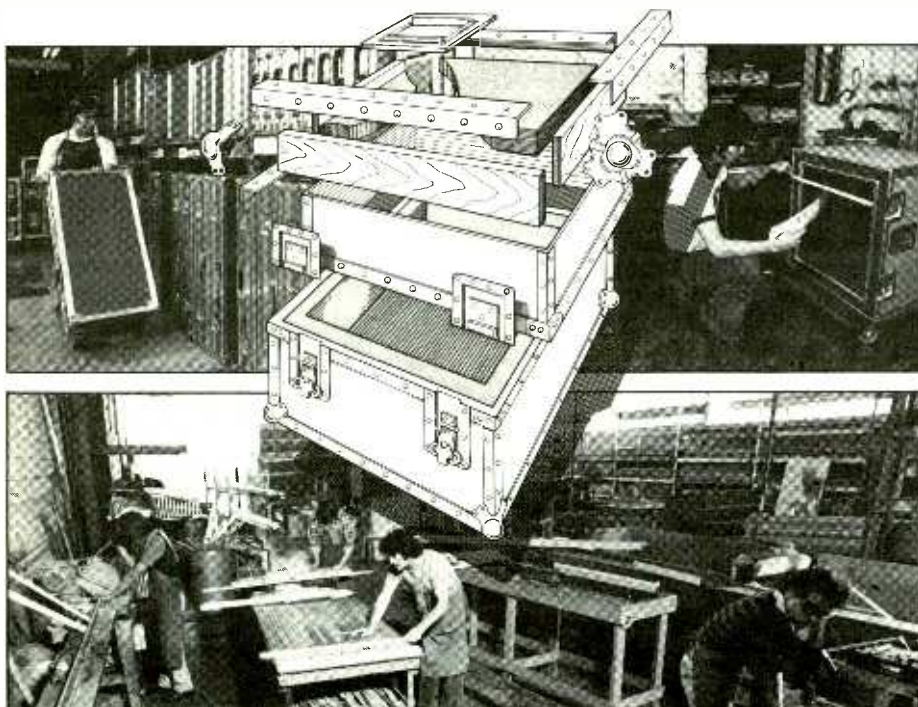
I'm on a small budget, and am in the process of soundproofing a room that I'm converting into a studio. I was wondering just how much of a problem loose objects would cause me in my recording. It's a cold room, and at times I've used one of those old radiating heaters to warm it up. Would it help if I added some sort of acoustically absorptive material to the room?

—Greg Dillon
Milwaukee, Wi.

Probably you should get rid of that heater. Heaters and air conditioners produce noise which could ruin your recordings. At least turn the heater off while recording. You should acoustically isolate those appliances that you cannot remove or disconnect. For example, an air conditioner with a heavy motor or a fan can be mounted on a rubber pad or on springs, which would help to reduce the transferred vibrations to the structure. Or you could build an enclosure, make it soundproof by lining it with fiberglass, to surround the equipment that produces the noise.

Loose objects tend to resonate at their natural frequency when loud music is played. These include objects such as paintings, wall hangings, sculptures, lamps, and small tables. They should therefore be eliminated, or if that is not possible, be mounted firmly.

As to your question regarding whether or not to add acoustically absorptive material to the room, we would say, that that is not really the most effective way to soundproof it. If you add acoustic tile and carpet to the room, you might succeed in reducing the level of outside noise by about 3 to 5 decibels, but what it does is make the room acoustically dead, which is entirely inappropriate for playing music. For complete details on soundproofing your recording studio we recommend getting your hands on Building a Recording Studio by Jeff Cooper, published by the Recording Institute of America Press, Inc., New York, N.Y., in 1978.



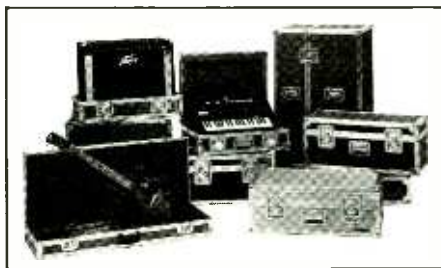
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The Master Room XL-305 is a totally new design approach in reverberation technology. For the first time, the qualities and properties of a live acoustic chamber are available in a rack mount unit at an affordable price. There is a natural sound on percussion, as well as voices and all other musical instruments. This quality has not been obtainable from other compact reverberation devices. The XL-305 exhibits no unwanted side effects; it's as natural as a live chamber itself.

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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 & Music reader's technical forum.

No Noise is Good Noise

I am doing some work with tape delay which involves running a tape across two decks and feeding the output of the second deck back into the line in of the first deck, etc. Anyway, as I am switching rapidly from source to tape and back again on the output switch of the second deck, the clicks of the switch are recorded. I am using a Teac 3340S and a Teac 2300SX and it seems that the output switches on either deck are noisy.

In addition to this, I also get a recorded click from the record solenoid when punching in or assemble editing on either deck. Apparently, noisy switches are inherent in the Teac line. Do you know of any way that I can modify the decks to improve this?

—David Smith
North Texas State University
Denton, Tex.

Those elusive clicks that plague us when we try to use a switch that has audio signals passing through it are easily understood, even if not necessarily a snap to palliate. When a switch is operated at the moment a

signal is swinging to either side of zero potential across that switch, a sudden shift in potential occurs, and produces a signal tantamount to the leading or trailing edge of a squarewave, depending on which polarity the signal is stopped at. Also any D.C. that might be present on the terminals of the switch, will surely also cause this sudden shift when it is interrupted by the switch action.

Possible remedies are several:

1. Check all the decoupling caps in the audio chain that might be connected to switches likely to be used during record or play. Make sure they are in good condition and are not leaky electrically.

2. Check the biasing circuits of the audio amplifier stages to make sure the total amount of D.C. offset is as low as possible.

3. Try conventional de-popping techniques such as ceramic caps or diodes across the terminals of solenoids and relay coils.

4. Check to make sure the signal lines feeding your tape decks are free of D.C. component, and any RF that might be leaking into your system.

5. Check to see that the humidity in your recording environment is not excessively low so as to precipitate static discharges when you touch a switch.

Not all pieces of equipment behave the same way electrically. Many exhibit peculiarities when used for a purpose that may have been overlooked by the designers. Fortunately, almost all of the circuits used to affect any given type of function are usually quite similar, especially switching, relay, and logic functions that route signals, and so familiar remedies are usually adequate where a common problem occurs.

If these simple suggestions are not entirely successful, get out your oscilloscope and start looking for

sources of D.C., RF, and coil reactance in the circuits of your system.

—Drew Daniels
Applications Engineer
TEAC/Tascam Professional
Products Group
Montebello, Ca.

When MXR Meets DOD

I bought an MXR Noisegate/Line Driver to use with my Fender Rhodes piano which is noisy when I EQ it for more mids and highs. I thought that I could power the MXR unit with my DOD unit to eliminate the need for batteries. But the MXR unit doesn't come with a mini-plug input so I had the store do it: they said it was simple to do, just hook the leads to the battery connections. However, this hasn't worked. Is there a simple modification that will solve this problem?

—Chris Dreisbach
Dreisbach Entertainment, Inc.
Post Falls, Idaho

The MXR unit is not compatible with the DOD unit. But be advised that MXR makes additional models 137, a power convertor, and a model 138 backplate adaptor. The power convertor retails for \$43. The power convertor is purchased separately, in a package of 2 for \$20. One is used for each product. One power convertor, on the other hand, can power 4 jacks, 4 or more pedal devices. We hope these satisfy your needs.

—John Porubek
Applications Engineer
MXR Innovations, Inc.

The Stuff That Dreams Are Made Of

How would you fellas like to help a poor little "back bedroom" studio owner fulfill one of his biggest

dreams? To own a plate reverb! Ever since I heard that first cymbal sizzle into the sunset and those violins fade into a whisper at +15 kHz I just had to have one.

Hello, Craig Anderton, are you there? Nothing against your "Hot Springs" reverb (I've built many of your kits, read your books, etc. My studio would not be what it is today without you.) but I hate springs. I want plate!

An acquaintance of mine in town has built his own plate reverb and it sounds great. But he is very secretive about the specifics and keeps it locked away...very hush-hush. However, I did manage to glean a bit of information from a close friend of his.

He used a sheet of stainless steel about 4'x6', two guitar contact pickups for the receiving transducers, and for the plate driver he used a "wall transducer" that Radio Shack sold several years ago. (It's a device you stick on the wall and it uses the wall as the speaker cone; literally turns the wall into a speaker.)

Now, do I need to send some muscle over to his place, or from this information can you tell me: 1) How thick should the plate be? 2) How much tension should be applied to the plate? 3) What send and receive electronics are necessary? and 4) What is the positioning of the transducers on the plate?

I think this merits your attention since I feel it would be a moderately simple (am I right?) project that would push home studios another few kHz closer to the pros.

Twang you very much.

—Fred Langer
Orlando, FL

Get a call in to Vito...muscle might be the only way to go. We got in touch with "Don" Anderton who felt that with the information you supplied, the only way he could answer your questions was to build a plate reverb and report back to us with the results. (Whether just such a Do-It-Yourself project will be forthcoming is still indefinite, so stay posted.) An interesting note from our conversation with Craig was that he shares your sentiments regarding spring reverbs, and that's precisely why he designed the "Hot Springs" reverb. Take another look at it and if anyone near you has built it, give it a listen, it just might surprise you with its "unspring-y" sound.

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In the recording studio, where proper room treatment is essential, WEDGE products can fulfill a number of recording needs.

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No Bells, No Whistles, just plain, simple, clean parametric eq. wherever you need it on your ax, in your studio, at your price. You Win.

Signal-to-noise - 99dB
Distortion - 0.025 %
"Q" (constant Q) .2 - 3.8
(i.e. bandwidth adjustable from 1/3 to over 4 octaves in "boost"; 1/10 to 3 octaves in "cut")
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While we normally avoid getting judgemental in this column ("Just the facts, please, sir, just the facts!"), we don't understand why your "acquaintance" is holding out on you (and how about that "close friend" spilling the beans, huh?). Share and share alike has always been our philosophy, and so far no one's been hurt, you know what I mean? Fred, didn't you ask nice?

Fader Functions

In the May 1981 Notes column detailing the Carrotron C920B1 Noise Fader (see pages 62-68), the output impedance was given as being 300 ohms. This is wrong for a guitar amp, is it not? Will I need an impedance matching device in this application?

We have a Yamaha CP-30 electronic piano which is a bit noisy: Will the Carrotron Noise Fader help here?

—Donald J. Dunbar
International Falls, Minn.

First, the short form answers. Re impedance matching: No, you don't need a transformer. The Noise Fader will drive any guitar amp or medium-to-high impedance unbalanced input. Re the Yamaha CP-30: I don't have a

CP-30, so I have not tried the combination of noise fader and CP-30. However, if any device is going to help the noise problem, I think the Carrotron Noise Fader would. Remember, though, to spend some time getting the right control setting.

Second, here's a long form answer to the first question in case you want to know the "why" behind the short form answer.

It is a myth that impedances in audio systems need to be matched; impedances need be matched only when you're going for the most efficient way to transfer electrical power from one stage to the next. However, in audio systems the general idea is to be able to transfer as much voltage as possible from one stage to the next.

You can compare input and output impedances to the two resistances in a volume control in the accompanying diagram.

As R_{out} gets smaller and R_{in} gets larger, the volume goes up (maximum voltage transfer). As R_{out} gets larger and R_{in} gets smaller, the volume goes down (minimum voltage transfer). So, this implies you want a small output impedance, and a large input impedance. In the case of the Noise

Fader, 300 Ohms would qualify as a low output impedance. If the input impedance is high, the loss of level is negligible because we've satisfied our condition that R_{out} be small and R_{in} be large.

From this you might think that the input impedance should always be as high as possible. Not so; the higher the impedance, the more susceptible it is to noise. Therefore, in professional, low noise systems, the input impedances are fairly low, and the output impedances are even lower.

In most musical electronics applications, a rule of thumb is that the input impedance of a device should be at least 10 times the output impedance of the preceding device for optimum signal transfer. According to that rule, the Carrotron Noise Fader can drive anything with an input impedance greater than 3000 ohms. For more information on impedance, as well as how to measure it easily, see the revised version of *Electronic Projects for Musicians*.

—Craig Anderton
Contributing Editor
Modern Recording & Music



The Orban 111B Dual Spring Reverb is ideal for small studios, because it offers the ideal combination of fully professional sound and affordable price. Orban's unique signal processing, flexible equalization, low noise, and heavy-duty construction make the difference. Unlike cheaper reverbs, the 111B is a reverb you'll want to live with after the honeymoon's over.

Judge for yourself. If you test the 111B the right way — in a real mixdown situation (not listening to the echo return only) — you'll find that the 111B's bright, clean sound complements the music, instead of muddying it as even higher-priced reverbs can do.

There are cheaper reverbs — with noise, flutter, "twang" sounds on transients, and questionable construction. There are more expensive reverbs — some of which are disappointing in "real world" situations. And there is the proven 111B — the right sound at the right price for the professional on a budget.

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CIRCLE 79 ON READER SERVICE CARD

THE **PRODUCT** SCENE

By Norman Eisenberg

RANDALL P.A. AMP/MIXER

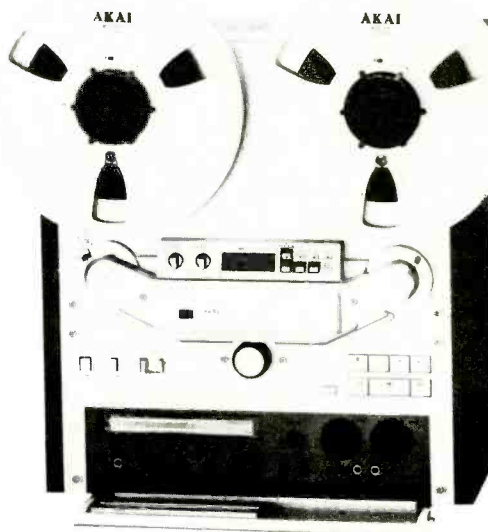


The RPA-800 from Randall Instruments Inc. of Santa Ana, Calif. is described as an "eight channel workhorse stereo P.A. amplifier providing for practically every function ever required in most P.A. applications." Output power is rated at 300 watts RMS. Inputs include balanced low-Z and hi-Z. Each channel has an input attenuator and warning clipping light; rotary controls for high and low EQ; reverb send, monitor and pan; plus a slider fader. There are two separate master sections, each with five-band graphic equalizers, effects/auxiliary gain controls, master reverb controls and slider faders. The monitor section has both high and low EQ, an effects/auxiliary gain control and a slider fader. All three sections have LED light-bar output indicators, each bar containing ten lights which indicate output in 3-dB steps from -15 to +12 VU. Master and monitor signals (pre power amp) of approximately 7 volts RMS (+10 dB) are available at output jacks. Separate switches enable the operator to assign either of the master channels or the monitor channel to the power amp. Reverb is built-in, but effects in and out jacks are provided for additional effects.

CIRCLE 1 ON READER SERVICE CARD

AKAI RECORDERS HANDLE NEW TAPE

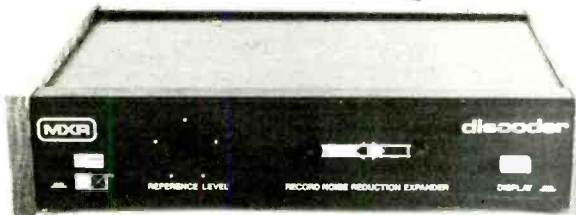
Said to be the world's first open-reel tape decks capable of handling the recently developed high-density "EE" tapes are two models from Akai. Both decks use three motors, and each has six heads for automatic reverse in both record and playback. Speeds are 7½ and 3¾ ips. The GX-747, which handles 10½-inch reels, lists for \$1250. The GX-77, a seven-inch reel deck, is priced at \$775. Both decks feature full logic solenoid controls, two-color LED metering, cue-and-review and more. The new tape itself, available from TDK and from Maxell, is described as a modified cobalt-ferrite type which requires a new bias setting. On the Akai decks, it is claimed to improve S/N and dynamic range while also extending frequency response at 7½ ips that compares with what was previously attainable only at 15 ips.



CIRCLE 2 ON READER SERVICE CARD

MXR SHOWS NEW UNITS

Recently introduced is the MXR model 153 stereo 5-band equalizer which provides ± 12 dB of adjustment over frequency bands considered "most critical to the effective reproduction of music in the home." These are centered at 50, 100, 200, 2 K and 10 K Hz. Additional sliders handle level on each channel, and the unit also has a switch for EQ in/out, plus another for monitor/source. LEDs help matching of input-to-output levels. MXR also has "reintroduced" its model 114 stereo graphic equalizer (10-band) which includes a 15-foot audio cable to permit operation "from wherever you are sitting in the listening room." A third item from MXR is the model 156 CX Discoder, under license from CBS, Inc., for reproducing discs made with the new CBS expander noise-reduction system. Prices for these units are: the model 153, \$150; the model 114, \$220; the model 156, \$100.



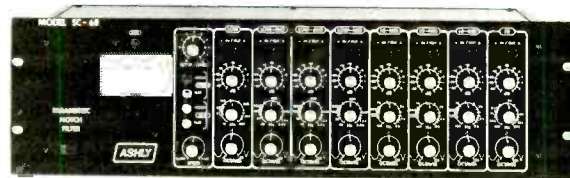
CIRCLE 3 ON READER SERVICE CARD

AKG STEREO MIC PAIR

A matched pair of microphones for stereo recording—known as the D-40 and packaged in a kit containing two mic stands and eight-foot shielded cables—has been introduced by AKG. Said to be ideal for the home cassette recordist, the D-40 mic is a dynamic with a cardioid pattern. Frequency range is listed as 80 Hz to 15 kHz; rated impedance is 600 ohms; sensitivity at 1 kHz is 1.8 mV/Pa; -55 dB.

CIRCLE 4 ON READER SERVICE CARD

ASHLY NOTCH FILTER



A parametric notch filter has been announced by Ashly Audio. The model SC-68 is described as a cut-only equalizer which may be used to insert relatively sharp dips in the audio frequency spectrum. Eight individual filter circuits are applied to a common buss, with each filter acting as a frequency dependent resistance. At center frequency the resistance drops to zero to provide a "nearly infinite cut (30 dB guaranteed)" for each band. The device includes a setup system with a built-in limiter to aid in reducing feedback. During setup, the limiter increases system gain until feedback occurs and then holds the feedback at a controlled low level. When feedback is notched out, the limiter automatically increases the gain until a new feedback is established. A meter indicates gain-before-feedback improvement. Features include bypass switching; inputs and outputs that may be used balanced or unbalanced; peak overload warning light; and variable bandwidth adjustments.

CIRCLE 5 ON READER SERVICE CARD

TWO DENON DECKS

Both of Denon's new cassette decks, the DR-320 and the DR-330, contain three heads and several other features including a tension servo sensor, non-slip reel drive, DC amplification and more. The DR-330 uses a quartz lock PLL capstan drive and a front-panel fine-bias adjust in addition to the usual tape selector. Both decks feature light-touch transport buttons with cue in both directions of tape travel, and one-touch recording pause or standby. Record and play may be activated by a timer, and all transport functions can be remotely controlled via an accessory unit. Specifications (for both decks) include frequency response with metal tape of 25 Hz to 21 kHz ± 3 dB; wow-and-flutter of less than 0.04 percent; and overall S/N with Dolby on of better than 67 dB.

CIRCLE 6 ON READER SERVICE CARD

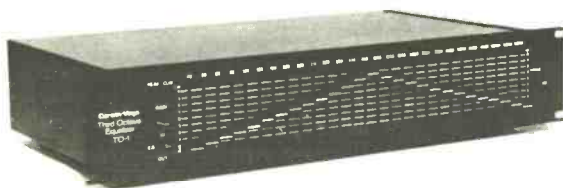
PACE PRO SYSTEMS

A full-color brochure from Pace Musical Equipment Ltd. of England describes in detail a line of console equipment, including the MP180 Series of stereo mixers. These are built up of basic input modules, 4-channels each, which are bussed to the output section. Numerous options and combinations are available. An MP180 series for four-track consists of consoles available in 8, 12, 16 or 20-channel formats and are said to be designed specifically for use with today's new generation of 4-track sel-sync tape recorders. Also, by routing the inputs to two of the four outputs, they can double as a "sophisticated" stage mixer. Professional and multi-track mixing consoles comprise the Pace DM series. Pace also offers several amplifiers, electronic crossovers, a compression/limiter and a graphic equalizer.

CIRCLE 7 ON READER SERVICE CARD

CERWIN-VEGA THIRD-OCTAVE EQ

Added to Cerwin-Vega's line of pro electronics is the model TO-1, a mono unit providing one-third octave equalization. The TO-1 uses twenty-seven band controls, each calibrated for 12 dB of boost or cut. Band centers are on ISO standard frequencies from 14 Hz to 16 kHz. In addition to the sliders, the unit has a clipping indicator, a rotary gain control and an EQ in/out switch. The rear contains both balanced and unbalanced inputs and outputs. All inputs and outputs are protected against potentially damaging levels or loads. All outputs can drive load impedances of 1200/600 ohms or greater to full rated output levels without increased distortion. The TO-1 has a dual voltage power supply for use on 115 or 230 volts AC without an added transformer. The equalizer circuitry employs, instead of induction coils, a recently developed type of active filter network known as GIC (for Generalized Impedance Converter) using operational ICs. Price is \$600.



CIRCLE 8 ON READER SERVICE CARD

NAKAMICHI UPGRADES 480 SERIES



Updated versions of the Nakamichi 480 series of cassette recorders include Dolby-C as well as Dolby-B noise reduction; wide-range (50 dB) peak-responding electronic metering; bias-trim control; and a choice of two headphone levels for matching different efficiency headsets. Decks in this series include the 480Z, the 481Z; and the 482Z. The latter two decks use three discrete heads, but only the 482Z includes the electronics for off-tape monitoring. Prices are \$595; \$850; and \$950, respectively, for the 480Z, 481Z and 482Z.

CIRCLE 9 ON READER SERVICE CARD

MCCANNON AMPLIFIER AND OTHER ITEMS

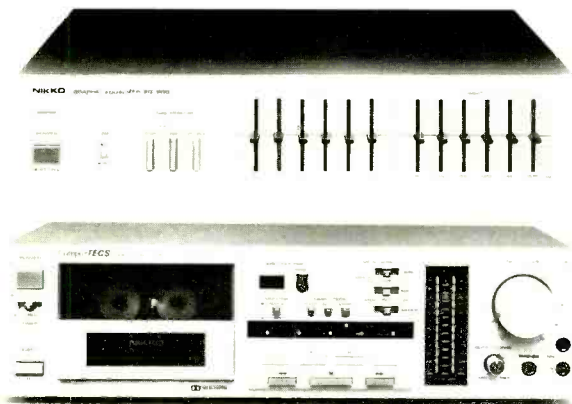
From McCannon Research of Atlanta, Ga. comes news of the model L-5 stereo power amplifier, rated for outputs of 230 watts per channel into 8-ohm loads, or 400 watts into 4-ohm loads. The amp also can be bridged for mono operation via a rear-panel switch. Of rack-mount width, the L-5 weighs 52 pounds and lists for \$995. McCannon also has listed the model L-2 amplifier (no specs supplied) at \$559; the model S-3 electronic crossover for 2-way stereo or 3-way mono, at \$279; and the model A-3 one-third octave spectrum analyzer (no price given).

CIRCLE 10 ON READER SERVICE CARD

TWO FROM NIKKO

Nikko's new model ND-1000 cassette recorder features a computerized tape evaluation system and a transport with full IC logic control that permits tape-mode changes without the need to go through "stop." All tape-mode functions may be handled by an optional remote-control accessory. The two-motor transport uses direct drive, and the three-head complement permits off-the-tape monitoring while recording. Metering is handled by two 12-section LED peak-level displays. There are separate left and right recording level controls plus an output level control. Also included are Dolby "B," automatic rewind, timer-activated record/playback and automatic memory-stop/memory-play. An optional kit permits rack-mounting. Price is \$650.

Also new is Nikko's EG-500, a stereo graphic equalizer offering six bands per channel. Center frequencies are 40, 125, 400, 1.25 K, 4 K and 12.5 K Hz. Switches are provided for EQ defeat; post or pre EQ for tape recording and monitor/source. Price is \$220.



CIRCLE 11 ON READER SERVICE CARD

WHO'S HYPING WHOM?

The summer month performances of the Boston Symphony at the Berkshire Music Festival in Tanglewood (which are just about over as I write this) have always been enjoyable and enlightening. The enjoyment, of course, is directly proportional to one's fondness for the music played. The enlightenment—at least for those of us of the "audio persuasion"—concerns such things as the influence of prevailing acoustics; whether you hear some music more clearly from some parts of the giant shed than

others; and the perennial matter of "live" versus recorded" in terms of which actually delivers more of the sound intended for a given performance.

I have commented on these matters in the past; right now it seems that another "dimension" is involved—that of the audience and its mass effect on itself and the onstage performers. We find ourselves dealing not with physical acoustics but with psychoacoustics, and it becomes even more intriguing.

Specifically, we have witnessed over the past few seasons, and especially the one just concluded, near-frantic outbursts of enthusiasm that seem to seasoned music lovers as a bit too much, even for such an esteemed and topflight body as the BSO. For instance: An impulse to break into applause before the end of a piece; wild cheers that keep the players onstage when you can tell from their tired and bewildered looks that they would rather get the hell off and relax; the hostility you encounter from total strangers who resent your not joining in the hysteria.

Bear in mind that this near-religious fervor stems from an audience that, moments earlier, may have been half asleep, munching snacks, rubbing insect repellent on bare feet, whispering and generally behaving as if they were watching TV at home instead of attending a concert by one of the world's greatest orchestras.

I think this incident says it all: During one concert, an eight-year-old in a nearby seat started out by eating smelly fried potatoes drenched in ketchup. He finished, threw the empty box on the floor and promptly fell asleep. At the end of the performance, his father woke him and cried: "Wasn't that great?" The kid nodded, eyes half shut. Papa says: "Well then, get up and yell." Whereupon the kid climbs onto his seat and raves loudly along with the others in the group.

Does any musical artist need this kind of "appreciation?" Are we into a new game of an audience hyping the performers? Is this really "artist-audience contact?" Or is the classical music public beginning to compete with rock audiences in clamoring at performers? I don't know the answers, but I will pay special attention to all this during the coming concert season which will of course be indoors. I have a feeling the audience hype will be considerably subdued. If it is not, the old debate of "live" versus recorded" will have scored a big point in favor of the latter—I just don't see record or tape listeners standing on their sofas and raving wildly at the end of a cut.



NEWSICALS

GUITARS AND BASSES

The National Association of Music Merchants trade shows are always the major opportunity for established manufacturers to present new products to the retail dealer community and also for smaller and newer companies to make themselves known to the dealers. At the most recent NAMM show in Chicago, it was these esoteric or lesser known manufacturers who seemed to predominate, at least in terms of guitar makers.

The names Michael Pedulla and his M.V. Pedulla Guitars, Ltd., must certainly qualify as esoteric among the guitar-playing public despite the quality of his instruments. Pedulla guitars



CIRCLE 15 ON READER SERVICE CARD

are totally handmade from select materials, specifically hard maple for the necks and bodies and Brazilian and East Indian rosewood for all trim work including fingerboards, trussrod covers, pickup mounting rings and pickguards. Pedulla uses the increasingly common technique of carving the entire neck and center body section from one solid piece of maple both for strength and for improved sustain characteristics; the necks are reinforced by adjustable truss-rods, of course, a single one for guitars and double ones for basses. An unusual construction detail is that the control cavity is formed in the lower wing section of the body early on in the construction, and that it is formed in such a way that the wood removed is retained for later installation as the access plate, avoiding the use of plastic materials and assuring absolutely perfect grain matching since the access plate actually returns to its original position. On the hardware and electronics side, the components are, naturally, first-rate: Schaller tuning machines; Schaller or Badass bridges; brass fingerboard nut; anodized aluminum knobs; and DiMarzio pickups are standard with Bartolini pickups optional for the bass guitar models. The twin-coil, humbucking DiMarzios are wired to an electronics package which provides a pickup selector switch, individual series/parallel switch and volume control for each pickup, a phase switch and a tone control. The deluxe EL series models also have a master volume control, or are available with on-board preamp with three-band equalization as an option.

Stars Guitars showed its new guitars at the NAMM show, explaining that the instruments are the outgrowth of over five years experience setting up and "hotrodding"

guitars for discerning professional guitar players. Stars Guitars utilizes select hardwoods from around the world, the finest quality hardware available anywhere and custom electronic configurations to give the musician all the advantages of a hot-rodded or custom-made guitar in an off-the-shelf model. Some of the Stars Guitars models closely resemble popular models from the well-known manufacturers, but are flatly said to exceed the specifications and performance of the original model thanks to the quality of the materials and workmanship; other Stars models are straight out of the space age and are truly unique creations.

CIRCLE 16 ON READER SERVICE CARD

One of the more unique instruments seen at the NAMM show is the Steinberger bass from Steinberger Sound. The unique aspect of this instrument is that it is constructed entirely from reinforced plastic material (with metal hardware, of course). Industrial designer Ned Steinberger hit upon the idea of using reinforced plastic material for the instrument since plastic materials are much more consistent and predictable to work with than wood can ever be. The body and neck of the Steinberger bass are molded in a single piece of extremely rigid fiberglass and carbon-fiber reinforced plastic which is strong enough and stiff enough to totally eliminate the need for a truss rod. Conventional wire frets are set into a fingerboard made from a phenolic fiber material. The instrument's design eliminates the peghead for better balance and a 38 inch overall length for a 34-inch scale length instrument. A unique fully adjustable bridge/tailpiece/tuning assembly machined from brass and stainless steel is said to provide very high levels of tuning accuracy and

stability to eliminate frequent retuning. Another unique feature is the strap suspension system which incorporates a pivoting "wing" which is attached to the body of the bass at the exact center of gravity and to the strap at the points of the wing so that the bass will balance perfectly and can be swung up or down without the strap moving on the player's shoulder at all. The Steinberger Bass is available in single and twin pickup models with a choice of conventional high impedance pickups or low impedance, active pickups from EMG/Overland.

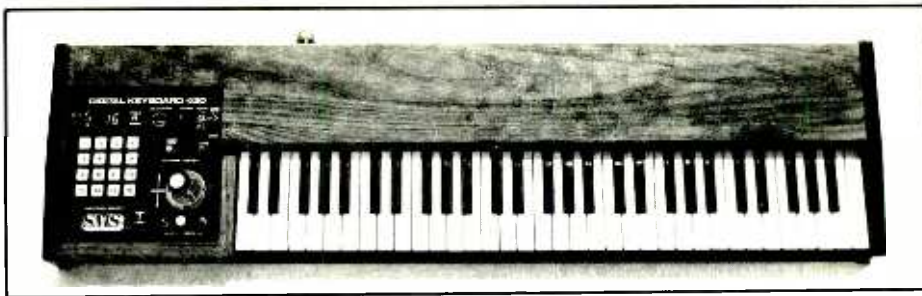
CIRCLE 17 ON READER SERVICE CARD

A diverse selection of electric guitars and basses were shown by Charvel Manufacturing. The guitars themselves are fairly conventional, but the finishing is rather unusual in that *any* color, design or pattern can be applied to the instruments—something that no production guitar maker has been able to offer in the past. Among the interesting designs shown were a bullseye pattern, spider webs, lightning bolts, as well as unusual solid colors. Guitars are available in two shapes—"strat" and Star, as are basses (a deep cutaway "P-bass" and an "explorer"), and are available with alder or hard rock maple bodies; the alder body is described as sweet and mellow while the maple body maximizes bite and sustain. The necks are one-piece hard rock maple with an adjustable truss rod, with a choice of maple, rosewood or ebony fingerboards. Pickup configurations include single or double humbucking DiMarzio's or triple, single-coil pickups for the guitars and single or double DiMarzio P-Bass or Jazz pickups for the bass. Various other customizing options are available as Charvel believes in the individual tastes and requirements of the musician.

CIRCLE 18 ON READER SERVICE CARD

SYNTHESIZER EQUIPMENT

Passport Designs has introduced a new synthesizer system which uses a rather unique design approach. The Soundchaser synthesizer is designed to interface with and be controlled by an Apple II home computer to yield a three-voice or six-voice music synthesizer of professional quality. A complete system comprises an Apple II



with 48 K RAM memory, at least one Apple Disk II disk drive with controller, an Apple video monitor, a Soundchaser Polyphonic Keyboard with interface card and one or two Soundchaser Three-Voice Synthesizer cards. The Soundchaser keyboard is a four-octave, 49-note unit housed in a fine wood cabinet. Each voice of the three-voice synthesizer cards features a keyboard-controlled oscillator with a 32 Hz-4192 Hz frequency range, a sawtooth/square waveshaper, a 24 dB/octave resonant low-pass filter and a dynamic loudness amplifier (VCA) with a 50 dB range. Each card further contains two envelope generators with a 4 millisecond to 8 second envelope range, and two low-frequency oscillators (LFOs) with a basic tuning range of .012 Hz to 250 Hz. These envelope and LFO signals are controlled by software in a rather interesting way using the computer video display and games paddle; in one of the system's operating modes, the video monitor displays the curves for these control signals as a level vs. time graph and allows modification of any of them by using the Apple's games paddle or by using the various "soft" switches and sliders shown below the graph window on the video screen, or the user may use the paddle to "draw" from scratch the desired envelope or LFO modulation curve on the screen with a resolution of sixty-four separate points. The Soundchaser Music Operating System is described as "intelligent, flexible, friendly and musical" meaning that it does a lot without intimidating users who lack a strong small computer background.

CIRCLE 19 ON READER SERVICE CARD

SMS recently announced the introduction of the Digital Keyboard 430, which is designed to interface with SMS Voice 400 synthesizer, but which may be used as a stand-alone keyboard controller. The 430 has a full five-octave keyboard which assigns

notes more like a polyphonic keyboard than other monophonic keyboard units in that it outputs the latest note played rather than strictly the lowest or highest note played, giving the unit a more pianistic feel than the typical mono keyboard. The unit includes a three-axis joystick for independent or simultaneous control of pitch bend (with a variable limit point) and filter cutoff frequency on the X- and Y- axes, and modulation depth (from the built-in, three-waveshape LFO) on the top twist knob. Also included on the 430 keyboard is a sixteen-button keypad and an associated digital display which serve several powerful functions when the 430 is connected to a SMS 400 synth. These functions include selection and display of one of the thirty-two presets on the Voice 400, selection and display of one of 16 sequences (which are programmable from the keyboard, of course), or transposition of the "live" keyboard or sequence replay in half-step intervals. Other features include LED display of LFO rate, a three-position octave switch, portamento and syncable LFO.

CIRCLE 20 ON READER SERVICE CARD

MICROPHONES

Stage Microphones are a new line of four dynamic mics from Unicord. All four models have cardioid pickup patterns and are designed to provide the working musician with a quality mic at an affordable price. At the top of the line is the SM260, a shock-mounted, low-impedance, balanced mic with built-in pop filter and on/off switch; frequency response is 40 Hz-16 kHz. The DM256 is similar in that it is also a balanced, low-impedance mic with integral pop filter and switch, but its frequency response is 50 Hz-15 kHz and it lacks the internal shock mounting. Both models have optional dual impedance cable assemblies. The DM255C and DM255 are both dual-

impedance models with 50 Hz-15 kHz response, built-in pop filter and on/off switch; the DM255C uses an XLR-type connector, while the DM255 uses a four-pin connector.

CIRCLE 21 ON READER SERVICE CARD

Audio-Technica U.S. has introduced a new, unidirectional, sub-miniature, electret condenser mic, the AT831. The mic is of the new, back-electret design; the electret charge is now on the fixed back plate, rather than the moving plate. An 8.2 foot cable is provided between the mic and belt module. An average N.E.D.A.-type 910 battery



should provide approximately 3,500 hours of intermittent use. A guitar adapter, windscreen and carrying case are included with the AT831.

CIRCLE 22 ON READER SERVICE CARD

MUSICAL INSTRUMENT ACCESSORIES

MXR, one of the pioneers and still leaders in the high-quality effects market, has recently updated its line with the introduction of two new models. The MXR Distortion II is an AC-powered unit which is said to produce an unprecedented simulation of tube amplifier distortion. The unit includes four controls for an extremely wide range of effects rather than the usual single-knob distortion box. A Drive control varies the amount of distortion and sustain; a Resonance control creates punch; a Filter control varies the amount of harmonic content of the unit's output; and an Output level control matches the level of the distorted signal to the straight signal. An LED indicator is provided to signal effect on, and switching is via solid-state devices to eliminate switch noise. The other new MXR product is the Limiter, which as the name states is a

compressor/limiter for a variety of effects and applications on stage and in the studio. The AC-powered unit has low distortion, low-noise circuitry with automatic noise suppression and features a high input impedance and low output impedance making it suitable for studio applications over and above its use on electric instruments. The Limiter has controls for Input, Attack, Release and Output, and its circuitry incorporates auto-slope limiting and dynamically varying attack and decay characteristics making it useful over a wide range of effects from controlling peak dynamics, to tightening up an instrument's sound, to long, clean sustain.

CIRCLE 23 ON READER SERVICE CARD

Another new tuning aid is the Player's PET from J&R Enterprises. PET stands for Positive Electronic Tuner, and the PET uses advanced circuitry (patent pending) to give quick, accurate tuning despite a very low price tag. The compact unit has a five-position selector switch (E is not duplicated) and a neon indicator lamp to show correct tuning by means of a visual pulse.

CIRCLE 24 ON READER SERVICE CARD

SIX SIMULTANEOUS DELAYS



The A/DA Stereo Tapped Delay (STD-1) is the only voltage controlled analog delay capable of producing six different delays simultaneously, making it the most powerful time processor available for "stereo" flanging, doubling, and multi-voice chorus effects.

Conventional delays take one input signal and produce one output signal at one delay length. When a signal enters the STD-1, it is delayed, then tapped at six different non-harmonically related points ranging from 1.3 to 55.5 ms. This produces six variations of the signal, each capable of being assigned and mixed into two output channels. The non-harmonically related taps create a natural sounding time delay, while other units at best, are multiples of some fixed delay time, creating predictable sounding effects.

The extensive delay section produces a 1-5x continuously variable delay range from each tap. The delay time can be swept at rates varying from .1 to 25 seconds. As the Sweep rate is increased, the Sweep range automatically tapers so you perceive a change in rate only, without an accompanying change in

range as is common with other units. (You're not forced to compensate by backing off the C.V. Mix when you increase the Sweep speed). Further, the Sweep Modulation control superimposes a higher frequency sweep pattern over the regular sweep. This allows effects like a vibrato sweep to sweeps which appear to move randomly like sample and hold on synthesizers.

The regeneration section has been carefully tailored to achieve mechanical to natural sounding ambiances by providing separate Level, High Cut equalization, and Tap select controls that can be switched in or out from the front panel or remotely via the rear panel jack. The Level control determines the decay time at long delays (up to 15 seconds), and the amount of resonance at short delays (up to -12 dB). Since a reverberant signal primarily consists of bass and lower midrange frequencies, the High Cut feature in the STD-1 reduces the high-frequency content in the program material as it recirculates through the system for a more natural sounding echo. At longer delay

CIRCLE 187 ON READER SERVICE CARD

times, echoes can be textured from a hard reverb to a soft spacious drone. At short delay times, the resonance can be shaped from a sharp "metallic ringing" sound to "boomy" bass peaking.

All these features working independently and in conjunction, allow such effects as high flanging, low flanging, voice doubling, multi-voice chorusing, echo, reverberation, machine gun reverb, singular to multiple "doppler" effects, vibrato, and highly resonant flanging. Never before has such an unlimited number of delay combinations been available to the musician, engineer, or concert sound technician.



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CIRCLE 190 ON READER SERVICE CARD

Building A Noise Gate

By Jon Gaines

One of the big problems facing the small studio owner is assigning priorities for equipment purchases. You'd like to have access to all the gear that helps produce that great "studio sound" you're after, but reality may dictate buying another microphone instead of a compressor, a better reverb unit instead of a digital delay. One piece of auxiliary equipment that always seems just out of reach is the noise gate, which is unfortunate since these simple devices can go a long way toward helping you get a tight, clean sound. This article presents a professional quality noise gate design that you can build yourself for a fraction of the cost of commercial units.

The project is fairly simple and is recommended for anyone who has had a moderate amount of construction experience. There are no exotic, hard-to-find components involved, and the semiconductors can take a fair amount of handling without fear of damage.

Noise Gate Applications

The term "noise gate" is derived from the device's use as a gate or switch to eliminate noise from an audio signal. Unlike an expander, the noise gate has only two active states of operation—on or off. In use, it is adjusted so that the audio signal fed into it is either switched on, in which case you'll hear it at the output of the noise gate, or it is switched off, in which case the output is silent.

As a typical example, consider a bass drum track in a multi-track recording. Between beats of the bass drum,

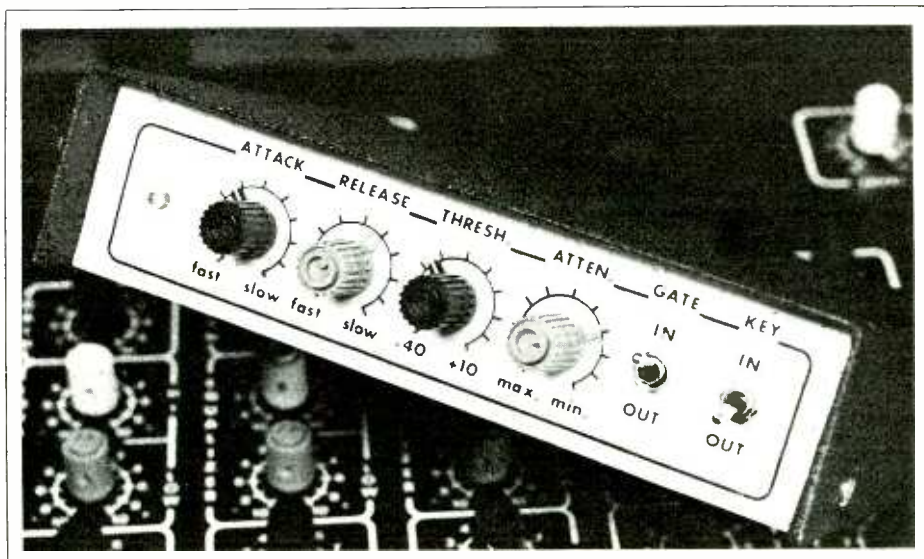
you normally hear some leakage, consisting of noise from the other drums and cymbals, leakage from the bass player's amp, a guitar amp and whatever else was happening in the room at the time of the recording. At mixdown time, this leakage, combined with leakage on other tracks, can contribute to a muddy, loose sound. By routing the bass drum track through a noise gate, leakage is totally eliminated, since the gate is on at the instant when the beater strikes the head of the drum, and off at all other times. With a noise gate on each drum track in a typical set, the improvement in overall sound can be spectacular.

While cleaning up drum tracks is one of my favorite applications for noise gates, they have many other uses in sound reinforcement and perfor-

mance as well. In a sound system, gates can automatically turn off unused microphones or groups of mics, giving a sound system better clarity by reducing leakage, and reducing the possibility of feedback by keeping the number of "live" mics to a minimum. Performing musicians can use gates as the link between their other effects and their amplifier, cutting out all the hiss, hum and buzz that might otherwise come out of their amp when they're not playing.

Operational Controls

How does the noise gate know what to pass and what to reject? This is primarily determined by the Threshold control, which establishes a fixed operating point, called the threshold. Any audio signal entering the noise



gate will either be below or above the threshold point. If below, the gate will remain off, and the output will be silent. As soon as the volume of the incoming musical signal reaches a critical voltage level, the gate switches on and the audio signal appears at the output. In practice, you simply rotate the threshold control until you find the point at which the gate is able to differentiate between music and noise.

In the design presented here, an LED indicator is included to give a visual indication of the noise gate's on and off states; the LED lights as soon as the audio signal has reached threshold.

Three other variable controls are used to make the gate respond effectively to different types of program material.

The Attack Time control determines how quickly the gate turns on after threshold is reached, ranging from a few microseconds to a few milliseconds. In most applications, a very fast response is desirable to prevent clipping off the beginning of any musical attacks.

Release Time determines how quickly the gate returns to its off state after the input signal has fallen below threshold. When gating drum tracks, I usually use a very fast release time so that the drum track is only heard at the instant when the stick hits the head. For more sustained types of material, such as guitar solos, a slow release insures that the end of a note won't get cut off. Not only does the gate stay on longer after the signal drops below threshold, but the rate at which it shuts off slows down as well, more closely approximating your hand pulling down a fader.

The Maximum Attenuation control allows you to determine to what extent the noise gate mutes the music when it is in the off state. Normally, you'll want the noise portion of the input signal to be muted as much as possible, in which case the attenuation control is set at maximum. In some instances, however, a track which abruptly changes between sound and silence won't be sufficiently masked by the other tracks, and the resulting change in ambience could be noticeable. In that case, you can adjust the attenuation control to achieve a usable compromise between noise reduction and musical coherence.

The Gate switch allows you to make

quick A-B comparisons between the original input signal and the processed output; when switched out, the input is hardwired to the output.

Finally, a Key switch makes it possible to use some external trigger to control the gating function. In normal operation, an instrument triggers its own gate; the attack of the kick drum turns on the gate that allows the sound of the kick drum to pass. But suppose you want an instrument to be turned on and off by a signal other than its own rhythmic attack. The key switch makes this possible. This use of the noise gate falls under the category of "special effects," and later on I'll offer some examples of its application.

Before You Start

The ultimate success of any build-yourself project depends largely on good planning and careful attention to

detail. There's nothing so frustrating as soldering in the last part, flipping on the power and hearing silence where you should hear music. While this is likely to happen occasionally, you needn't be resigned to it.

Here are a few general rules:

1) Use only resin core solder for electronics work. Acid core is great for plumbing, but can utterly ruin a low-noise circuit.

2) Use a medium heat iron, 30 to 40 watts, clean and well tinned. Iron-clad tips tend to keep their shape longer than plain copper tips. Keep a damp sponge or an old rag on your bench to occasionally wipe the crud off the tip.

3) Soldering. The secret of good soldering is to bring the connection to be soldered up to temperature as quickly as possible, melt on a small amount of solder and let the joint

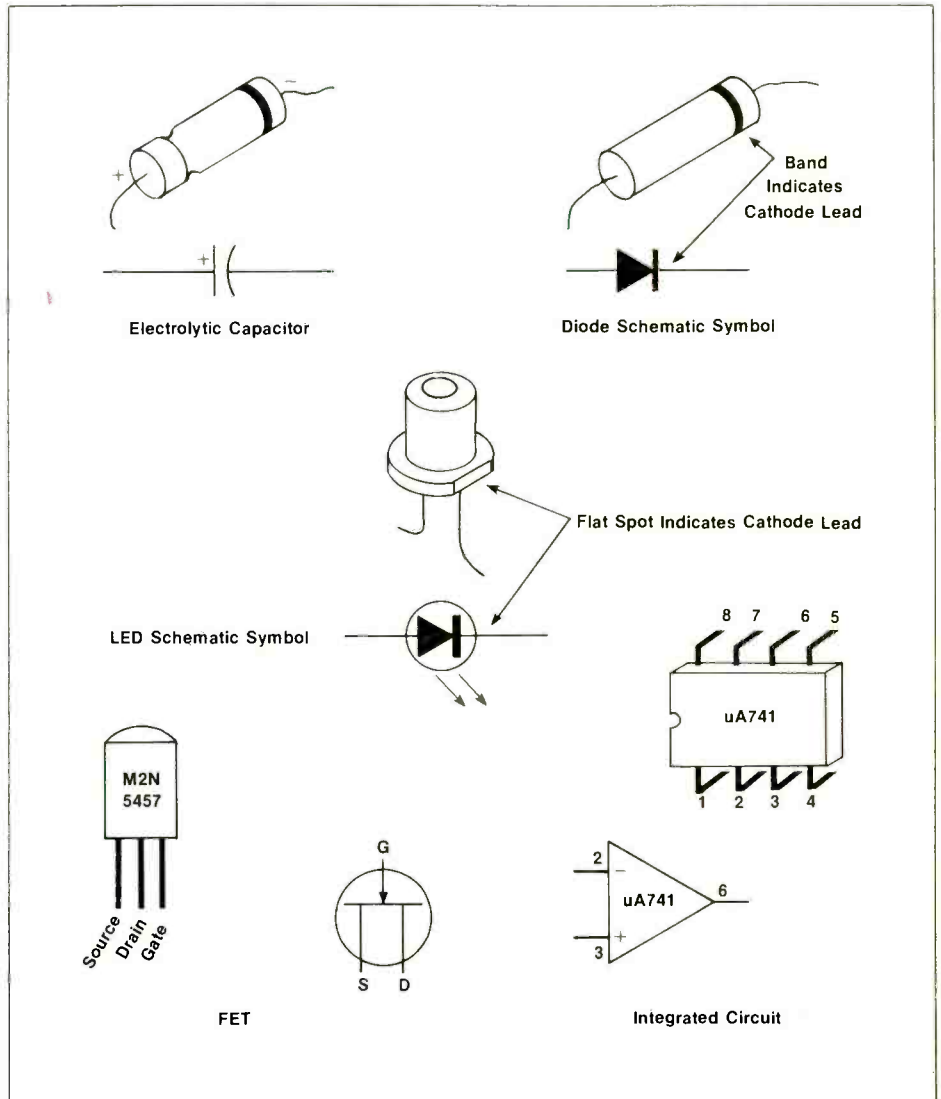


Fig. 1: Component polarities and schematic symbols.

cool without moving. Put another way, the object is to "get in and get out" as quickly as possible. Where a lot of people seem to have trouble is that first part, heating the joint. It's almost impossible to heat a joint with a dry tip; the component will get awfully hot, but the joint refuses to melt solder. Therefore, it's important to prime the soldering iron with a small bead of molten solder, and then hold the molten solder against the joint. The effective surface area of the tip is greatly increased, and the heat transfer is almost instantaneous. Now you can melt an additional bit of solder onto the joint, and then remove the iron as soon as the solder has flowed all around the connection. If you follow this routine, the whole process should take about one second, and it's nearly impossible to overheat a component.

Common sense will suggest ways to keep parts as cool as possible while soldering. For example, if you're soldering a diode in place, solder just one end of it, and, while it's cooling, go on to some other connection. Then come back to the diode after it has cooled a bit, and solder the other end. This advice applies equally to the LED and FET in this project.

4) Whenever possible, use IC sockets. Although it's tempting to eliminate them from your parts list, they're more than worth their expense if you should ever have to replace an IC. They also eliminate the possibility of overheating an IC while soldering.

5) Desoldering. Every now and

then, you'll be looking over your assembled circuit board, admiring your nice shiny solder connections and impeccable workmanship, when you suddenly realize that you've soldered a few parts in the wrong position. Getting the parts out is easy enough—simply reheat the solder and pull the components out. However, getting them in again can be a problem. If you just reheat the solder and try to poke the lead through the hole again, there's a 90% chance that you'll lift the copper foil pad away from the circuit board. Once off, it's nearly impossible to make it stick down again.

The solution is to clean all the solder away from the hole and let it cool completely before attempting reinsertion. Use either a suction type desoldering tool or a braided copper desoldering wick.

6) Pay attention to polarity. For the noise gate project, this applies to the LED, the three diodes, the FET and C2, the 22 microfarad electrolytic capacitor. Most caps have an indent at one end, which corresponds to the (+) sign on the circuit board and the schematic. Alternately, a cap may have a band at one end, or a minus sign, both of these corresponding to the negative end. The LED has a flat side on its plastic case, indicating the cathode lead, which corresponds to the line on the schematic symbol. This symbol also appears on the circuit board. Similarly, the band on the 1N4148 diodes is equivalent to the line on the schematic and parts layout diagram. See *Figure 1* for examples of these components and

their schematic representation. Also shown is the package and pin designation of the 2N5457 Junction Field Effect Transistor (JFET). The "gate" lead is the most critical one to get right on this device; drain and source can usually be interchanged with no effect on performance.

Note that ICs usually have a notch or hole at one end to designate Pin 1. This also corresponds to the notch or rounded-off corner on the IC socket, and to the notch indicated on the parts layout diagram.

7) Check your work and then double-check it. One of the variations on Murphy's Law states that if you double-check your work, no errors will be found, but if you don't check it, an error will exist. This principle naturally makes checking your work one of the least gratifying aspects of project building. Nonetheless, it's wise to try to get into the habit.

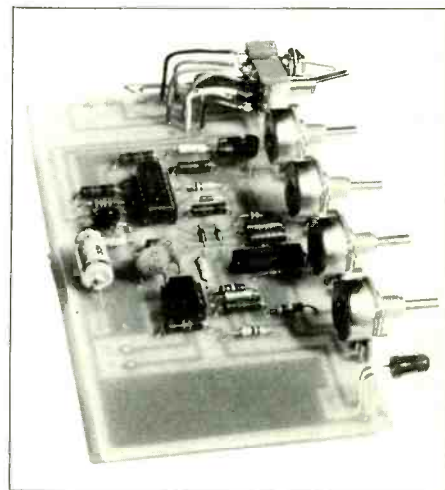


Fig. 3: Assembled noise gate.

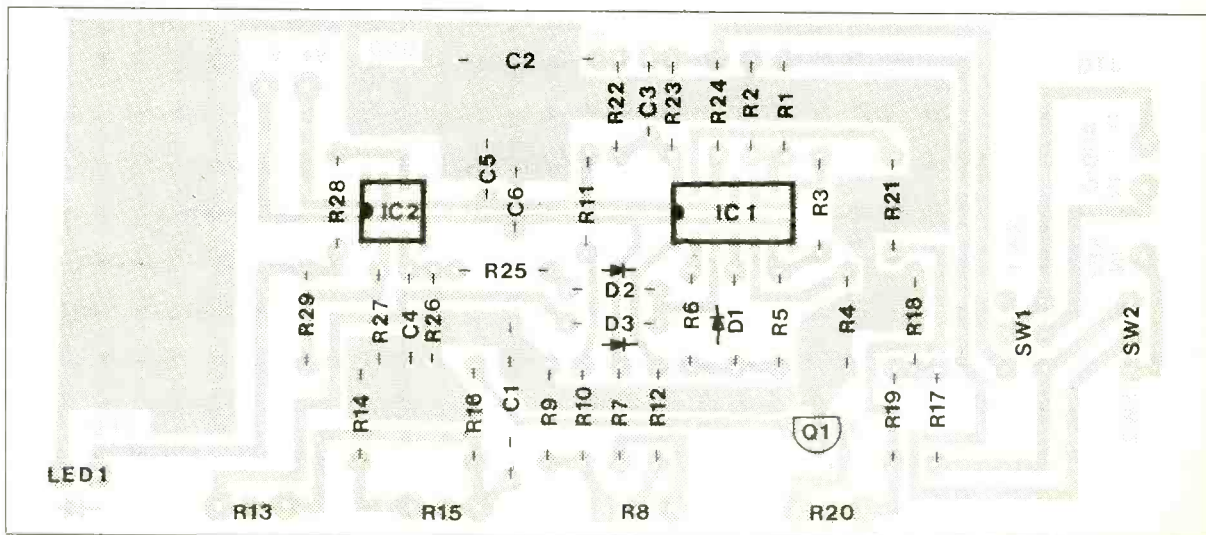


Fig. 2: PCB parts layout diagram (viewed from component side).

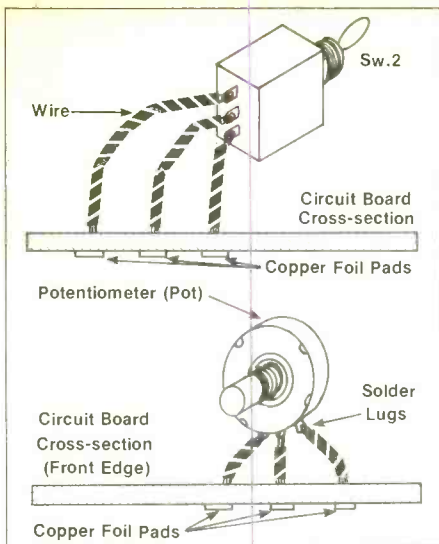


Fig. 4: Switch and pot insertion.

Procedure

Check to see that you have all of the parts ready, and that they'll all fit into the circuit board in the designated places. It's a good idea to clean the copper side of the board with steel wool or a rubbing compound to make soldering easier. Also, check that there are no fine copper burrs left over from the drilling process, as a stray bit of copper can produce a hard to locate short.

If you're not using a printed circuit board to build this project, try to follow the general layout shown in the accompanying photos and diagrams. Remember that the TL075 is an extremely wide bandwidth amplifier; keep lead lengths as short as practical.

To begin, insert and solder the IC sockets, noting polarity. The sockets will serve as a reference point for all the other parts to be inserted. Follow-

ing the parts layout diagram (Fig. 2), insert and solder all of the resistors, capacitors and diodes. If the parts tend to fall out when you turn the PC board over to solder them, try holding them down with a piece of masking tape until they're soldered.

To insert the LED, you'll need to bend the leads outward slightly. Grasp the leads just below the case with a pair of needlenose pliers and then bend the leads with your fingers. This minimizes the stress on the leads and the transistor's plastic case. Use the same procedure to bend the leads for the LED; note that the flat spot on the case will be facing in toward the center of the PC board.

The PC board layout (Fig. 5) has been designed to reduce handwiring and confusion. The potentiometers I've used mount directly to the board, as illustrated in the photo (Fig. 3). Simply plug the pots in and solder. The advantage of this type of pot, besides the reduction of tedious wiring, is that the PC board becomes rigidly attached to the pots, and when the pots are mounted in the chassis, the physical mounting of the board itself is also accomplished. In most cases, no additional nuts and bolts are needed to secure the PC board. However, if your noise gate is going on the road, you might consider additional supports.

If you're using standard solder-lug pots, run wires from the pads on the board to the lugs on your pots, as if you were plugging your pots into the PC board (see Fig. 4).

The pads for the two switches have also been laid out to make their wiring as straightforward as possible. For ex-

ample, switch 1 is a DPDT, represented on the copper side of the board by six copper pads, only five of which are used. These six pads are the equivalent of the six solder lugs you'll find on the back of any miniature DPDT switch, with the two center pads representing the arm, or common, of the switch. To see how you wire this switch to the board, hold the switch with the solder lugs facing away from you, and imagine that you are plugging it right into the PC board pads—from the component side, of course. Now, attach five wires to the switch and insert them into their proper holes. (See Fig. 4 for additional clarification.)

That completes the insertion of all the components except the ICs themselves, which we'll put off for the time being. Your gate should look pretty much like the photograph at this point (Fig. 3).

External Wiring

All that's really left to do is to hook up a power supply to the noise gate and connect the two inputs and one output. You can run this project from any standard ± 15 -Volt power supply. If you have built other projects that have appeared in *MR&M*, you already have such a supply handy. Because they are common and readily available, I have not included one in this article.

Attach the positive power supply lead to the pad marked V+, the negative supply lead to the pad marked V- and the power supply common to the copper foil area near the word GND.

If you are housing your project in a metal chassis, you can use un-

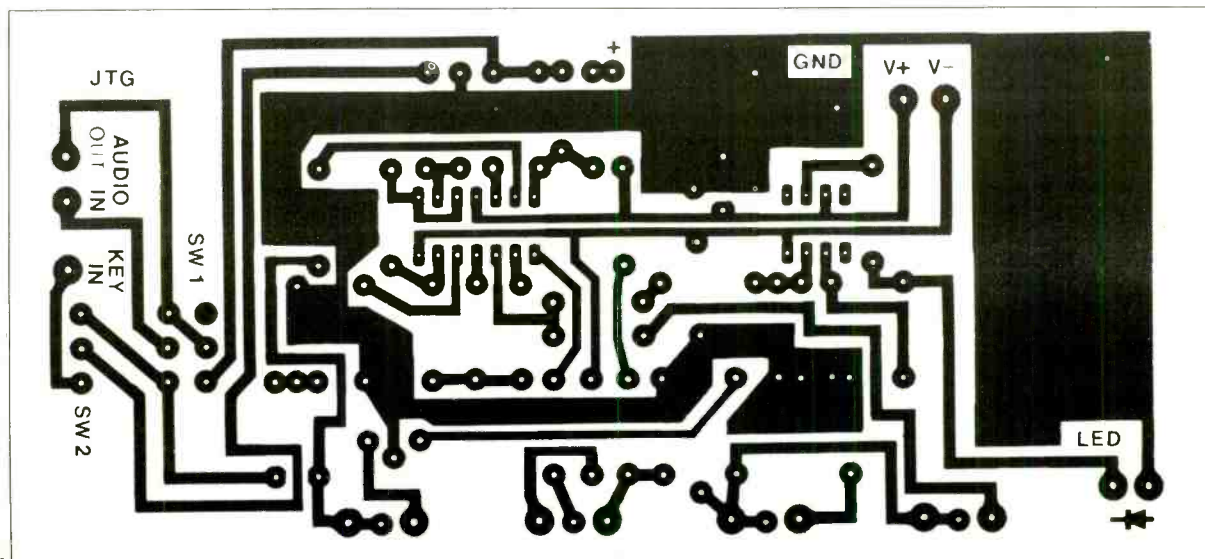


Fig. 5: PC board artwork (positive; viewed from copper side of board).

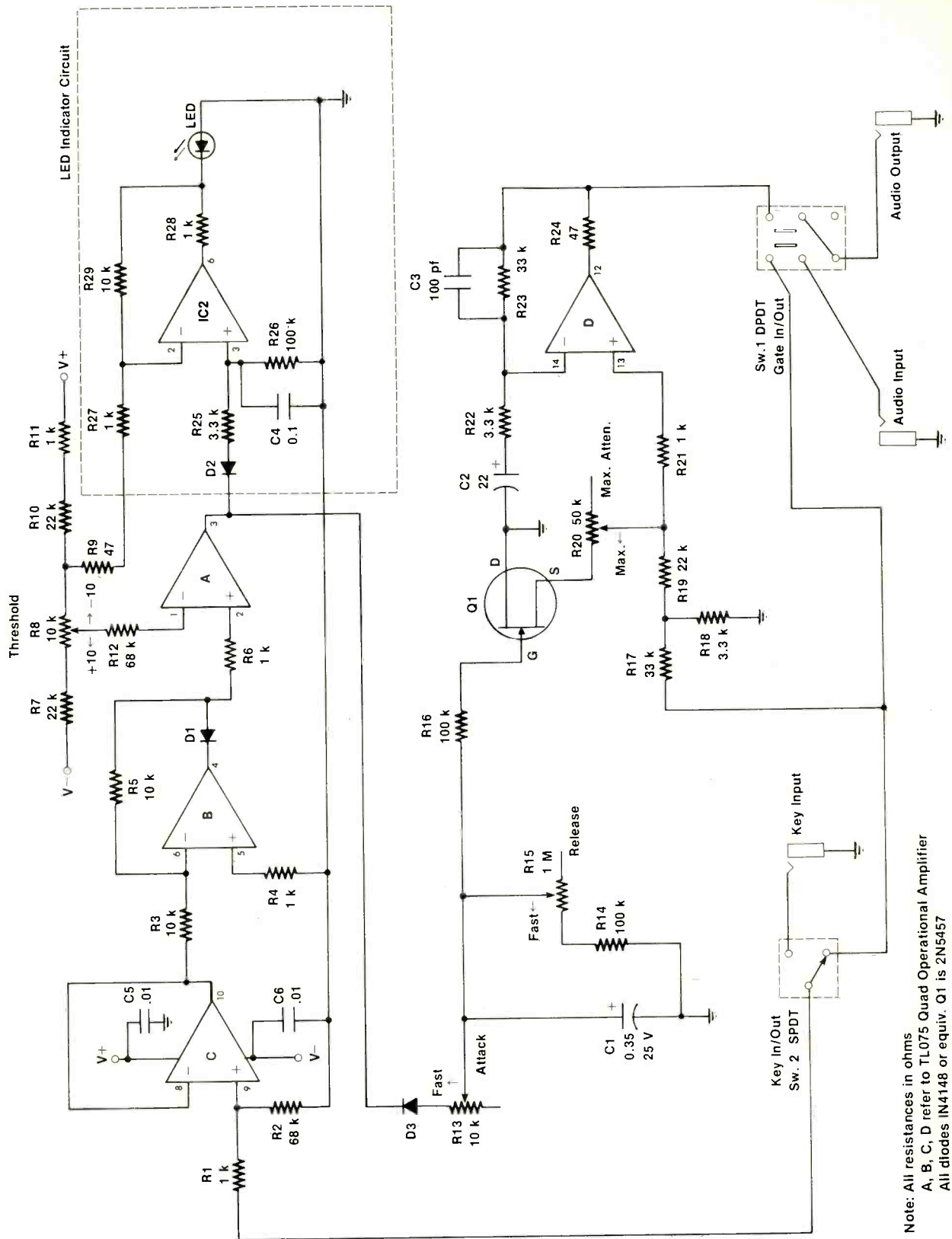


Fig. 6: Schematic diagram.

Note: All resistances in ohms
 A, B, C, D refer to TL075 Quad Operational Amplifier
 All diodes IN4148 or equiv. Q1 is 2N5457
 IC 2 is a 741

shielded solid or stranded hookup wire to connect the input and output jacks. Use either RCA type or 1/4" phone jacks, depending on your particular application.

Label one of the jacks "Audio Input" and run a wire from its hot terminal to the pad marked AUDIO IN.

Label a second jack "Key In" and wire its hot terminal to the pad marked KEY IN.

Label the third jack "Audio Output" and wire it to the pad marked AUDIO OUT.

Lastly, ground all of the jacks to each other, either with a piece of hookup wire or through the metal body of the chassis, and ground the chassis to the circuit board, again at the point marked GND. The object is to have all of the audio grounds, power supply ground, chassis and PC board ground referenced to the same point.

As soon as you mount the unit in a suitable case, the construction phase of the project will be complete; this is a good time to go back and check your work. Verify component placement and polarity and look for shorts or unsoldered connections.

Initial Test

Before you plug in the ICs, it's a good idea to check supply voltages. First, turn on the power supply, and using a DC Voltmeter, verify that the supply voltage is approximately ± 15 Volts. Next, check to be sure that you have +15 Volts at pin 11 of IC 1 and pin 7 of IC 2. Check for -15 V at pin 7 of IC 1 and at pin 4 of IC 2. Turn the power off again.

Connect a line-level music source to the Audio Input jack. Any tape or record will do, but the more dynamic range, the better. Connect the Audio Output of the noise gate to a monitor amplifier. Set the GATE IN/OUT switch to the OUT position. You should hear music at the output. If you don't, you either have the input and output jacks or SW. 1 incorrectly wired.

With the power still off, insert the two ICs. Turn all of the controls fully counterclockwise, set the GATE switch to the IN position and the KEY switch OUT. Turn on the power. The LED should now light, and you should hear music at the output.

Adjust the threshold control clockwise until the gate reaches the edge of threshold. The music will begin

Noise Gate Specifications

(using TL075CN)

Frequency Response:

10 Hz-22 kHz, +0 dB, -1 dB

Overall Gain:

Unity

THD (Gate On):

0.01% typical

Current Consumption:

+10 mA, -22 mA

Maximum Power Supply Voltage:

± 18 Volts

Parts List

Resistors - all 1/4 watt, 5% tolerance

R1, R4, R6, R11, R21, R27, R28

1 K ohm

R2, R12

68 K

R3, R5, R29

10 K

R7, R10, R19

22 K

R8, R13

10 K Potentiometer, Linear

R9, R24

47 ohm

R14, R16, R26

100 K

R15

1 Megohm Potentiometer, Linear

R17, R23

33 K

R18, R22, R25

3.3 K

R20

50 K Potentiometer, Linear

Capacitors

C1

0.35 microfarad, 25 Volt electrolytic

C2

22 microfarad, electrolytic 16 Volt

C3

100 picofarad disc or polystyrene, 15 Volt

C4

0.1 microfarad disc or polystyrene

C5, C6

0.01 microfarad disc

Diodes

D1, D2, D3

1N4148 or 914

LED 1

Red

Integrated Circuits

IC 1

TL075CN Low Noise Audio BiFET Op Amp, Quad

An acceptable substitute for IC 1 is the RC 4136 (Raytheon)

IC 2

uA 741 Op Amp

Transistor

Q1

Motorola 2N5457 N-channel JFET, or 2N5458
Substitute Radio Shack 2028, part # 276-2028

Switches

SW 1

DPDT Toggle, miniature

SW 2

SPDT Toggle, miniature

Miscellaneous

14 Pin IC Socket

8 Pin IC Socket

(3) RCA or 1/4" Jacks

Circuit board, solder, wire, chassis, knobs

A parts kit containing all of the above items, except chassis and solder, is available for \$44.95, and a circuit board alone is available for \$9.95. Order from:

JTG Electronics
76 Smyles Drive
Rochester, NY 14609

Prices are postage paid. N.Y. Residents please add 7% sales tax.

to cut in and out as the gate tracks the amplitude peaks. As you continue to turn the control clockwise, the sound will cut out completely since there is nothing of sufficient volume to turn the gate on. Experiment with this and the other controls to get a feeling for their functions. If you don't immediately hear the effect of the Attack time control, don't worry; its influence is subtle.

To check the external KEY function, plug another line level source into the Key Input jack and set the KEY switch to IN. Re-adjust the threshold control so that it tracks the new keying signal.

Using Your Noise Gate

You'll find that the gate is very easy to use and that the control settings are not particularly critical. If you are

Still The Best!

- Flange
- Double
- Echo
- Vibrato
- Pitch resonance
- Doppler effects
- 95db typical
- 15kHz at all delay settings
- 512 mS of delay standard

Don't be deceived by lower priced imitations, the DL-4 Time Line™ is still the best high-quality, full-bandwidth, long-delay digital processor available today. You owe it to yourself to find out why



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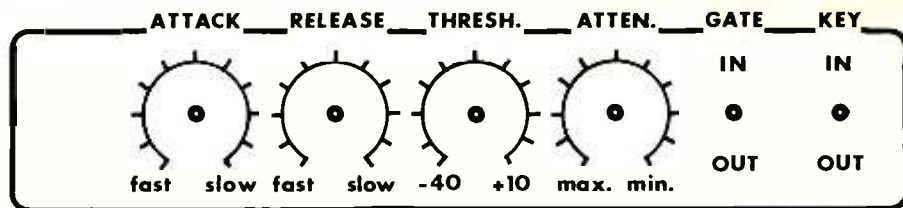


Fig. 7: Suggested front panel graphics.

using the gate in conjunction with other processing equipment, such as equalizers and compressors, it's usually best to make the noise gate the last link in the processing chain.

For example, an equalizer is typically used ahead of a compressor to keep it from mistracking due to subsonic noise. Similarly, you would want to eliminate any very low frequency junk that might cause false keying of the noise gate.

If you are gating a kick drum track and the drummer did not play with a consistent attack, there may be a tendency for the gate to "miss" a lightly struck beat now and then. One solution is to lower the threshold level slightly, allowing the gate to respond to the softer kicks. However, this may also allow more noise to sneak by, as the gate's threshold has been shifted closer to the track's noise level. An alternate solution is the judicious use of a compressor just ahead of the gate. While their functions might seem contradictory, a little compression here can even out the drum track just enough so that the noise gate keys more accurately. By the way, it would be risky to use the gate when laying down original tracks, for the same reason just mentioned. If a musician doesn't play with a consistent attack, the gate may decide that the lighter beats are noise, and mute them.

Special Effects

Keying a sound source with an external voltage offers interesting possibilities. To use the kick drum as an example once more, let's say you've just started a mixdown session and discover that the kick drum sounds like a baseball bat hitting an old cardboard box. You pour on the EQ and manage to make it sound like a sonic boom, but it still doesn't have much character. There's no time or money to overdub a new track. What to do?

Plug the kick drum track into the Key Input of the gate. Tune an oscillator to a 40 Hz sine wave and

plug that into the Audio Input of the gate. Route the output of the noise gate to the console input module that was being used for the kick drum track. Roll the tape once again, and you'll hear the oscillator turning on and off in time to the music. By tuning the oscillator, you can give the kick drum a definitive musical pitch. You might think that this trick would sound gimmicky and not very musical, but you'll be amazed at just how good a kick drum sound you can simulate this way. If you want to preserve a little of the original drum sound, mix the dry track and the gated oscillator together through two faders and adjust the ratio for the best sound.

Once you've become familiar with the concept of external keying, you'll think of lots of ways to create special effects with the noise gate.

Modifications

If the noise gate presented here offers more control than you need, you can build a "stripped down" version by eliminating certain functions.

For instance, although the LED indicator is a handy aid in setting the threshold level and for monitoring the gate function, removing this part of the circuit won't effect the noise gate's other functions at all.

If you're willing to give up control of attack time and want a consistently fast response time, simply eliminate the attack time pot (R13), and short across the three copper pads on the circuit board where that pot would have been inserted.

The same applies to the release time pot and the maximum attenuation control, with a resultant fixed fast release and maximum attenuation in the off state.

If you don't plan on using the key option, leave out that switch and short across the three copper pads for SW. 2.

In some situations, you might want to extend the maximum release time by using a larger value pot for R15, say 2.5 M ohms.

EVM™ by Electro-Voice

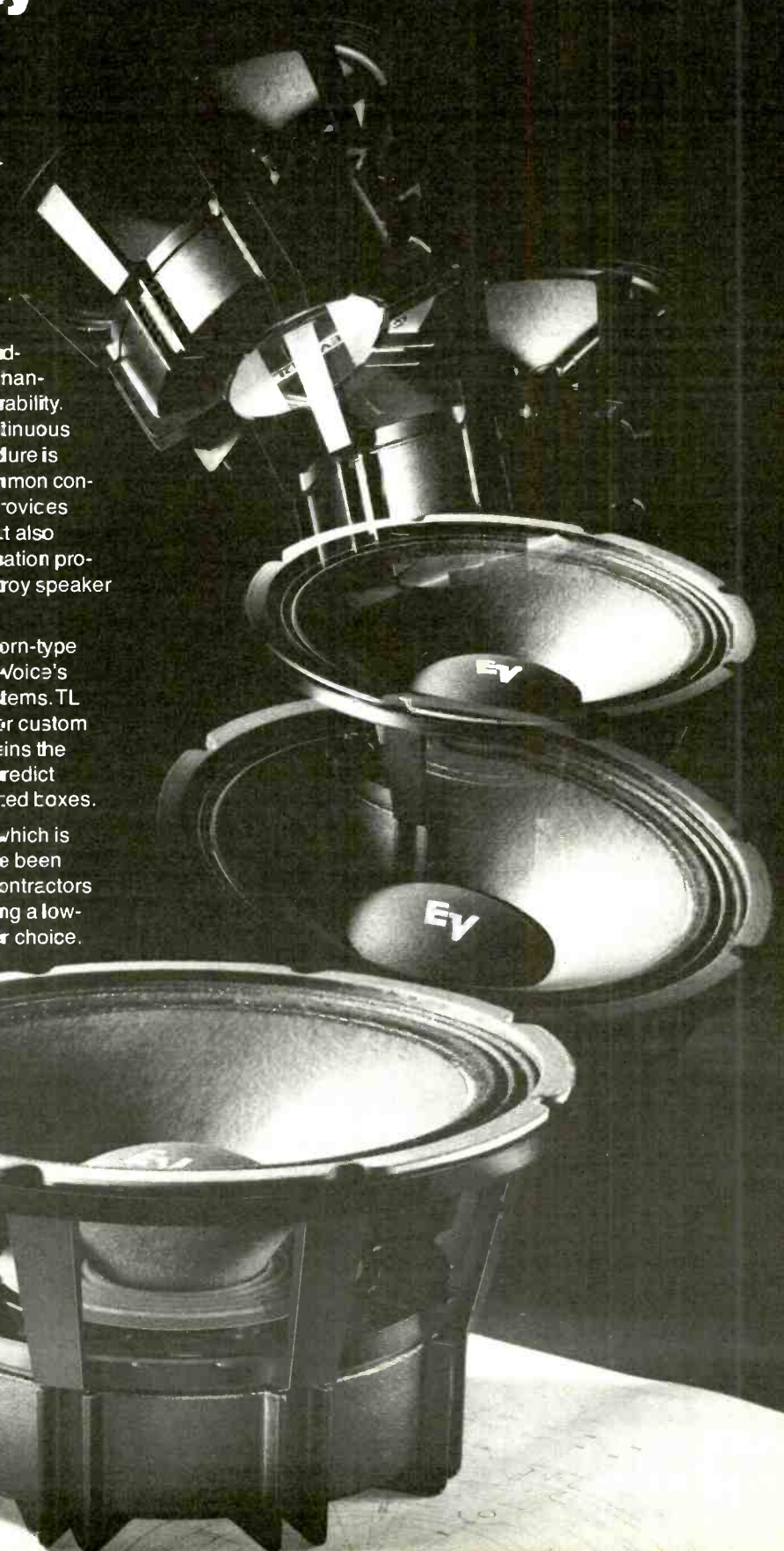
The low-frequency loudspeaker

Electro-Voice EVM™ Series II loudspeakers represent the ultimate in maximum efficiency, low-frequency speaker design. Years of experience, testing and refinement have resulted in a series of loudspeakers that are ideally suited for professional high-level, high-quality musical instrument and sound reinforcement systems.

Series II speakers incorporate many unique and innovative refinements that result in a loudspeaker that combines incredibly high power handling capability, efficiency and mechanical durability. All EVM's are conservatively rated at 200 continuous watts per EIA Standard RS-426A. This procedure is substantially more stringent than the more common continuous or "RMS" sine wave test, because it provides not only a 200-watt long-term stress (heat) but also duplicates mechanically demanding short duration program peaks of up to 800 watts which can destroy speaker cones and suspension parts.

EVM's are the ideal speaker for vented and horn-type enclosures. They are also featured in Electro-Voice's TL line of optimally-vented low-frequency systems. TL enclosure builder's plans are also available for custom construction, and each EVM data sheet contains the Thiele/Small parameters which allow you to predict the large and small signal performance in vented boxes.

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THE FACTS: PERFORMANCE.

Overall Signal-to-Noise: 66 dB unweighted @ 520 nWb/m, 30 Hz to 18kHz.
Dynamic Range: 72 dB unweighted: 30 Hz to 18 kHz.
Headroom: +24 dB. Maximum output: +28 dBm.
Overall Frequency Response: 30 Hz to 22 kHz ± 2.0 dB (15 ips @ +4 dBm).
Playback Frequency Response: 31.5 Hz to 20 kHz ± 2.0 dB (15 ips @ +4 dBm).
Distortion: less than 0.7%, 1 kHz @ 250 nWb/m.
Crosstalk: greater than 55 dB, 1 kHz, adjacent tracks.
Wow and Flutter: less than 0.05% (15 ips).
Rewind Time: 90 seconds for 2500 feet.

THE FACTS: FEATURES.

Three switchable speed pairs: 15/7½ or 7½/3¾ ips (automatic equalization).
NAB/IEC selectable equalization.
Selectable +4 or -10 dBm output.
D.C. servo capstan motor with $\pm 7\%$ varispeed control.
Selective reproduce for overdubbing.
Four heads: ½ track erase, record, reproduce, ¼ track reproduce plug-in assembly.
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Choice of three alignment levels: 185, 250 & 320 nWb/m.
Dump edit and tape lifter defeat; precision aligned; and indexed splicing block.
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THE NEW
WORKHORSE



A SESSION WITH

HALL &





O A T E S

John screams like a cow, and I just yell, 'So beautiful!' " Daryl Hall is discussing how he and his partner in hitmaking, John Oates, prepare their voices before exercising them for posterity in the recording studio. The funny thing is, he's not kidding.

"Really, I scream at the top of my lungs," says Oates in all seriousness. "When you're sitting around your living room, you tend to sing softly and in between tours, your voice gets out of practice. So when I'm in the studio, I scream for about three seconds and it loosens it up."

"We take about a month off from recording to go out on the road while we're making a record," explains Hall. "We both sing better when we loosen up. The more I sing, the harder I sing."

Whatever it is that Hall and Oates do to get their voices ready for the recording studio, it's been working. Known for their string of mid-70s R&B-laced hits such as "She's Gone," "Sara Smile" and "Rich Girl," Hall and Oates recently struck again with a trio of hits taken from their 1980 RCA release, *Voices*. One of the tracks released as a single, "Kiss On My List," rose to number one on the charts, giving the New York-based duo one of its biggest records ever. The other singles, "How Does It Feel To Be Back" and "You Make My Dreams," also did extremely well.

Although Hall and Oates have been used to hit records, one thing that set *Voices* apart from their other records was that it marked the first time they had produced themselves. And, according to the blond Hall and the dark, bushy-haired Oates, they'd never been happier with a record. Until, that is, they recorded *Private Eyes*, the followup to *Voices*.

"This album is a very sensible extension of *Voices* as far as the actual sound," offers Hall, who, with Oates, is sitting in a lounge at New York's Electric Lady Studios, where *Private Eyes* is being mixed. "It's not so much our writing style that has changed, but those other factors, that have made our past albums sound so scattered."

"This is the most consistent record yet in terms of the totality of the music," adds Oates.

What was the problem in the past? Why have they given up using outside producers?

"We tended to hire people with

BY JEFF TAMARKIN

strong musical identities," explains Hall, "and they tended to impose some of that identity upon us. They had very definite perceptions of what we were or what we should be."

"And we never agreed on what those things were," throws in Oates.

"They were often performing," continues Hall, "in the role of the

Several other factors may have gone into the success of *Voices*. For one, it was the first album recorded with the road band Hall and Oates had been working with. It also was the first involving Kernon, who was a big fan of Hall and Oates' music. And, certainly, the songs were more accessible than those on the duo's past couple of

doing with *Red Ledge*, *X-Static* and *Sacred Songs* (Hall's LP). Those were rawer and more East Coast oriented than the albums we'd been having success with. The reason we had no hits on those albums was because people were slow to grab the switch we wanted to make."

With *Voices*, the people caught on.



John Oates and Daryl Hall flanking grinning engineer Neil Kernon.

translator between us and their friends, who happened to be the studio musicians they'd hire. And they'd like to work in an environment in which they felt comfortable, like a studio in California. So we were never on home ground, whether it was with the making of the music itself or the actual location of the studio. We tended to make less than exact records."

Did Hall and Oates ever have a producer that so dominated the proceedings that they felt the record wasn't even theirs? Both musicians simultaneously answer yes. "In fact," notes Hall, "there was one album we made, which I won't name, that I can't even listen to."

All of that changed with *Voices*, the twelfth album recorded by Hall and Oates. They produced themselves, took on Neil Kernon as engineer, applied some of the experimentation of previous albums to their natural commercial sense and hitmaking ability and scored a major success. How did it feel to be back in the charts again, to pun on one of the album's hits?

"It was a vindication," replies Hall. "We were finally making the kind of music that we wanted to make on our own terms and having success with it."

albums, *Along The Red Ledge* and *X-Static*.

Those two LPs, produced by David Foster, found Hall and Oates stepping out on an experimental limb, eschewing their usual blue-eyed soul sound for a diverse collection of styles, including forays into electronic music and new wave. In that same period, Hall also released his long delayed solo album—a collaboration with experimental guitarist Robert Fripp, who also produced the LP. Decidedly non-commercial, the album didn't do much for Hall's bank account, but it did help him learn a few tricks that he brought back to his work with Oates.

"Working with Robert was easy and quick, which I wasn't used to at the time," reports Hall. "It was nice to get back to that feeling, and I took a lot of that back with me. Doing things in one take, working spontaneously—that's how I like to work anyway."

On the same note, Hall doesn't totally dismiss the two pre-*Voices* LPs. "Those were preparation for *Voices*," he says. "They were the transition albums. In order to evolve you must branch out, and that's what we were

Did Hall and Oates find that their audience had changed by the time *Voices* struck?

"They change with our successes, sure," admits Hall. "Now when we play 'live,' we end the show with about four or five hit singles and it definitely changes the mood."

Do they consider those hits representative of the albums from which they came? "Not representative all the way," says Hall, "especially the '76 and '77 songs. Those albums were more rock and roll and soul oriented than some people's perception of the singles, but they were the easiest songs for radio to program. Now, there is little difference between the singles and the total album. That's what we were looking for. We wanted more consistency between what we like and what lots of people like."

Did they have any idea that "Kiss On My List" would be liked by enough people to put it at the number one spot on the charts?

"We didn't even know it was going to be on the album," says Hall. "It was a demo, recorded at a different speed and everything. After we started work

on the album we decided it might be good for the album, so we transferred it to regular speed and started overdubbing." Adds Oates: "We didn't realize just *how* good it would be for the album."

* * *

What goes into the making of a Hall and Oates album? What processes are employed and what is the relationship between the singers/musicians (both Hall and Oates play a multitude of instruments) and the studio?

Hall and Oates describe their recording process. "Usually the music is finished first, and then we work on the arrangements in the studio with the guys in the band. The writing is usually done beforehand, but this time it wasn't," reports Oates. "We leave the arrangements pretty open and then work it out the day of the recording. A lot of times on this album we started out with a Rhythm Ace, the Roland Compu-Rhythm or, say, with just a piano, guitar or bass. Then we'd add guitars, drums, etc., very simply, just like that. For vocals sometimes we just put down a rhythm and do the backgrounds right away."

"Vocals are very important to us," adds Hall. "They keep us from overloading things because they take up so much space on our records and they don't leave us any more. I find it's best if we get the rhythm section together and then do vocals."

How is the writing done? Do they collaborate on everything, or are there definite divisions of labor?

"On this album," explains Oates, "we both wrote at home on four-track Teac cassette recorders. It was really helpful for writing because we could experiment with textures and sounds and get a good idea of what a song should do. On this album, many times we tried to duplicate our own demos, capture what we had in our living rooms." They do, however, collaborate on many lyrics.

"We leave a lot of room for the band in our writing and we also take suggestions from them. G.E. Smith, our guitarist, does a lot of arranging, and so does John Siegler, the bassist." (The other members are Charlie De Chant, sax; Jerry Marrotta, drums; and Mickey Currey, also drums.)

As for engineer Kernon, "He really gets the sounds," says Hall. "At this point, we have a good rapport with him, plus, I like what he gets naturally. He takes care of what we consider the dirty work, the technical stuff."

"He also has a good musical ear," adds Oates. "We rely on that when we're in the studio. He's good with pitch, tuning, vocals. We first try to get everything to sound as natural as possible, and then we alter things afterward."

Hall doesn't like to get too involved technically, but Oates does. Says Hall: "I like to stick with the musical end of things. I like to work fast, and luckily,

Neil's a fast worker. He sets up the mix and then we go and fine tune."

"The final mix," says Oates, "isn't right until it sounds good in our manager's car."

And after that, the album is ready for the consumers and the band is ready for the road. Which do they prefer: the studio or the stage?

"They shouldn't be compared," suggests Hall. "Playing 'live' is a point which is focused out and you do the same material over and over again. Recording is taking things you've never done before and focusing inward. I like them both equally."

And are they always satisfied? They joke that they can live without all of the recordings they made before *Voices*, and mention, perhaps more seriously, that they wish they could re-record all of them. But even now, after they've taken over the production reins and have made at least two albums—*Voices* and *Private Eyes*—that they consider representative of their true talents and desires, do they achieve what they set out to achieve?

"Hopefully not," answers Hall in conclusion. "If we achieve what we set out to do, we'd probably stop. Remember, when Dracula doesn't die at the end of the movie, there's always a sequel."

After Daryl Hall and John Oates discussed their music-making techniques, they were joined by Neil Ker-



non, their engineer on the *Voices* album and the new *Private Eyes* album. Kernon discussed the technical aspects of recording the new *Hall and Oates* album.

Modern Recording & Music: You recorded part of *Voices* here at Electric Lady Studios in New York and now you've returned to do *Private Eyes*. What is it that you like about this studio?

tageous. Other studios are just getting it in now.

MR&M: Have you recorded this entire project at Electric Lady?

NK: Yes. In fact, we used all three of the rooms [studios] here.

DH: As well as the bathrooms, the hallways—and Bruce's (Buchhalter, asst. eng.) next door. It's right through the alley, and since he was just moving in and had no furniture, it had a great echo sound. We did some handclaps in there.

NK: We did handclaps in the

used a regular battery of AKG, Neumann and Sennheiser mics.

MR&M: What mics were used on the vocals?

NK: Either a 267 or an AKG 414.

MR&M: Any special effects?

NK: There are a few from track to track. There's a digital reverb—a new Lexicon 224—and the usual studio outboard equipment. There's a brand new studio Harmonizer™ called the Publison, and the Roland Dimension D, plus the usual flangers, Harmonizer™, delay units.



John Oates: It's about three blocks from my house.

Daryl Hall: That's the best part.

Neil Kernon: Technically, it's got a very good backup, and the equipment is very well maintained. It's efficient.

MR&M: Do you use any special techniques or setups that perhaps no other recording act might use?

NK: Just in the sense of choosing the right microphones and things like that.

JO: What about our half-inch?

NK: Yeah, that's certainly something new. This is the first album ever to be mixed onto half-inch stereo, as opposed to quarter-inch, which is the norm.

MR&M: What is the advantage of that?

NK: You get a much fuller frequency response, a more solid bottom end. And the high end is much clearer and crisper. This is a brand new development that should prove very advan-

hallways here, and for one drum track, I ran a cable to the ladies' room downstairs. We set the drummer up in there and got this huge, bright ambient sound.

MR&M: Can you run through the equipment that was used on the sessions?

DH: We used the [Sequential Circuits] Prophet; that's our main synthesizer. We used Larry Fast on keyboards so he brought his own equipment. We used a Yamaha electric piano and a Wurlitzer MLM student keyboard that looks like an Emenee organ. John used that on one song. It has an unbelievably cheesy sound. We used an acoustic piano, a Steinway. We used an Arp 2600, a mini-Moog, one Vocoder; that's all the keyboards. As for guitars, I used my four-string Mandarin tenor guitars; I have some of the only ones in existence.

NK: Getting into the technical side, I

JO: Telephones were used quite often, especially in the evening.

NK: The monitors we used are not wall monitors, but brand new UREIs. They're much more accurate than the last ones they had.

MR&M: What kinds of guitar amps were used?

DH: Mostly Music Man. We used an Ampeg bass amp, but we usually take the bass signal direct as well.

MR&M: Can you describe the console?

NK: They're all Neve. The one (the 8078) in Studio A is the most advanced of the three here. It has a more sophisticated EQ section. Basically it's 32-in and 24-out. This one has an added section so you can expand it to 48. This one is the 8068. There's a new one, possibly the 8088, which they'll be getting in here. This is the last album to be done in this room. Then they're re-doing the whole room.

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Profile:

PRODUCER TOM DOWD

By STEVE CARAWAY & DAN FORTE

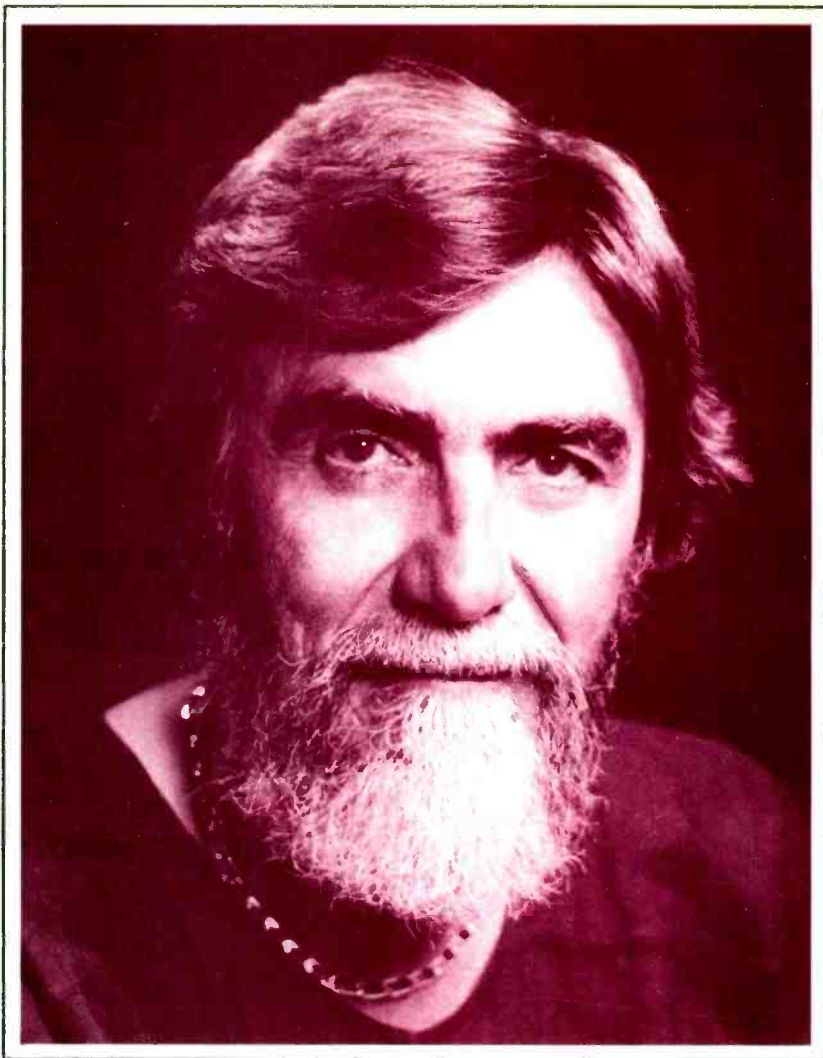
"Dynamo" is how Tom Dowd describes his long-time associate, producer Jerry Wexler, but the word could just as easily be applied to Dowd himself. For more than three decades, Dowd has been one of the busiest producer/engineers in the country, and at 55 he and his schedule show no signs of tapering off.

First attracted to the recording industry through an ad in the newspaper, Dowd has worked on numerous records, in all fields of pop music, that could only be described as milestones—from "Mack The Knife" to "Giant Steps," from "Respect" to "Layla."

Engineering primarily jazz sessions in the late forties and early fifties, Dowd worked with music heavyweights such as Charlie Parker, Lester Young, Bud Powell, Lennie Tristano, George Shearing and Errol Garner, for independent labels such as Dial, Savoy, Apollo, Prestige, New Jazz, National, Riverside and Bethlehem.

He also worked several sessions for the burgeoning Atlantic label, led by Jerry Wexler and Ahmet and Nesuhi Ertegun. By the mid-fifties, having already engineered virtually every Atlantic session during a five or six year span, Dowd joined the label full-time, manning the console on records by Atlantic's impressive roster of R&B pioneers—including the Drifters, the Clovers, Ruth Brown, Big Joe Turner and Ray Charles. Atlantic was also crossing over into the pop market, with singers like Bobby Darin, and following the evolution of jazz into "modern" and "progressive" styles, led by the likes of John Coltrane, Eric Dolphy and Ornette Coleman. Dowd was on hand throughout.

In the mid-sixties, Atlantic got involved in the recording and distribution of the Stax/Volt R&B of Otis Redding, Carla Thomas, Sam & Dave, et al; it was Dowd who commuted



from New York to Memphis, to work with the Stax house band known as Booker T & the MG's, and later to Muscle Shoals, Alabama, to use the famed Muscle Shoals Rhythm Section to back Atlantic acts such as Wilson Pickett and Aretha Franklin.

After his first solo production in the studio, with the Young Rascals, Dowd began producing as much or more than engineering, and by the late sixties he became completely immersed in the rock scene. His engineering work on several Cream albums spawned a relationship with Eric Clapton that has seen Dowd behind the board for Layla, 461 Ocean Boulevard, There's One In Every Crowd and Clapton's latest release, Another Ticket. Dowd has worked with rock & rollers as far flung as Rod Stewart and Black Oak Arkansas, and has tentative plans to go into the studio with Heart and Roger Daltrey later this year.

Dowd estimates that he has been the recipient of approximately 45 platinum albums and a far greater number of gold LPs. He is a Grammy award winner (including "Mack The Knife" by Bobby Darin; "Respect" by Aretha Franklin). "I revere them," he says of the awards. "They mean something to me."

More important perhaps is the respect and admiration Dowd has earned from his colleagues in the industry. Barry Beckett, keyboardist with the Muscle Shoals Rhythm Section, speaks for most when he says, "I learned a lot from Tom

Dowd. He's probably the best producer/engineer active."

The following interview took place at the Record Plant in Sausalito, California, where Dowd was producing an upcoming LP by Pablo Cruise [see MR&M, July 1981 issue].

In conversation, Dowd is constantly animated, displaying the enthusiasm of a schoolboy as he relates anecdotes from his own experience. He will shift into a Southern drawl when

talking about the Allman Brothers, then segue into a clipped English accent when the subject of Eric Clapton comes up. Each of the names of the artists he's been associated with is met with a different smile, a different laugh.

Tom Dowd got into recording at age 22, because, in his words, "I thought it would be fun." Thirty-four years later, it's easy to see that the man is still having the time of his life.

Modern Recording & Music: How did you get involved with the music business?

Tom Dowd: During high school and college, I was in orchestras. I played in the Columbia University Orchestra. I was playing tuba, sousaphone, double bass, baritone saxophone—that whole "bottom" section of the staff. I liked it down there; I like wind instruments, although I did take piano lessons.

In 1943 I went into the service for 33 months. When I got out, in 1946, I went back to school, and it was during summer vacation that I found an ad in the newspaper from a recording studio that was looking for an engineer. I thought it would be fun. And that was when I started, in 1947.

MR&M: Was that more or less how people got into the business back then?

TD: No, that was drastically different. Recording in those days was done using radio station studios. Radio stations had two or three studios—because they used to have "live" audiences and "live" musicians. Coming out of World War II, the whole character of radio changed, and the stations found that all they needed was canned music and an announce booth, because they had disc-jockeys. So they had these studios just sitting around, and they started using them for recording. That's why Columbia and RCA were so involved in recording then—they had so damn many studios sitting around. I think that maybe Majestic Records and Capitol Records were the first two independent record companies that built studios to accommodate recording sessions, the rest of the studios were converted radio equipment, with radio engineers operating them.

MR&M: When you first started, did anyone teach you or did you just pick skills up along the way?

TD: See, the studio I was working in was a classical demo-type studio. It belonged to a publishing house called Carl Fischer; they did operatic pieces. They had a moderately good-sized studio, but it was for voice with piano,

or chamber music. It was in the Carnegie Hall area, so when someone was preparing for a recital or taking various coaching lessons, they'd run in to make a quick acetate to evaluate it. Fortunately, or unfortunately, depending on the way you view it, there was a man who was the president of the AF of M union at the time named James Petrillo, and he called a strike. So, any room with a console and microphones hanging in it became a hot recording studio as the strike ban moved close. Everyone was recording 24 hours a day. I got sucked up into that and got a lot of experience under the gun [*Laughs*] in nothing flat. I came up with a couple of good records, and that started a whole world.

MR&M: When did you start working on popular records as opposed to classical material?

TD: It wasn't more than about two months. In the history of the record business coming out of World War II, you had a series of labels that pursued foreign language records, to preserve the tradition of the Europe that existed before World War II. So you had labels making Polish records or polka records; you had labels that were making Spanish records, Italian records. They sold overseas and in small areas in the States. So I was making polka records and doing all that kind of thing. But as the recording ban grew nearer and nearer and people were in a frenzy to record, I started getting into more and more pop and contemporary acts, and late at night we'd be doing jazz artists. Because of the location, there on 52nd Street in New York City, you had Charlie Parker, Lester Young, Oscar Pettiford...you had all those people, and I worked with all of them.

MR&M: What kind of music were you listening to then?

TD: I was classically sensitive at all times. I enjoyed big bands and the big band/swing era. But I can spot roots in all music that exist in the various styles of music I've worked with. I am not pinpointed on one style. In fact, to-

day I still listen to classical, and then I'll put on a jazz LP or a swing record.

MR&M: How much creativity could an engineer impose on sessions back then with the equipment available?

TD: Well, I was a rebel! I had no respect for what the hey the radio people did, and if they gave me a console with five knobs on it, I'd pull out five microphones. Most of the other chaps would put out one or two. I was not adverse to putting a microphone on the bass, one inside the piano (putting the lid down), putting one over the drummer and everyone else play on the remaining microphones [*Laughs*].

MR&M: In terms of the *sound* of a record, how much of that was the producer's input and how much was your knack as an engineer?

TD: In the early days the term A&R meant Artist & Repertoire—the man who was a producer in the A&R Department would be assigned an artist to work with and would seek songs for that artist and have a predetermined notion of what he thought was a worthy marriage of artist and song. When he saw how the artist performed the song with accompaniment, that would determine whether or not a simple background or a lush background was needed, whether they would do it in a traditional mode or free. And record companies would use their manpower to the utmost. For instance, you wouldn't hire a string section for one session and send them home; you'd book all the string arrangements for a particular date. That would make the engineer's task much easier, because it was one picture for three or four hours.

MR&M: Did you ever work with any producers who had great and total control over an artist's material and sound, such as a Phil Spector?

TD: In those earlier days, no. Long about the 1950s I worked with a whole pile of people like that. The people that I finally identified with, and was identified with, was Atlantic Records—in particular, Ahmet Ertegun and Jerry Wexler. That inadvertently led to

Leiber & Stoller, which led to Phil Spector, which led to Burt Burns—the type of individual you’re talking about.

MR&M: How did you get started with Atlantic?

TD: During that crisis, the end of 1947 and going into '48, they were just starting as a record company. I did a few dates for them at that time, and they liked the result I had gotten for them on one or two records. So when the recording ban was over, they asked me to do more sides for them. While I

ing. They were awesome, the things they were doing.

At the same time I was seeing and working with those jazz people, there was a band that came from North Carolina, which came over to Atlantic to record one day, they were called the Joe Morris Orchestra. They'd travel in a bus and run up and down the Atlantic seaboard, doing one-nighters in tobacco warehouses, bars or what have you, playing traditional blues in a loose, coarse fashion. Who was to know

When I say that, I mean that every time I recorded, it was a challenge, but it wasn't foreign to me. I thoroughly enjoyed it.

* * *

MR&M: When did you make the transition from engineer, under Jerry Wexler and Ahmet Ertegun, to actually producing your own sessions?

TD: Well, I was still at Atlantic. As Atlantic expanded, I did a whole pile of engineering numbers for them, and we finally allocated an office as a studio. We expanded it and got very sophisticated and moved way up in a short time. I must say that in 1957 we took order and delivery on an 8-track machine. Most of the other studios were laboring, "Should we go to 2 or 3 track?" We had already moved from 2 track up to 8 track.

The first stereo recording for Atlantic was in 1952; we used a stereo Magnacorder. That record was Wilbur DeParis, the dixieland fellow. From then on, because open-reel tape was in vogue, most of the sessions that we did do in outside studios where we had auxiliary engineers working on the mono, I'd be recording in stereo or binaural in some form. That's how you got some of the early Chris Conner and early Modern Jazz Quartet, because I had separate equipment and was recording simultaneously. Anyway, we were 8-track in 1957, and after all the initial concept was done and everybody would go back to do other work, I'd sit there and tamper with mixes and say things like, "Well, why don't we go back and fix this," or, "Let's change that." More and more I started to influence records from *that* side. By the time we moved to our new facility in 1960, I then had three or four assistants. By 1962, 1963 I started wandering down south to Stax Records for Atlantic—to expedite getting product out of there and give them some input on arrangements or voicing influences. But I guess the first act I produced without any outside input was the Rascals, although I had my finger in a lot of things one way or another from 1958-1959.

MR&M: What was your involvement with Stax Records?

TD: Historically, Atlantic Records started as a jazz and blues company. At the same time that Atlantic was starting, there were two record companies in California that were historically "race" record companies.



Dowd (far right) working with Pablo Cruise recently at the Sausalito Record Plant.

was working for Atlantic Records, I engineered just about every record they did from 1947 until 1955 or '56. They were only doing one or two dates a month, so it was no problem. About that time, they started their own studio, so they'd work around me. When I was done with whatever else I was doing, we'd do sessions at night. We gradually developed a moderately fine recording facility there and made a pile of good records. I went exclusively Atlantic Records in about 1954.

MR&M: During the late forties and early fifties, did you ever have occasion to walk into a session not knowing what to expect and find out that you were working with an artist that was very special?

TD: That whole jazz line I was first subjected to: Charlie Parker, Lester Young, Lee Konitz, Billy Bauer, Lennie Tristano, Bud Powell...those people, their brilliance was just frighten-

ing. The bass player was Percy Heath, the drummer was Philly Joe Jones, the saxophone player [most likely Johnny Griffen, according to the knowledgeable librarian, John Voight, at the Berklee School of Music in Boston, Ma.] would go on to play with Art Blakey?

I saw all kinds of people and all kinds of musicianship going by. When you listened to the radio back then it was big bands, Al Jolson, Bing Crosby...What's this other stuff (jazz, R&B, etc.) going on? It was a different world.

MR&M: Did you have to listen to different idioms to go and record, say, a rhythm and blues artist when working at Atlantic, or were you already exposed to just about everything by then?

TD: I had a deep empathy for blues and jazz or anything that was of that root—whether it was gospel, blues or jazz. And it was very easy for me.

That's what the terminology was. Those two companies were Modern and Aladdin—Ida Brooks, Charles Brown, Amos Milburn. Atlantic was based out of New York and recording gospel and jazz—Boyd Rayburn, things like that. But they were sensitive to gospel singers doing pop songs, or who had the potential to, so they picked up a Ruth Brown. Joe Turner was dropped by National Records and—he was a blues shouter *a la* Wynonie Harris—Atlantic picked him up. We were not devoted to the purist; we were the converted blues-jazz area. All of a sudden we had hits with the Clovers and the Drifters, and with Clyde McPhatter. We were getting more “poppy” with our records, because teenage white kids were buying those records. We were in Manhattan, where there was a school on the Upper West Side that produced Carole King, Gerry Goffin, Neil Sedaka, Don Kirschner, Howie Greenfield and Bobby Darin. They all came from the same neighborhood. They used to come through our offices once every week or two and sing us songs and ask, “Does this sound like a good song? Can you use this one?” They would write songs for the act, because they knew every song the act did! So we became more of a crossover, fusion of the fifties.

We knew where the root was, and all of a sudden there was this record company in Memphis making root, Black blues records that were crossing over into our market, but still came from the root. We recognized this and started distributing and representing them to the rest of the country. They then ran into some engineering problems and so forth, and I started commuting from New York to Memphis. We started doing Sam & Dave, then Otis Redding, Carla Thomas, that whole story. But I was the city cousin to the country people down there. I was using ideas I heard down there and putting them into sessions we were working in New York, or I'd bring something from New York and incorporate it into a Memphis session. More and more, I left engineering and got into being a catalyst.

MR&M: It seems unusual that a company run by the Ertegun brothers, whose main producer at the time was Jerry Wexler, whose main engineer was Tom Dowd—all *non-Blacks*—was the focal point of, and the most popular label for, Black music in the fifties.

“I came up with a couple of good records, and that started a whole world.”

TD: Herb Abrahamson and Ahmet Ertegun are the two who started the company. You have to know about the Erteguns. Nesuhi and Ahmet Ertegun were born of a very, very well known, sophisticated political family in Turkey. Their father was next in line to become prime minister, but he refused to become the head of Turkey. He did take the ambassadorship to the United States. He died here in service during World War II, and President Truman, during the end of the second World War, dispatched a cruiser and brought the body back to Turkey. I mean, that was the importance of the man. By the nature of Nesuhi and Ahmet's upbringing, as best as I could surmise (because I've known them for a long time), being foreign born, being raised in that Euro-Eastern environment and with short-wave radio coming in...when I was listening to ball games in 1937 and '38, they'd be listening to jazz records. That was the thing to do in Europe. They knew more about American jazz than most Americans knew.

Jerry Wexler, born and brought up in New York City on the Upper West Side, educated in the New York school system, sensitive to the melting pot character that went with New York in the thirties. So he has an empathy for everything! Jerry is a jazz enthusiast and was a writer and reviewer for trade magazines in the late forties, so he knew all the good records. He'd hang out in jazz clubs; he'd go to blues concerts; he'd go to the Apollo on a Thursday night to see an opening show. I was born in that neighborhood. It was the thing to do to go up and see amateur night at the Apollo and bust a gut laughing and then go to school the next day and talk about it. We were into blues-jazz; we had knowledge of it. For me it was a rub-off, for them it was a study.

MR&M: Do you think that you and Wexler, growing up near Harlem and being acquainted with the Black music, yet being from White families, had anything to do with Atlantic being able to take this Black music and present it so that White teenagers would buy it, as opposed to the rawer ver-

sions that other labels were putting out?

TD: I don't think it was the endeavor to take anything and make it more saleable. Because, after all, whatever the form of music, the sequence of notes has always been played once before. The idea was how to play it again so that it was more timely. Do you know what I'm saying? Not to preserve the tradition. Anybody who plays Rachmaninoff or Beethoven is a religious fanatic about it, because it's “That's the way it should be done!” Well, with the blues and jazz progressions and permutations, “That's the way it was done, so we should keep on doing it”? We would never make any musical progress! So we were less purists, but at the same time respecting the root. We would never “take” anything; we'd try to put a new wrinkle on it, or use it as a stepping stone for something else *to do* in a new direction.

MR&M: Now that your work is mostly with rock artists, do you ever have a yearning to go back and do some jazz or R&B things?

TD: Yeah, every once in a while I really do. We're talking about doing something like that, perhaps before the end of this year. I'd like to get into some good jazz sessions, but I don't really know what's going on now in that area. I've lost “deep-root” touch with the field. I don't know if I could help; I could only be a witness, really, or sit around and enjoy it. I'd have to spend some time in it. I'd have to do a lot of research to get back into it.

MR&M: How about a straight blues project?

TD: Blues has been so watered down. The confusion between traditional blues and rock playing blues tongue-in-cheek...I do have a better awareness of what's going on now in that area. There is talk of putting together a master blues session, with a bunch of fine, sophisticated traditional blues players, and having one or two fusion people come in and play with them and see what happens.

MR&M: When you produce a rock act that has blues roots, do you find

yourself falling back on the sensibilities under which you once operated?

TD: I find myself arguing whether we should go back to the root and undo the permutation they are doing, or if we shouldn't even mention it and not even tell them where it came from. Just encourage them to do it a little more this way, or suggest something that preserves more of the tradition but still doesn't take away from their wrinkle on it. It depends on how serious the people are, and whether it's imperative that they do know. It might just be a token flash. In which case, all right, if it's in good taste and you're not defiling anything—as opposed to mockery because of sheer ignorance. That I wouldn't stand for.

* * *

MR&M: When did your relationship with Eric Clapton begin?

TD: Eric and I got together back when he was in Cream and they were doing the *Disraeli Gears* LP. I engineered on that one and had my hands on some of the ideas of how those songs came out on *Disraeli Gears*, *Wheels Of Fire* and part *Good-bye*. Felix Pappalardi produced those for Cream.

In the late sixties, I pretty much went into rock with both feet. Early sixties, I was still doing Eric Dolphy, Ornette Coleman, the Modern Jazz Quartet, Jim Hall, Jimmy Giuffre and a bunch of other people. At the same time, I'd go to Memphis and record with the Stax group, and two days later I'd be in New York doing the Drifters or Nino Tempo and April Stevens! It was all music and it was all good.

MR&M: From your experience, have you come up with a definition of what exactly a producer is supposed to do?

TD: A producer's responsibilities change from artist to artist. As a producer, I am not an artist. Some artists don't need a producer—they need encouragement; they need stability; they need somebody to semi-babysit them, stroke them and give them confidence. Some artists need direction, whether it's in choosing material or, "Why do it that way, why not do it this way?" That kind of thing. Some artists are accustomed to working with the same musicians or traveling and living the same musical experience over and over again; you try and change that, because you'd like to get them better

exposure. So you get them different musicians and different types of songs that have maybe the same musical root, but a different lyrical content or emotional conveyance. Those kinds of things are producers' roles. Each artist is different, and someone you've worked with for two or three years might be different the fourth year. You can't address them the same way. At the same time, I have never made a career of an artist, and personally I don't believe in making more than three or four albums

**"We would never
"take" anything;
we'd try to
put a new
wrinkle on it . . ."**

in a row with one artist. I find myself guilty of saying, "Do it like the first thing we did." That's not right; it's not fair to the artist.

MR&M: When you come back to an artist after a hiatus, as with the new Clapton LP, *Another Ticket*, how do you approach that? Do you sit down with Eric and say, "Let's do something new"? Do you review with him his last couple of albums and critique them?

TD: With Eric in particular, what happened was, I listened to most of his records over and over again. When we re-established contact, I was aware of his last two albums. I didn't offer him an opinion of those albums, but I had an idea of where he was at and what he was doing and how it was done. We started talking about the possibility of working together again, and I asked him, "What did you have in mind?" He played me a couple of songs, and I came along with two or three songs that I thought he might like—one or two that were recorded in years gone by and one that was foreign to him. We listened to them and just talked a couple of days, exchanging tapes and ideas and playing things—just re-establishing communication. I then tried to understand how he felt about what he had just done and offered input as to where he might go with the songs I presented him. He then continued his road trip, and I came back to

the United States. After a couple of weeks we exchanged tapes again. And when we met in Nassau to record it was, "Oh yeah? I brought you that one [tape] too!" So obviously we were on the same beam! *[Laughs]* "Black Rose" was one of those songs.

MR&M: On *Another Ticket* Clapton seems to have found a renewed energy.

TD: He's singing better than I have heard him sing in ten or fifteen years. Eric and I go back a long ways; it's a deep friendship. I would like to think I have a little influence in encouraging him in those types of things. On one cut on that album, I got Eric to sing harmony with himself—something he has never done before on record. He wouldn't have had the confidence. And he did it in one pass! I said, "See, that was painless." *[Laughs]*

MR&M: The *Layla* album...did you have anything to do with Duane Allman joining up with Derek & the Dominoes?

TD: Okay. I was working on an album with the Allman Brothers called *Idlewild South*, in Miami. While I was working on it, I got a call from Robert Stigwood, and he asked if I would be interested in doing Eric, because Eric had a new group that had been playing in England and they wanted to record. I said, "Ship them in in two weeks; I'd love to." I put the phone down and said to Duane Allman, "How do you like that? Eric Clapton's going to be here in two weeks to record." Duane just looked at me and gasped, "Eric Clapton!" Then he said, "We're going on the road, but if he's here and I have a day off, can I just sneak in and sit in the back and watch him? He's my idol." I said, "Sure, I'd love for you to meet him." His reaction was, "I don't want to meet him; I'm scared."

Well, the Allman Brothers went back on the road, and Eric came in with some ideas, including "Layla," but he had a few loose ends to tie up on many of the songs. It was good hard work, with Bobby Whitlock, Carl Radle and Eric. We piloted about eight or ten things and then went over them and said, "Well, we can use two guitars there, and stretch that out here and I have an idea for a lyric here." It was "breadboarding," but it was fermenting very well.

During that first week Duane called and asked if he could come by after the band played Miami. Well, one thing led to another and I said to Eric, "You

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don't mind if this chap, who is deeply impressed with your playing, comes by on Saturday, because he's in the area... his name is Duane Allman." Eric snaps back [*Dowd impersonates Clapton's English accent*], "You mean that chap who plays the slide?" And Eric started playing me some of Duane's licks. "Yeah, that's him!" Eric said: "We're not recording Saturday; we're going to a concert."

It was an open-air concert in Miami Beach, and we drove over and I caught the attention of one of the roadies. He walked us into a security area between the audience and the stage, and we leaned up against these sand bags. Duane was in the middle of a solo as we got situated in front of the stage, so as he finished the end of his solo he opened his eyes and was staring right at Eric. His jaw fell a good foot, and he just stopped dead. Well, with that, Dickie Betts just picked it up and started playing like a fool. Eric was dumbfounded by Duane's playing; it was a love affair. They *all* went back to the studio that night and jammed for a couple of days. Gregg was playing with Bobby Whitlock; Eric was showing Duane how he did certain high-E licks; Duane's showing Eric a few slide techniques; they were swapping guitars. From then on it was history. They were two human beings meant for each other.

* * *

MR&M: How did you get involved with the recording scene in Muscle Shoals?

TD: Well, it's very similar to the Stax story. There was a producer in Muscle Shoals, Rick Hall, who had a rhythm section. He was making some "bad" records for VeeJay. We were jealous of those records, and we decided to see what he was doing. Did he have a product we could get our hands on, or could we send somebody down to record there, etc., etc. That's how Atlantic got into the Rick Hall thing. Then his rhythm section—which was David Briggs, Norbert Putnam, Jerry Carrigan—moved to Nashville, and he got a second rhythm section, comprised of Jimmy Johnson, David Hood, Roger Hawkins and Barry Beckett. Jerry Wexler flew down and did some sides with Wilson Pickett; I went in and did some sides with Lulu; and then we both went in there and did the famous Aretha Franklin session.

That rhythm section split from Rick

and started its own studio, Muscle Shoals Sound. From there on in, Steve Cropper would come down from Memphis to record there, instead of using the Stax musicians. He wanted to change the sound of his recordings. I had to find different guys in Memphis...

MR&M: Is there a difference in making a record in California vs. New York vs. down South, in terms of the atmosphere, the flow of the session?

TD: Generally in the South it's a family affair. Musicians who are in communities 300 or 400 miles apart know each other. They might have met five minutes earlier, but they *know* each other. "Hey, you played on that tune." "Right, I just..." You know, that congeniality and friendliness. It's a vibe; it's very soothing. But the musicians are also very lethargic; "laid-back" is the phrase, and it is. Energy level is down, but taste and empathy are great. You get into California, and it's like playing a Southern tape at double speed! They're going a mile a minute, and you wonder what attention span they have. But...they're good. It's unnerving, when you go from one environment to another. Or vice versa. But I'm extremely sensitive to that difference.

MR&M: When you're producing and someone else is engineering, are you ever tempted to become a "backseat driver"?

TD: No. If I don't like what's going

down, I'll tell them what I want. If they don't comprehend it, I'll ask them if I can show them. If they don't like it, I'll do it. Also, I have to remember back when I was starting out and people were kind with me. They'd walk in and know what they wanted and look at me and say, "What the hell is he doing?" I have that same respect: Maybe he knows something that I don't know; let me see what he's doing.

MR&M: Is there any such thing as a "Tom Dowd sound"?

TD: Naw. I said before, I am not an artist. If I chose to record and I went in with a group of musicians...and I had a sound in mind, then I would be heavy. But when I go in with an artist who has an idea, I try to put a better frame on it, or cast a better light on his or her art. I go with the song and go with the concept. Or, if in rehearsal I hear something, I'll give my input and say, "Wouldn't you like it to sound like this?"

MR&M: Could we just throw out some names of people you've been associated with to get your impressions, anything that comes to mind?

TD: Sure. Shoot.

MR&M: Aretha Franklin.

TD: One of the finest instruments that I have ever heard. An incredible performer for singing or creating a feeling by sound. I have never heard her sing a wrong note—it's impossible. Just an incredible human being with a fine instrument.



Dowd during a 1979 session with the Allman Brothers at Criteria Studios in Miami.

MR&M: John Coltrane.

TD: John Coltrane was a master of his instrument. He had a deep respect for and knowledge of what other people had tried to do on the instrument and what had been done musically on other instruments. He was trying to do it all on his instrument. He never ceased to try to develop better facility and concept on how to do it: he was doing that until the day he died. He wasn't the kind of say, "That's it; we'll do it this way." It was always, "Try it...try it." He was a perpetual innovator. You can't produce an artist the stature of a John Coltrane. You can provide him with a good recording accompaniment, or provide him some input that would trigger his facility. After that, you just witness! *[Laughs]*

MR&M: Jerry Wexler.

TD: Ah! Dynamo! Jerry is ten or eleven years my senior, and to me he's the kid on the block who I wanted to grow up to be like. A University of Kansas psychology major, but an award winning short story writer. Brilliant mind...and a jazz and blues freak! *[Laughs]*

MR&M: Rod Stewart.

TD: A deep, deep person—unlike the fopish, playboy image that brought him his fame. Very well read and super sensitive to the arts. Also a very learned person who has exquisite command of the language.

MR&M: Booker T & the MG's.

TD: Duck Dunn, a teddy bear and a very fine, honest human being. Al Jackson...gone, but a very sensitive person. If he didn't have a feeling for what you were trying to do, he was the first person to say, "I just don't see it that way." Very open to help, but very rarely needed any help. Booker's the strange one. Creative musician striving for a better education. He was making all those records while he was attending the University of Indiana School of Music! He is a deeply knowledgeable musician...and also an exquisite trombone player, which nobody knows. Steve Cropper...You've got to understand something: Steve is like my cousin. His birthday is a day apart from mine, even though I'm twelve or fourteen years older. We kind of vibe each other. Steve is a very sensitive person—not as outspoken as I am. He gets angry but doesn't say it, he *plays* it. They are a bunch of boys brought together by fate from an environment where integration was on

trial. They proved themselves with no effort on their part. They had a hell of a good time doing it!

MR&M: The Young Rascals.

TD: Good lord! *[Laughs]* Eddie [Brigati], the imp, the upstart, the spirit—and yet a mind like a steel trap. Felix [Cavaliere], deeply aware of and respecting roots. If they used a musical root, they would never abuse it. Gene [Cornish], fully aware of what life is about and what the world is about. Respecting Felix's ideas and having patience with Eddie's impetuous conduct. Dino [Danelli], a great drummer, but he's an artist of a different kind. He's into sculpting and painting. Quite a deeply creative person.

MR&M: Bobby Darin.

TD: Brash. Cocky. But so damn tasty and aware. If you didn't know him, he could provoke you with some of his brusqueness. But that wasn't a measure of what kind of human being he was, because he was compassionate, warm, deep and talented!

MR&M: Duane Allman.

TD: A pussycat. Duane was in charge of anything and everything that was involving him. He knew. If it was running itself, he'd let it run; but he could take over a situation if it got to something he didn't like. Never an alarmist, but always aware and in control.

MR&M: The Muscle Shoals Rhythm Section.

TD: Jimmy, David, Barry and Roger. There is a great deal of humility that goes with them. They are astutely aware of their influence on music and what careers they have helped with. Yet, though they aspire to the recognition they deserve, they wouldn't give up the integrity that goes with their lifestyle to move to a New York or an L.A. to exploit their individual fame. That's not their sense of value.

MR&M: Eric Clapton.

TD: Oh, God. Which one? *[Laughs]* The 20-year-old upstart in Cream, or the smoothy *a la Layla* or the reborn Eric Clapton from *461 Ocean Boulevard* to present? A very deep, warm, loving, sensitive person with very strong loyalties. He's also a fine artist. A very just person, but a very firm person.

MR&M: If this was a Barbara Walters special, the next name would be Tom Dowd.

TD: Tom Dowd. Blessed with having been in the right place at the right time a lot of times in his career...and hoping it continues.

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Zeta Systems Little FEANC

By Craig Anderton

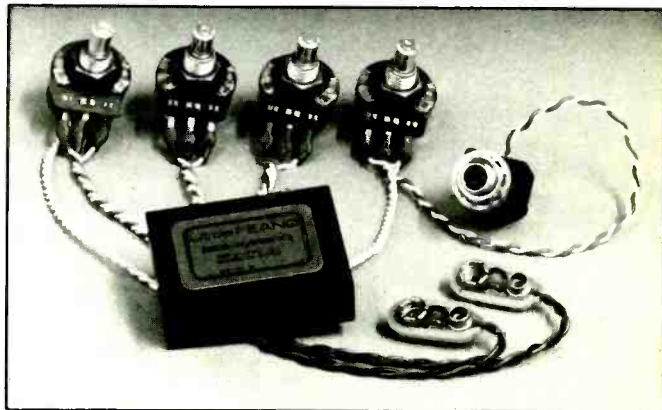
There is a certain amount of controversy regarding on-board electronics for guitar. Those in favor claim better tone, higher output level (which improves the signal-to-noise ratio through a system), the ability to drive long cables without signal degradation and, often, a greater degree of control over the guitar's timbre. Those opposed to on-board electronics cite the problem of possible equipment failure (which is rare, but can occur), the need to have a battery in your guitar and also the possibility that it may be necessary to substantially modify your guitar in order to accommodate the active circuitry. Whatever your feelings, there is no doubt that the field of on-board guitar electronics has undergone some great improvements since the first such devices were introduced; while early units were often noisy and sometimes created more problems than they solved, newer examples of the art are getting quieter and providing more functions to the guitarist. And exactly what do we mean by more functions? Read on...



WHAT is IT? The Little FEANC is an on-board electronics package designed specifically to replace the standard electronics in a Gibson Les Paul (or Les Paul clone-style) guitar. It surely holds the existing record for most number of functions jammed into a single on-board electronics package; after all, FEANC stands for Fuzz, Equalizer, Amplifier, Noise Gate and Compressor (see *Figure 1* for a block diagram). There are four controls: Bass

(boost and cut), treble (boost and cut), compression (there's also a switch on this control that disables the noise gate at maximum compression) and volume (with a pull-on/push-off switch that activates the fuzz). It appears to me that the FEANC is intended for sound-conscious rock and rollers, specifically those who play a lot on-stage and would prefer to have their favorite effects controllable at the guitar itself rather than strung among a number of floor boxes.

When you open up the box in which it comes, you discover what appears to be an electronic octopus. The circuit board and components are encapsulated in a black plastic blob, with eighteen wires trailing off to four pots, a jack and two 9-V battery clips. In addition to the circuitry, you'll find a couple of instruction sheets. After untangling



the wires and reading over the instructions, you're ready to begin the modification process. Price of the Little FEANC is \$150.00.

Modifying Your Guitar for the FEANC

Since I'm a Fender fan and don't have a Les Paul, I mounted the FEANC externally to the guitar. However, I did borrow a Les Paul and it seems like the FEANC would fit in there with little or no creativity required. The only problem could be with brand new Les Pauls (manufactured within the past few months); I understand that the section holding the pots is now a little thicker, and as a result the FEANC's pot bushings *might* be too short. Although I haven't checked this out, it would seem to me that carefully tapering the hole through which the bushing passes on the *inside* of the guitar would solve this problem.

Whether you're capable of doing the installation job yourself or not is something that only you can decide. The instructions included with the FEANC are adequate, but certainly not novice level. Perhaps this was done on purpose, to discourage those who don't know too much from destroying their guitars through ignorance. In any event, while I would have no trouble following the instructions, I certainly wouldn't qualify as your average neophyte, and if you are the average neophyte, you might prefer to have a guitar repair shop install the FEANC in your axe. They could probably do it in less than half an hour. And by the way, in Step 9 [of the FEANC's instructions] where it says if the knobs are loose, place a little glue on the shaft: Don't use epoxy glue! Otherwise, you'll never get the knob off should the pot need replacing. Use a glue that's not quite as drastic, such as Elmer's glue-all. And if you do use glue, don't let any run down the control shaft into the pot itself. Tightly tying a piece of cloth around the base of the pot (near the bushing) will help catch any overflow.



Another problem with the instructions is that they don't identify which pot coming out of the module corresponds to which control. Basically, I used a process of elimination; the pot with the pull-on switch had to be volume, the other one with a switch had to be the compression control since it switches the noise gate, which left the bass and treble pots. I still had to hook the thing up, though, just to make sure which pot performed what function. Before you mount the FEANC in a guitar, make sure you know which pot is which.

PREFLIGHT for the FEANC: After successfully (I hope) installing the thing in your guitar, you're ready to check out the controls. But first, install the two 9-V batteries. Two batteries may be uncommon for on-board electronics, but there are sound technical reasons for doing this (increased headroom being one). Two batteries also split the current consumption, which is a good thing because the FEANC draws 6 mA from each battery. If you only had a single battery, it would then have to provide 12 mA, thus eating batteries with unashamed regularity. 6 mA of current consumption, while far from micropower, allows for a decent battery life, especially if you use alkalines. Better carry spares, though, if you pay any attention to Murphy's law. (As it says in the instructions: "96.32% of all trouble with Little FEANCs is dead batteries. Please replace with fresh alkaline

batteries before getting upset. If we receive any FEANCs returned for service and find that it's just the batteries, we have many ways of making you feel embarrassed.")

With that out of the way, patch the output of the FEANC to an amp, and you're ready to go.

EVALUATING the STRAIGHT SOUND: First, I checked out the FEANC without any compression, fuzz or EQ. The sound was virtually identical to my straight guitar sound, although there's an almost imperceptible low-frequency boost. I thought this [low-frequency boost] might be due to a misset EQ control, but even trimming back the bass control a bit still left a minuscule low frequency emphasis. This is certainly not a problem in any way, and I probably wouldn't have noticed it had I not measured it.

The input impedance of the FEANC is a little over 300 K. This represents a well-chosen compromise between a very high impedance (which places a minimum load on the pickups, thus preserving high-frequency response) and a lower impedance (which is less sensitive to hum, interference, etc.).

So far so good, but then I discovered one peculiarity—you can't disable the noise gate in the straight mode. In fact, you can only disable the noise gate when running at maximum compression. Therefore, on long fades, some gating action and occasional "chattering" was noticeable towards the very end of the fade. Another problem is that there is a slight attack time when hitting a string *lightly*; in other words, it takes a very small amount of time for the signal to turn the noise gate on (this is not a problem when playing with normal force). While these are admittedly perhaps minor details (I may not have made them *sound* like minor details, but they are), considering that the volume pot has a pull-on/push-off switch to activate the fuzz, you'd think that the compression control could have a similar type of switch to cut out the noise gate when not desired. If the noise coming out of the unit is so severe that some kind of noise gate is necessary at all times, so be it; but I certainly didn't hear any evidence of excessive noise during my tests. So how about it, Zeta—make the next

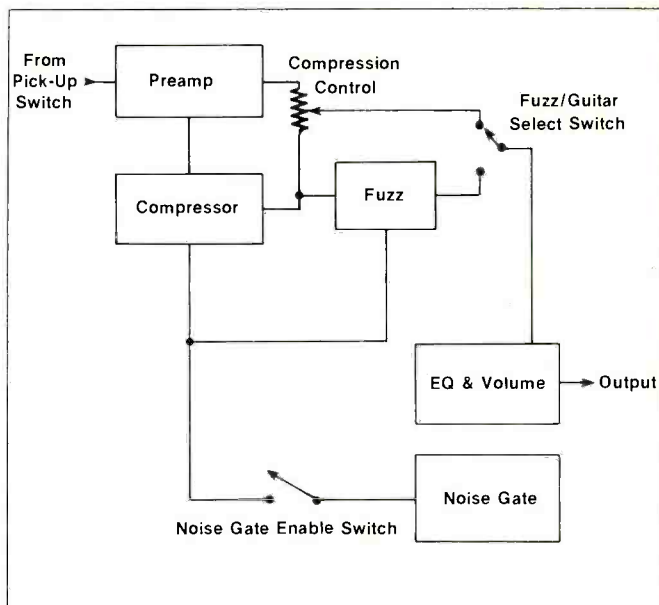


Fig. 1: FEANC block diagram.

generation with a selectable noise gate and the straight sound will have my full support. Aside from that one quirk, the straight sound is clean and hi-fi and can drive long cables without signal degradation.

EVALUATING the FUZZ: We all know how subjective fuzzes are, but I will say that the fuzz sound of the FEANC is quite good. It has a nice, full sound that isn't too dissonant or "crunchy." I would hesitate to use the term "tube sounding," because I think that would get expectations up too high, but it definitely is not as shrill as many solid-state fuzzes. The only time that the fuzz sounds at all odd is towards the very end of the decay; whereas most fuzzes become less and less distorted with smaller signal levels, the distortion quality itself undergoes a change to a somewhat "choppy" distortion (well, *you* try to describe shades of distortion! What the world needs is cheap sound sheets to accompany these reviews with sound...but I digress, as they say). Anyway, a positive feature of the fuzz is that it sounds pretty decent on rhythm guitar parts as well as lead. But the real strength of the fuzz, and perhaps the strongest feature of the FEANC, is the fact that the fuzz and compressor can work together at the same time.

EVALUATING the COMPRESSOR: Let's forget about using the compressor with the straight guitar sound and consider its use in conjunction with the fuzz. At this point of the evaluation, I was so pleased with the compressor/fuzz sound that I ended up just playing guitar for about 45 minutes. Whenever a piece of equipment inspires me enough to start some serious playing and forget about the article at hand I know I'm dealing with something really neat. In the fuzz mode, turning the compression control from no compression to full compression does *exactly* what you want it to do—create a very slight volume boost, and a round, fat, sustaining tone. The distortion is quite smooth when compressed, the sustain is great without being overbearing and the sound is amazingly quiet considering all that's going on. For chords, I generally pulled back most of the way on the compression control; for single notes, crank 'er up!



Turning the compression pot beyond the maximum compression point clicks a switch which disables the noise gate, while still leaving you at maximum compression. This is handy for techniques like controlled feedback, where you can't have the instrument cut out accidentally, even at super low levels. This also allows you to hear the crud and noise between notes, if desired. Don't laugh, sometimes the raw sound of a guitar "chomping at the bit" is a most powerful effect.

Shutting off the fuzz allows us to evaluate the compressor under more objective circumstances, and it still holds up well. There is a slight popping at the beginning of notes, as you would expect, but luckily there is no annoying noise build-up towards the end of notes (this is one application where the noise gate really comes in handy). With complex chords there is some slight choppiness with extreme amounts of compression, but again this is a tradeoff and I feel that Zeta has made the right tradeoff between response time and compressor distortion.

One note of caution: You don't have to turn the compression control up all the way to get a decent compressed sound. From what I can tell, most inexperienced guitarists overcompress and then wonder why they have a noisy, poppy signal. With straight guitar, it's particularly important not to overcompress; with fuzz, you can get away with a lot more compression.

"It holds the record for most number of functions jammed into a single on-board electronics package."

EVALUATING the EQ SECTION: Again, EQ is a very personal thing, and at first I wasn't sure that Zeta had chosen the right frequencies for the EQ controls. Both the bass and treble boost/cut controls have their corner frequencies at around 500 Hz, which means that the bass control takes in a lot of the guitar's upper range and the treble control takes in a lot of the guitar's lower range. My initial reaction was that the bass corner frequency could stand to go lower and the treble frequency a little higher; but think about the context for a moment. If you're playing guitar "live" through an amp, chances are the amp will already have a bright switch or treble control, and a bass control at a relatively low frequency. So, if you think of the EQ on the FEANC as not being your "ultimate EQ" but instead as a supplement to the tone controls on your amp, the choice of corner frequencies makes a lot more sense. In fact, cranking up the bass control will really rattle the floors, and cranking up the treble control, while not adding sheen, will add punch and definition. It's very convenient to have controls of this nature at the guitar itself. Again, there's a tradeoff here; but once more, whoever designed the FEANC seems to have made the right tradeoff.

OVERALL EVALUATION: By its very nature, a device like the FEANC invites a subjective response...which makes it very difficult to give an objective evaluation (as you would in the case of something like a hi-fi amp or tape machine). After all, everybody seems to have his own favorite ideas of what a fuzz should sound like, how a compressor should pop and what frequencies EQ controls should effect. It takes a certain amount of trial and error with a product like this until you hit a happy medium that will satisfy the greatest number of people; in fact, in the case of the Little FEANC, this is the second time I've looked at this unit. The first one they sent me for review (about 6 months ago) I returned to the company, saying that I felt it needed a little more work. The company representatives I talked to, instead of getting defensive, asked me what I thought could be improved. I mentioned several things,

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and it appears that many of these suggestions were taken seriously. As a result, my opinion that Zeta made the right tradeoffs might have something to do with the fact that some of these tradeoffs were ones that I had suggested. It's possible that you won't like the fuzz sound, for example, or the EQ frequencies. However, when it comes to active electronics I don't think my opinions are that much different from the opinions of other guitarists, so perhaps most people would agree with me that the "sound"—that elusive, undefinable quality—of the Little FEANC is excellent, and is arguably equivalent to the best that you can expect from present day, moderate cost stomp boxes for guitar. If you want some really heavy guitar sounds, laden with sustain and distortion, the FEANC will provide it. And if you twist the controls a few degrees in the other direction, you can wind everything down for when a ballad comes along. Quality of sound? For rock guitarists, the FEANC's got it.

The other important contribution of the FEANC's design is convenience. As they say in their ads, "We don't make you bend over to get the sound you want"; there's much to be said for that aspect of the FEANC's design. The redundant two volume/two tone controls on the Les Paul, while serving us well for decades, might just be due for a change, and the FEANC definitely provides a good way to put four controls to use. The controls are also pretty easy to adjust (no agonizing is required; the whole thing is pretty straightforward, and it's pretty easy to get the sound you want), with one exception: I prefer footswitch control for a fuzz—period. In many cases, you don't have time to turn the fuzz on manually; you want to be able to hit a note or

chord and initiate the fuzz at the exact same instant. This cannot be done with the FEANC. Perhaps a toggle switch would be more convenient, but even that isn't as good as a footswitch.

The other complaint, which I mentioned earlier, concerns the fact that you cannot disable the noise gate, except with maximum compression. While this probably won't bother most people and can't be considered a serious drawback, it still seems to me that it would be easy enough to use a pull-on/push-off switch.

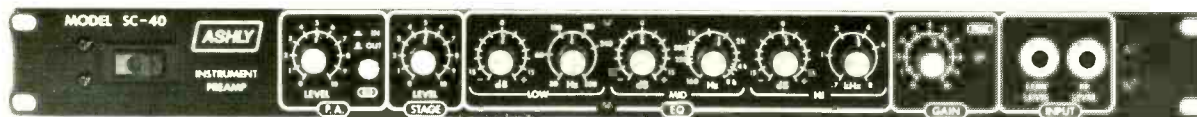
There's also one suggestion I have for improving the EQ. As with many designs, the last few degrees of pot rotation give the greatest boost or cut. This is useful because it makes the "flat" section of the pot much broader; you can set the pot to center or at least close to center, and still have a reasonably flat frequency response. However, this also makes it more difficult to set precise amounts of cut and boost. It would be best if the pots had a center detent, so that you could have a more gradual pot taper but it would still always be easy to return to flat response in a jiffy.

However, these complaints are relatively minor considering the many options offered by the FEANC. While some may still worry about the reliability of on-board electronics, you can also make a convincing case that something like the FEANC is more reliable than having a batch of external effects boxes with cables, batteries and so on. As we said at the beginning, whether you choose to use on-board electronics or not is a very personal matter, but the Little FEANC just might make a few converts to the world of active electronics.

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CIRCLE 91 ON READER SERVICE CARD

Ambient Sound

By Len Feldman

What Are We "Weighting" For?

If you turn to the test report covering the Yamaha K-960 cassette recorder which appears in this issue of *Modern Recording & Music* you will come across a series of new diagrams or graphs which our lab was able to generate, thanks to an update of our versatile Sound Technology Tape Recorder tester, Model 1500A. This piece of equipment is now able to analyze, on a third-octave by third-octave basis, the spectral distribution of noise over the useful audio range from 20 Hz to 20 kHz, whereas previously, all it could do was produce a single signal-to-noise ratio number, in dB, which was the effective geometric sum of all the noise components taken together. In its wow-and-flutter metering function, the tester can now analyze the actual frequency components of the wow and flutter—and not just the total percentage figure which all these components add up to. This new facility offers powerful clues to designers and users who want to know *which* element in a tape transport system is the greatest offender as far as wow-and-flutter is concerned.

In the course of learning to use these new features of the tester I could not help but be reminded of the significance of weighting curves as they apply to noise measurements, frequency response measurements and, yes, even wow-and-flutter measurements. It occurred to me that all of us are so accustomed to seeing those familiar phrases "A" weighted or "C" weighted or CCIR/ARM weighted, that perhaps we tend to lose sight of their basis and real meaning.

Why We Weight

It all goes back to those well known researchers Messrs. Fletcher and Munson who, in the early 1930s conducted some experiments to determine whether people hear all audible frequencies at equal loudness intensities. Of course, we don't, and that's how the familiar Fletcher-Munson curves, or so-called equal-loudness curves, came into being. We hear mid-frequencies a lot more "efficiently" than we hear low bass or ultra-high treble tones at all but the loudest levels. In other words, the quieter the sound levels, generally, the greater the difference between our perception of mid-range tones

and bass or treble tones. In fact, if a sound is soft enough (say, at a sound pressure level of only 40 dB) and is at a frequency of 1 kHz, a second sound, having a frequency of, say, 60 Hz, would have to be reproduced at a level of 60 dB SPL (fully 20 dB more intense) to give a listener the same loudness sensation.

Looking at all this from the point of view of residual noise in a sound system, since the noise, by its very nature, is going to be a lot softer than the desired signal, it follows that the subjective effect of mid-range noise frequencies (where our ears are more sensitive) will be greater than the subjective effect of bass or ultra-high frequencies reproduced at the same power level. What we really want to know when we ask about residual noise of a product (or a brand of tape, or the background noise heard from an FM tuner) is how "bothersome" is the noise going to be? To get the answer to that question, it makes no sense to give equal weight to *all* the noise frequencies in the reproduced signal. Clearly, from what we know from Fletcher and Munson (and other researchers whose results were slightly different but still came to the same general conclusions), we must modify the response of any metering device that we use to measure noise in such a way that the sensitivity of the ear to different ranges of noise frequencies is taken into account.

The Battle of The Weighting Curves

So far, it all sounds pretty simple, doesn't it? Simply choose a curve that resembles the reciprocal of one of the low-level Fletcher-Munson curves and interpose that kind of response between the noise output of the item being measured and the meter doing the measuring. Unfortunately it didn't work out that way. For one thing, *which* level of curve should be chosen? If we intend to measure noise that is fairly loud, then choosing a 20 dB SPL or 30 dB SPL shaped curve of the Fletcher-Munson family of curves would be unrealistic. And so, how can *one* curve serve all purposes? It can't. And that's why we have "A"-weighting, "C" weighting and, more recently, CCIR-ARM weighting.

The "A"-weighting curve, long a favorite in NAB,

ANSI (American National Standards Institute) and IEC (International Electrotechnical Commission) circles is still widely favored by many laboratories and "spec" writers. Basically, if you set 1 kHz as a zero dB reference level, the "A" weighting response curve rises a bit above 0 dB, peaking at around a dB or so between 2 and 3 kHz, then dropping off gently so that response is down by about 10 dB at 20 kHz. On the lower side of 1 kHz, rolloff of this curve is much steeper, reaching a -30 dB level or thereabouts at 50 Hz. What the curve is implying is that we are most sensitive to noise content from around 500 Hz to about 10 kHz, somewhat less sensitive to noise frequencies between 10 kHz and 20 kHz and much less sensitive to low-frequency noise down below 100 Hz or so. Note that 60 Hz hum assumes much less subjective importance than, say, high-frequency tape hiss when a weighting curve such as this is used.

Not too long ago, Ray Dolby of Dolby noise reduction fame proposed that a new weighting curve should be substituted for the old "A" curve, especially if we were concerned with tape noise, which has its own particular spectral distribution of noise frequencies. Dolby argued that his proposed weighting curve more nearly provides a true subjective numerical value for the "annoyance" factor associated with tape noise. The curve is known as the CCIR/ARM curve. CCIR stands for International Radio Consultative Committee, another international standards body, while ARM stands for Average Reading Meter.

The ARM portion of the CCIR/ARM curve raises yet another issue in the matter of noise measurements. There are those that argue that a meter having square-law or RMS characteristics should be used to measure noise, while others maintain that the meter should be of the full-wave rectifying or average-reading type. These differences in meter operation can affect the ultimate numerical noise reading, just as the weighting curve can. So, you see, the permutations and combinations are many and complex. But, to get back to the CCIR curve itself, this curve has its arbitrary "0 dB" reference set at 2 kHz but continues to rise to a level of about +6 dB at around 6.5 kHz, dropping off rapidly above 10 kHz to a level of around -30 dB by the time we reach 20 kHz. Below 2 kHz, rolloff is at a steady 6 dB per octave, so that the curve is down around 30 dB at 60 Hz or thereabouts. As you might have guessed, when this CCIR/ARM curve is used to measure the overall net effect of Dolby noise reduction, the "numbers" come out slightly better than if you had used the old "A"-weighting curve. I have no doubt, however, that Dolby truly believes that this curve offers better correlation with the subjective annoyance factor of tape hiss or he wouldn't have suggested the change.

Weighting Wow and Flutter

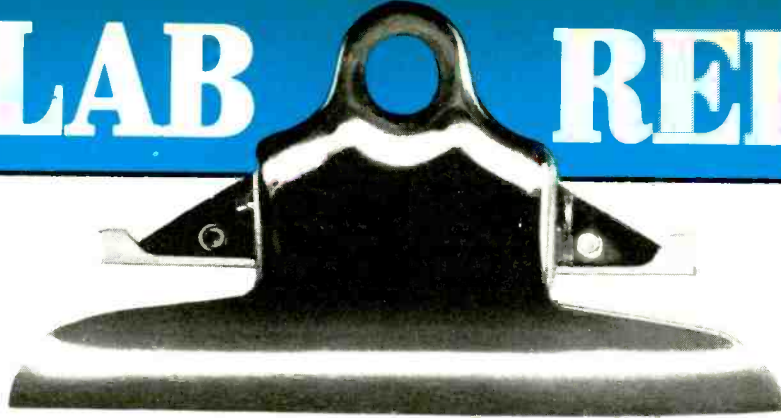
It has been found that the annoyance factor associated with wow and flutter, when listening to a tape or record that is fluctuating in absolute speed, varies depending upon frequency too. For example,

you will find it more annoying if tape speed fluctuates at a rate of four times per second than if it fluctuated at a rate of, say, a half of one time per second (or once every two seconds) or 100 times per second. Again, it simply has to do with the ear-brain combination and how it responds to different forms of distortion (since fluctuating pitch caused by varying tape speed is certainly a form of distortion). So, with that in mind, the people who concern themselves with such things decided that it would be a good idea to apply a weighting network between the tape deck (or record turntable) being measured and the test instrument that measures wow-and-flutter as a percentage. And that's how wow-and-flutter readings came to have that familiar WRMS designation following the percentage that expresses

" . . . the annoyance factor associated with wow and flutter varies depending upon frequency, too. You will find it more annoying if tape speed fluctuates four times per second than, say, once every two seconds . . . "

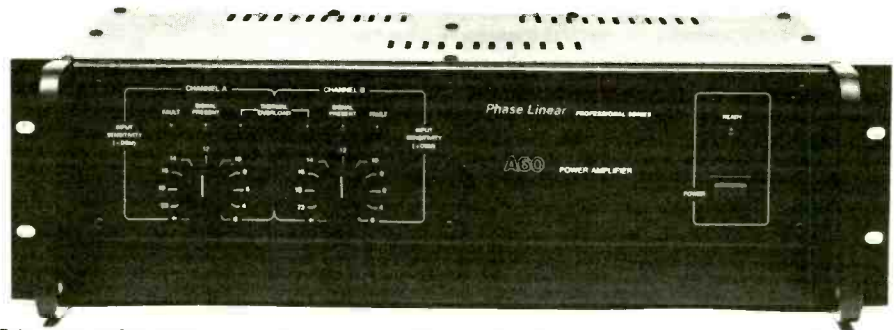
the severity of the wow-and-flutter numerically. The "W" of WRMS stands for "Weighted" and the RMS describes the type of meter system and calibration used. As for the weighting curve used here, there is general agreement. Its reference "0 dB" level is set at 4 Hz (the frequency at which wow is most annoying) and it slopes off on either side of that frequency, reaching a level of -20 dB at 150 Hz and to -20 dB at around 0.3 Hertz. As for the meter and its dynamics, however, there is still no worldwide standard, with DIN (Deutsche Industrie Normen, the German Standards organization) and ANSI favoring peak-to-peak metering, JIS (Japan Industry Standards) favoring RMS detection and meter calibration and NAB favoring full wave rectified average detection accompanied by RMS meter calibration.

From all of this it becomes increasingly clear that a single number when used to describe noise or wow-and-flutter can be pretty confusing and even meaningless, unless the weighting curve and meter construction and calibration are known. If a complete spectrum analysis of the noise and/or the wow-and-flutter can be presented instead, the person interested in the performance of the product under test has a far better chance of making an intelligent judgment regarding the parameter in question. That's why I'm so glad to be able to add these spectrum analysis curves to the noise and wow-and-flutter measurements in our test reports.



NORMAN EISENBERG AND LEN FELDMAN

Phase Linear A60 Power Amplifier



General Description: The Phase Linear model A60 is a stereo power amplifier rated to deliver 225 watts (minimum RMS power) per channel into 8 ohms at no more than 0.05 percent THD across the 20 Hz to 20 kHz band. Into 4-ohm loads, the power rating increases to 350 watts per channel. For mono mode into 8 ohms, power available is 650 watts. The amp is not recommended for use in mono with loads less than 8 ohms. Minimum permissible load in stereo is 4 ohms per channel. Any speaker connected to the A60 should be capable of safely handling a minimum of 225 watts.

Of standard rack-mount dimensions, the A60 accepts line level balanced or unbalanced signals via standard ¼-inch phone jacks. When a stereo phone jack is connected it allows balanced operation; plugging into a mono phone jack automatically switches the system to unbalanced operation. In addition to these stereo inputs, a separate mono (bridged) input also is provided; plugging into it automatically changes the amplifier to the bridged mono mode. Speaker outputs are binding posts that may be connected for stereo or for bridged mono use. These terminals, a fuse holder and the socket for the detachable three-prong line cord are at the rear, most of which is taken up with a long series of huge heat-sinks.

The front panel of the A60 contains, for each channel, an input level control in the form of a stepped attenuator for matching input sensitivity to the source input. Calibration is in dBm markings. Above each control are three LEDs for indicating some type of fault, thermal overload and signal present. In addition, there is a "ready" LED over the power switch; this indicator comes on about five seconds after turn-on to show that the amp is ready for use.

Internal circuitry of the A60 is modular to facilitate ease of servicing. Replacement of a complete amplifier

channel would require the removal and refastening of only four screws.

Test Results: In our lab tests the A60 came in at, or better than, specs in most areas. The discrepancies in SMPTE IM and in 1-watt frequency response were not considered significant since IM as measured on this sample was "low enough" and a response from 10 Hz to 60 kHz was "wide enough" for any normal applications. More important in terms of "numbers" was the excellent signal-to-noise and the high levels of clean power we measured.

Some comment on the amp's design and layout are in order. Phase Linear has arranged the sensitivity (input level) control on each channel so that for a setting of "0 dB" a voltage of 0.775 V at the input (0 dBm) will produce 120 watts of power into 8-ohm loads. Note that this is not the full rated available power of better than 225 watts per channel—that requires an input of 1 volt. However, Phase Linear's lower-powered amp, the model A30, is calibrated in the same way. Thus, no matter which Phase Linear amp is used in a given system with similar speakers, a "zero" setting on the input level controls will produce the same sound-pressure levels (SPL) from those speakers provided the input supplied from the mixing board remains constant. The difference between amplifiers then becomes simply the difference in headroom between the lower-powered and the higher-powered amplifier.

General Info: Dimensions are: 19 inches wide; 5¼ inches high; 13¾ inches deep. Weight is 47 pounds. Price: \$1099.

Individual Comment by L.F.: Have you ever wondered why some professional amplifiers having 200

watt plus ratings require noisy ventilation fans, while others of the same power rating can coast along without a fan and without the slightest tendency to overheat? This Phase Linear A60 falls into the latter type. Part of the explanation lies in the output circuitry of each channel, which employs eight power transistors, each rated to handle 250 watts for a total capacity of 2000 watts per channel. Add to that the efficient and overly large heatsink and you have an amplifier that remains adequately cool even when driving 4-ohm loads at or near rated output levels.

I suppose it's my "hi-fi" background, but I have never believed that a good professional amplifier needs to employ circuitry that is substantially different from that found in high powered separate amps used in home music systems. Higher power requirements, perhaps, and more rugged construction may be called for. Even more elaborate protection circuitry may be in order for the pro amp. But when it comes to low distortion, good frequency response, total stability under varying load conditions and all the other things that contribute to the way an amplifier *sounds*, I have never seen any reason for compromise in a pro amp just because it is going to be used for sound reinforcement applications. Obviously, Phase Linear agrees with me on these points. The A60 would do just as nicely in a home music system requiring high power levels as it will do in a sound reinforcement situation. Aside from having to connect to its inputs with 1/4-inch phone plugs instead of flimsy phono tip plugs, you wouldn't

be able to tell the A60 from today's best "home music system" amplifiers.

Individual Comment by N.E.: Once again, as we have noted in the recent past in connection with other amplifiers, we have a unit that seems to straddle both worlds—that of the "audio tool" for the working sound technician, and that of the "home product" for the demanding audiophile. In terms of its sound quality, reproducing source materials through various speakers, the A60 is easily up there with the best. In terms of its built-in protection, its input and output versatility and its apparent reliability (within the time we have been able to observe it), the A60 is very much a member of the "pro amp" family.

The input sensitivity arrangement is a nice convenience when the A60 is used in a given sound system with another amp—such as the A30—on which similar control settings will yield similar output levels. Of course, if the other amp is not a Phase Linear A30 or some other whose "zero" setting produces 120 watts for an input signal of 0.775 volts, the operator would have to take into account the difference.

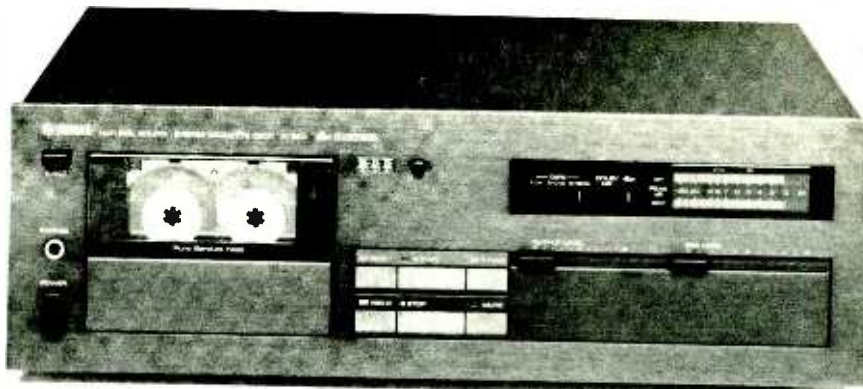
One thing I wondered about is the wisdom of having the audio response extend so far above the audible range for an amp that may be used in complex sound reinforcement systems, since noise and stray signals could be picked up on long input signal lines and then amplified. A low-pass filter at the input might be a good idea.

PHASE LINEAR A60 POWER AMPLIFIER: Vital Statistics

PERFORMANCE CHARACTERISTIC	MANUFACTURER'S SPEC	LAB MEASUREMENT
Continuous power for rated THD		
at 1 kHz, 8 ohms	225 watts	230 watts
4 ohms	350 watts	350 watts
FTC rated power (20 Hz to 20 kHz)	225 watts	225 watts
THD at rated output, 1 kHz, 8 ohms	0.05%	0.03%
4 ohms	NA	0.05%
20 Hz, 8 ohms	0.05%	0.05%
20 kHz, 8 ohms	0.05%	0.05%
IM distortion, rated output, SMPTE	0.005%	0.03%
CCIF	NA	0.005%
IHF	NA	0.025%
Frequency response, 1 watt, for -1 dB	11 Hz to 190 kHz	10 kHz to 60 kHz
S/N ratio re: 1 watt, "A" wtd, IHF	NA	94 dB
re: rated output, "A" wtd	100 dB	110 dB
Dynamic headroom, IHF	NA	1.2 dB
Damping factor at 50 Hz	330	NA
Input sensitivity, IHF	NA	0.078 V
re: 120 W output	0.775 V	0.780 V
Slew rate (volts/microsecond)	100	confirmed
Power consumption, idling; maximum	NA; 960 watts	42; 900 watts

CIRCLE 12 ON READER SERVICE CARD

Yamaha K-960 Cassette Recorder



General Description: Yamaha's model K-960 is a two-motor, two-head cassette recorder which incorporates the dbx as well as the Dolby-B noise-reduction systems. The former system is the one that expands the dynamic range by compressing it during recording by a ratio of two-to-one, and then expanding it in playback by a ratio of one-to-two. The transport is under full logic control, and the light-touch buttons permit going from any mode to any other—including run-in recording—without first going through “stop.” Metering is handled by twin “bar graph” segments calibrated from -30 to $+3$. Peak levels are shown.

The cassette compartment, toward the left, is behind a swing-down lid that has a large, transparent, removable section. To its left are the eject button; a stereo headphone jack; and the deck's power off/on switch. At the top right are the three-digit tape counter and reset button. Farther to the right is the meter panel which includes—in addition to the signal level display—indicators for the type of tape selected (LH or standard bias; chrome; and metal), as well as for the Dolby and the dbx noise-reduction systems.

To the lower right of the cassette compartment are the transport buttons for the functions of rewind, normal forward, fast forward, record, stop and mute. There is no pause button, although the pause function is available—the recorder can be put into record-standby by pressing only the record button. Actual recording then will start by pushing the “forward” button. The recording may be temporarily stopped by again pushing the “record” button, and resumed via the “forward” button.

Directly to the right of the transport buttons are the deck's electronic controls, most of which may be hidden if desired behind a swing-down door. The two that remain always accessible are horizontal sliders for output level and for recording level. Each of these simultaneously adjusts the level on both channels. Behind the door are the following: A stop memory switch; a timer switch that permits unattended recording or playback with the use of an external timer; left- and right-channel microphone jacks; a bias adjust control; the tape type selector; a recording channel-balance control; a row of three switches for selecting Dolby, dbx or “thru” (no noise-reduction is applied); and another row of three switches marked “subsonic,”

“MPX” and “focus.” The subsonic filter may be used to remove low-frequency noises, such as from warped discs being dubbed. The MPX button activates the multiplex filter, if needed, during off-the-air FM taping. The “focus” button has two positions—according to the instructions, “sharp” is supposed to produce “extra-clear playback of high frequencies, while setting it to soft gives accurate phasing and a softer effect.”

The rear of the K-960 contains the usual hi-fi pin-jacks for stereo line in and out; a socket for use with an optional remote-control accessory (model RS-10); and the recorder's AC line cord. The K-960 is housed in black matte metal with neat white markings for controls and colored illuminated indicators for tape types, noise-reduction and metering.

Test Results: Because of some confusion over the K-960's metering (see “Individual Comments” by Leonard Feldman, below), we had to choose our own “0 dB reference level” for the measurements of the K-960. We chose Dolby level, or 200 nWb/meter, which may explain why some of our distortion and S/N figures do not always agree with Yamaha's. However, we feel that our results are more meaningful from the practical standpoint of actually using this machine for recording and playback.

We used Maxell cassette tapes for all of our tests (UD-XL-IS for the 120 usec., standard bias tape; UD-XL-IIS for the 70 usec., high-bias tape; and MX for the metal tape). Frequency response results at reference level, and at the more meaningful -20 dB record level, are shown in *Figs. 1, 2, and 3*. Note that in all cases response was at least as good as, or better than, claimed. The effect of using the “focus” switch also was examined, with results shown in *Fig. 4*. The lower curve here represents the response with the focus switch on its “sharp” position which is the response previously obtained. The upper curve, obtained with the switch in its “soft” position, simply caused a rolloff of high frequencies.

Figures 5, 6 and 7 depict third-order distortion as a function of recording level for the three tapes used. Clearly, something was wrong with this machine's settings for high-bias (chrome) tape, since we reached a 3.1% percent third-order distortion level at -1 dB record level. And remember, our 0 dB reference level

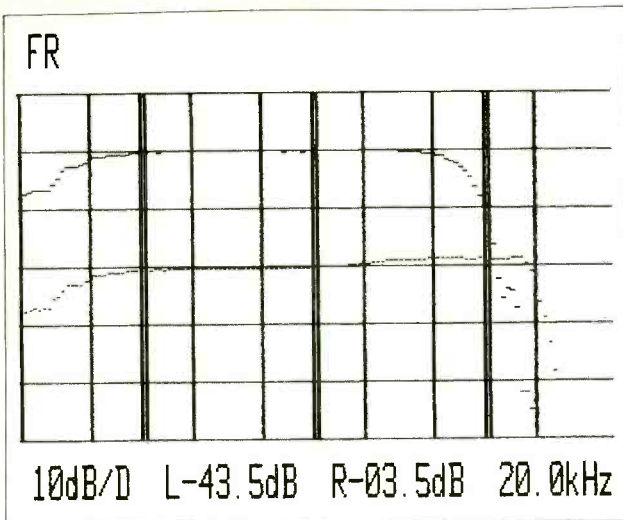


Fig. 1: Yamaha K-960: Frequency response using Maxell UD-XL-IS tape (normal bias).

was 6 dB below the 0-dB mark on the deck's illuminated meter scales. Based upon *our* reference level, the other two tapes (standard and metal) did exhibit reasonably good headroom of +5 dB or so, and +3 dB, respectively.

Note what happens (happily enough) as per Fig. 8 in which we compare distortion with and without dbx (lower plot here represents results with dbx). The compression action of the linear dbx system prevents tape saturation, and what would have been a third-order distortion of 3.9 percent (upper curve of Fig. 8) at a +5 dB record level is suddenly and marvelously "tamed" to a very acceptable 0.42 percent when dbx is turned on.

The power and versatility of our Sound Technology model 1500A Tape Recorder Tester has been enhanced recently by the addition of a spectrum analyzer option. This now allows us to examine the noise spectrum of any

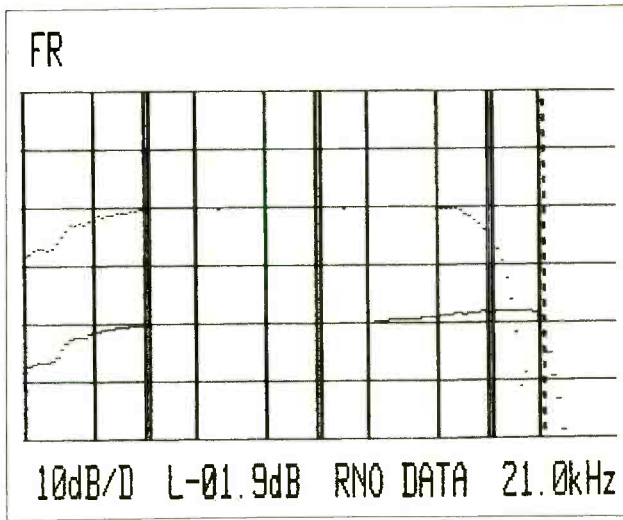


Fig. 3: Yamaha K-960: Frequency response using Maxell MX (metal) tape.

input signal in third-octave increments in addition to simply extracting a single S/N number. The graphs in Figs. 9, 10 and 11 show sweeps from 20 Hz to 20 kHz, just as in the case of our frequency plots. In Figs. 9A, 10A and 11A we have compared noise content with and without Dolby for the three tape samples. The single readings at the top of each display give the familiar S/N numbers, referred to the respective 3-percent third-order distortion recording levels. Thus, in Fig. 9 (standard bias tape), the S/N measured 53.1 dB without Dolby and 62.2 dB with Dolby on. The CCIR/ARM weighting was used in Figs. 9A, 10A and 11A, as recommended by Dolby Labs. In Figs. 9B, 10B and 11B we compare noise levels with and without dbx. Note, for example, that with dbx the noise reduction extends over the entire audio frequency band, and not only in the high-frequency region. Note too that the amount of overall

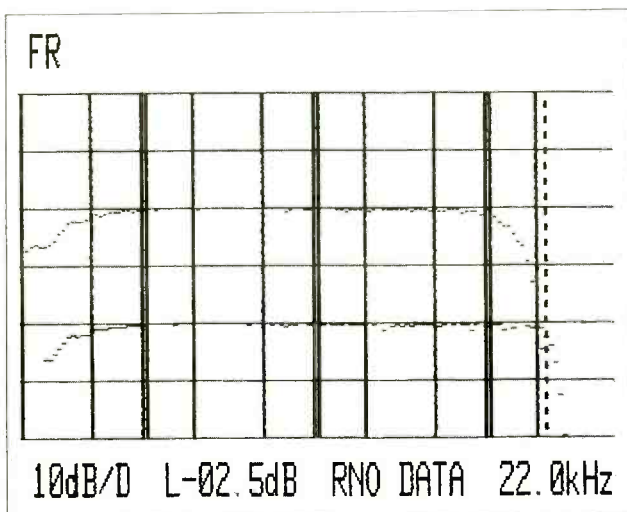


Fig. 2: Yamaha K-960: Frequency response using Maxell UD-XL-IIS (high bias).

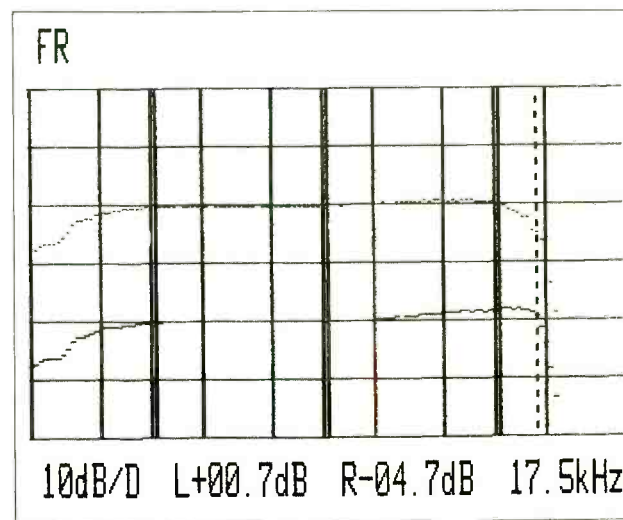


Fig. 4: Yamaha K-960: Effect of "focus" switch on frequency response (see text).

noise reduction is much greater with dbx than it is with Dolby-B. In Fig. 9B, for instance, we obtained a reading of 53.5 dB without dbx, and a whopping 86.3 dB with dbx turned on. These readings, as well as those shown in Figs. 10B and 11B for the other tape samples were taken with no weighting, simply because when we tried to add in "A" weighting or CCIR weighting, the S/N numbers with dbx were so far below reference level (in excess of 100 dB) that even our sophisticated test setup could not detect the remaining "noise."

Our updated test equipment also is now able to analyze the frequencies inherent in the wow-and-flutter readings which formerly were available only as a single number. Fig. 12 shows (top of display) an overall reading of only 0.026 percent (slightly better than the spec'd 0.028 percent), while pictured across this graph are individual "flutter components." The plot here runs from 0.5 Hz to 200 Hz. The double vertical lines represent 1, 10 and 100 Hz and, as usual, the cursor (dotted vertical line) can be moved to any frequency which is then displayed at the lower right. We "tracked" the largest flutter component as being at 6.3 Hz and having an individual value of 0.012 percent.

Fig. 13 shows deviation from correct speed as a function of time. We plotted this parameter for two minutes beyond turn-on and, although a trend toward more accurate speed can be seen, after 120 seconds the tape was running 0.821 percent fast.

General Info: Dimensions are 17 $\frac{1}{8}$ inches wide; 5 $\frac{1}{8}$ inches high; 12 inches deep. Weight is 17.6 pounds. Price: \$495.

Individual Comment by L.F.: This being our first encounter with a cassette deck that features both Dolby and dbx noise reduction systems, we were naturally curious to compare the two systems. Unfortunately, there are so many things that need criticizing on this

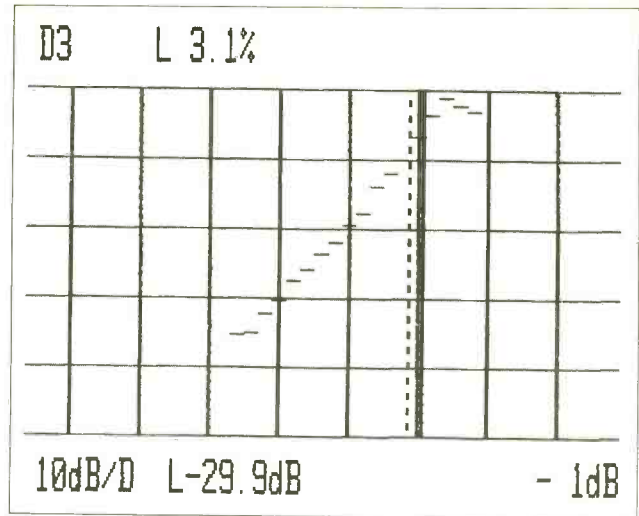


Fig. 6: Yamaha K-960: Third-order distortion vs. record level (Maxell UD-XL-IIS).

mid-priced deck that we were somewhat distracted from our initial investigations.

To begin with, the Dolby in the Yamaha K-960 is Dolby-B, and not the newer and more effective Dolby-C which would have provided a much better basis for comparison. Keep that in mind when examining the various noise spectrum curves and signal-to-noise ratios elsewhere in this report and in our "Vital Statistics" chart.

A second, more important, criticism has to do with what can only be described as a nonsensical meter calibration. The "illuminated" so-called 0-dB point on this deck is a full 6 dB above Dolby level which—as most of us know—is already at 200 nWb/meter. That puts the K-960's "0 dB" level at 400 nWb/meter, which is a good deal higher than the 0-dB level found even on professional open-reel decks! Of course, if you understand how

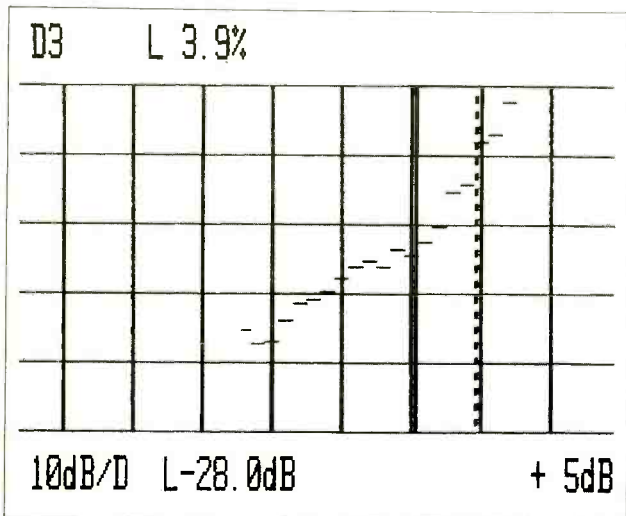


Fig. 5: Yamaha K-960: Third-order distortion vs. record level (Maxell UD-XL-IS).

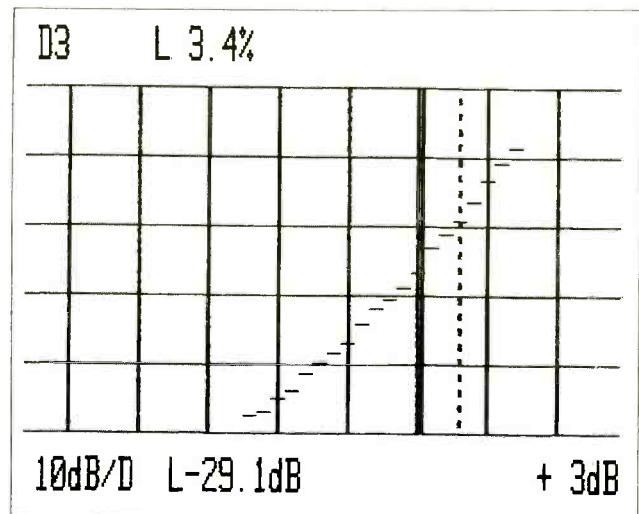


Fig. 7: Yamaha K-960: Third-order distortion vs. record level (Maxell metal tape).

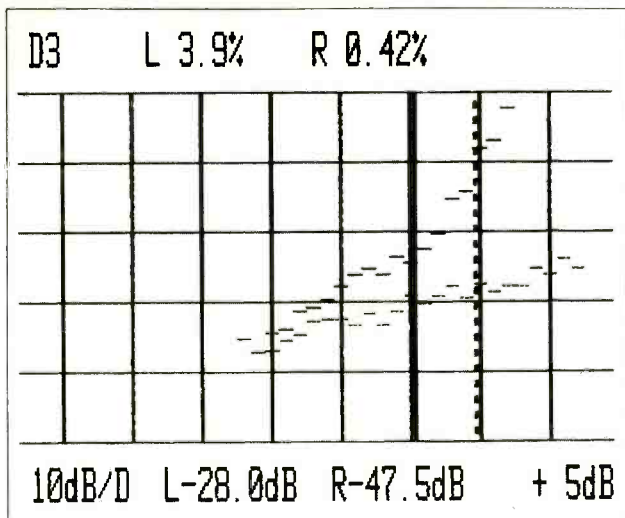


Fig. 8: Yamaha K-960: Effect of dbx on third-order distortion (see text).

dbx companding works, you will at once guess why Yamaha resorted to this ploy. When you use dbx, loud recording levels are compressed by a 2:1 ratio, and you will not saturate the tape even if you push readings up to that arbitrary 0-dB level. But heaven help you if you elect *not* to employ dbx for a given recording, or if you decide to use the Dolby-B (which is, after all, offered in this deck as an alternative for both the record and playback modes). You will end up so far into tape saturation that, upon playback, you will be treated to "pure distortion."

The odd thing about all this is that if you peer at the unilluminated portion of the metering panel (a magnifying glass will help) you will find a barely visible "0 VU" notation which is located at around -8 dB on the illuminated scale, and a "double D" Dolby level marker at around -5 dB on that scale (it actually should be at -6, at least on our sample). I suppose I could live with all this confusion if in the owner's manual Yamaha had chosen to explain *why* they did it, but nowhere in the manual could I find such information.

This explains why, as stated earlier, we chose for our own "0 dB" reference level the Dolby level or 200 nWb/meter.

Yamaha has indeed attempted to offer a lot of cassette decks at a competitive price, but the combination of dbx plus Dolby cannot offset the fact that the K-960 is still only a two-headed machine—and one whose metering system is likely to confuse even the most seasoned home recordist. In my opinion, both dbx and Dolby deserve a better "home."

Individual Comment by N.E.: The inclusion of a dbx system in a cassette recorder may prove to be more germane to this format's future than many other recent embellishments such as microprocessors (which make operation easier but not necessarily better), or even metal-tape capability (I still have yet to be con-

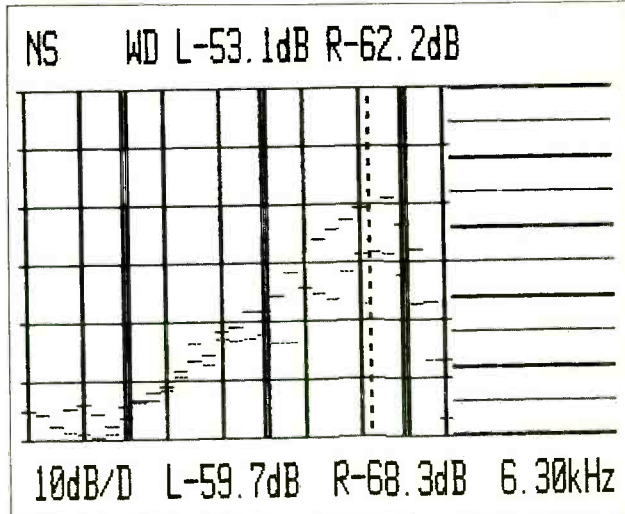


Fig. 9A: Yamaha K-960: Noise levels with and without Dolby (Maxell UD-XL-I tape; CCIR-ARM weighting).

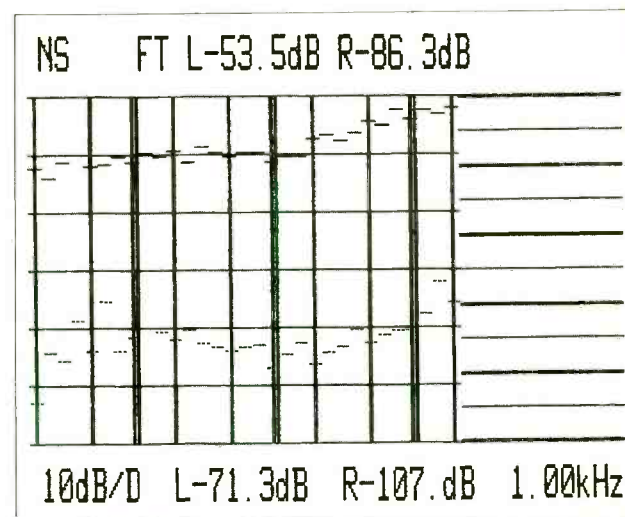


Fig. 9B: Yamaha K-960: Noise levels with and without dbx (Maxell UD-XL-I tape; unweighted).

vinced that the few dB more headroom of metal tape—when used on a deck really optimized for it in all, not just a few, respects—has much importance except when recording "live" rock, and for this demanding chore an open-reel deck still is the preferred serious format).

But dbx is something else. That 2:1 compression in recording, and the reciprocal 1:2 expansion on playback really can make a difference in terms of audible musical sound which becomes enhanced in dynamic range and improved in signal-to-noise. This has been amply demonstrated in professional applications and—for the more general market—in terms of the dbx-coded discs which, when played through dbx decoding, offer unprecedentedly clean surfaces and dynamic range.

It is to Yamaha's credit to have introduced this

system in a cassette recorder, thus enabling one to make original tapes conveniently with dbx processing, as well as to enjoy playback of prerecorded cassettes that have dbx processing (apropos of which, I recommend a real "ear opener"—The Digital Fiedler put out by Ultragroove as dbx cassette EC-7011 and containing the *Capriccio Italien* of Tchaikovsky and the *Capriccio Espagnol* by Rimsky-Korsakov. This is, to my knowledge, the first prerecorded cassette that does justice to its original digital master tape. And the Yamaha K-960 certainly does justice to it).

Having said this, it remains to be pointed out that for all its excellent sound with dbx, the Yamaha K-960 could have been a little better thought out as an audio product. Len has taken to task its metering system, although once understood, it does not detract from the

deck's inherent capability for making fine-sounding tapes. But it is confusing, and the depiction of two "0-dB" points doesn't help matters. And it is not adequately covered in the owner's manual. Worse than that, after about two hours of use, the left-channel meter "pegged" (or its equivalent for the bar graph type in which all the segments lit up and stayed that way) for any signal in record or playback, while pressing the Dolby button produced a low-frequency motor-boating in the left channel. This weirdness then cleared up as suddenly and as mysteriously as it had come on, and all was well again. No doubt it was due to some quirk in our particular sample, but it should be checked out by a prospective buyer (Yamaha, please note!).

Which brings me to the likely market for this machine. It has light-touch controls that permit

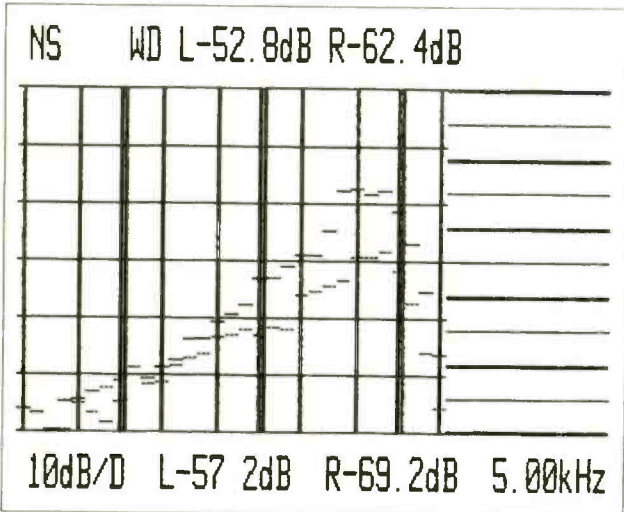


Fig. 10A: Yamaha K-960: Noise levels with and without Dolby (Maxell UD-XL-IIS; CCIR-ARM weighted).

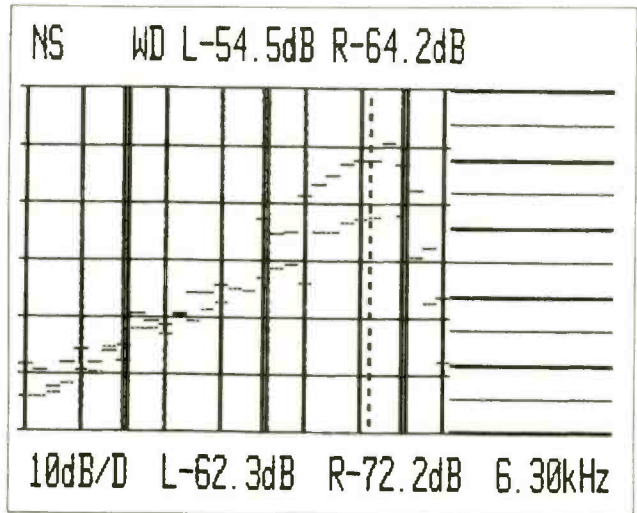


Fig. 11A: Yamaha K-960; Noise levels with and without Dolby (Maxell metal tape; CCIR-ARM weighted).

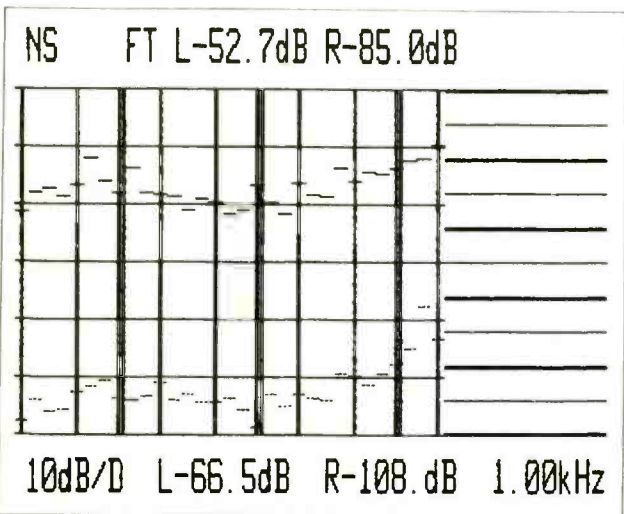


Fig. 10B: Noise levels with and without dbx (Maxell UD-XL-IIS; unweighted).

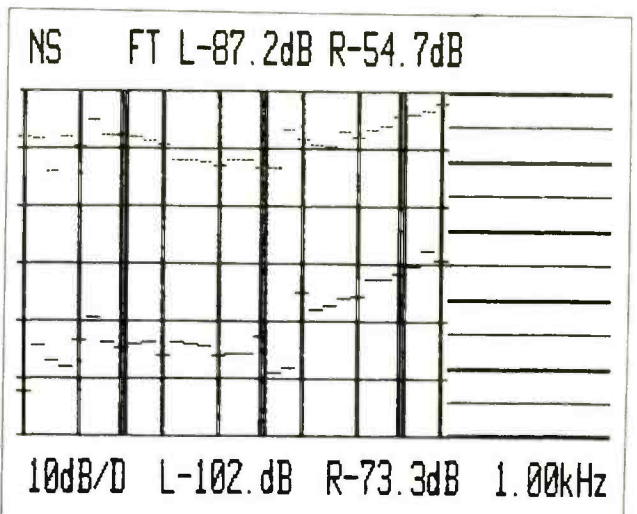


Fig. 11B: Yamaha K-960: Noise levels with and without dbx (Maxell metal tape; unweighted).

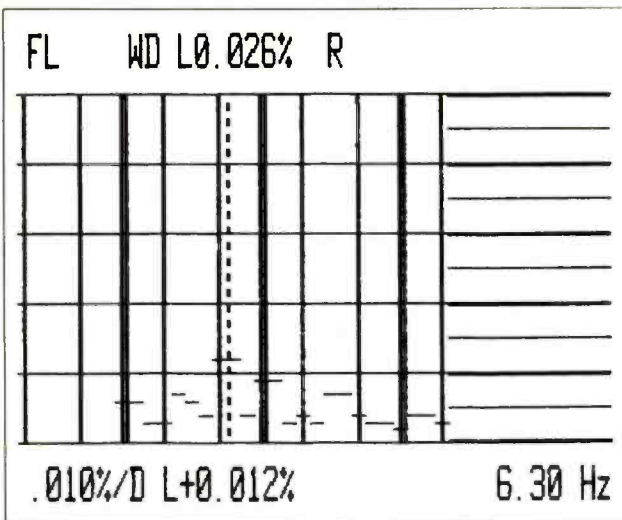


Fig. 12: Yamaha K-960: Flutter components.

unrestricted fast-buttoning, and with the dbx switched in, it has an awesome dynamic range combined with good, extended smooth response. But its two-head design means you cannot monitor off the tape while recording. It lacks separate recording level controls for each channel, although the channel balance knob does help in this area. The smallness of some controls, and "hiding" them behind a panel will not exactly appeal to many semi-pro users or advanced tape hobbyists, and

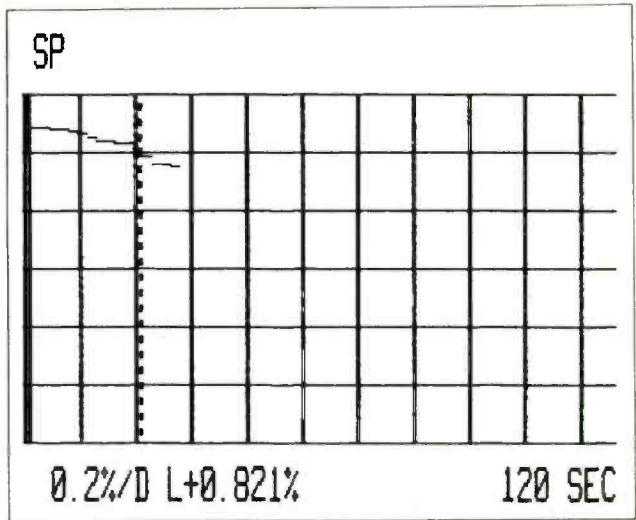


Fig. 13: Yamaha K-960: Speed accuracy deviation.

designating a high-cut filter as a soft- and hard-focus control is just kid stuff.

On the other hand, a working dbx system in a cassette recorder as generally good as this one, and listing for under \$500, these days is new and maybe even "state of the art." At least for many consumers. For the more advanced tape buyer, I'd like Yamaha to build a three-head deck, use man-size controls and a clearer metering system and supply a better owner's manual.

YAMAHA K-960 CASSETTE RECORDER: Vital Statistics

PERFORMANCE CHARACTERISTIC	MANUFACTURER'S SPEC	LAB MEASUREMENT
Frequency response, normal bias tape	± 3 dB, 30 Hz to 17 kHz	± 3 dB, 36 Hz to 19.5 kHz
high bias tape	± 3 dB, 30 Hz to 19 kHz	± 3 dB, 35 Hz to 21 kHz
metal tape	± 3 dB, 30 Hz to 22 kHz	± 3 dB, 36 Hz to 22.3 kHz
Signal-to-noise re: 3% THD record level, normal; high-bias; metal	NA; NA; 60 dB	53.1; 52.8; 54.5 dB
Signal-to-noise re: 3% THD record level; w/Dolby; w/dbx		
normal bias tape	NA	62.2; 86.3 dB
high bias tape	NA	62.4; 85.0 dB
metal tape	67; 100 dB	64.2; 87.2 dB
Record level for 3% THD (0 dB = 200 nWb/m)		
normal bias; high bias; metal	NA	+ 4.5; - 1.0; + 3.0 dB
THD at 0 dB record level		
normal bias	1.0%	0.6% (with dbx, 0.35%)
high bias	1.0%	4.0%
metal	1.0%	1.5%
Line output at 0 dB	340 mV	350 mV
Headphone output at 0 dB	1.0 mW/8 ohms	Confirmed
Mic input sensitivity for 0 dB	0.3 mV	0.25 mV
Line input sensitivity for 0 dB	50 mV	50 mV
Bias frequency	105 kHz	Confirmed
Wow-and-flutter, WRMS	0.028%	0.026%
Speed accuracy	NA	+ 0.821%
Power consumption	35 watts	32 watts

CIRCLE 13 ON READER SERVICE CARD

Gold Line ASA-10B Spectrum Analyzer

General Description: The Gold Line ASA-10B audio spectrum analyzer is a compact, lightweight, battery-operated portable instrument that may be hand-held or placed wherever convenient. It may be used for real-time analysis, sound system equalization, elimination of feedback, tape recorder alignment and other applications including the analysis of tone-control action and the output of other audio devices such as equalizers and amplifiers. For spectrum analysis and SPL work, the device has a built-in microphone; in addition there is a mini-jack for feeding in line-level signals for analysis. The ASA-10B may be powered by eight size "AA" (penlight) cells, either alkaline or NiCad rechargeables. Carbon-zinc cells are not to be used. The device also may be powered by an external supply or battery eliminator capable of delivering 8 to 15 volts DC (12 volts nominal) at 8 ma. To gain access to the battery area, as well as to a switch that selects alkaline or NiCad cells, the back of the device must be removed via four screws.

The top edge of the ASA-10B has the small projection that houses the microphone. The face of the instrument contains the display which is made up of 100 LEDs (ten rows of ten each). The horizontal rows read frequency in ten octave-centers of 31.5, 63, 125, 250, 500, 1 K, 2 K, 4 K, 8 K and 16 K Hz. The vertical rows read signal levels. Nominal calibration runs from +3 to -20 dB. In addition, the actual values shown can be varied to suit the signal being analyzed by means of a slider control that regulates the device's input sensitivity, and by an input range switch. The sensitivity control has eleven stepped positions which provide ten steps of 5 dB each from 70 to 120 dB to change what "zero dB" on the display represents. The input range switch (which is referred to in the instruction manual as the input gain switch although it is labeled "range" on the device itself) may be used to expand the range of the vertical scale by an additional -20 dB. Also on the device is a switch for selecting flat response, or either of two weighting curves, the "C/SPL" or the "A/SPL." A final control here is the decay time switch for selecting slow, hold or fast. The jack for line-level input and the other jack for external 12-volts DC input are both on the right-hand side of the device. A printed panel on the back contains brief instructions for use, while a lengthier printed brochure contains more detailed instructions.



Test Results: All specifications for the Gold Line ASA-10B were either confirmed or bettered in *MR&M's* tests. In addition, the device was judged to be very well designed and planned for its intended functions. Although a "mini" design vis-a-vis conventional-

ly sized analyzers, the ASA-10B is capable of serving as a real-time analyzer and as a sound-level meter. By providing two completely independent sensitivity adjustments (one covering a wide range from 70 to 120 dB; the other changing the observed range by 20 dB), the display itself has been made as easy to read as possible and has not suffered as a result of miniaturization. The line input facility adds to the device's usefulness, apropos of which some caution must be exercised—as the instructions point out—to keep external signal source gains at minimum since there are limits to the voltage amplitude that can be safely applied via this line input terminal, especially from such an external source as a power amplifier.

As a final fillip, the ASA-10B has outputs for feeding an oscilloscope for special purposes such as trouble-shooting and other types of signal analysis. These outputs may be found on the circuit board behind the unit's back cover.

General Info: Dimensions are 8 inches high, 3 inches wide, 2 inches deep (including mic and knobs). Weight is 12 ounces. Price: \$299.95.

Individual Comment by L.F.: Not too long ago I encountered my first truly portable, battery operated spectrum analyzer which used LEDs in its display of ten octave bands and cost between \$700 and \$800. I recall writing about it and commenting on the technological breakthroughs which had enabled the cost of a real-time spectrum analyzer to be "slashed to such a low level." Here we are less than five years later and I am confronted with a similar device that costs less than \$300 but can do everything that earlier unit can do—and then some.

The ASA-10B is one of two hand-held analyzers offered by Gold Line. The other model, ASA-10, lacks the overall range of the ASA-10B, and its visible display

range is limited to 15 dB. In other respects the lower-cost model is similar to the new 10-B. Gold Line also makes a rack-mount, AC-powered analyzer which comes complete with a built-in pink-noise source and a small-diameter separate electret microphone that can be cabled to the analyzer. This "bench version" of a complete spectrum analysis system retails for just under \$600. Thus, even when you add the cost of an auxiliary pink-noise generator recommended by Gold Line for use with the ASA-10B—that's the model PN-2 at \$59.95—you still come out ahead, especially since portability and battery operation often are important when EQ'ing a hall or other listening environment where AC outlets aren't always where you want them to be.

If you can wade through the overly simplistic owner's manual—(does anyone knowledgeable enough to want and need a real-time analyzer need to be told "not to block the microphone in the end of the analyzer"?)—you will find that there is a wealth of information contained in that four-page document, including tips on when and when not to use "A" or "C" weighting.

In addition to the inclusion of these two weighting curves and the two range adjustments, I also liked the "hold" setting which allows you to "freeze" a given spectrum display for more careful observation or note-taking, and the slow and fast decay settings which seem to have been adjusted so that one or the other position suits just about any equalization task that you are likely to encounter, whether in sound-reinforcement work, feedback reduction or system response modification in a music playback system.

As I have said, the instruction pamphlet supplied with the ASA-10B leaves some things unsaid and perhaps oversimplifies what it does discuss, but I have to agree with its final paragraph which states: "IN SUMMARY: The application of audio spectrum analyzers such as the Gold Line models ASA-10 or 10B

is continuously being broadened. Your own imagination may suggest some of the new areas of use for these versatile instruments."

Individual Comment by N.E.: One cannot help but like this compact versatile instrument which does all it is claimed to do and weighs little more than a couple of cassettes. The idea of being able to whip out a device that weighs under one pound and do a real job of spectrum analysis is itself something remarkable that was not possible a few years ago. Add to this the unit's versatility both in terms of what it can do with signal analysis, and the various ways it may be powered, and you have a really worthwhile "audio tool."

My only criticism here has to do with two matters. One, I believe some kind of carrying case with perhaps a shoulder strap or handle should be made available for the ASA-10B, especially since it is designed for in-field or on-the-move applications, and it would be a real blow if this great little instrument became damaged in transit or was accidentally shoved off a table or dropped, etc.

Two, I feel—as Len does—that the instructions supplied with it need revision to make certain things more definite or explicit, while at the same time omitting references in these instructions to the other model, the ASA-10. Two products need two manuals. This seems especially germane since the very "product personality" (not to mention relatively low cost) of the ASA-10B would seem to appeal more to the first-time buyer of any kind of real-time analyzer who might just want to get into this area of work because of the very availability of a low-priced professional-grade instrument of this type. But it would be this same buyer who might be confused by instructions that mention another unit, and who also would be grateful for more carefully delineated instructions, including some clear illustrations.

GOLD LINE ASA-10B SPECTRUM ANALYZER: Vital Statistics

PERFORMANCE CHARACTERISTIC	MANUFACTURER'S SPEC	LAB MEASUREMENT
Measurement range	30 to 123 dB/SPL	Confirmed
Display channels	10	Confirmed
Center frequencies	32, 63, 125, 250, 500, 1 K, 2 K, 4 K, 8 K, 16 K Hz	Confirmed
Center frequency accuracy	3%	2%
Relative flatness, channel to channel	+ 1.0 dB	Confirmed
Weighting curves	IEC A or C	Confirmed
Detector decay time (500 Hz channel)	2.2 dB/sec in Slow; 18 dB/sec in Fast	Confirmed
Display range	23 dB	Confirmed
Microphone	omni electret	Confirmed
External output level	- 85 dBm to + 8 dBm (0.043 mV to 1.94 mV)	Confirmed
Input impedance	10 K ohms	Confirmed
Battery type	alkaline or NiCad	Confirmed

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GROOVE VIEWS

Reviewed By:
NAT HENTOFF
JOE KLEE
STAN SOOCHER
JEFF TAMARKIN
NORMAN WEINSTEIN

POPULAR

GEORGE HARRISON: *Somewhere In England.* [George Harrison and Ray Cooper, producers; Phil McDonald, engineer; recorded at Friar Park Studios, England.] Dark Horse DHK 3492.

Performance: **Sobering**
Recording: **Unsettling**

George Harrison has been a man of many causes, from spreading the word of the Maharishi Mahesh Yogi in the '60s to saving starving people in Bangla Desh in the '70s. On *Somewhere In England* he takes up the cause of John Lennon's death. As the most spiritually-oriented of the Beatles, this might seem appropriate for Harrison. But the bleakness he wallows in on his new album is unhappily its major distinguishing characteristic.

Harrison was singing "Love Comes To Everyone" on 1978's *George Harrison*, but on *Somewhere In England* he decries dancing, love, the music business, and even life itself. Many of the new album's melodies are uninspiring, its instrumental arrangements fall over each other, and the lead vocals very often sound tinny. In fact, one of the highlights of *Somewhere In England* is the nuclear bomb explosion during "Save The World."

Ironically, "All Those Years Ago," the album's touching Lennon tribute, is also its saving grace. The melody is almost whimsical, like "This Song,"

Harrison's parody of his "My Sweet Lord" copyright suit. But the cutting lyrics which Harrison spits out in anger (God becomes "Ga-hadd") combined with weeping lead guitar lines and "Glass Onion" strings give "All Those Years Ago" the kind of sincerity and depth that makes for great art. Ringo's spare drums and Paul and Linda McCartney's background vocals seal the sense of suffering and loss that many of us are bound to feel whenever we hear this song.



GEORGE HARRISON: Bleak.

"Teardrops" has an upbeat melody but, in line with the rest of the album, despairing lyrics. Its similarity to the musical style of Elton John shouldn't be surprising since Ray Cooper, noted for his percussion work with John, is the album's co-producer. The two Hoagy Carmichael tunes Harrison includes here, "Baltimore Oriole" and "Hong Kong Blues," are also about hard times, but they succeed as character studies. The trouble begins with songs like "Writing's On The Wall" that mourns among its easily forgotten melody, "all the time you thought it would last/Your life, your friends would always be/Till they're drunk away or shot away or die away from you."

The production on *Somewhere In England* fares just as poorly. There is little sense of structure or style. Harrison's voice is often forced out in front of a flat, garbled mix. On "That Which I Have Lost," for example, George sings a music hall melody about redemption over a cobweb mess of guitars and flittering tambourines that sound recorded largely without engineering feel or form.

"Blood From A Clone," a gory parable of the music business, suggests "beating your head on a brick wall/Hard like a stone." Unfortunately, many Harrison fans might heed this advice after listening to *Somewhere In England*.
S.S.

ELTON JOHN: *The Fox.* [Chris Thomas, producer, except for "Heart in the Right Place," "Carla Etude," "Chloe," and "Elton's Song," Elton John and Clive Franks, producers;

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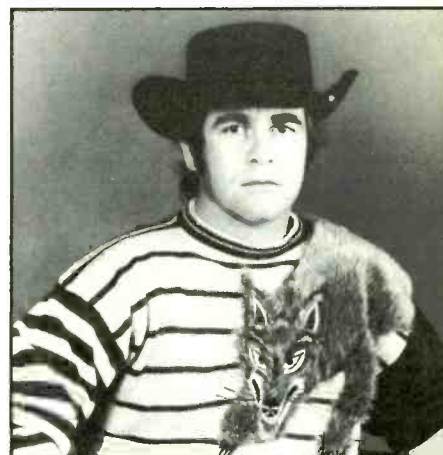


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Performance: **The old Elton is back**
Recording: **Does justice to the performance**



ELTON JOHN: Fresh sounds.

Elton John's first album for Geffen Records is also his best album in years, ranking with the multi-platinum recordings which made him one of the most revered superstars of the '70s. Much about the structure of this album reminds one of the classic John LPs, and coming as it does after the fallow period in his career that began with *Blue Moves* and reached a nadir with his disco disaster a couple of years ago, *The Fox* is a truly triumphant comeback.

Perhaps the credit can be given producer Chris Thomas, who coaxed a performance out of John which allowed the pianist to include the kind of melodic rock and ballad material that could have easily fit on one of John's mid-70s classics. The opening track, for example, "Breaking Down Barriers," is a driving rocker featuring John's pumping piano and a rousing, upbeat backing that reunites John with his famous rhythm section of the classic era, drummer Nigel Olsson and bassist Dee Murray. The pair resurfaces on about half the other cuts on the album, proving that there was a certain chemistry bet-

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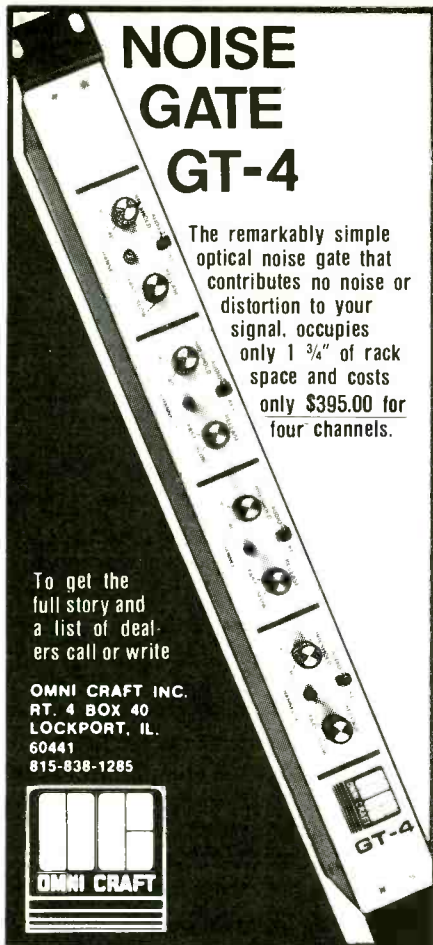
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ween these musicians that is responsible for bringing out the best in each of them.

Another factor contributing to the success of *The Fox* is John's return to collaborating with lyricist Bernie Taupin, who co-wrote four of the album's cuts, which also happen to be some of the best songs on the LP. Taupin may be considered a bit too maudlin and over-sentimental for some listeners, but his lyrics suit John's vocal style perfectly. John becomes more emotionally involved with the material written by Taupin than he does with the songs written by others.

Although Gary Osbourne—who co-wrote most of the other material with John—has a different outlook than Taupin, Taupin's subject matter is more eclectic and less clichéd. John seems to enjoy singing the descriptive, colorful scenes Taupin has created in "Just Like Belgium" and the grandiose, gushy title cut more than he does singing the songs by Osbourne. Osbourne's love songs are more typical, although they are quite pretty, and at this point in his career, John seems to be having more fun with a song like the quirky, anti-political "Fascist Faces" that he wrote with Taupin.

Another interesting track, however, is "Elton's Song," which John co-authored with Tom Robinson. An unabashed love song, this is the kind of material on which John built his reputation.

Still, what makes this album so enjoyable is not only the renewed sense of vitality that the lyrics possess, but the vibrancy of the music itself. Even the orchestral prelude to "Chloe," which opens the second side, is imaginative, and well produced and recorded. A new burst of enthusiasm pervades this record, and although it does recall John's work of the past, it is the most contemporary, fresh-sounding music to emerge from this man in a long time. J.T.

YOKO ONO: *Season of Glass*. [Yoko Ono and Phil Spector, producers; Ed Spriggs, engineer; recorded, mixed and mastered at the Hit Factory, New York, N.Y.] Geffen 2004.

Performance: **Frightneningly blunt but poignant**
Recording: **Low-key; some interesting concepts**

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The first indication that this album is not going to be one in which Yoko Ono avoids confronting reality comes when one looks at the album cover. On the front, two kinds of glass: a glass filled with water, and a pair of glasses—the glasses worn by John Lennon the night he was killed. The photograph is stark, frightening. It will anger many people and make them turn away from this record. It will also draw the daring—those willing to be taken inside, to hear what Yoko Ono has to say just slightly more than six months after her husband was gunned down in front of her eyes. Those who wish to erase the incident from their minds, and who might consider Ono's frankness offensive, who wish she wouldn't rub it in, are best advised to stay away from this album.

Those who don't ever want to forget, who are willing to open up and face this woman's statement, and maybe find something with which to identify will find many emotions on the album. Ono doesn't beat around the bush, doesn't try to forgive and forget—she's a bitter woman. But she is a very strong one.

Season of Glass is not like any other record Ono has been involved with, not like any of her early '70s experimental, avant-garde art recordings. This is a melodic pop album, produced for the most part by Phil Spector until Ono took over on her own. There's very little that's abrasive about the actual music, which is mostly traditional soft rock with backing by many of the musicians who worked with Ono and Lennon on *Double Fantasy*. There's none of the primal screaming of the old Ono recordings, but in its own way, her voice is just as close to the edge as it was then. Ono's voice is not pretty in a traditional way. Even she says in the liner notes that she was "all choked up and my voice was cracking" during the recording of this LP. But then she adds that it's OK for her voice to sound like that because "That's what the critics had been saying about me all those years anyway."

From the start of the record, Ono makes her feelings known. "Goodbye Sadness" is an emotional tune in which Ono sounds as if she's started to come to terms with her fears and sadness because she "can't take it anymore." Between that song and the next, "Mindweaver," Ono is heard speaking on the phone, presumably to Lennon. The conversation could have taken

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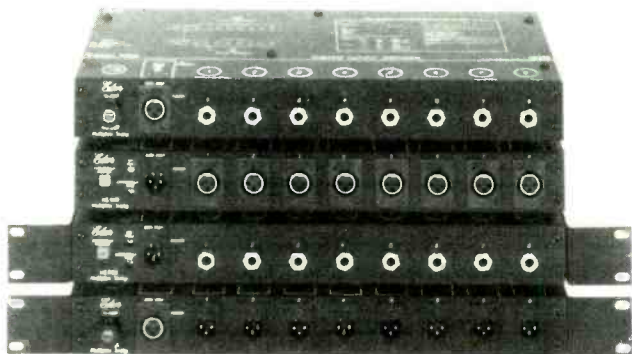
place during the period when the couple separated for a while, and the lyrics indicate that perhaps she's feeling the same loneliness and emptiness now that she felt when they went their separate ways. That theme is suggested again several times during the record. At one point, the couple's son Sean is heard speaking and mentioning his "daddy." It's difficult not to feel the same feelings one felt upon hearing about the murder.

The most obvious references to Lennon's murder occurs during the song "I Don't Know Why," which opens side two. "It was getting so good with us," Ono sings at one point. At another, she repeats the words, "You left me/You left me without words." Then, screams: "You bastards! Hate us! Hate me! We had everything/You..." and then abruptly stops. It's the most intense, chilling moment on the otherwise calm, collected record. Whether she's shouting directly at Lennon's killer or to the masses who blamed her for the breakup of the Beatles and who condemned her throughout the years that she and Lennon simply wanted to have a peaceful family life together, is up to the listener to decide. But she'll make you think about it.

Another blatant reference at the beginning of "No, No, No," when we hear gunshots followed by screams, then a confused sounding voice of Ono singing nervously over a discordant funk guitar and a dance beat. But those incidents are the exceptions. The bulk of *Season of Glass* finds Ono making nearly accessible pop and fronting a well rehearsed band of crack studio musicians. Spector's production does not attempt to turn Ono and band into a huge sounding thing, as was typical of his famous productions of the past.

If anything, this is possibly the sparsest recording Spector has been involved with. Most of the music is pushed far into the background, allowing Ono's singing to hold its own and create the moods by itself. The music, in turn, becomes ominous in its thinness, and therefore more poignant under the circumstances. The occasional melodic bursts of sax and guitar stick out as islands of sanity to grasp onto in the midst of all of Ono's purposeful tension. It works extremely well and leaves a mark. Yoko Ono always did know how to get her message across. J.T.

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DOLLAR BRAND: *Echoes From Africa*. [Horst Weber and Matthias Winckelmann, producers; Carlos Albrecht, engineer; recorded at Tonstudio Bauer, Ludwigsburg, Germany.] Inner City IC 3019.

Performance: **Fervent and mesmerizing**
Recording: **Appropriately clean and precise**

While considerable lip service is often paid in jazz circles to the African roots of the music, few African jazz musicians have achieved any measure of critical success beyond their native land. One of the better known African jazz masters is Dollar Brand who is a devout disciple of Islam and has recorded under his holy name of Abdullah Ibrahim. For over a decade I have listened with delight to Brand's albums (all, alas, commercial failures in America) and have never failed to be astonished at the man's inventiveness and charm. His recordings merge in unexpected ways his love for the folk melodies of his native South Africa with his intuitive feel for the styles of Ellington and Monk. Add a liberal sprinkling of Islamic devotional melody to the pot and you can get a sense of the unique power of Brand's piano attack.

Echoes From Africa matches Brand with a young South African bassist Johnny Dyani whose forceful and majestic bass playing handsomely complements Brand's piano work. The opening cut, "Namhanje," features Dyani and Brand chanting variations to an old African folk song while their bass and piano articulate mesmerizing melodic lines. With one hand Brand issues waves of percussive chords; with another Brand meanders with shades of blues and hymns. Dyani's bass punctuates Brand's developments with the authority of a Charles Haden or Eddie Gomez. The emotional tone conveyed by this seventeen-minute tune is nothing short of ecstatic. A quiet ecstasy like the roar inside a seashell, a religious appreciation of music as a joyous celebration of earthly life.

Side two represents a slight change of pace and is the less "African" sounding side. The droning sounds of Brand

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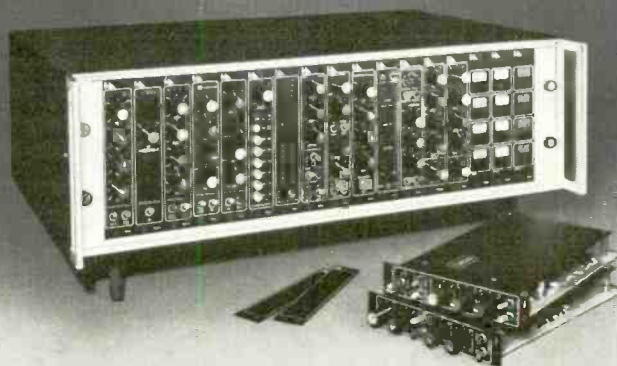
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and Dyani chanting are largely gone. "Lakutshonilanga" opens the side with a tune that sounds remarkably like an outtake from a recent Keith Jarrett solo piano recording and I'll leave it to your imaginations, gentle readers, who invented that Keith Jarrett solo style. There's also a brief lyrical piece dedicated to McCoy Tyner. The album closes with a rendition of the traditional Islamic hymn of praise to Allah, the "Zikr." There's not an unnecessary note on this entire record, no pretense or emotional excesses often associated with music so spiritually inspired. I can't imagine any jazz lover not stirred by this album and I hope Inner City continues to release this enchanting and ennobling music to an unworthy world. Wonder how Brand feels about that line in the Bible about "pearls before swine"? The man has never sold as many records in America as Jim Nabors.

The recorded sound is crisp and precise. No frills. No fancy studio work. Just two instruments and two praying voices recorded with care. This recording, like many of Brand's, was originally released on the European Enja label. That original album cover featured the words "Direct-to-Disc" above Brand's name. That might explain why the sound is all one could ask for.

This reissue appears at an auspicious moment. Traditional African music in transmuted form is reaching American audiences through the new Talking Heads and Eno/Byrne releases. Those who demand the real thing in modern African music need look no further than *Echoes From Africa*. N.W.

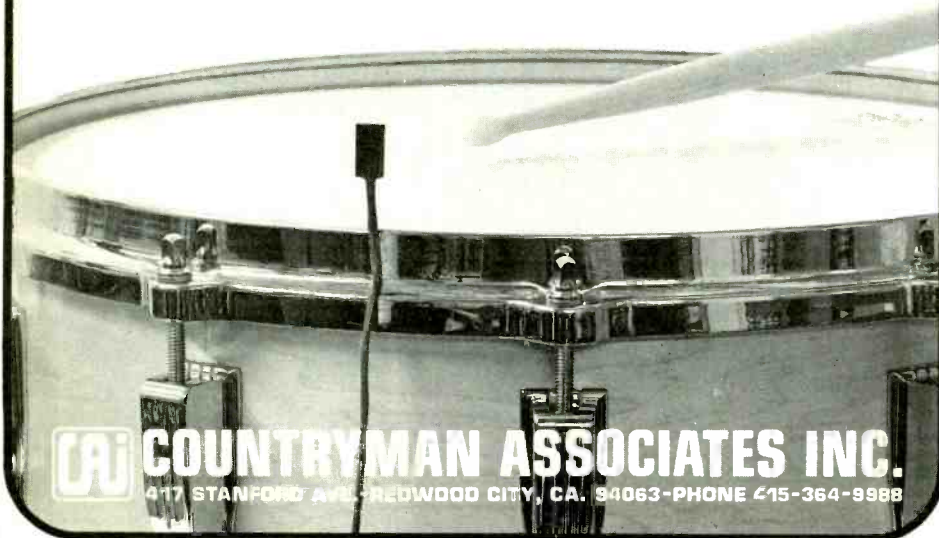
ELLA FITZGERALD: *Ella Abraca Jobim*. [Norman Granz and Paulinho da Costa, producers; Humberto Gatica, Paul Aronoff and Allen Sides, engineers; recorded at Group IV Studios, Hollywood, Ca., September 17, 18 and 19, 1980 and March 18, 19 and 20, 1981.] Pablo Today 2360 201.

Performance: **Not a perfect match**
Recording: **Contemporary layers of sound**

One thing about Ella Fitzgerald is unchangeable and that's Ella Fitzgerald herself. What I mean by that is that Ella does something in a particular style and idiom in which she is master

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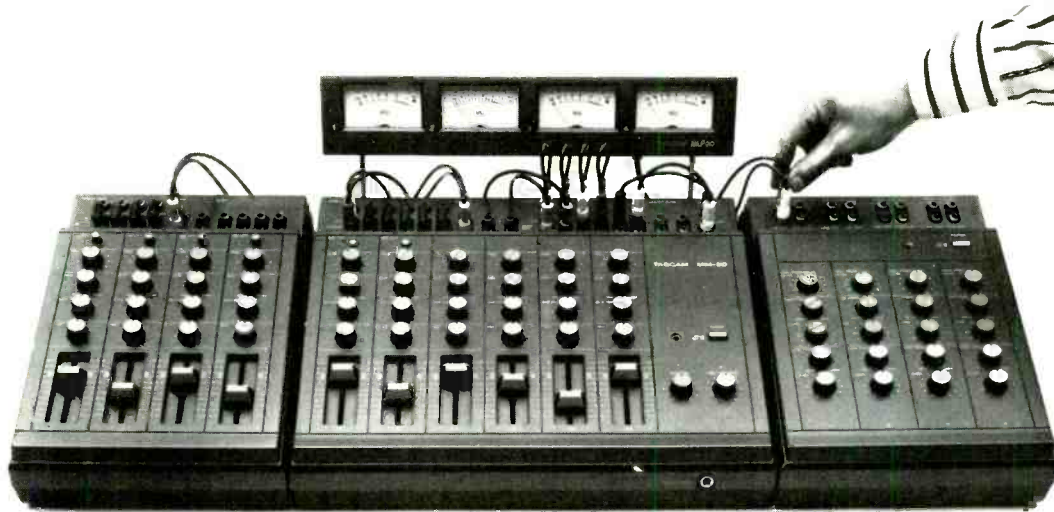
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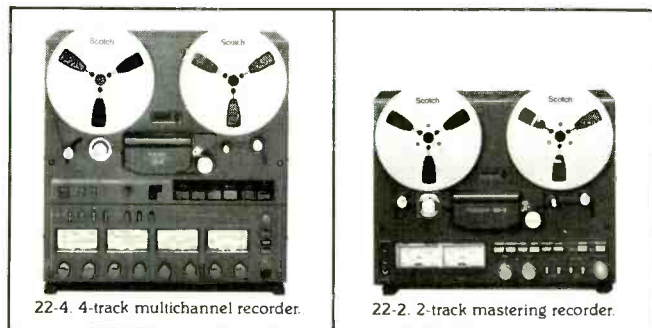
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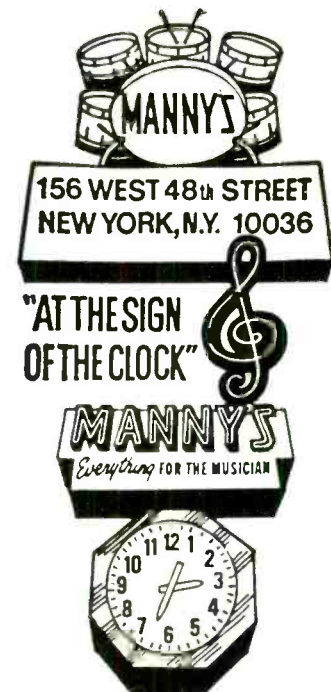
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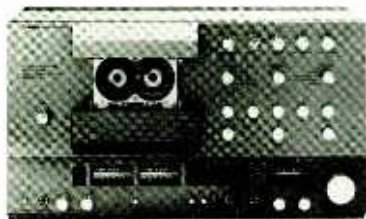
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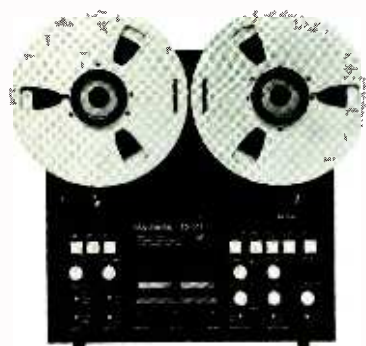
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NEW JAZZ MASTERS: CHICO FREEMAN, MARTY KRYSTALL, BUELL NEIDLINGER

By Nat Hentoff

At 31, Chico Freeman—tenor saxophone, bass clarinet, and other reeds—has emerged as one of the unmistakable classic horns among the new jazz generation. Moreover, as Amiri Baraka emphasizes in the notes to Chico's current release, *The Outside Within* (India Navigation), Freeman, unlike some of his contemporaries, "has found a way to be clearly melodic and musically swinging, yet searching, daring and experimental." He goes inside and outside the chords; he can so shout that he seems to be speaking in tongues and yet he can also get subtly, sensuously inside a ballad in a way that mesmerizes both those unfamiliar with jazz and the cognoscenti.

All these qualities are powerfully evident in *The Outside Within* in such pervasively riveting pieces as "Undercurrent," "The Search," "Luna," and "Ascent." Each one charts fresh terrain while remaining rooted in the entire continuum of jazz (for Chico has deeply knowledgeable roots). Brilliantly complementing his penetratingly authoritative sound and time are drummer Jack DeJohnette, bassist Cecil McBee, and pianist John Hicks who creates here some of his most inventive work on record.

The recorded sound sets a new standard for India Navigation, and ought to be heard by other engineers as well. The wide, vivid, thrusting range of Chico's horns and the explosive density of the rhythm section are fully caught in all their fire and glory.

Much less known, as yet, than Freeman is Marty Krystall, a Los Angeles-based tenor saxophonist who has strong backgrounds in both jazz and classical music (he has toured, for example with Peter Serkin's Tashi, a chamber

ensemble). But Krystall is no "third stream" fisher in both waters when he plays jazz. In *Ready for the 90's* (K2B2 Records), Krystall's tenor is wholly, exhilaratingly, leapingly immersed in what could be called post-modern jazz. His sound is room-filling, capable of an extraordinary gamut of colors. And his command of rhythm, layer upon layer of rhythm, is continually, authentically exciting.

Like Chico Freeman, Krystall is so clear in everything he conceives and executes that, as far out as he goes, he never loses you. This has also long been the case with co-leader Buell Neidlinger. It might seem odd to call Neidlinger a "new master" in view of his remarkable career in jazz (Johnny Hodges, Cecil Taylor, Billie Holiday, Zoot Sims, et al.). But the prowess of this singular bassist and musical thinker is only just beginning to become recognized.

Also strikingly present are trumpeter Warren Gale, drummer Billy Higgins; and on one 1961 track, Cecil Taylor. The engineering is excellent. As on the Chico Freeman session, the broad scope of dynamics and the continually changing textures are all present, in rightful place.

CHICO FREEMAN: *The Outside Within*. [Bob Cummins, producer, David Baker, engineer.] India Navigation IN 1042.

MARTY KRYSTALL, BUELL NEIDLINGER: *Ready for the 90's*. [Marty Krystall and Buell Neidlinger, producers, no information on the engineer.] K2B2 Records 2069. (Distributed by Daybreak Express, 169 7th Avenue, Brooklyn, N.Y. 11215.)



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and in which she has no peer. To the bad is the fact that she is inflexible. She has never been able to successfully bend her individual mode to accommodate some other idiom. When she did the famous Gershwin, Porter, Ellington, Rodgers and Hart and other songbooks which she and Norman Granz put before the public way back when, she was dealing with what Ella Fitzgerald does best, the American popular song. Her attempts to stray from that idiom into the areas of the blues, rock and roll, gospel and bossa nova have been charming enough (Ella always has charisma going for her) but not appropriate to the style of the material. That's basically why this album doesn't really work. There are moments when the magic of Ella Fitzgerald takes over and a tune like "Agua de Beber" works but it always works on Ella's terms—not on Jobim's.

The bossa nova, especially the music of Antonio Carlos Jobim, needs a lighter voice than Ella Fitzgerald's (Astrud Gilberto was perfect for this music) and a more convincing mastery of the Portuguese language.

Surprisingly, the best album I can recall of this sort of music was sung by Frank Sinatra (Reprise FS 1021) but he had the help of Jobim's voice to get him over the linguistic hump and Frank is a much softer, lighter singer than Ella. In the liner notes to the Sinatra album Frank jokes about this, pointing out "I haven't sung so soft since I had laryngitis." That's basically what Jobim's fragile music requires. Ella, on the other hand, belts the lyrics just as she always has and always will. That's not to say that Ella's not the great song stylist—we all know that she is—but just that she's out of her element with this music.

The band comes on, like the recording, in layers. There's the Brazilian percussion section, the Latin guitarists, the jazz guitarist (Joe Pass, the best jazz guitarist but if you're going for bossa nova he has to take third place to Laurindo Almeida and Charlie Byrd), the jazz soloists (Zoot Sims who couldn't play badly if his life were in the balance, Clark Terry and Toots Thielmans, better than ever on harmonica) and the keyboard players. By now, I should be used to the fact that if you give an engineer a 16-track machine he'll find a way to use all 16 tracks even if it means isolating the piano player's left hand from his right but when you get so wrapped up in technocracy that

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you've got to have a separate engineer (Allen Sides) for the percussion overdubs, I think things are getting a bit out of hand. But I'll admit that the sound is marvelously clear and leaps out of the set and meets you more than half-way.

There are a few minor matters like Ella's changing "The Girl From Ipanema" to "The Boy From Ipanema" so she can avoid having to sing the lyrics third person. It really works better with the original lyric. There are some fine English lyrics here such as Gene Lees' "Quiet Nights Of Quiet Stars." Others I'm not so crazy about, such as "Off Key" by the same Gene Lees.

Yet all in all, if you're willing to accept Jobim on Ella's terms this is a record you'll surely enjoy because what Ella does she does better than anyone else in the world and what Ella does is do any material that's given her in her own individual, distinctive way. J.K.

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VLADIMIR HOROWITZ: Concerts 1979—1980. [John Pfeiffer, producer; Edwin Begley, engineer; recorded on tour in various cities, 1979-1980.] RCA ARL1-3775.

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which in Los Angeles. If he knew or remembered he wasn't letting on. This year I didn't even try. Let's just say it is a fine Horowitz sampler. Like most samplers one side is devoted to music that is less than monumental. Unlike most samplers one side is a major work by a major composer, "Sonata #2 in B Flat Minor" by Rachmaninoff. This is not the first recording that Horowitz has made of the Rachmaninoff B Flat Minor but as a further restatement and rethinking of the work it has validity. And as with anything Horowitz plays, it has intense vitality and excitement.

Artur Rubinstein has not been in the practice of recording his concerts "live" but since he is now living in retirement, RCA has taken to going back to those concerts which were recorded for product. Again, one side of the record is tidbits and encores (although Claude Debussy's "La Plus Que Lente" is one of the best known of this composer's many miniatures for piano). The meat and potatoes of the record is Schumann's "Symphonic Etudes." Except for the Debussy, which was recorded in Rome in 1970, all these performances were recorded in New York concerts given in 1961.

If Horowitz is the fire breathing dragon, Rubinstein is the poet. They are not mutually exclusive. While I probably would not pick Rubinstein for a performance of such muscular music as Rachmaninoff's second sonata it would be interesting to hear (especially bearing in mind his excellent recordings of that composer's 2nd piano concerto and the Rhapsody On a Theme by Paganini). If Vladimir Horowitz has recorded Schumann's "Symphonic Etudes" I haven't heard the recording but his recordings of other music by Schumann would forecast well for his interpretation of this music.

I guess that until Horowitz decides to retire, one disc a year is what we're bound to get from him. With Rubinstein, it seems to be all reissues or heretofore unreleased material from hereon out. While Horowitz, still in his seventies, is still actively making music, Rubinstein, at ninety plus, has retired. Someday they'll both be gone and only the records will remain to remind us of the genius that was here with us for awhile. We can only be glad that the records do exist and that Horowitz and Rubinstein lived long enough to give us such a vast repertoire in superior recordings.

J.K.

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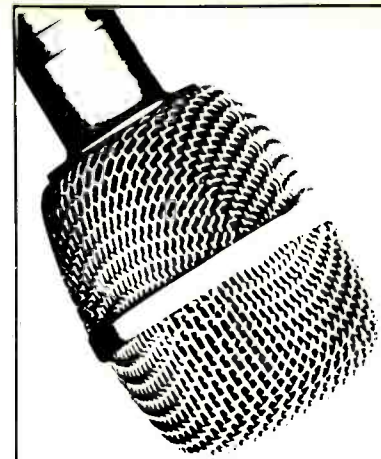
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