ECHO, REVERB & DELAY —PART I

MODERN RECORDING

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SERVING TODAY'S MUSIC/RECORDING-CONSCIOUS SOCIETY

VOL. 3 NO. 8
MAY 1978

A Session with the COMMODORES

Grounding Problems

Lab Reports
New Products
Record Reviews

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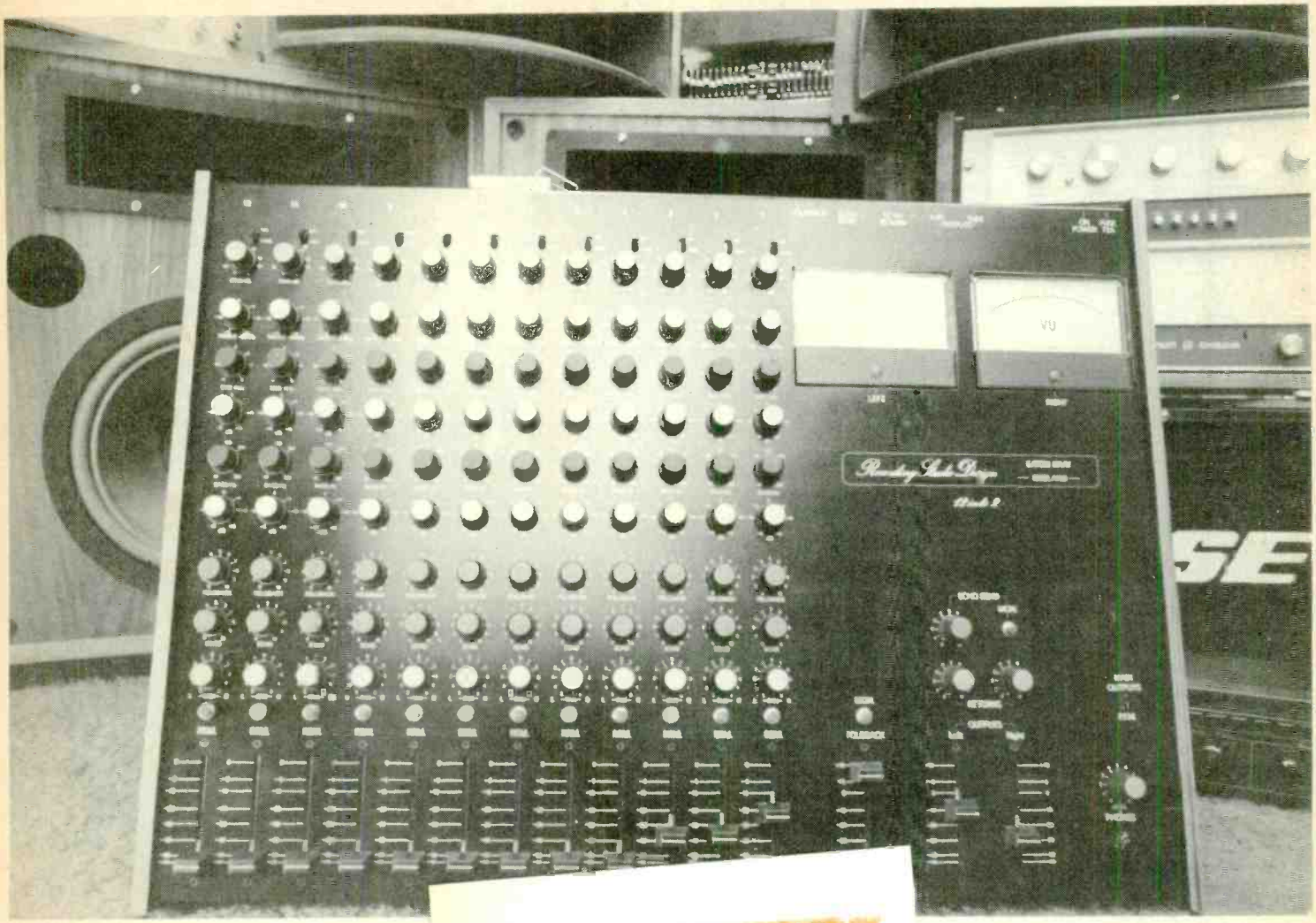

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of trendsetting success in Europe, **RSD**
important, unique extras. Incorporated in
allowing a parametric equalization effect
equipped with a multicore connector cou
able winding spindle) to its 12 channel s
through the highly selected dealers you see

...he American market after two years
...ts competition, as well as two very
...usly variable mid and bass controls
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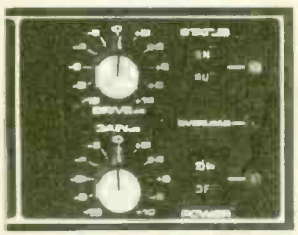

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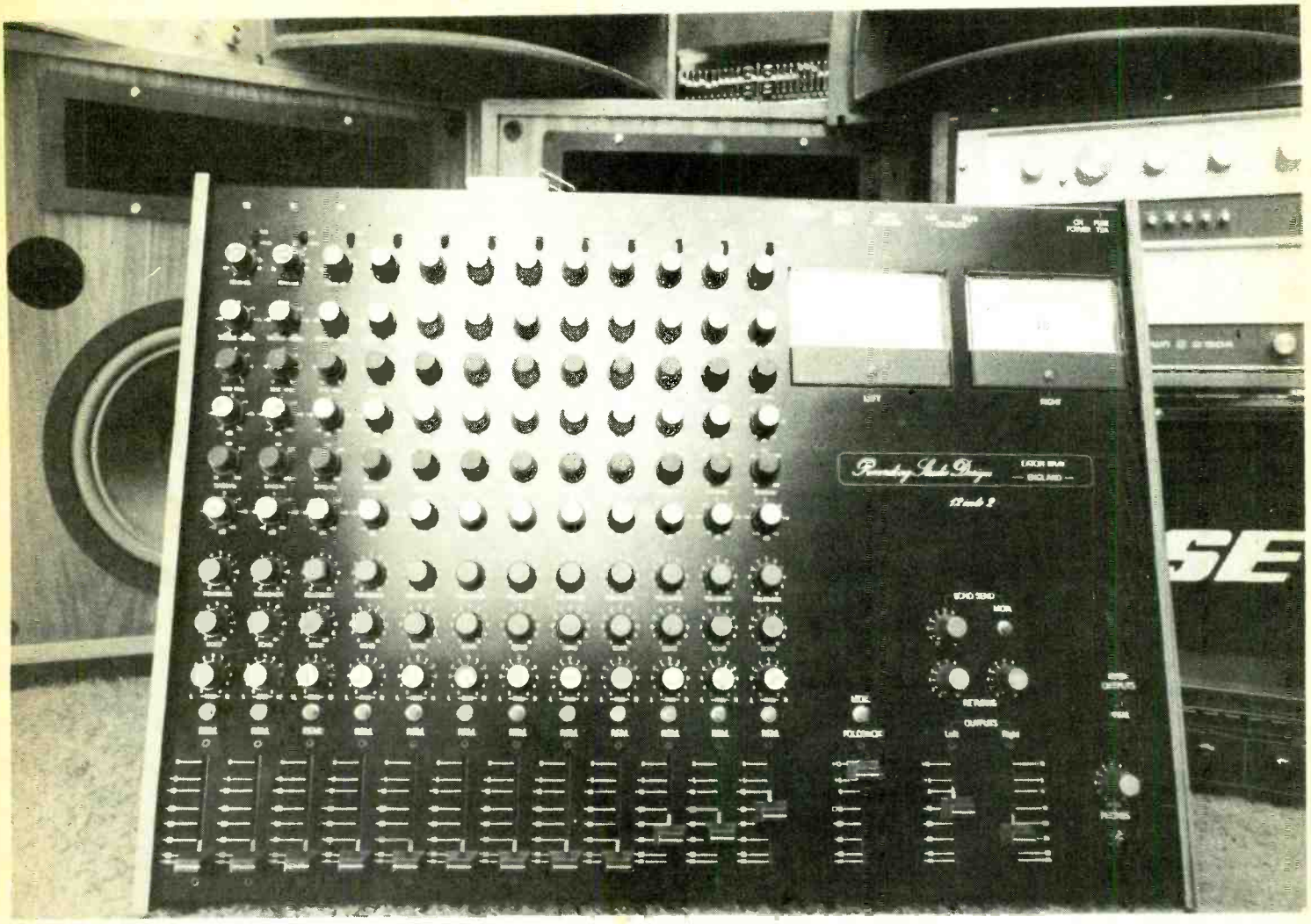

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MODERN RECORDING

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THE FEATURES

COMING NEXT ISSUE!

Echo, Reverb and Delay—Part II
The Making of a Record

THE STAPLES

Cover photo by Joanne Geffen

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SERVING TODAY'S MUSIC/RECORDING-CONSCIOUS SOCIETY

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Letters to the Editor

Splice On Ice?

Congratulations on a fine publication. Your magazine acts as reinforcement for those of us who are into recording, and has broadened the scope of our abilities considerably. The one thing few of us know how to do—and no one cares to admit—is how to splice properly. Help!

Aside from choosing leader, splicing tape, scissors and razor blades, we are lost. Our splices only pull apart a bit, stick to the capstan occasionally, and ooze all over the master once in a while!

We console each other by comparing our failures and we all sighed a breath of relief recently when I found a factory splice that was falling apart.

You are our last hope in our continuous search for info on how to make a clean splice. The finest mixes and best recordings don't mean a thing if the splices run through the machine like the finest work of a kindergarten art class.

Is there an expert out there who will take us through the recording process without leaving out the secrets of a pro splice?

We will keep our splicing blocks on ice until then.

—Jeff Isaacs
Waterloo, Ia.

You do have a point, Jeff, but don't abandon hope now. Your honest assessment of this situation has spurred us into action! You can expect to see an article on this too-long overlooked aspect of the recording process in an upcoming issue of MR.

Some Changes Made

Thank you for your complimentary review of our 1280 Recording Console in the Hands-On Report of the February 1978 issue (page 78). I am a bit concerned, however, that when your reviewers encountered noise pickup and were not able to correct the situation they did not contact us.

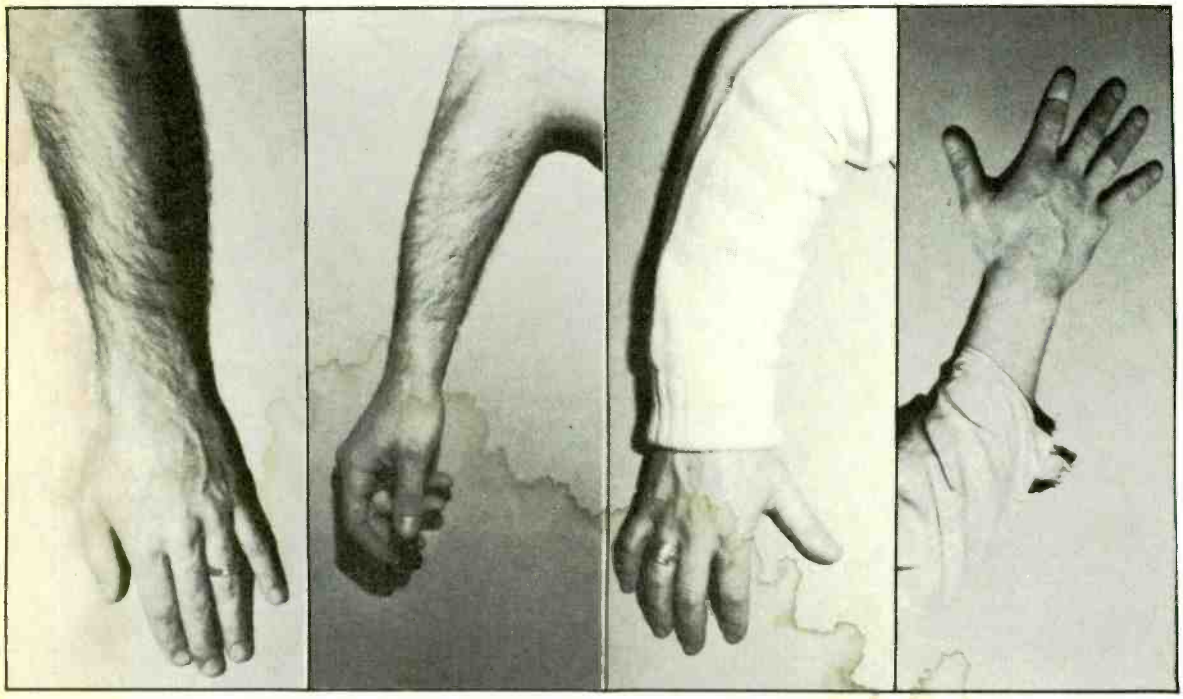
If they had, we would have isolated their problem and given them specific techniques to correct it. We do not employ certain line filter suppression circuits in our products since they represent potential interference interface problems to the majority of users who are not faced with noise or RF pickup. With several hundred 1280 consoles presently in use, less than 3% installed experienced noise pickup problems. In all cases we were able to eliminate the interference.

Since your reviewers encountered noise or RF problems with the other recording boards they have tested (Tascam and Soundcraft), I can only assume that their facilities are susceptible to such problems. Although they found that "the performance was excellent," I regret that we were not given the opportunity to cure their problems so that they could have more fully appreciated using the 1280.

Once again, thank you for reviewing our product and allowing us to explain this point.

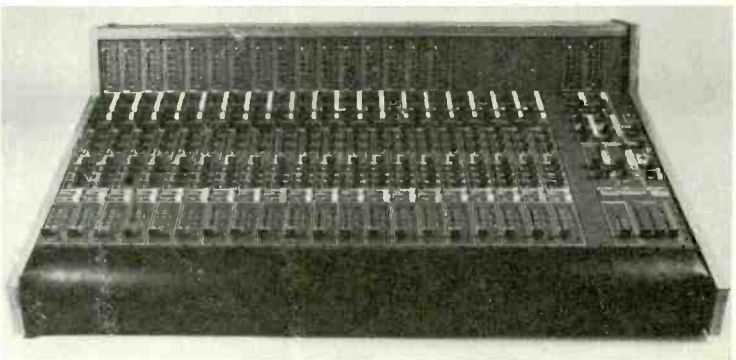
—Michael Tapes
President
Sound Workshop Professional Audio Products
Roslyn, N.Y.

Sound Workshop introduces its arms.



The Auto-Recall Mixdown System brings computerized mixing to the Sound Workshop Series 1600.

The Series 1600 is a high-performance, automation-ready audio recording console available in several mainframe sizes, all fully expandable to a maximum configuration of 36 x 32, and all ready for direct interface with both the VCA input sub-group package and the **ARMS** Automation Processor.



arms
AUTO-RECALL MIXDOWN SYSTEM

During mixdown, **ARMS** stores fader levels which can be recalled for track by track update of the mix.

The Sound Workshop Series 1600 Recording Console.
A new philosophy in console design. Now with arms.

Tapes processed with ARMS are compatible with MCI's JH-50 Automation System.

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Bringing the technology within everyone's reach.

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[We forwarded Mr. Tape's letter to Jim Ford and Brian Roth. The following is Brian's reply.]

When we review a product, we make every attempt to test a unit that will correspond to exactly what a customer would purchase from a dealer. We generally do not feel that it would be fair to test a modified product. While we feel certain that there is a suitable cure for the line noise pick-up, the point is that the standard product does not include this circuitry. Thus, it would be necessary for the customer or dealer to make this modification.

As for noise pick-up with other products we have reviewed, *neither* of those you mentioned exhibited sensitivity to power line glitches. There were other noise problems, but *not* due to the power line. Since all of these products were initially tested at the same location on the same AC power circuit, the problem would seem to be peculiar to the 1280 sample we evaluated.

We are in a fairly dense RF field (although not *nearly* as bad as at some unfortunate locations we have observed) and thus it is likely that any radio detection susceptibility in a piece of gear will be apparent. We have made no attempts to build a shielded room for our testing since these are not likely to be found in the field.

We have observed that RF detection will sometimes occur in equipment when a particular volume pot is set full "off." This often can be traced to the grounded (counterclockwise) end of the pot being returned to a ground point other than the ground reference of the amplifier stage that follows that particular control. The RF pick-up of the 1280's control room section was noticed only with the volume pot full "off;" however, we did not check the grounding scheme of the control to see if it was wired in the fashion mentioned. Since the RF detection occurred only at the full "off" position, this was more of a nuisance than a genuine problem.

We still feel that the 1280 is definitely above average as compared to other products in its price range. It is unusual indeed for *any* product at *any* price to be 100% perfect, and consequently we were not overly distressed with the relatively small imperfections of the 1280, particularly since they could probably be easily eliminated.

We thank you for your comments.

—Brian A. Roth
Contributing Editor
Modern Recording Magazine

[Michael Tapes of Sound Workshop Professional Audio Products has informed us that the grounding scheme of the 1280 control room pot was changed in production after the Hands-On Report was written. Thus, anyone with RF problems in the control room section can write to Sound Workshop, 1324 Motor Parkway, Hauppauge, New York 11787 for the simple modification.]

Creative In Cucamonga

After reading your interview with Frank Zappa in the March 1978 issue (see Profile, by Joseph Laux, page 46), I was inspired to write and compliment you on probably your finest article to date. Although I must admit that I've previously been put off by Mr. Zappa's particular brand of music, the interview revealed him as one of the recording industry's truly creative individuals. Of special interest (since I'm in the remote recording business) was his technique of using a "live" performance for the basic tracks, and overdubbing vocals and sweetening in the studio. This idea, though not entirely new, has generally been used only for "doctoring" purposes on a "live" recording.

Credit is also due for your brief inclusion of Paul Buff. (Unfortunately, today no evidence remains of his studio, and no one has even heard of the Cucamonga Moltra.)

Thanks for a refreshing interview.

—Rich Houston
Houston Recording
Cucamonga, Ca.

[We checked with the author of the article, Joseph Laux, and he confirmed our theory that the Cucamonga Moltra was indeed a restaurant. —Ed.]

A Constructive Solution

I want to thank you and Robert Runstein for the enlightening article, "How to Build Your Own Cue System," April 1977, page 44. This article brings to mind a problem I encountered some years ago while recording a full swing band. Budget limitations would not allow the purchase of 100 or 400 ohm headphones as described by Mr. Runstein. This posed an obvious problem if we wished to have an acceptable stereo cue mix without severe impedance overloading.

We constructed a constant impedance headphone mult box. (See sketch below.) The box contained twelve stereo phone jacks that switches to a ten-ohm

You can hear the difference because the difference is right here.

Take a look at what's taking the industry by storm. The Back Electret, another giant step forward from Sony.

Never before has it been possible for thin polyester film to be used in electret condenser microphones. That's because polyester film, acknowledged as the best material for microphone diaphragms, just can't hold a static charge for a long duration.

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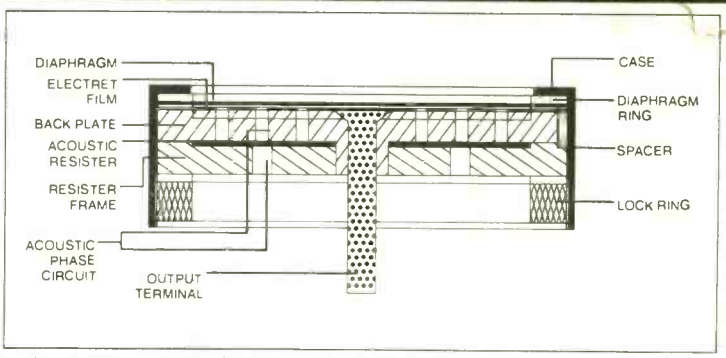

You can find the Back Electret in four Sony microphones: ECM-56F, $220; ECM-65F, $210; ECM-33F, $165; and ECM-23F, $100.

But you don't have to look at Back Electrets to see why Sony is ahead.

NO MATTER WHAT KIND OF MIKE YOU NEED TO GET, WE'VE GOT IT.

Sony's microphone line is thoroughly complete. It ranges from professional condenser to semi-professional to microphones for public address, vocalists, and outdoor use. There's omni and uni-directional. And we think it's big of us to make sophisticated miniatures.

And all microphones are available with Phantom Power, battery operated, or both.

So if you need something to talk into, it makes a lot of sense to talk to Sony. Write to Sony, 714 Fifth Avenue, Dept. TK, New York, N.Y. 10019.

SONY AUDIO

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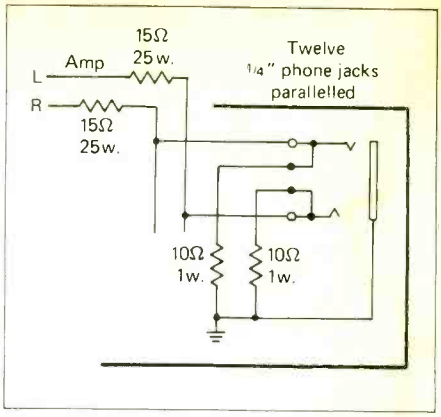

load when not in use. The sum total of all twelve ten-ohm loads produced too low of an impedance for our amplifier. So we simply series connected a fifteen-ohm, twenty-five-watt resistor to each channel.

Although the actual resistive load changes slightly as headphones replace resistors in the circuit, an impedance match is left well within the tolerance of the amplifier output.

This systems allows us to use any quantity, up to twleve sets of headphones, without significantly changing sound pressure level of quality while maintaining stereo separation.

—Charles Rose
Milwaukee, Or.

DJ In Distress

Broadcasting problems may not be directly related to recording but I'd certainly appreciate some suggestions. I'm a female disc jockey working for the first time at an AM station. My problem is compression and the effect it has on my beloved AKG K240 headphones. It appears that they are too "good" to use on the air—I hear murky music, compression "swishing," and, very vaguely, my voice. Off-air tapings indicate that the compression brings out lots of presence in my voice, so the problem is definitely in the monitoring.

I've tried several models of headphones, and finally settled on an inexpensive pair of Koss, just because the limited frequency range at least eliminates most of that high frequency "swishing." I tried a few others that some of the DJs here use, but the ones that give you a better sound also tend to clamp your head like a vise. I assume that the higher register of my voice, in comparison to most of the male DJs here (although some of the fellows do share my problem to a lesser degree), complicates the problem. If you can come up with a pair of "punchy" head-

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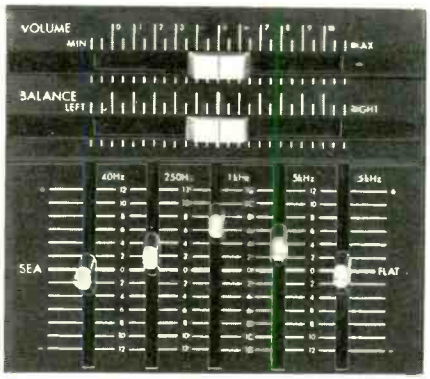
And if you're a recording buff, you'll appreciate another exclusive JVC professional touch. You can switch the SEA equalizer section into the tape recorder circuit for simultaneous equalization while you're recording.

While these unique features alone set JVC's pace-setting receivers apart from the common herd, we're further insuring top performance with a solid combination of additional features.



Exclusive 5-zone SEA graphic equalizer system for better performance from components and listening room.

And all the power you'll ever need to drive your favorite speakers.

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Total harmonic distortion	0.08%	0.08%	0.1%
Approx. retail value	$660.	$550.	$430.

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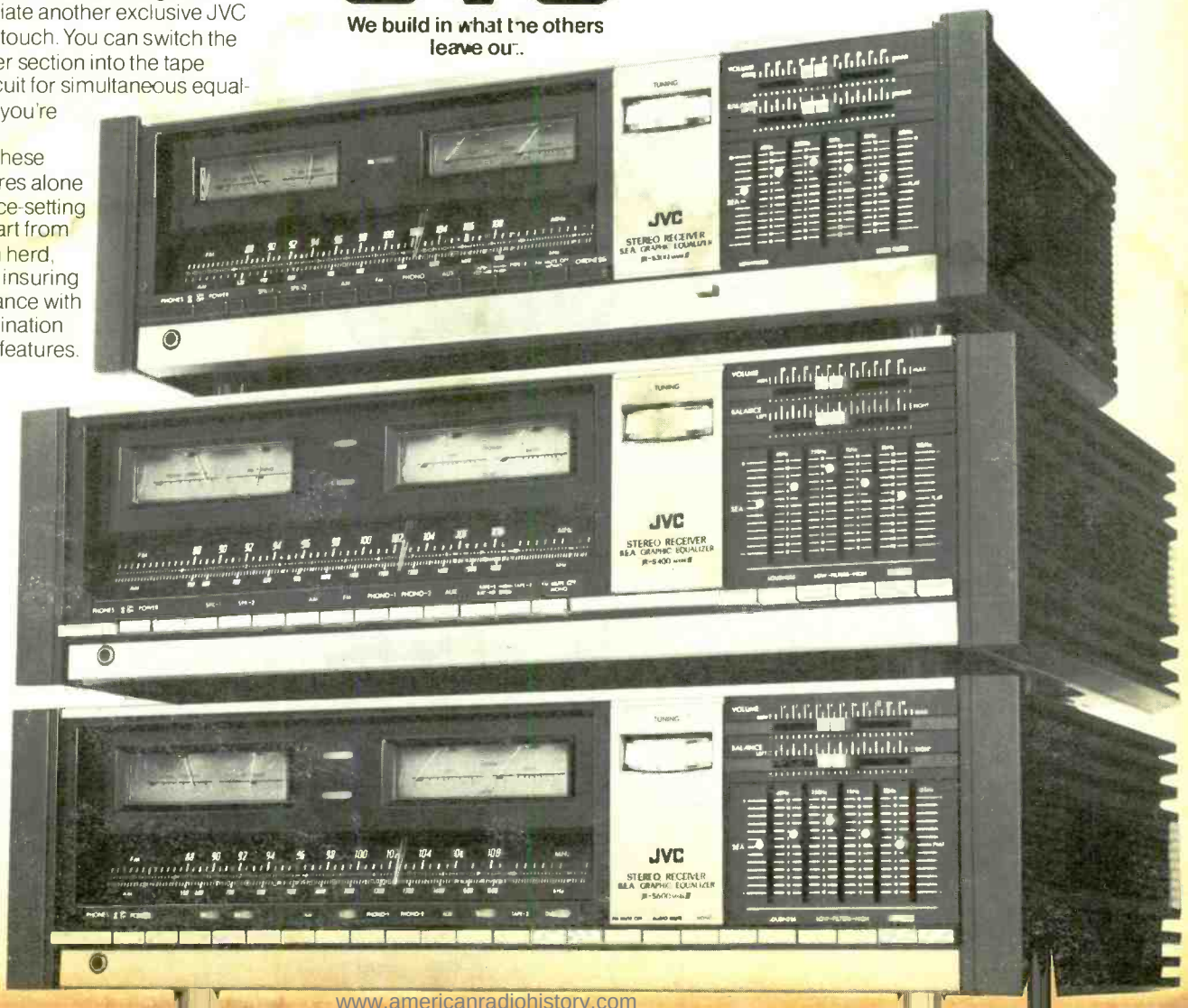
We build in what the others leave out.



phones that are reasonably comfortable . . . well, bless you!

Thanks for any information you can give me, and for *Modern Recording*, which is one of the more responsive and useful audio magazines on the market today.

—Ellie O'Day
CKLG Radio
Vancouver, British Columbia, Canada

We have no desire to ruin our reputation as a helpful publication, but we had to refrain from making suggestions in this instance. It would be senseless to name all the headphones that might prove comfortable and an improvement in sound. What we will do is solicit responses from MR*'s readership, many of whom we're sure have encountered this problem and whose suggestions would be grounded in experience.*

Gaining Admission to AES

I am an amateur recording enthusiast and professional musician. I enjoy your magazine very much. Even though I am just an amateur, I have a good knowledge of recording from working in the electronics repair field when not playing gigs.

What I would like to know is how I'd go about joining the Audio Engineering Society—their admission standards, what, if any, credentials or experience are necessary, etc.?

—Peter Lane
Sea Bright, N.J.

For the information you want, we suggest that you write directly to the Audio Engineering Society. They can be reached at 60 East 42nd St., New York, New York 10017. Or you can call them at 212-661-8528 regarding admission requirements.

Clearing Things Up

[The following is a clarification of the editorial reply given MR *reader Paul Speer in the March 1978 issue. (See "A Pressing Problem," Letters To The Editor, page 6.) —Ed.]*

Last January, *MR* called me and told me of Mr. Speer's problem about the high end being missing from his record pressings after having an acceptable master cut. The question revolved around a delay of over twenty-four hours between mastering and plating. I explained over the phone that it sounded more as if the stamper was polished, which indeed would seem to be the most likely explanation for so drastic a loss although not the only one. When I saw my answer translated into print, it appeared as a much too definite condemnation of the (anonymous) plating plant. It would be foolish to make an absolute judgement 3,000 miles away from the problem, particularly while going on record, as there are many other factors to be considered.

One such factor is that the master crossed the Canadian border, a point which I was unaware of. This is a significant item. You see, stationed at each border crossing in the U.S. are certain idiotoid life-forms. These automatons waste their lives away taking a sadistic delight in ripping apart people's private property just to see what they own so they can confiscate it and consume it themselves. And heaven help the poor soul who sends a master lacquer through US customs. These cretins are likely to play the funny looking record, totally oblivious to the fact—and unconcerned to boot—that they are ruining it. Playing a master makes it noisy and also wipes out the high end.

So the problem could have come as a result of any number of things (even from something as simple as the mastering engineer accidently putting in the wrong filter setting). As far as time is concerned it is true that the delay should be as short as possible but there is no reason to freak out if it takes more than twenty-four hours to reach the plating plant. We ship many masters all over the country for some rather trifling clientele and I know that some lacquers reach their destination forty-eight and seventy-two hours later without incident. (Now, on the other hand, I don't recommend storing them in the attic for a week either.)

So again let me emphasize that the high end loss could have been the result of any one or more of a dozen misfortunes and not necessarily polishing by the plater.

—David Moyssiadis
Mastering Engineer
Frankford-Wayne Mastering Lab
Philadelphia, Pa.

Slow But Sure

Just finished reading your article "A Producer's/Consumer's Guide To Better Record Pressings," by David Moyssiadis (December 1977, page 56). No, I didn't just get the magazine, I'm a slow reader. (I'm a musician, and that explains that!)

All I can say is, keep up the good work. In this piece, as in the rest of the magazine, I found a treasure chest of information. Keep on keeping on!

—George Pyle
Amateur Audio Tech
Long Beach, Ca.

Really, George, we know many very bright musicians! And, at any rate of speed, we're glad you're getting something out of MR.

Reviewing The Remarkable

I recently purchased a Yamaha PM-1000 professional mixing console and received your address through their service manual. I would like any additional information concerned with the PM-1000 that you might have available.

—Anthony F. DiTullio, Jr.
Star Sound Studio Productions
Philadelphia, Pa.

The Yamaha PM-1000 was the subject of the April 1977 Hands-On Report (see page 64 of that issue) by Jim Ford and Brian Roth. You'll be happy to hear that they summed up their report on the PM-1000 by calling it a "most remarkable performer."

Trials Of A Two-Tracker

I'd like to relay a message to your readers. I'm sure many of them share the same problem that I have. I own and operate a small 2-track recording studio. I am also a musician. I'm very proud of the fact that I can approach recording from both ends of the spectrum. I am, however, very disappointed with many of the musicians I encounter. It seems that because they listen to music and play on the weekend they assume they know more about music and recording than I do.

For instance, I may get a call from a band leader who discounts my opinions because I can't offer him the quality equipment that is used in professional facilities for my price. In other words, if he doesn't see Ampex, Scully, Neumann, Studer or Revox, he assumes that I don't know equipment. Sometimes I feel like saying, "kindly dish out $50,000 and I'd be happy to oblige!"

I wish this gap between artist and engineer didn't exist. I believe that if more musicians read your magazine, they'd understand more about recording facilities such as mine; in short, that a small studio with semi-pro audio gear can produce demos of excellent quality, many suitable for pressing.

Don't take our word for it.

Consumer Product Review

Musician's Guide, May 1977

The super distortion pickup is very widely used. Artists such as Tom Scholz of Boston, Jeff Linscott of Johnna Wild, and John Steele have used them with great success. DiMarzio pickups are well made and carry a five year guarantee. So if you are looking to increase your guitar's output, the DiMarzio pickup is a good thing to have in your possession.

Rick Derringer

— commenting on B.C. Rich guitars

International Musician and Recording World
June 1977

can get a choice from them of what kind of pickup; I think they're changing over to DiMarzios which I like a lot.

Nugent Talks Power

— interview, *Circus, September 1977*

Most of Nugent's Byrdland guitars are models from the 60's or late 50's. They have either the original Gibson pickups or DiMarzio PAF pickups. [illegible] have been "[illegible]entized." Exp[illegible]

Tom Scholz of 'Boston'

— article, *Guitar Player, August 1977*

Fifties, is unaltered. Beneath the gold-top is a two-piece face which Scholz finished in clear lacquer. The guitar retains its original cream single-coil rhythm pickup, though Tom put in a DiMarzio Super Distortion humbucker in the saddle. "The DiMarzio is in[illegible]

NAMM (Atlanta) Preview

International Musician and Recording World
June 1977

Di-Marzio only filtered through to Britain last summer (following the NAMM show) and they've been a huge success. Gibson now talk about their pick-ups putting out Di-Marzio-type signals, and that's a tribute! T

The Gibson Les Paul - Electronic Warrior

— article, *Musician's Guide, August 1977*

movement. A hotter pickup in this position could bring the pickups into balance with each other, i.e. DiMarzio Super Distortion in treble position, and P.A.F. in bass have good balance).

Domenic Troiano

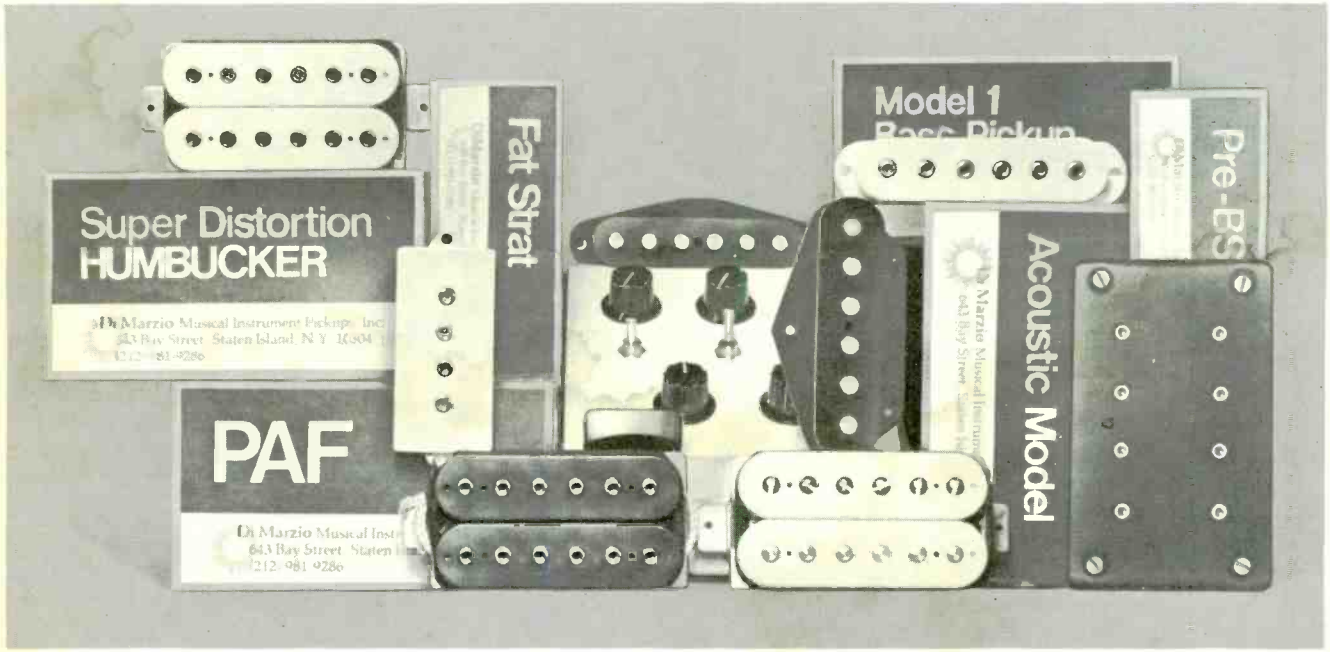
— interview, *Tempo, July 1977*

What electronics are you using on it?

I have two DiMarzio pickups with tone and volume controls. Then I've got pickup switching so I can use either pickup, I can split the pickups so they're not as thick sounding, and I can put them out of phase. . . . Ninety-nine percent of the time I use the front pickup on. That's just the sound I like.

"I want a pickup that'll make the skies burn."

Roy Buchanan discussing his new DiMarzio Pickups with Larry DiMarzio.



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CIRCLE 49 ON READER SERVICE CARD

I do realize that no low-end gear can compete with the flexibility of top-of-the-line multi-track equipment, but all I can say is that if you want the best tape possible, go to a place that has such capabilities and don't complain about the charge. You get what you pay for!

I'd like to see (simple as it might seem to the experienced recordist) a guide directed at musicians on the ins and outs of recording, the differences between a simple and complex mic set-up and the advantages of both.

Thanks for the opportunity to sound off!

—Randy A. DeFord
DeFord Sound Workshop
Logansport, In.

There is room in this world for studios of every size and of many capabilities. This variety works best when the parties involved start off by knowing exactly what they require and desire as well as what a studio is capable of giving. A sound knowledge of equipment and techniques does help a musician pinpoint who can best serve his needs. We would like to believe that every issue of Modern Recording *helps both musicians and engineers alike to keep up on advancements in gear and recording techniques. Recording being a field in which art and science cannot easily be divided, we have faith that this knowledge will eventually lead to more cooperative studio efforts.*

Erratum

In the article "Building a Direct Box" by Peter Weiss (April 1978, page 48), all references to #12 tinned bus wire should have been changed to #16 tinned bus wire. For those of you who are out there soldering even as you read this, we hope this correction reaches you in time. Please note, however, that the #12 wire will not cause any malfunction, #16 is merely easier and more convenient with which to work.
—Ed.

A Flattering Comparison

Two weeks ago I purchased my first copy of *Modern Recording*. Now, fourteen days later, I'm still leafing through the articles and commentary, digesting what I'd initially passed over and redigesting what I've already forgotten. There is so much more than what *High Fidelity* and *Stereo Review* have to offer. The discussions, reports and

HUSH UP YOUR 4-TRACK.

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

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

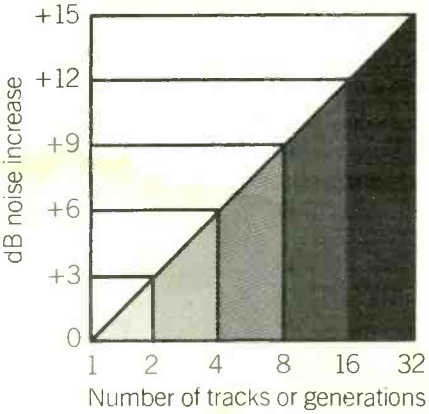
But...haven't you forgotten just one important item?

Noise reduction.

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

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

Additive Noise Chart



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

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

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

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CIRCLE 50 ON READER SERVICE CARD

exposes are written with an inherently higher degree of technical expertise and are obviously designed for the reader with advanced interest in not only recording, but audio electronics as well. The difference is comparable to that between a block diagram and a schematic.

Naturally, one purpose in writing was to compliment your magazine's excellence. My other reason is to request information concerning a lab report I believe you published on the Technics RS-1500US. I am very interested in any information that may have been published on this machine, especially in test report form.

I would like to know if *Modern Recording* did indeed review the RS-1500 US and, if so, if it would be possible to acquire a reprint of that report or a copy of the issue in which it appeared.

Thank you in advance for your cooperation in this small matter. Again, my compliments on an outstanding magazine. May you have many years of success.

—Frederick J. Haskins
Rochester, N.Y.

The Technics RS-1500US was the subject of a Lab Report by Len Feldman and Norman Eisenberg back in the Feb/Mar 1977 issue of MR. *While it no longer appears on the coupon for back issues in the more recent issues of* MR, *this issue is still available by sending $1.75 to our editorial offices.*

Cueing A Reader's Memory

Due to my increasing interest in recording, I am now contemplating building a small studio in my home. What I need to know at this time is how to build a cue system. A friend of mine (also a devotee of *MR*) remembered an article a while back that dealt with this topic, yet he didn't quite recall which issue it was in. Could you refresh his memory? Also, any other sources of information you might know of would be greatly appreciated.

Thanks for a great magazine. I discovered it just when I needed it most.

—Bob Wilson
Kitchener, Ontario, Canada

The article your friend was referring to was "Building Your Own Cue System," by Robert E. Runstein which appeared in the April 1977 issue on page 44. You might also want to check out the Recording Studio Handbook, *by John M. Woram. He might also be able to give you some hints on this aspect of studio operation.*

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SM59

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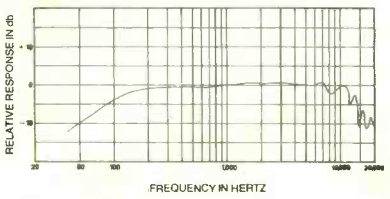
Some like it essentially flat...

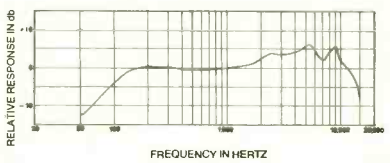


SM58

Crisp, bright "abuse proof"

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

...some like a "presence" peak.



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CIRCLE 43 ON READER SERVICE CARD

TALKBACK

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

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

Out Of Luck Listener

I have a Dokorder 1140 4-channel reel-to-reel. It has two headphone jacks, one for tracks one and three, the other for tracks two and four. I do not have a mixer as yet, but I do have a TEAC mix down box hooked up between my Sansui 9090 receiver and the tape deck. My problem is that there are times when I need to listen to all four tracks in stereo through the tape deck itself.

I have tried several types of Y-cords that pick up all four tracks, but only in mono. Is there any way I can hook my headphones straight to the tape deck and listen to all four tracks in stereo, one and two on the left and three and four on the right?

—Mark Carbone
Mohegan Lake, N.Y.

[We addressed this question to Hirozo Kambe, who is Chief Engineer for Dokorder, Inc., in Lawndale, California. He regretfully informed us that there is no way for you to listen to all four tracks of the 1140 through regular or 4-channel headphones in the manner you describe.

However, never content to settle for the easiest way out, we now toss the ball out to all you readers who might have solved this or a similar problem in the past or to those designers among you who can put on your thinking caps and create a reasonably simple, workable solution for Mr. Carbone. Any and all practical plans to accomplish his goal are welcome!]

Showco Specifics

Gil Podolinsky's feature in the February 1978 *Modern Recording*, "Led Zeppelin 'Live'—The Showco Must Go On," page 42, prompts the following questions.

It was stated that a Crown DC-300A will drive 600 watts into their "W" boxes. I have a Crown owner's manual and mine says that you can only get 300 watts in the mono mode. Why the difference? Does Showco modify their Crowns?

Showco's bass power was stated as being 15,000 watts on each side of the stage. How do they drive each amp? If each amp is 600 watts, then it would take twenty-five Crowns in the mono mode to reach 15,000 watts. This means that the crossover must be able to drive 25X1.75 volts (input sensitivity of each Crown for full output) which equals 43.75 volts. Is this a correct assumption on my part or am I way off base?

I assume that the outputs of the crossover are 600 ohms balanced; if so, how is this line kept balanced considering that the input of a Crown is hi-Z unbalanced?

—D. Haulman
Brunswick, Ga.

It was stated in the article that a Crown DC 300A will drive 600 watts into an *8*-ohm load. Crown's owner's manual does not state the power output into an 8-ohm load. They state only that in a mono configuration, the amp will deliver 310 watts into a *16*-ohm load. The only modification Showco adds to the Crown is cooling fans which are necessary when the amp is operated mono into an 8-ohm load.

Showco does use twenty-five Crowns on each side of the stage for low frequencies at large concerts. These amps are essentially connected in parallel which means that 1.75 volts across the input will drive them to full output. However, the input current requirement does go up by a factor of twenty-five.

The outputs of the crossover are balanced but the impedance is 50 ohms rather than 600. This enables Showco to add as many amps as necessary for a concert without worrying about loading down the crossover unit. The balanced line is fed to the amp racks into a transformer which is used to unbalance the signal to feed into the Crowns.

—Keny Whitright
Operations Manager
Showco, Inc.
Dallas, Tx.

Optional Uses Of An Oscilloscope

In what ways can an oscilloscope be connected into a recording system? In Liz Saron's Talkback reply on the January 1978 issue ("Some Facts On Phase," Talkback, page 23), she states that an oscilloscope connected at the output of the recording deck would indicate if your overall program is in phase. Exactly how can this connection be made? Also, are there other uses for a 'scope, i.e. tuning two sound sources?

—Dave Howse
Lagrangeville, N.Y.

If you have a patch bay, the best way to connect an oscilloscope is to patch the left and right outputs of your two-track machine into the horizontal and vertical inputs of the 'scope. If you have no patch bay, then just come directly

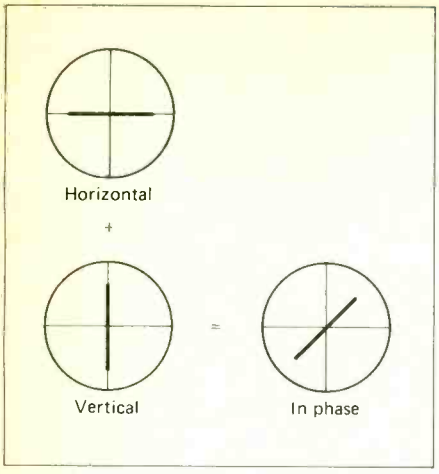


Fig. 1

out of the line out left and right of your tape machine. It does not matter which way you patch (left into vertical, right into horizontal or vice versa).

If you have an oscillator, run tone into your tape machine. If you machine is in phase, the horizontal and vertical should combine to look like this (see Fig. 1). If your machine is out of phase, the 'scope will look like this (see Fig. 2). By the way, these patterns on the 'scope are called "Lissajous Patterns."

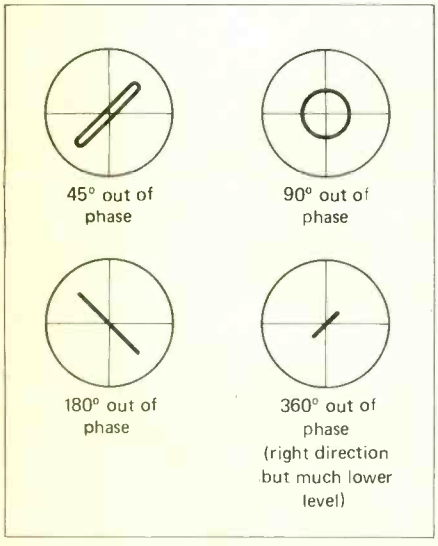


Fig. 2

When using an oscilloscope to check for phase, you are comparing the phase relationships of two signals. An oscilloscope is useless for phase purposes on a mono machine.

During playback, you can watch the 'scope to see if your overall program is in phase. If in phase, it will look somewhat like this (see Fig. 3). It's fun to look at, too.

About using an oscilloscope to tune two sound sources, you can run a tone (say, 440 Hz—which is an "a") into the

Fig. 3

horizontal (or vertical, it doesn't matter) of the 'scope and play a 440 Hz "a" on the piano. Run that into the vertical (or horizontal, etc.) and if the frequencies match, the 'scope will look like it does in Fig. 1. If you run an "a" on the piano an octave higher, that is at 880 Hz and the frequencies match, the 'scope will look like this (see Fig. 4).

This method is not used very much as it is difficult to do unless you are working with pure tone, such as a synthesizer.

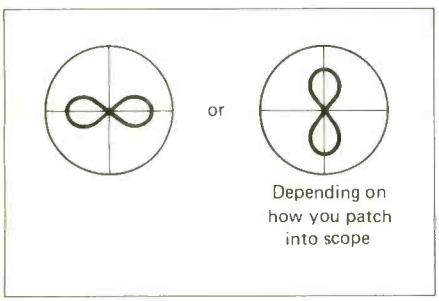


Fig. 4

One thing to remember is to be sure to ground your tape machine to the 'scope or you might get hum or RF which will affect the 'scope and the output of the machine.

—Liz Saron
Engineer
Mediasound Recording Studios
New York, N.Y.

Turntable Tip

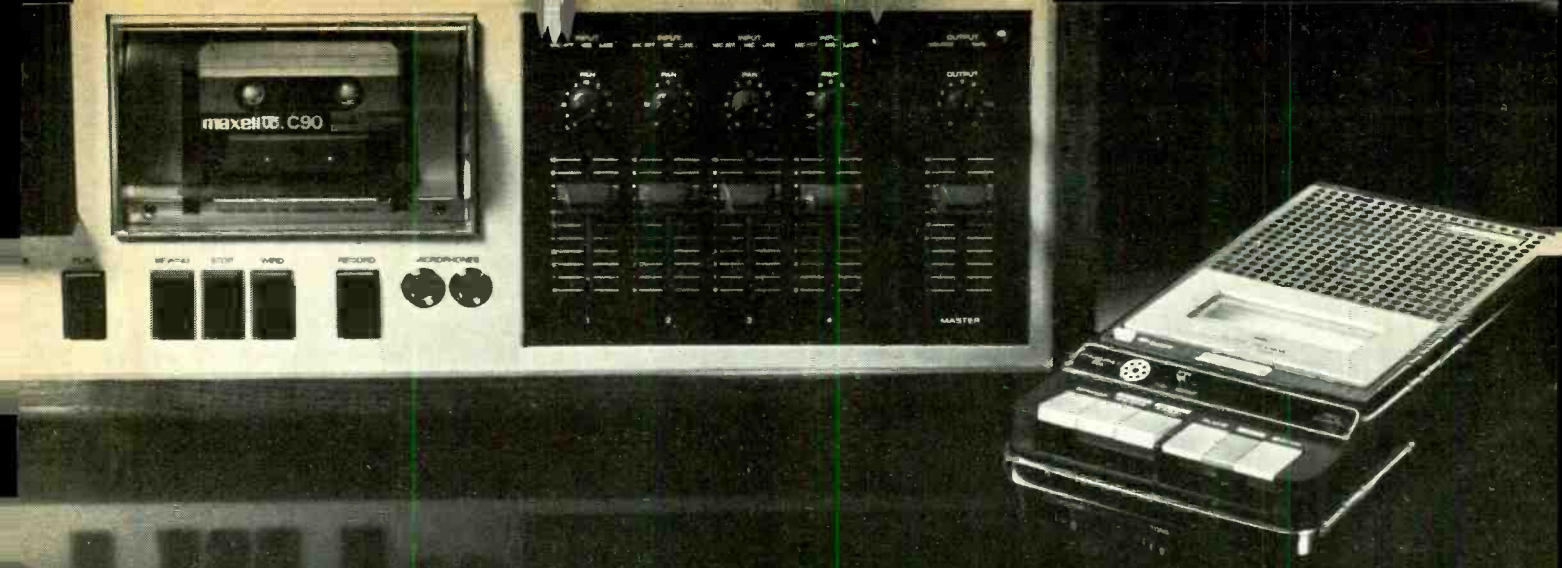
To the very competent advice given by Travis Turk in response to reader Alex Lawryczenko's query in the February 1978 Talkback column under the heading "Panel Pointers" (page 28), I would like to add a word or two on one aspect that may not have been completely covered.

The diagram sent by the reader includes a turntable but there is no indication of what kind of pickup is used. If it is a magnetic cartridge, it should not be terminated in an open-field jack panel before going through either an RIAA-equalized phono preamp, or a CD-4 demodulator. The parametric EQ may be able to provide RIAA compensation but if it is used for this purpose it cannot also be used at the same time for other EQ chores unless it is a combined phono preamp-equalizer in which case the diagram as shown omits a very important connection. In any event, it would seem that you are flirting with hum pickup and signal loss by introducing output signals direct from a magnetic pickup in the manner shown. I think that between the turntable output and the panel jacks there should be some kind of low-level device—the RIAA-equalized preamp or the CD-4 item, depending on the discs being played.

—Norman Eisenberg
Audio Editorial Board
Modern Recording Magazine

Compression, Expansion and dbx

My home four-track sound system currently consists of a TEAC 3340, a Pioneer RT-1050 half-track, a TEAC Model 2 mixer, a Tascam PB-64 patch bay, an Audio-Pulse digital delay and numerous other gadgets including a dbx 128 noise reduction unit. I understand



It's hard to find a $1,000 tape deck that doesn't use Maxell. Or a $100 tape deck that shouldn't.

If you spent $1000 on a tape deck, you'd be concerned with hearing every bit of sound it could produce.

That's why owners of the world's best tape decks use Maxell more than any other brand.

But if you're like most people, you don't own the best tape deck in the world and you're probably not using Maxell. And chances are, you're not hearing every bit of sound your tape deck is capable of producing.

Whatever you spent for your tape deck, it's a waste not to get the most out of it. So spend a little more and buy Maxell.

Maxell. You can think of us as expensive tape. Or the cheapest way in the world to get a better sounding system.

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CIRCLE 65 ON READER SERVICE CARD

the noise reduction, but the compression and expansion throws me.

What is a good rule of thumb for setting compression ratios for vocals? For both acoustic and electric guitars? For drums?

I know it is best to compress your tracks as you record them, but what about mixdowns? Do you use additional compression and expansion then?

I have done some experimenting and found it best to set the compression so that the threshold lights above and below flicker back and forth, and to use little or no compression and no expansion whatsoever in the mixdown. However, something still seems to be lacking and I can't exactly put my finger on it. Can you venture some advice?

—Scott Chapin
Wisconsin Rapids, Wi.

In the early days of tape recording it was often desirable to compress (or peak limit) your tracks prior to recording. Primarily this was due to the fact that the dynamic range capability of the tape machine (limited to approximately 54 dB) prevented the recording and reproduction of the dynamics often found in "live" music. (Up to 100 dB!) Today the dbx Noise Reduction system has virtually eliminated the dynamic range limitations of the tape recorder by using complementary companion. This means that the music is still compressed (2:1) during recording but that full dynamics are *restored* by applying the same amount of expansion during playback. Hence, it is no longer necessary to "compress your tracks as you record them" (other than by the amount that is preset in the record circuits of the noise reduction system).

Some engineers, however, still find it desirable to utilize compression for effect. Given the fact that with dbx Noise Reduction it is possible to record music with full dynamics, it is preferable to add compression to the track(s) in question *during the mixdown process*. In this way it is infinitely easier to experiment with a track without running the risk of ruining an otherwise great performance during the original take. Unfortunately, when you have more tracks to compress than compressors in the studio it does require that you compromise; process some of the tracks during the initial recording, and some during mixdown.

The exact amount of compression used is dependent on many factors: the instrument, mic placement, type of

Bill Lawrence PICKUPS & STRINGS

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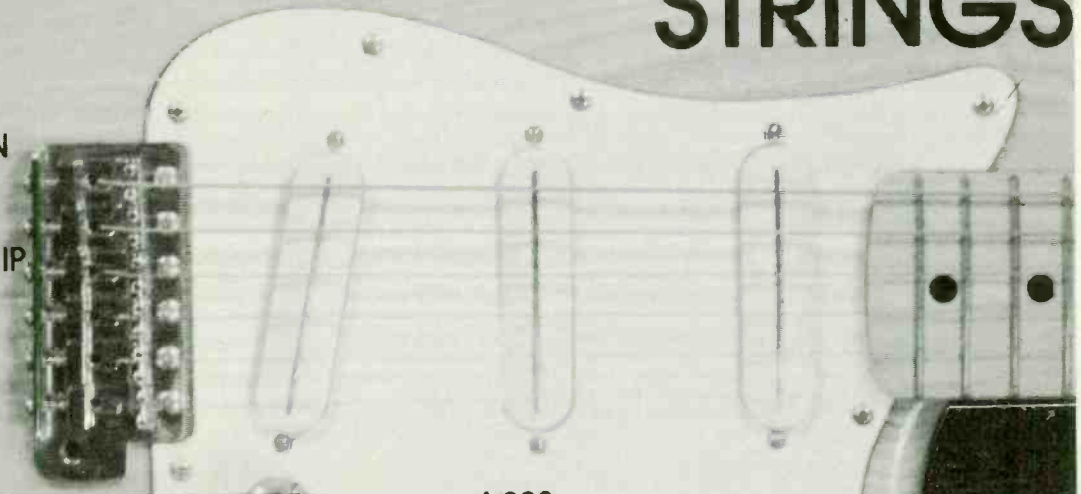
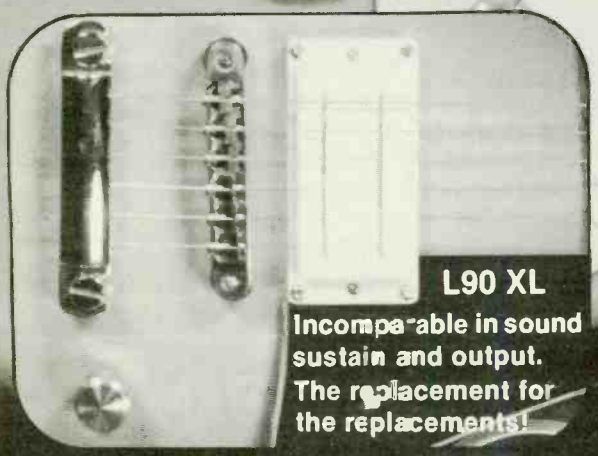


L220



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music, etc. As you've probably guessed by now there is no *set* textbook answer. The best solution is that lent by intuition and years of recording experience. However, you might begin by asking yourself "What kind of compression effect do I want to achieve?".

Overall compression at moderate to high ratios adds body and fullness (by reducing the peak-to-average characteristics of the signal's waveform). It also increases the sustain of an instrument. For this application the compressor should be set in the "above threshold" mode with the threshold level set near 10 mV. In this way all signals above 10 mV are compressed while the noise of the circuit (hopefully below 10 mV) is not. As you set the threshold level higher you begin processing primarily the musical peaks (indicated by the above and below threshold indicators flickering back and forth) leaving the main body of the music untouched. This is often termed peak limiting—limiting denoting a compression ratio greater than 10:1. As an example, peak limiting is sometimes effective for stabilizing a wandering singer's vocal. You can think of it as keeping the lid on an instrument when it gets too loud.

But you mention that "something still seems to be lacking." You made no mention of a 4-channel noise reduction unit in your system. Only of the dbx 128 stereo unit. As a word of caution, I hope you are not using your 2-channel dbx Noise Reduction system to independently record each of the 4 channels on your TEAC, then during playback mix the 4 tracks together into 2, then feed them back into the dbx for decoding. It won't work! You cannot mix encoded tracks together prior to decoding. Once a track is encoded it shouldn't be changed, processed, or modified in any manner to insure accurate decoding.

—John Harrow
Professional Sales
dbx, Incorporated
Newton, Ma.

Synthesizers Simplified

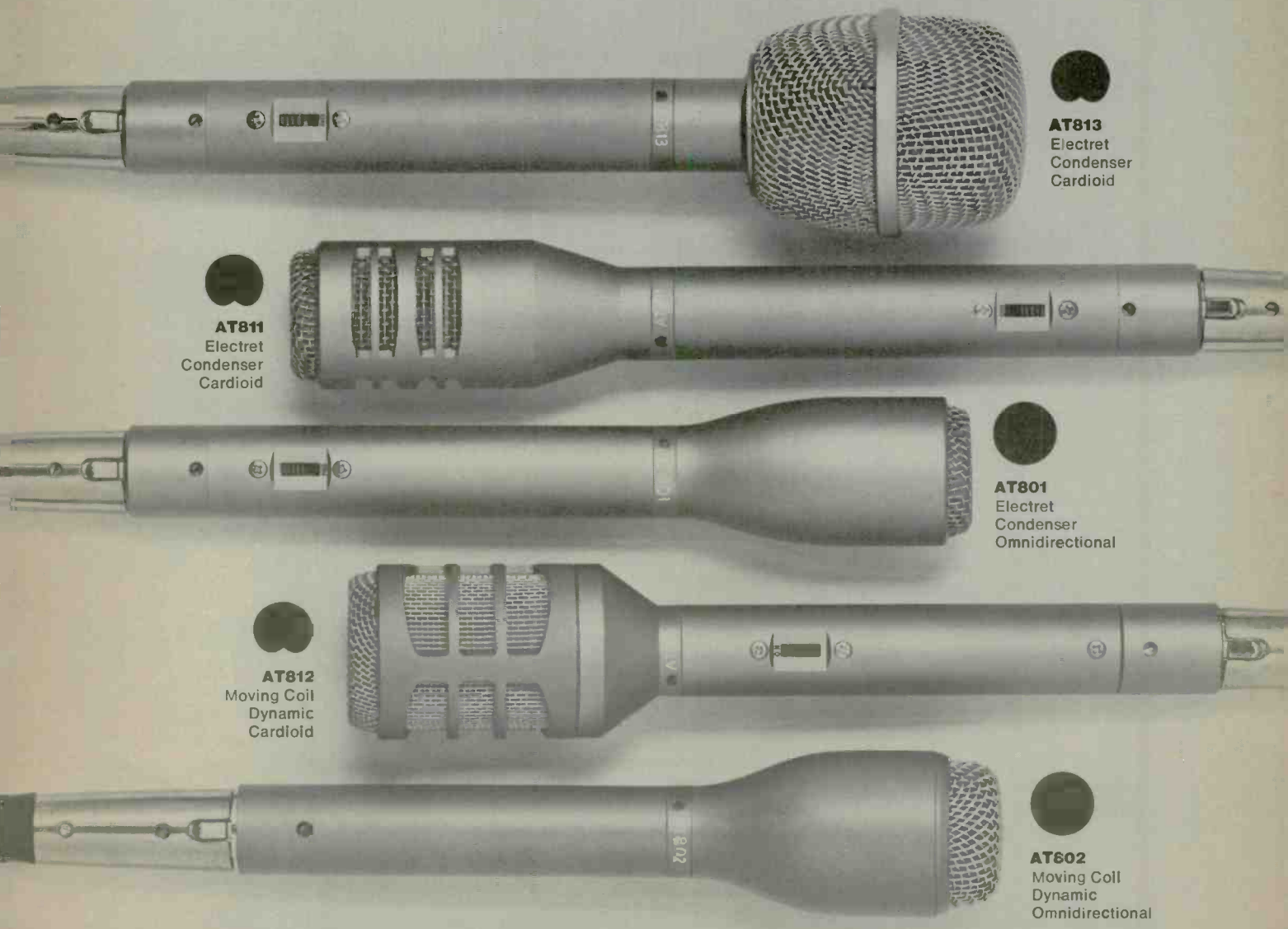
I have just finished reading the piece on guitar synthesizers that appeared in the January 1978 Musical Newsicals column (page 34). What do the abbreviations VCF, VCA and LFO stand for? Whereas I'm sure most of *MR*'s readers understand the technical jargon, there are still some of us that need catching up.

—Bob Gerald
Valparaiso, Fl.

Separately, a VCF (voltage controlled filter), a VCA (voltage controlled amplifier) and an LFO (low-frequency oscillator) perform diverse, specific tasks in your synthesizer. Together they, along with myriad other controls, combine to make the synthesizer the dream instrument that it is.

To help you better understand these three controls, I'll go one step further to the VCO (voltage controlled oscillator) which could be considered the heart of the synthesizer. An oscillator is simply a circuit which, in the case of the synthesizer, generates sound. "Voltage controlled" simply means that a DC (direct current) control voltage is being used to control the frequency (pitch) of the oscillator. Pitch, range and/or tuning controls set internal control voltages to give the VCO its range (high, low, etc.), and its basic tuning. The most important sources of external control voltages for the VCO are the keyboard (or keyboard controller) and the LFO. Pressing a key on

Audio-Technica announces a creative new start toward better sound.



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Cardioid

AT801
Electret
Condenser
Omnidirectional

AT812
Moving Coil
Dynamic
Cardioid

AT802
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Omnidirectional

Every "live" recording has an excitement all its own. You must capture sound that will never be heard exactly the same again. And in some cases the recording is literally a once-in-a-lifetime chance. With no opportunity to remake the tape or disc.

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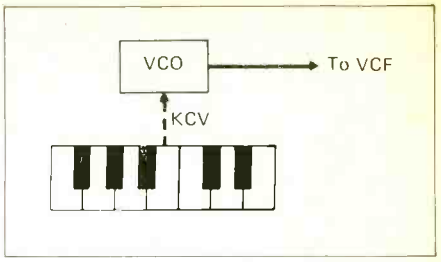

Fig. 1

the keyboard produces a control voltage which causes the VCO to produce pitch related to that key. Thus, we can play melodies. The LFO generates low frequencies, which when used to control the VCO, produce vibrato.

Most VCOs generate more than one wave form. The most common are the sine wave, the triangle wave, sawtooth (or ramp) wave and square (and/or pulse) wave. Each of these wave forms has its own particular tone color, or quality, and they form the basic foundation on which to build a wide range of different sounds. Most VCOs have a selector switch for selecting the desired wave form. In other VCOs, these wave forms are available simultaneously. Many VCOs also include pulse width control which alters the square wave and thus alters its tone color. Some VCOs also include a sync function so that the pulse wave can be used to synchronize another VCO.

A filter is used to remove unwanted tone colors from sound sources. A low pass filter removes higher frequencies and passes lower frequencies. A high pass filter passes higher frequencies and blocks lower frequencies. A band pass filter passes groups of frequencies and blocks frequencies above and below that group or band. Most VCFs are low pass filters. Most synthesizers also have a high pass filter but these are usually voltage controlled only in the more expensive units. Without going into a deep and involved explanation of filtering, the best way to understand their action is to experiment with the controls and listen to the effects produced.

Amplifier may seem to be a misnomer to you since most VCAs have a gain of unity when level controls are set at max-

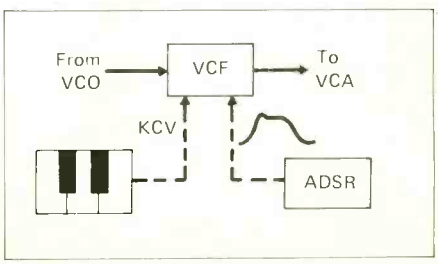

Fig. 2

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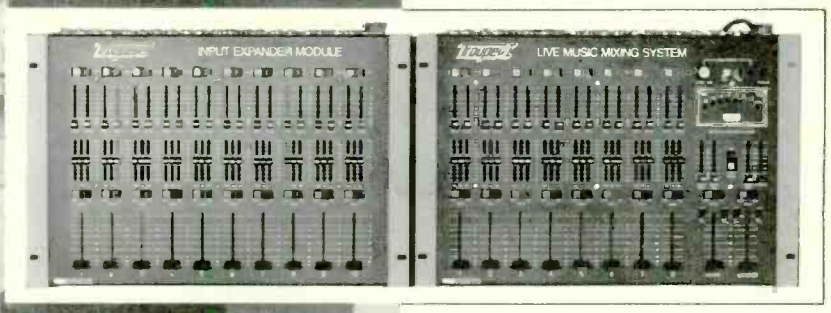
Live Music Mixing System



INPUT FEATURES

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HIGH Z LINE INPUTS
IN/OUT JACKS
20dB ATTENUATION
MONITOR SEND
ECHO SEND
3-BAND GRAPHIC EQUALIZER
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CIRCLE 39 ON READER SERVICE CARD

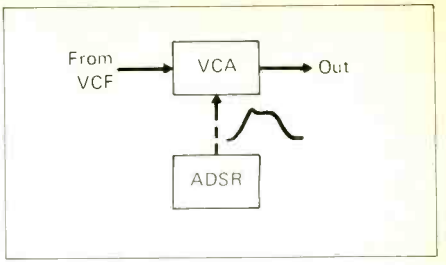


Fig. 3

imum. This means that the output signal level will be the same as the input signal level or less. It also means that in order to hear sound, you will need some type of audio amplifier and speaker system. Some synthesizers have a separate built-in amplifier for driving headphones or built-in speakers.

The VCA is usually the last element used in the synthesis of sound. It controls loudness. Many VCAs include a hold or initial gain control for internal control of the VCA; their action is much like a volume control and are usually used only when tuning or setting up a sound, rather than when playing. The major external control voltage for the VCA comes from the envelope generator (ADSR) and is used to give the output sound its final loudness pattern. Some VCAs are also provided with an LFO control input to produce tremelo effects.

The LFO is an oscillator which produces frequencies below the range of sound. Many LFOs can produce frequencies so low that it requires ten seconds to complete one full cycle. Most LFOs can also produce the same

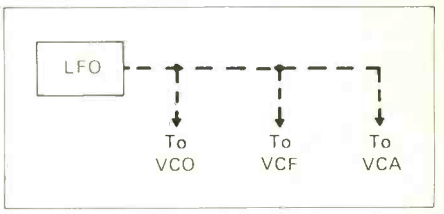


Fig. 4

wave forms as most VCOs. The sine wave is perhaps one of the most used. Controlling the VCO it produces vibrato, controlling the VCF it produces growl and controlling the VCA it produces tremolo. Some LFOs also provide a delayed output which is triggered each time a key is pressed. This is most often used for delayed vibrato effects.

—Vidal Bermudez
Service Manager
Roland Corp.
Los Angeles, Ca.

PHASE LINEAR SETS THE STANDARD FOR HIGH POWER.

Current loudspeaker design theory takes for granted the availability of a high power reserve. An idea once considered frivolous by many. Today it is considered essential for the best possible reproduction of recorded material.

To reproduce a musical peak, a loudspeaker requires up to 10 times the average power being delivered. If the amplifier lacks a sufficient power reserve, it will clip, producing distortion and audibly destroying sonic quality.

The Phase Linear Dual 500-Series Two Power Amplifier is capable of delivering in excess of 505 watts per channel from 20Hz-20kHz into 8 ohms, with no more than 0.09% Total Harmonic Distortion. That's unsurpassed power for unsurpassed realism.

CONVENTIONAL OUTPUT TRANSISTOR.

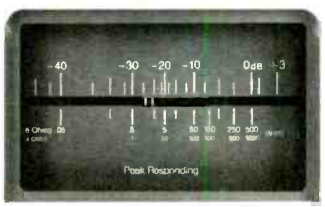
DUAL-500 OUTPUT TRANSISTOR.

The Dual 500 utilizes an advanced design in output devices to overcome the problems associated with amplifier clipping at realistic listening levels. As a result, the power handling capability is greatly improved. In fact, the power semiconductor complement of the Dual 500 features the highest power handling capability in the audio industry.

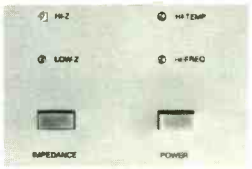
A massive rear mounted extruded aluminum heat sink assembly protects the 36 output devices against overheating and includes a self-contained, thermally activated forced

air cooling system. You don't have to worry about over-heating under normal operating conditions.

Instantaneous indication of output activity is easily maintained with an exclusive 32-segment LED display,



while a special 4-segment clipping indicator warns of hazardous overloads. High/Low Impedance Operation modes are automatically, or manually activated for increased amplifier efficiency when using low impedance speakers.



HEARING IS BELIEVING.

See your local Phase Linear dealer for the most powerful argument for the DUAL 500: a demonstration.

SPECIFICATIONS

OUTPUT POWER: 505 WATTS MINIMUM RMS PER CHANNEL 20Hz-20,000Hz INTO 8 OHMS, WITH NO MORE THAN 0.09% TOTAL HARMONIC DISTORTION.

CONTINUOUS POWER 1000Hz per channel, with less than 0.09% Total Harmonic Distortion:
8 ohms - 600 watts
4 ohms - 800 watts

INTERMODULATION DISTORTION: 0.09% Max (60Hz: 7kHz = 4:1)

DAMPING FACTOR: 1000:1 Min

RESIDUAL NOISE: 120uV (IHF "A")

SIGNAL TO NOISE RATIO: 110dB (IHF "A")

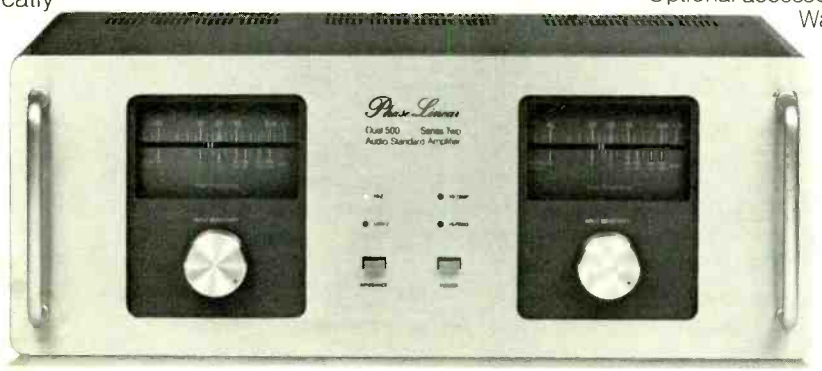
WEIGHT: 65 lbs. (32 kgs.)

DIMENSIONS: 19" × 7" × 15" (48.3cm × 17.8cm × 38.1cm)

Optionally available in E.I.A. standard rack mount configuration.

Optional accessories: Solid Oak or Walnut side panels.

AGAIN.



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CIRCLE 54 ON READER SERVICE CARD

THE PRODUCT SCENE

By Norman Eisenberg

R/C CARD FOR DELAY LINE

Now available from Eventide Clockworks is a microprocessor-controlled Remote Control card for use in the company's well-known model 1745M Digital Delay Line. A modular PC card, it plugs into an unused connector in the Line to allow delay

setting, and control of the repeat and double modes of operation. It also adds two special features: automatic flanging with digital delay quality, and a highly effective method of vocal and instrumental doubling.

Another option available for the model 1745M is a Pitch Change module which allows wide-range pitch and tempo variation, and musical harmonizing. The R/C card is priced at $550; the PC module, at $850. Full details on both pieces are available from the manufacturer.

CIRCLE 1 ON READER SERVICE CARD

CONSOLE MATCHES SCULLY 280

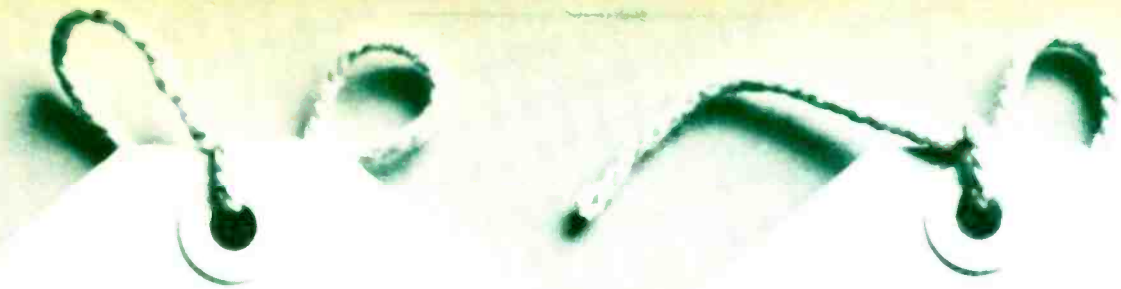
An improved electronics console which can be added onto any Scully 280 tape transport console is offered by Ruslang Corp. of Bridgeport, Ct. Designed to permit the owner to expand the electronics without losing functional continuity, the Ruslang console matches the Scully model in styling and finish so that when it is bolted on it looks like an integral part of the whole. The new add-on console also accepts a pair of Dolby 361s or any other 19-inch by 3½-inch panel. Price is $49.95.

CIRCLE 2 ON READER SERVICE CARD

STAGE LIGHT CONTROL

Described as "a major breakthrough in portable stage lighting control" is the ALICE Model 1 from Automated Lighting Concepts, Inc. of Denver, Colorado. With its patented programmable circuitry, says the company, ALICE can provide professional scene changes with every channel of light fading at its own rate with or without a light operator. The entertainer himself can control the changes via a remote footswitch or hand controller. ALICE Model 1 units can be stacked to provide eight channels at 8000 watts, 12 channels at 12,000 watts, etc.

CIRCLE 3 ON READER SERVICE CARD



TWO FROM CERWIN-VEGA

A disco mixer, model DM-1 has been announced by Cerwin-Vega. Featured is an autofade circuit which crossfades between two stereo sources at the touch of a button (fade time may be adjusted from two to ten seconds). There also is a talkover switch for the mic input; phono and line inputs to each side with level presets; separate cue circuit; independent stereo monitor output with level control; VU meters; bass, treble and stereo balance controls; and more. High-current output amplifiers permit driving several power amps in parallel.

The GE-2 is a new Cerwin-Vega graphic equalizer. It provides half-octave control below middle-C, and full-octave control above. Thirteen frequency bands are provided; they are interleaved and color-coded to permit simultaneous adjustment of both channels if desired. Also included is a tape-monitor circuit with pre or post EQ. The GE-2 equalizer is rack-mountable.

CIRCLE 4 ON READER SERVICE CARD

PCM RECORDING

Laser beams are used to record and then to reproduce sound of "high-fidelity purity" in the pulse-code modulation (PCM) system developed jointly by Mitsubishi, TEAC and Tokyo Denka. The new system projects an extremely small laser beam onto a disc, converts 1/40,000th-of-a-second segments of sound into binary pulse code signals, modulates each one into FM digital signals, and then records them. Since the reproduced sound is not a function of amplitude or groove depth in the record, says a TEAC spokesman, pure high fidelity results.

The three companies involved feel that this new technique can lead to an entirely new kind of audio system, which they call a "super hi-fi" system within the price range of home audio systems. Suggested applications of the new technique include recording several long selections (e.g., symphonies) on one disc; a juke-box application with a single disc containing dozens of songs which can be selected by using the system's short access time and multi-channeling of music by utilizing separate tracks for each instrument.

The first disc developed so far, made of polyvinyl chloride, plays up to thirty minutes, but the developers expect to extend this time to two hours. While marketing plans remain inconclusive, the unit is expected to cost about $800.

CIRCLE 5 ON READER SERVICE CARD

PEAVEY'S MARK 2 SERIES

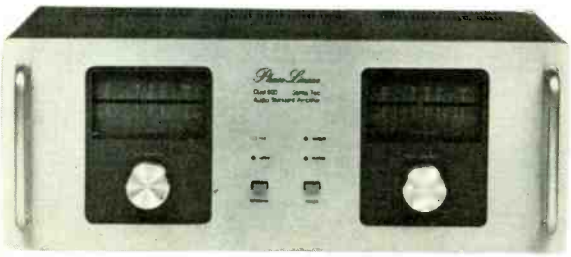
From Peavey Electronics comes word of its MC and MR series mixing consoles designed for portable or fixed installation sound-reinforcement applications. MC consoles are available in eight, twelve, sixteen and twenty-four input configurations. The MR-7 mixer is a special seven-input, rack-mountable console. Peavey states that these units are designed for optimum operational flexibility in sound reinforcement; as an example of "applied engineering considerations," they cite the master controls which include two sub-mixes and a monaural mix which is the sum of the two sub-mixes. This, points out Peavey, allows the operator optimum flexibility of control—"rather than having a stereo output which must be combined for monaural, this function is provided internally with all required level controls, metering, and 600-ohm transformer-coupled output line amplifier."

Send and return jacks on the rear panel are separate, and a completely separate monitor send is provided on each channel. Each input has four bands of EQ and an effects send that applies a signal derived after the EQ circuitry and prior to the pan and channel-level controls. An internal spring-type reverb system is also included in the MR and MC series. Rated response is within ± 2 dB from 30 Hz to 20 kHz.

CIRCLE 6 ON READER SERVICE CARD

AMPLIFIER NEWS FROM PHASE LINEAR

Phase Linear has introduced a new 500 watt per channel power amplifier. Known as the Dual 500-Series II, it is rated at 505 watts per channel (minimum RMS) into 8 ohms from 20 Hz to 20 kHz, with distortion spec'd at no more than 0.09 percent THD. The power semiconductor complement features a power output stage rated "at a conservative 8000 watts, providing a more than adequate margin of safety." Other features include LED output metering; individual channel input level controls; high/low Z operating modes (automatically or manually activated) that allow impedance loads downto 2 ohms; high-frequency limiters to prevent output overload. The Series II, advises the manufacturer, is designed for professional use as well as for demanding home stereo applications.



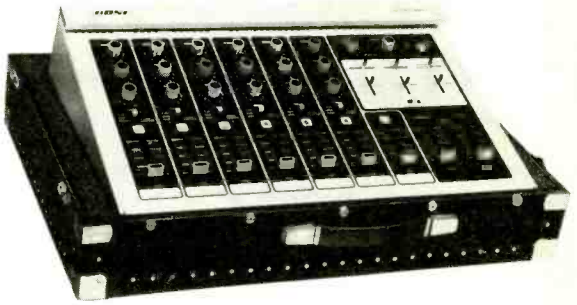
CIRCLE 7 ON READER SERVICE CARD

PCM CASSETTE DECK EXPECTED

A pulse-code modulation (PCM) cassette deck based on helical-scan, rotary head technology, and claimed to offer "better than open-reel fidelity" may become available later this year at a price of about $2,000 according to Melco Sales, Inc. who are handling it for Mitsubishi Audio Systems. Using half-inch cassettes for up to two hours of play, the deck operates on two channels for PCM signals and one for bias. Initial specifications released include: frequency response, from DC to 20 kHz within ± 0.5 dB; dynamic range of 80 dB; disortion of less than 0.03 percent; wow and flutter, undetectable. The PCM deck has a sampling frequency of 47.52 kHz, and a digitization of 13-bit logical compression. Dimensions are 900 mm high; 315 mm wide; 272 mm deep. Weight is 21 kg. These figures translate approximately to 35 inches high; 12.3 inches wide; 10.6 inches deep; and 46.3 pounds.

CIRCLE 8 ON READER SERVICE CARD

BOSE POWER MIXER



New in Bose's professional product line is the model PM-1, described as a powered mixing console. Included is a power amplifier that supplies either 400 watts in mono or 200 watts on each channel in stereo; a three-section parametric equalizer; a 6-channel low-noise mixer; and additional options and features, including a versatile arrangement of outputs for line, effects and so on. In addition to the six mic inputs there is a seventh channel with two more inputs that, depending on what is connected to them, can give the PM-1 the capacity of an eight-channel mixer. The line outputs provide up to 7 volts RMS. Distortion across the band from 50 Hz to 15,000 Hz is rated at less than 0.2 percent. Weighing 70 pounds, the PM-1 is supplied in a luggage-type wraparound. Available as an extra is a stand that holds the unit about three feet above the floor.

CIRCLE 9 ON READER SERVICE CARD

NEW PRO AMPLIFIER

The model 215 from Neptune Electronics of Portland, Oregon is a rack-mount sized stereo power amplifier rated to supply 150 watts RMS per channel into a 4-ohm load with less than 0.1 percent THD. Hum and noise are listed as better than 105 dB below rated output into 4 ohms. The output impedance is stated as being designed for any load equal to or greater than 4 ohms, although no specs are listed for 8-ohm loads. Weight is 16 pounds and dimensions are compact enough for transporting around. Features include input level controls, multi-LED output level indicators, two speaker outputs (¼-inch phone jack and 5-way binding posts); built-in short-circuit protection, etc.

CIRCLE 10 ON READER SERVICE CARD

3M ANNOUNCES DIGITAL RECORDER

The result of joint research effort conducted during the past two years by 3M and the BBC is the new digital recording system recently shown in prototype form by 3M. Using one-inch wide tape, the mastering system can record 32 audio channels. There also are two other units, including a 2/4-track stereo model. Claimed advantages of digital recording are a very high S/N ratio, and the complete absence of tape noise, modulation noise, distortion and flutter, plus the lack of deterioration of signal quality in making multiple-generation copies during dubbing and mix-down, and the elimination of involved EQ and bias settings. A two-unit system (2-track stereo recorder plus 32-track pre-mix recorder with overdubbing, remote control, in-sync track-to-track recording, etc.) is expected to cost "under $150,000" sometime this year.

CIRCLE 11 ON READER SERVICE CARD

MONITORING THE MONITORS

Everyone, or so it seems, has what is called a "monitor" speaker system. The fact that they are all different in so many ways only points up the simple idea I propounded here some issues back—that a "monitor" speaker is one that sounds right to you. Carrying this idea a step or two beyond that, a "monitor" speaker could be one that convinces you that what you have recorded is the way you want it to sound, and in this area we get a little lost, since "the way you want it to sound" may not be the way others want it to sound, and then you get into the trap of liking a speaker not because it really reveals what's in the recording but because it flatters the recording, bringing up certain tonal portions and suppressing others. You might get along with such a speaker for a few years and then find that the public taste has changed; what was accepted as great suddenly is out of vogue.

Just such a problem was admitted to recently by JBL ("There has been such a shift away from the kind of sound represented by the L-100" a JBL executive has stated) and accordingly, its once-popular L-100 Century is being phased out of existence. Aside from admission that there is nothing inviolate about the phrase "monitor speaker" and indirectly confirming my earlier column on this tricky subject, this move by JBL should indicate that speakers for professional use ought not to be bought on faith, or by the numbers—but by careful listening, and maybe some personal soul-searching.

With this cautionary note out of the way, I feel better about reporting news of some recently announced "monitors." One such is the Pioneer SPEC-15L: 15¾-inch woofer, horn-loaded tweeter with acoustic lens, input power handling capacity, 200 watts; rated output, over 115 dB SPL at 1 meter. Impedance is 8 ohms; weight is 160 pounds; dimensions are 31⅜ inches high, 24⅝ inches wide, 19⅝ inches deep.

CIRCLE 12 ON READER SERVICE CARD

The "Studio 4" is one of a series from American Acoustics Labs. It uses a 15-inch woofer, midrange cast horn, and piezoelectric tweeter. Maximum power handling is 150 watts; output not stated. Impedance is 8 ohms; weight is 80 pounds; dimensions are 31 inches high; 24 inches wide; 15 ¼ inches deep.

CIRCLE 13 ON READER SERVICE CARD

Audiomarketing Ltd. is offering the "Little Red" which handles up to 50 watts input power; maximum output level is 109 dB/SPL. For 1 watt in it yields 92 dB/SPL at 1 meter. It uses a 12-inch a/s woofer and a small dome/cone tweeter. Impedance is not stated. Weight is 45 pounds; dimensions are 24 by 16 by 12 inches.

CIRCLE 14 ON READER SERVICE CARD

MUSICAL NEWSICALS

SOUND REINFORCEMENT

A new west-coast manufacturer, Professional Audio Systems, has introduced two models of stage monitors and a column-type P.A. speaker system. The two monitor models are outwardly identical; the design is a slant-front cabinet with a bass-reflex loaded 12-inch woofer and a compact radial horn with compression driver. Specifications for the PAS Slave Monitor include impedance of 8 ohms, power capacity of 100 watts RMS, frequency response of 45 Hz to 18 kHz and coverage angles of 120° horizontal and 60° vertical. The PAS Energised Monitor is identical to the Slave Monitor except for the addition of a low-distortion, solid-state power amplifier rated at 60 watts RMS into 8 ohms or 100 watts into 4 ohms. PAS's Pavilion is a three-way, vertical linear array P.A. speaker system. Bass frequencies down to 40 Hz are reproduced by a pair of 12-inch drivers in a bass reflex enclosure, while a high-definition 8-inch speaker covers the critical midrange frequencies and a compression driver with radial horn handles the top end up to 18 kHz. Coverage is given as 120° horizontal and 60° vertical, power capacity is 200 watts RMS and the system impedance is 8 ohms. All three Professional Audio Systems models are built of black vinyl-covered birch plywood with extruded aluminum corners and feature perforated steel grilles for maximum speaker protection.

CIRCLE 15 ON READER SERVICE CARD

Long a leader in professional sound reproduction, Altec Corporation recently introduced a new line of portable loudspeaker systems. A number of models are included in the line which were specifically designed for a variety of P.A., sound reinforcement and monitoring applications. All of the new models are rated at 125 watts of power handling ability. Several of the new models are notable for their use of Altec's innovative Tangerine radial phase plug in their compression drivers. This new phase plug design resembles a peeled tangerine since it uses radial slots rather than the usual concentric slots for better high-frequency response.

CIRCLE 16 ON READER SERVICE CARD

POWER AMPLIFIERS

Another high-power amplifier is the SMF Stereo 150 from Dallas Music Industries. As the name implies, the unit is a two-channel model delivering 150 watts RMS per channel into 4 ohms (or up to 200 watts RMS into 2 ohms with additional fan cooling) at less than .1% distortion. The SMF was designed with "roadability" and reliability as the highest priorities. The 1/8-inch anodized aluminum chassis is contained in its own metal-edged wooden cabinet so that the owner can avoid the time and expense of mounting the amp in a rack himself (rack-mount adapters are available as an option, however). Thermal cutouts and short-circuit protection were eliminated from the Stereo 150 on the theory that the circuit breakers will protect against catastrophic failures while unnecessary shut-downs occurring during a performance are extremely unwelcome. Each channel of the amp has its own completely separate power supply to eliminate the possibility of interaction between channels due to power supply inadequacies; this can be particularly troublesome in bi-amp applications where the treble channel may be ad-

versely affected by a power-hungry bass channel. Quarter-inch phone jack output connectors (two per channel) are found on the back panel while the inputs are on the front for better accessability; a ¼-inch phone jack and a 3-pin XLR are provided for each channel's input plus a "Link" connection to facilitate paralleling amplifier channels. Also found on the front panel are two volume controls, power switch, two circuit breaker reset buttons and a Mono/Stereo switch which applies the same signal to both channels in the mono modes.

CIRCLE 17 ON READER SERVICE CARD

MIXING CONSOLES

The Model 12x4 mixer from Interface Electronics is a fully modular, four-output mixing console for up to twelve input channels. The 12x4 was designed to be equally suitable for small recording studios or for P.A. use. Input modules feature mic-line switch, preamp gain set in 10 dB steps, two input pad settings, monitor-only soloing, four cue sends (pre- or post-fader), pushbutton bus selectors for track or submix assignments and panning between odd- and even-numbered buses. Numerous options are available from Interface including your choice of switched-frequency equalizers or parametrics in the input modules, and various filters and equalizers for the output channels. All mic inputs are transformer-balanced as a standard feature and output transformers are available as an option. For recording use, a Type N module provides a mixdown of the four main outputs for control-room monitoring; in P.A. applications, the buses are used as submixes and the mixdown output is then used as the main P.A. feed. Frequency response is specified as ±1 dB from 20 Hz to 20 kHz, distortion is under .03% at 0 VU at 400 Hz, and noise is said to be very low under all conditions. The mixer is housed in a black anodized case measuring only 18x26x8″ for ease in transporting.

CIRCLE 18 ON READER SERVICE CARD

MUSICAL INSTRUMENT ACCESSORIES

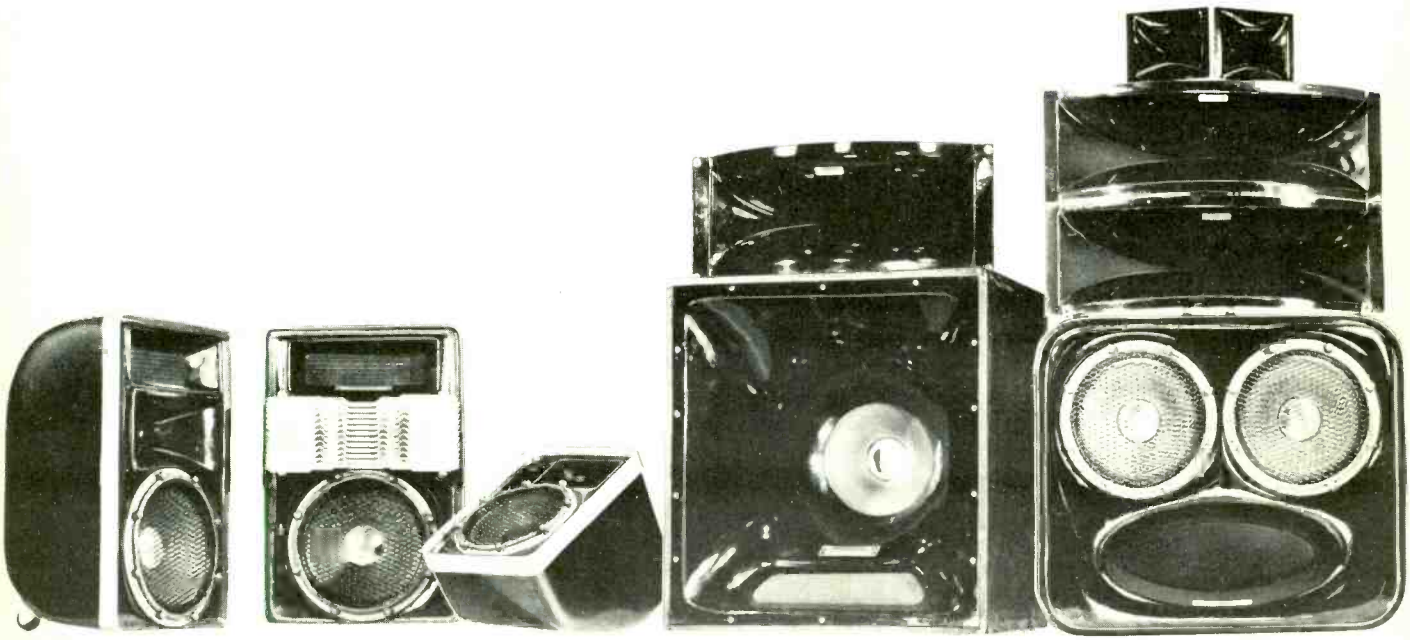
International Music Corporation has announced the new Texas Transducer, model TT-1. The pickup attaches to any acoustic instrument with reusable mounting cement (included with the unit) and has a ten-foot detachable cord. Suggested list price of the Texas Transducer is $29.95.

CIRCLE 19 ON READER SERVICE CARD

Another very useful synthesizer adjunct is a new joystick device from Mediamix. The unit was originally designed for use with an Oberheim two-voice synthesizer, but is now being offered on a turnkey modification basis for Moog, ARP or Oberheim units, or as a kit for use with any synthi-system. The stick itself is spring-loaded to return to the center, no-modification position unless it is being held. As it is normally connected, the Mediamix joystick controls pitch bend in the X-axis (left-right motions) and filter sweep in the Y-axis (forward-backward motions). The maximum amount of modification in each axis is set by a rotary pot, and each axis may be turned on and off separately. According to Mediamix, the joystick opens new vistas of musical expression because of the ability to manually alter pitch and filter simultaneously.

CIRCLE 20 ON READER SERVICE CARD

Come here, kid. I'm gonna make you a Star!



The soaring purity of a performance that takes your breath away, the crowd-catalysing thunder that starts a rush for the stage — that is not the sound of a little box stuffed with cheap components. Look beyond the spotlights and under the dirt and bruises of a hundred one night stands and you'll find Community, the equipment that professionals depend upon to electrify their fans in city after city. Why Community? Because it's the best there is.

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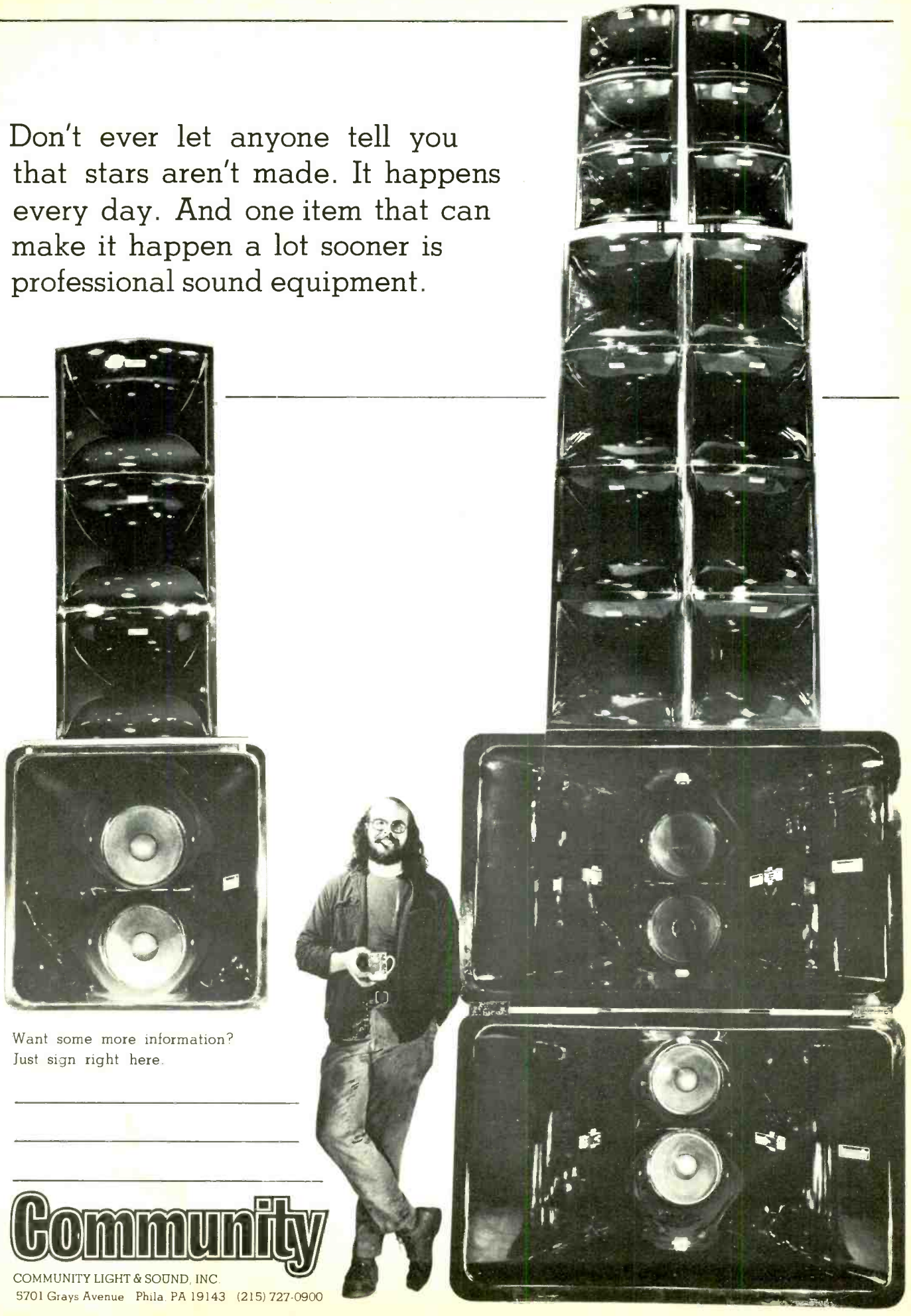

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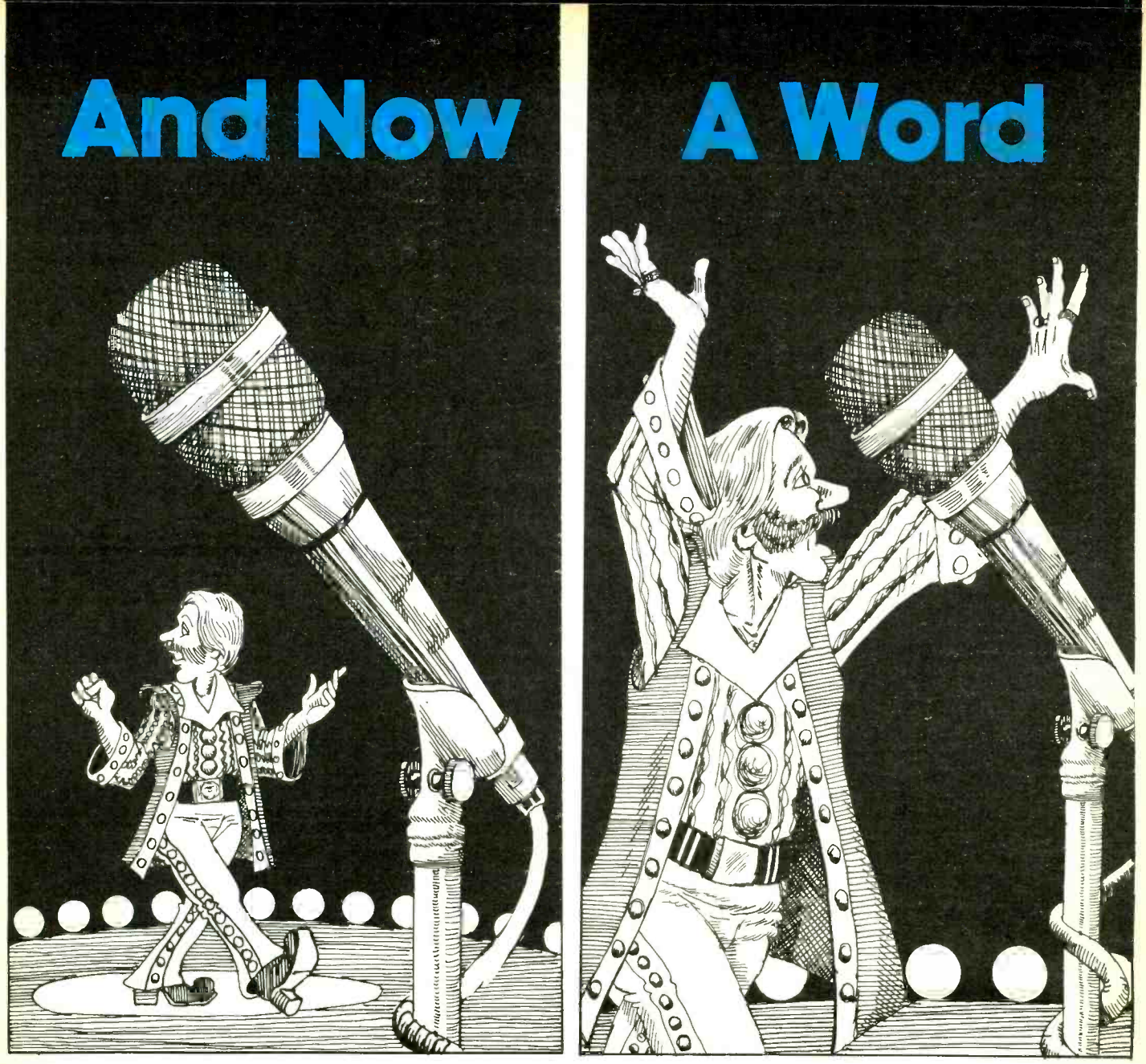


By Lothar A. Krause, Jr.

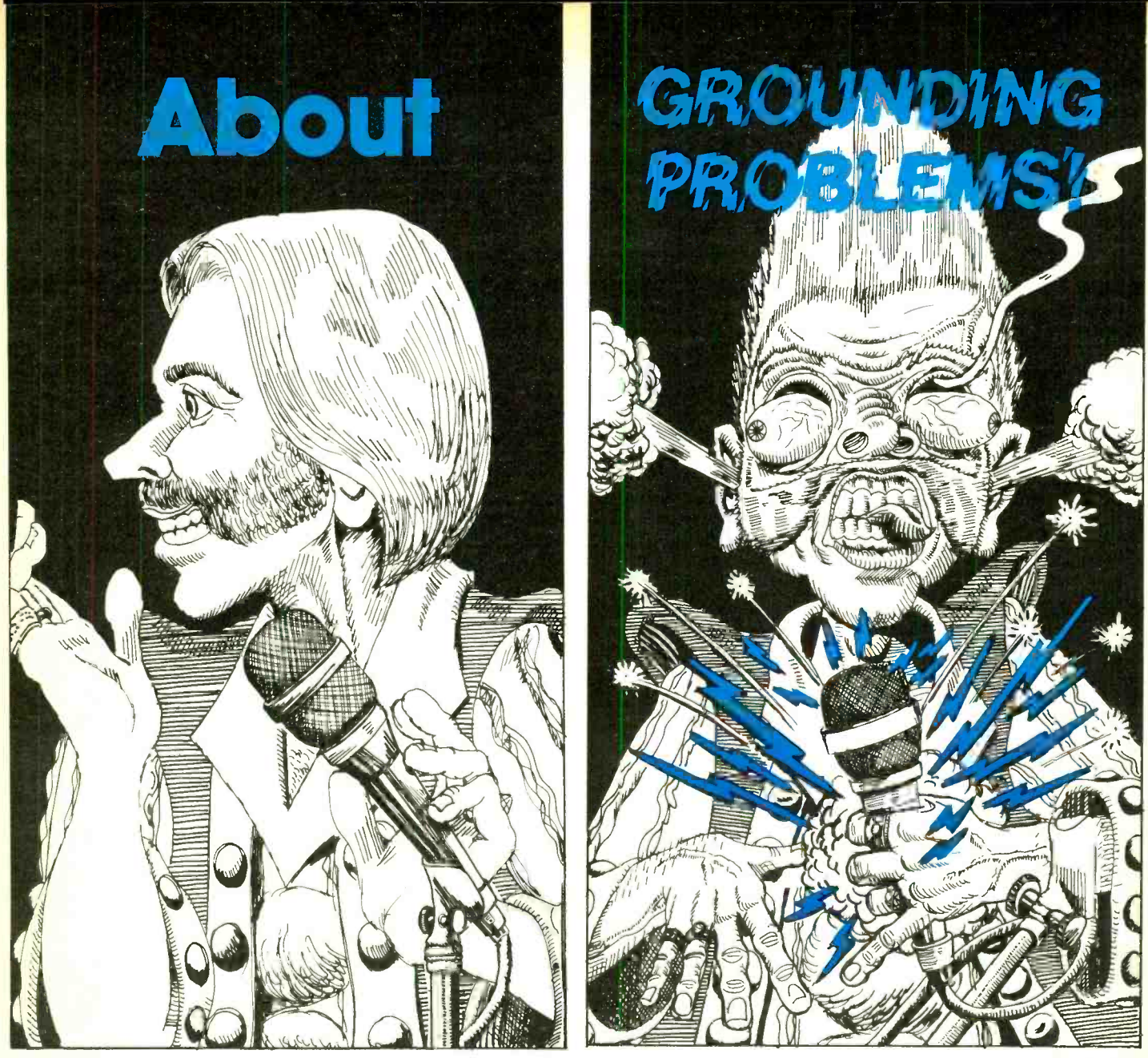
Of the multitude of problems encountered in touring sound reinforcement and fixed installation systems, proper grounding (or lack of) is one of the most irritating and difficult to correct. The purpose of this article is to aid or to at least give some general advice on proper grounding techniques.

AC Power Distribution

The majority of equipment used in portable and fixed installation sound reinforcement applications is designed for use on 115 Volt, 60 Hz AC power. The accepted means of 115 AC power distribution is the single phase three-wire system. The system is characterized by the use of a black wire which is "hot" (I never have understood this), a white wire which is neutral and an uninsulated wire which is used for ground. This is the way things should be if everyone has done his job correctly. Every outlet or junction box in a building should be wired the same way. In a sound reinforcement system, a single miswired junction box can cause what is commonly called a "Ground Loop." Ground loops create a constant 60 Hz hum which is guaranteed to drive engineers and artists up the wall. Before attempting to track down the demon ground loop, let's see where he came from (maybe some knowledgeable electrician will read this article and help prevent him from being born).

In this article, we shall be concerned with AC distribution systems which originate from a 220-Volt AC service drop. In this system, there are two 110 Volt conductors and a neutral. In a correctly designed system, the loads on each side (110 to neutral) are balanced. As an example, if you have two 10-Amp loads, each of which is connected to one side of the 220-Volt service, you will have a balanced condition and no current will be flowing through the neutral conductor. If, on the other hand, you have a 5-Amp load on one side and a 10-Amp load on the other, you will now measure 5 Amps of current flowing through the neutral. This is where our problems begin.

I cannot recall how many times I have been told by an union electrician that a group of AC outlets are on the same phase (side) on the 220-Volt service. Before I finally learned the hard way, I would set up my system, turn on the equipment and listen to the 60 Hz hum. What I am trying to say is



Illustrations by Harold Perry

that you should never assume that all the outlets you intend to use are on the same phase. This is especially true if they are not located on the same wall or are in different parts of the building. It only takes one piece of equipment being plugged into a different phase of the AC distribution system to result in a loud system hum.

Please refer to Figure 1, Typical Fixed Installation AC Distribution Diagram. This diagram represents a typical sound reinforcement installation. If power amplifiers A and C were the only loads on the line, you would have no current flowing through the neutral conductor. Now, consider the total system. With the additional loads of power amplifers B and D, the load is no longer balanced. Because of the difference of 15 Amps (between power amp B and power amp D), you have 15 Amps flowing through the neutral circuit. For illustration purposes, we shall assume that the resistance of the neutral wire is 2.0 Ohms. Ohm's law tells us that the voltage drop between power amplifier A and the mixing desk is 30.0 Volts. If you could actually place an AC voltmeter between the white conductor at the mixing desk and the white conductor connected to power amplifier A, you would measure a potential difference of 30.0 Volts. If all other factors were ideal, this difference would not result in difficulty. All equipment designed for commercial use has a power transformer which performs a dual role. From a functional standpoint, the transformer prevents the equipment enclosure from becoming hot (120 Volts) when referenced to ground.

If my memory serves me well, I can recall having a very shocking experience with a five-tube AM radio. These things were very dangerous because they did not have the transformer to keep the AC from the chassis. If your memory is really good, you can recall that there were no such things as a three-prong plug. It is easy to see how you could have a hot chassis. If the plug was rotated so that the white wire was connected to common, everything would be okay, or would it? If the load were unbalanced as shown in Figure 1, there would still be the 30.0 Volt difference measured between the chassis and a solid-earth ground. This does not represent a very great health hazard but think of what would happen if the 30 Volt AC difference were between the shield (ground) of your input cable to the power amplifier and the power amplifier chassis. The result would be a ground loop and probably a very loud hum.

The green ground wire used in three-

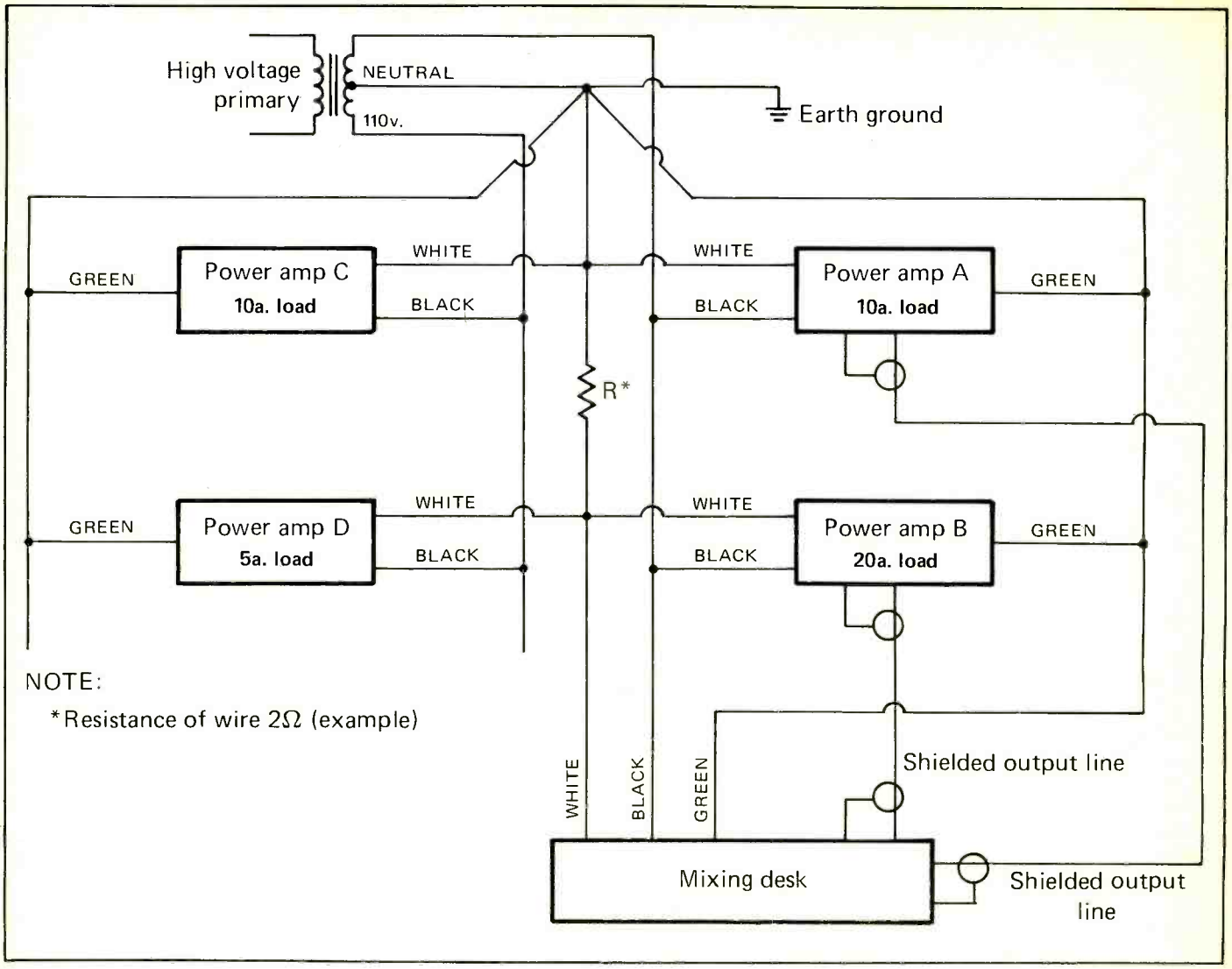


FIGURE 1

wire systems will prevent dangerous differences in potential between different pieces of equipment. I don't know the exact name for the object which allows you to plug a three-wire plug into a two-hole socket. They functionally perform two duties: First, they lift the chassis ground reference; and secondly, they reverse the phase of the white and black conductors. The proper use of these adaptors is to make absolutely sure that the green wire from the adaptor is grounded to the third wire ground of the junction box or to a suitable earth ground. If the equipment in use does not have a three-wire plug, it will be necessary to secure the ground wire to the equipment chassis. Before doing this, please check for a power transformer. If there is no power transformer, the piece of equipment does not belong in a professional application or in any other application where the chassis could be accidentally touched. After all of this trouble, simply rotate the adaptor until you find the point of minimum hum. This is really a lot of unnecessary work, especially after learning how easy it is to correctly ground the system in the first place.

Basic Equipment Personalities

This may seem like a strange topic, but before you decide you need to do something else, please read the following paragraphs; they really are quite important.

There are several design philosophies when it comes to the circuitry concerning the primary (line) side of a piece of equipment. Please refer to Figure 2, Equipment Primary AC Circuitry. In the case of Figure 2A, it can be seen that there is a single pole-double throw switch wired for reversing the phase of the AC input. Capacitor C_2 acts to prevent high-frequency noise from entering the equipment from the AC line. Capacitor C_1 is the problem child. Because all power transformers have some leakage to the core, there is nearly always a volt or so of AC coupled to the chassis. It makes sense that a voltage that is equal in amplitude but 180 degrees out of phase would help cancel out the transformer induced voltage. This is true to a point and this is the approach taken by nearly all guitar amplification and packaged Public Address systems manufacturers. It is unfortunate that these manufacturers carry this design philosophy over into their commercial or professional product lines.

Consider what happens when several (let's, for explanation purposes, consider ten) power amplifiers are used in a three-way or tri-amplified system. It is entirely possible that all ten capacitors will be in parallel. The typical value used is .047 MF and ten in parallel would be .47 MF. This is a lot of capacitance and as a result, a fairly

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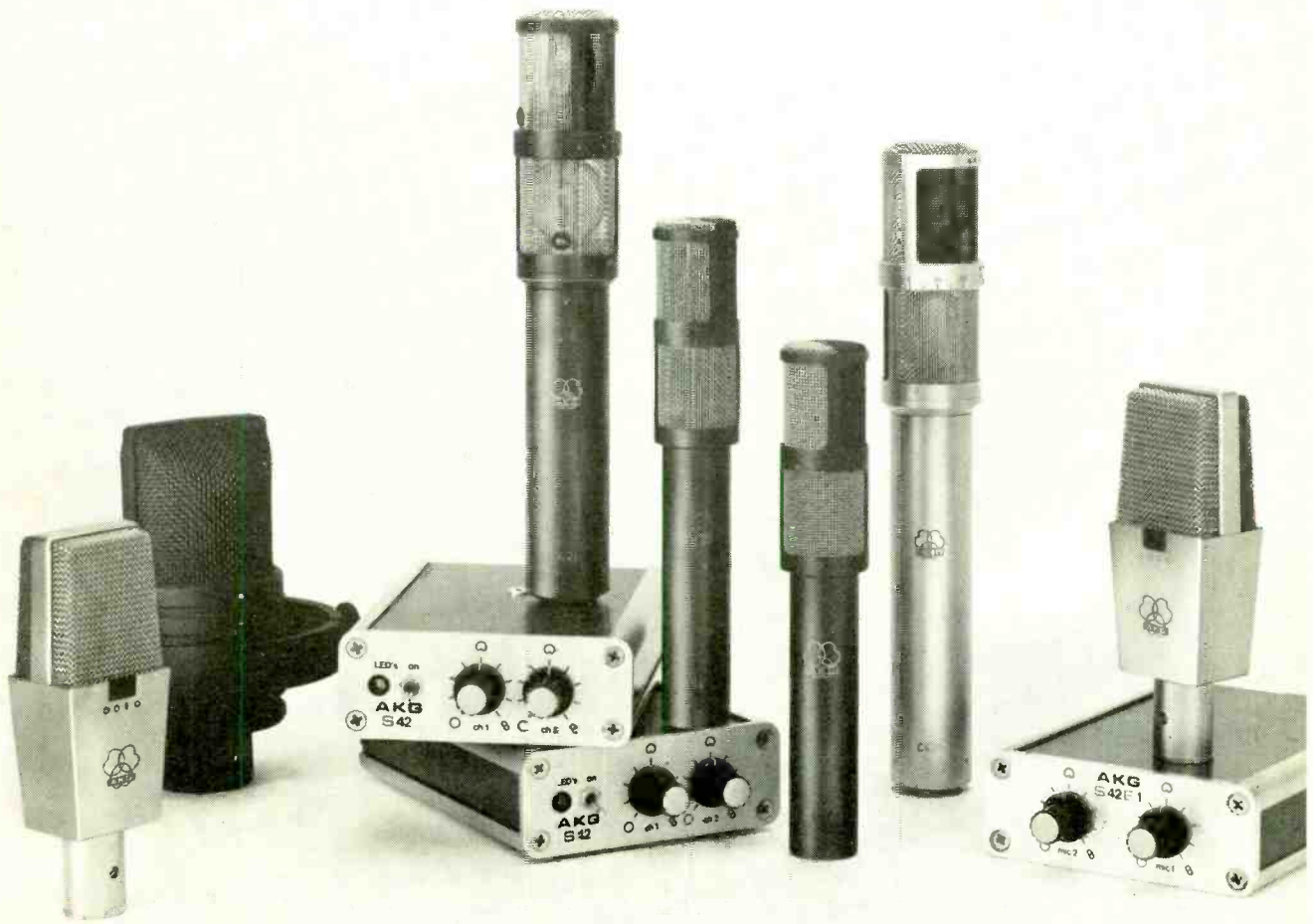

large AC voltage would be coupled into the power amplifier ground system through the input signal cable shields. If you suspect this problem in your system, disconnect the AC line cord from three or four amplifiers. Carefully listen to the speaker system and plug in the power amplifiers, one at a time. If this is your problem, the hum level will increase each time a unit is energized. There is a simple cure for this problem. Be sure you unplug the power amplifier (or any other piece of equipment), remove the cover, locate C_1, and then cut it out. If you are in doubt as to what to do, take the piece of equipment to a qualified service technician. If you have a large number of power amplifiers with this type of input, no amount of input polarity switching or reversing will get rid of the hum.

Figure 2B is fairly representative of the line bypassing technique used by most commercial equipment manufacturers. The concept is basically the same except that a double pole-single throw switch is used and two line bypass capacitors are employed. It should be obvious that in this configuration, each side of the line is bypassed equally and any number of power amplifiers can be used without the resulting hum buildup. The main mission for these capacitors is to help prevent high-frequency noise from entering the equipment from the AC line. If the third wire cable or separate ground wire is used, there will be no need to try to cancel out the transformer leakage current.

Fixed Installation Grounding Practices

Commercial sound installations which are permanently installed are the easiest to properly ground against light dimmer noise, AC ground loops and radio frequency interference. Unfortunately, the sound system often comes in low on the list of priorities. I have found this to be especially true in religious institutions. They seem to want to save a few dollars in the beginning and in the long run, spend much money trying to correct a very bad situation.

In fixed installations, it is imperative that every piece of equipment associated with the sound system be connected to the same AC power distribution point. This does not mean a set of wall outlets assumed to be on the same circuit breaker. You should have a separate circuit breaker for the sound system. It is also a good idea to provide a four-outlet junction box for anything that sooner or later will be plugged into the sound reinforcement system. A single electrical device such as a tape recorder plugged into a different phase of the AC system will generate much more trouble than could be imaginable.

After all this trouble, there is one thing which I feel must be done to insure against possible problems. Find a good ground such as a cold water pipe or an eight-foot ground rod driven into moist earth and attach a number 14 cable from this ground point to each electronic device. I do not mean a wire that goes from ground to the mixer and then from the mixer to the limiter and etc. If you have ten separate pieces of electronic equipment, you should have ten separate ground wires connected to your common ground point. If all equipment is in a rack, you should connect a ground cable to each piece of equipment in the rack and then connect all of these cables to a single point on the rack. Your common ground should then be connected to the rack, along with all of the individual equipment grounds. This may seem like a lot of trouble, but in the long run it will be worth the time and expense.

(continued)

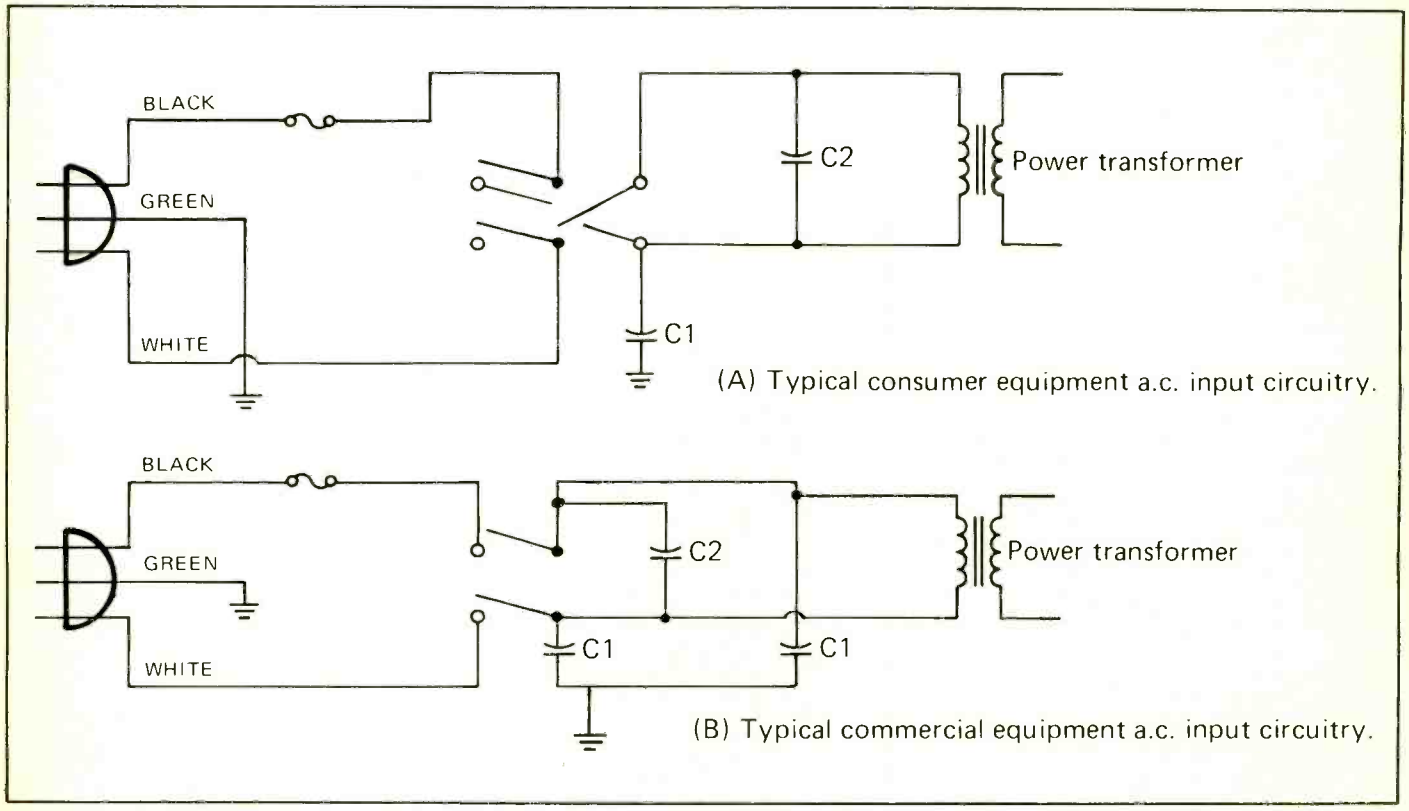

FIGURE 2

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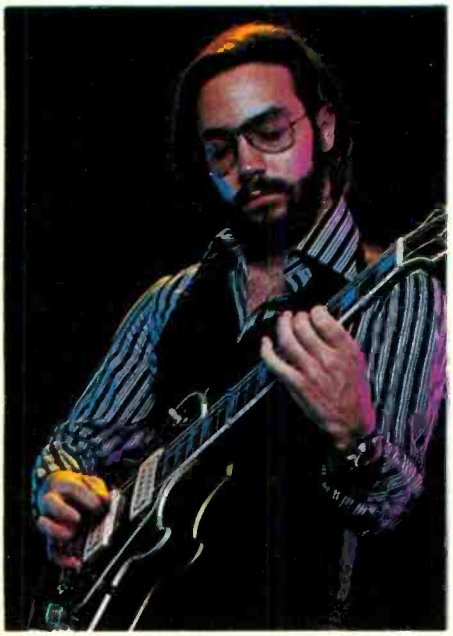

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AC Power Distribution and Ground Technique for Touring Sound Reinforcement Systems

The basic principles of single phase feed and proper ground carry through used for fixed installation sound reinforcement systems also apply to portable systems. The one big difference is TIME; you simply do not have enough of this valuable commodity when you are on the road. It is not unusual for large multi-way systems to require over 100 Amps from a single phase line. The distribution of this much power has been reduced to an art form by large touring companies. They have developed cable, connector and distribution systems which keep the setup time to a minimum and also provide the reliability and safety required by the management companies.

In the following paragraphs, I shall endeavor to describe an AC power distribution system that could be used for a typical sound reinforcement application. The system may be scaled up as required by the use of larger wire sizes and appropriate connectors and circuit breakers. If you do not have the knowledge or proper tools required to build your own distribution system, *do not attempt it!* Go to a reputable commercial electrical distributor and ask for the name of someone who can do the job. If they hesitate to help, you will find that the local chapter of the I.E.W. union can provide assistance. Please remember that it is your money and reputation on the line and if you see that things are not going exactly as they should, stop the work and find someone else.

The first step in designing your system is to determine your total load requirements. This is not as hard as it might at first seem. Every piece of equipment used in your system will have a fuse that is labeled as to its correct size. To determine your total load, simply add up the fuse sizes. If, for example, you are using four power amplifiers for the speaker system and each amplifier requires an 8-Amp fuse, your total load will be 32 Amps. Normally, there will be separate amplifier racks for stage left and stage right. This will dictate the use of a split feed for the 32-Amp system. There are two good reasons for a split feed. First, the reliability is increased by the use of separate circuit breakers for stage right and stage left. Secondly, the possibility of ground loops is reduced because each of the feeds is balanced (16 Amps each) and is derived from a central point. Please refer to Figure 3, Typical Portable AC Power Distribution System. As illustrated by Figure 3, each of the power amp racks is fed through an AWG number 12 flexible rubber cable and is protected by 20.0 Amp circuit breakers. The remainder of the system is fed by AWG number 10 flexible rubber cables and protected by 30.0 Amp circuit breakers. This system is slightly overrated but I would rather be on the safe side. You must keep in mind that some of the cable runs will be quite long and if you are using a marginal cable size, there could be an excessive voltage drop. In addition, all cables should be flexible rubber insulated type designed for outdoor applications. The main feed cable which consists of three AWG number 2 conductors should be a minimum of 150 feet long.

All connectors and their associated junction boxes must be of the twist-lock type and suitable for the current involved. The only exception to this rule is the junction boxes located on the stage for the performers' instrument amplifiers. The twist-lock connectors are designed for use at a specified current carrying capacity and if you are using the correct wire size, everything should fit. If there is some problem with the mechanical fit, you are probably doing something wrong!

Proper grounding of all junction boxes and connectors is absolutely essential in portable systems. The ground conductor of each cable must be securely fastened to the connector or junction box ground common point. Before plugging in the AC distribution system, take an Ohm meter and check for proper grounding for every exposed metal junction box. After establishing this ground integrity, check the ground prongs of all connectors with reference to the junction box grounds. When you are sure that all the ground connections are correct, proceed to check the neutral for proper distribution. Don't spot-check a few connectors or junction boxes; check every single possibility. Repeat this for the hot side and if everything checks out, you will be pleased with the results.

Onstage Equipment Grounding

When setting up a stage, the importance of proper guitar amplifier grounding cannot be overemphasized. It is possible for someone to be electrocuted by a "hot" guitar amplifier. Because there is no standard as to how most instrument amplifiers are constructed, you cannot afford to risk a potential difference between the sound reinforcement system microphone and metal guitar strings. This is the most critical ground loop in your entire system. It is one thing for a P.A. to hum, but it is something else when someone gets killed because of the improper use of a ground lift adaptor or faulty third-wire ground. *You must check with an AC voltmeter every possible path between instrument amplifiers and sound system microphones!* This is an ironclad rule, and yet I will guarantee that you will find at least one hot chassis on a large stage. When you find a ground loop, do not shake the plug around in the junction box until the crud is knocked off. When the stage starts moving around or a stage-pass-wearing hazard steps on the connection, it will again become faulty. To protect yourself and the artist, run a solid ground wire between the instrument amplifier and the metal junction box. If the instrument amplifier develops a hum, have a qualified "roadie" check it out; there is something wrong inside the amplifier.

Remember those little capacitors discussed in the beginning of this article? I don't care if you have to cut capacitors or run a ground around the building, do *not* have a hot amplifier on the stage.

In Conclusion

Hopefully after reading this article and studying the diagrams, you will pick up a few usable ideas. I can truthfully say that even when you have done everything by the book, something will come along and foul this up. On-location recording will probably give you more ground problems than you will encounter in a year of straight sound reinforcement work. The basic problem is the splitter box used for the main P.A. send, monitor system send and the recording truck send. Whenever you have three ground systems tied together, you are asking for trouble. Most splitter boxes are fitted with ground lift switches for one of the outputs, but even then, you still have two or three ground systems tied together.

The most irritating instance of recording truck-P.A.-monitor loops I can recall is when we were trying to tape "The Rolling Thunder Review" in Clearwater, Florida. The television

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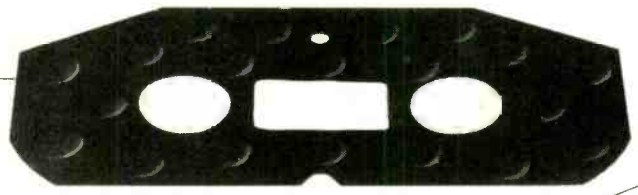

Perfectly Circular Hubs and Double Clamp System—insures there is no deviation from circularity that could result in tape tension variation producing wow and flutter and dropouts. The clamp weds the tape to the hub with a curvature impeccably matched to the hub's perimeter.

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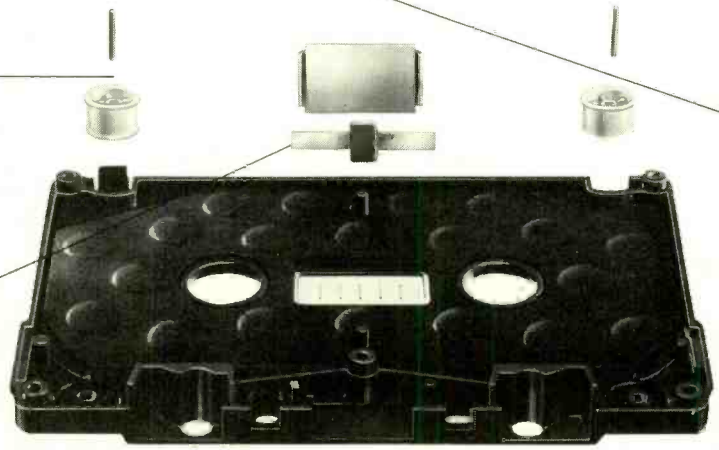

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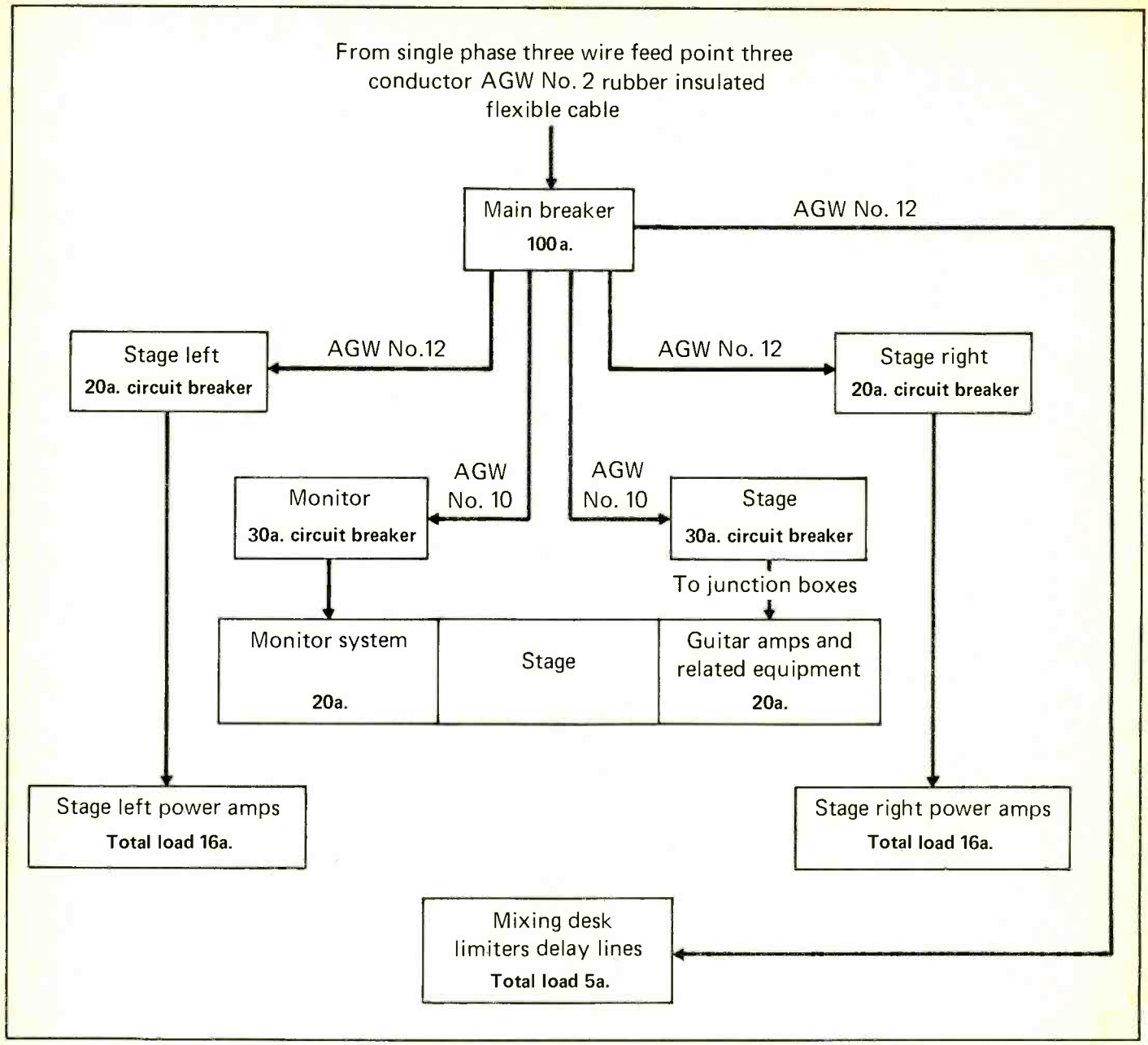

FIGURE 3

production people were there with their hundreds of kilowatts of SCR controlled studio lights, Metro Audio was tied in for an additional load of 15 or 20 kilowatts and the P.A. and monitor system was contributing at least 20 kilowatts to the total load. The building in which this was taking place was the oldest single structure wooden building in existence (so I was told), and the AC system seemed to prove its age. To make a long story short, anytime we tried to use all three feeds from the splitter box, both the P.A. system and every input on the recording desk had a very loud 60 Hz hum. On a job of this magnitude, you didn't have much time for excuses and people really don't want to hear them. All they know is that the television production time is costing thousands of dollars a minute and the audio is not working. After several minutes with the producer and other people, we reconfirmed our beliefs that the only thing that television people are interested in is video. This is an unfortunate fact but as time goes on, things are improving. I have some really good friends in the audio production end of television and with more people like them, the line of thought toward audio will change.

In this particularly bad situation, it was in fact Mr. Joe Ralston, who was with the audio unit, who recommended a fix. It seems as if the recording truck was taking its power from one point and the P.A. was taking a feed from a separate point. I might have been suspicious of this except that the two junction boxes were only four feet apart. We did the obvious thing, which was to take a single feed, but, alas, the hum was louder. It seems that the lighting cables was inducing a current into the AC lines powering the recording equipment and P.A. Joe simply said, "Why not power the P.A. from the recording truck?" We disconnected the feed from the wall circuit breaker, took a long power cable and attached it to one of the recording truck's air conditioning outlets and turned on the P.A. The silence was golden!

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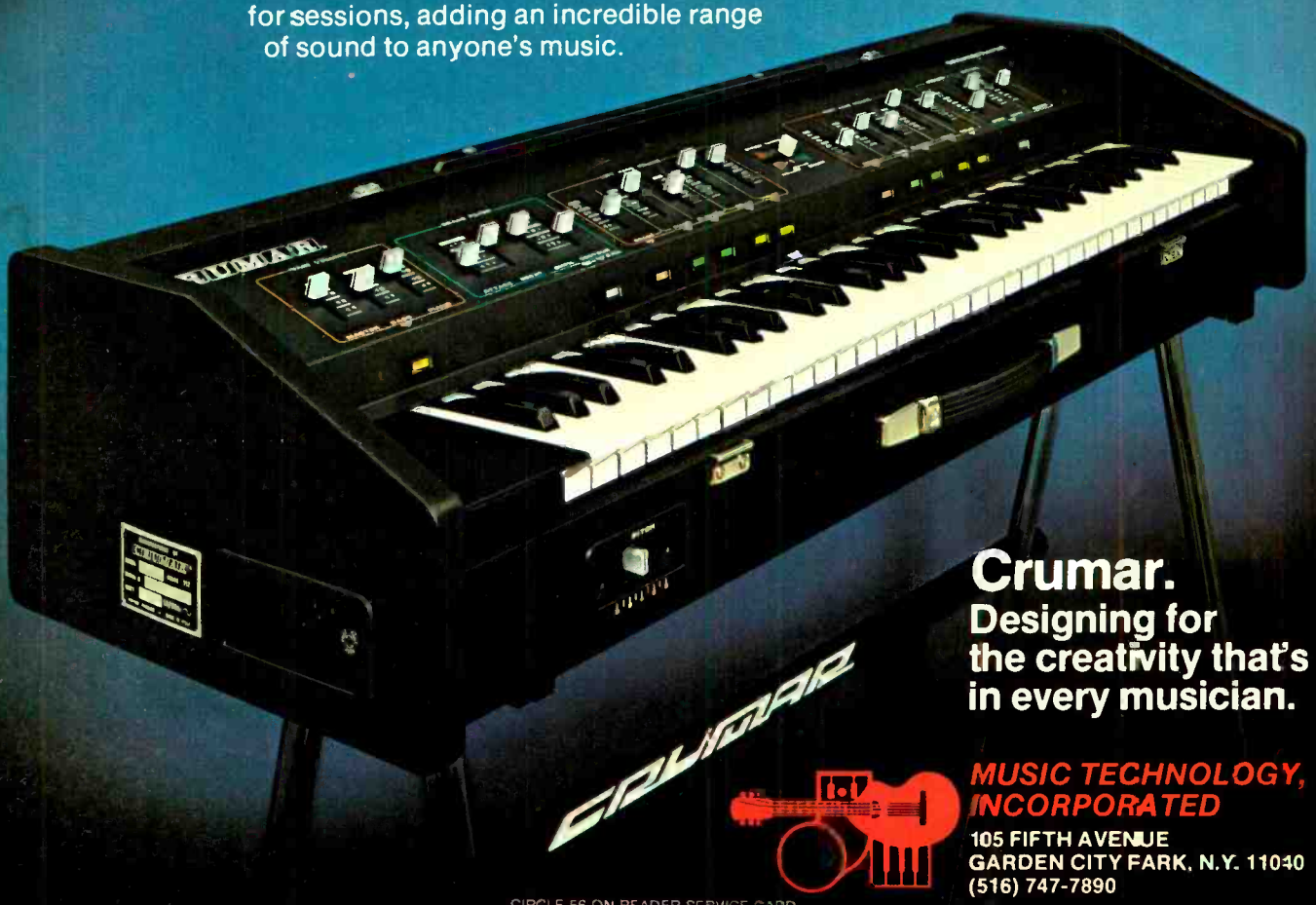

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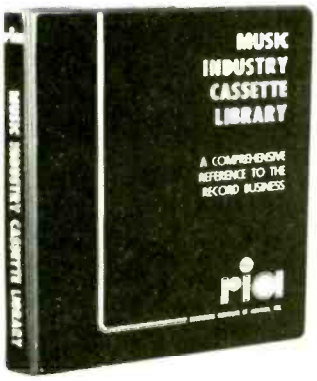

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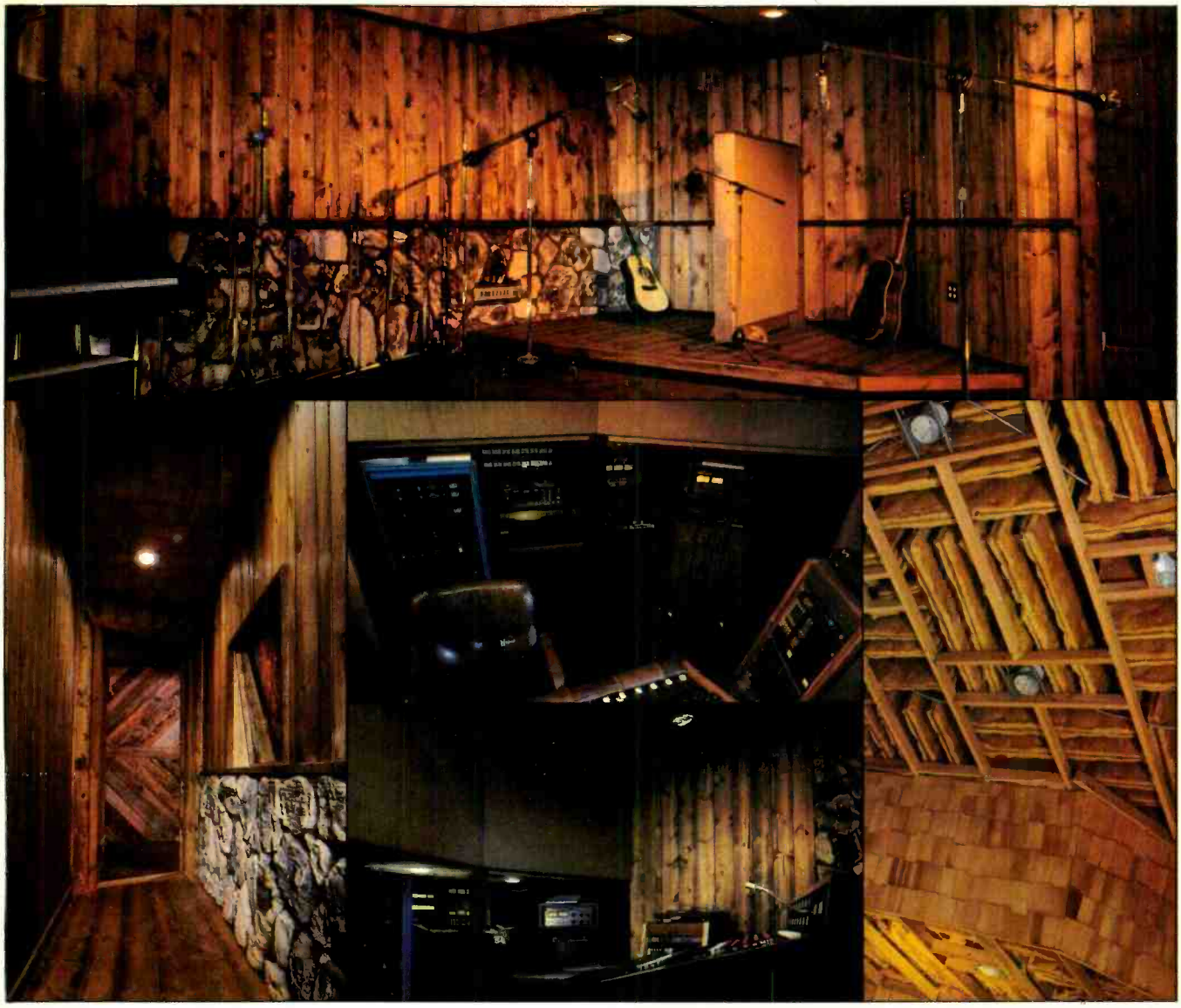

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CIRCLE 88 ON READER SERVICE CARD

ODORES

By Larry Rebhun

When *Modern Recording*'s editor called and asked me to write an article on the Commodores, I had definite reservations about taking the job. I felt out of place sitting behind a typewriter; I am an engineer, not a writer. I fail to understand any keyboard that has less than 500 switches on it, and my Olivetti only has 54.

I obviously took the assignment, and then began to admire *Modern Recording*'s willingness to go with an article written by an engineer, rather than by a journalist.

During the course of the Commodore sessions, I was able to meet some fine people who overcame their fear of having a writer in their midst and who took some time to help me out. I would like to thank them. I hope the album's a hit.

[Mr. Rebhun is presently on staff at Cherokee Studios in California. —Ed.]

On a Night Like This

It has been raining in Los Angeles for what seems like years. As I drive up to Motown's studios in Hollywood I wonder how anyone could possibly feel like making music on a night like this.

Inside the door, however, the atmosphere is totally different. Motown has built their studios in a low, industrial park-type building, and it seems really warm and friendly.

The Commodores are in the studio named Sunset. I am a bit early, and co-engineer Jane Clark is setting up the console for some vocal overdubs. Jane shares the engineering seat with Cal Harris. Both have worked at Motown for many years, on staff, and know the studio inside out. They, along with producer James Carmichael, have been involved with the Commodores from the start of the group's phenomenal success.

Over the next half hour, everyone arrives except Lionel Richie—who is slated to sing tonight. Talking to "Reverend" Carmichael and Cal, I begin to get a sense of how versatile this group really is. Four of them are proficient drummers, some play bass, guitar, keyboards and whatever else they may need. Bassist Ron LaPread says, "We've got six different writers, six different producers, six different arrangers and we come from six different ways."

This is evident from the atmosphere at a Commodores session. Everyone

there is in action. If they aren't on the mics, then they are out in the studio running down vocal parts. It's almost as if there are no walls—no separation from the control room to the studio and the vocal booth. There is a constant flow of people, and everyone is smiling.

has a hardwood floor, with area rugs under the drums and piano. On the right side of the studio is a low, suspended ceiling which juts out into the main area. This is where the drummer is usually placed. There are no walls or separate booths used for the Commodores' basic tracks.

ring to concentrate totally on the basic drums, bass, guitars and keyboards.

I must repeat that the above techniques are all starting points; there are many times when microphone placement or selection is changed, simply to try something different.

Producer James Carmichael takes care of business from his place at the board.

Out in the studio, there is a "live" mic, and the group is huddled nearby. Cal hits the talkback and asks "What's happening?" Tommy's [guitarist Thomas McClary] head pops up and he says they are studying some lyrics. I wander over hoping to hear some of those harmonies developing, and find "Clyde," the lead vocalist, studying the "lyrics" on the centerfold of some magazine.

No Set Rules

Cal and Jane are a little hesitant to speak about the microphone placement that they use on these sessions. Not that they want to be secretive, they simply are reluctant to give readers the idea that what they do is *the way*.

"We don't have any set rules," Cal explains. "We just play it by ear. We have a general starting place and if the situation requires something different, then we'll accommodate it. All the songs are different."

Jane gave me the rundown on that starting point. The room at Motown

An Electro-Voice RE20 is put into the kick drum, and a Shure 545 picks up the snare. Cal likes to use Neumann KM-86s on the high-hat and each of the three toms. Finally, he sets up a pair of U-87s for left and right overhead mics.

The guitar and bass amplifiers are arranged in a circular pattern along with the drums and keyboards. Milan Williams is the keyboard player, and his clavinet and Fender Rhodes are taken direct. There is a beautiful Steinway Grand in the studio, but Jane notes that if it is used on the basic tracking session, it is just for feeling. The final acoustic piano is always overdubbed in order to minimize leakage (KM-86s).

Ron's bass is taken direct, and as far as miking the guitar amps, Cal uses any good dynamic, such as an SM57, or even a Shure 545.

By placing the amps on the edge of the circle, Cal is able to minimize any visual obstructions between group members, and this can't but help keep the rhythm tracks tight.

The Commodores don't lay down a reference vocal during tracking, prefer-

Traffic Jams & Ego Incidents

"Rev" Carmichael takes his place at the producer's desk. William King, who plays trumpet and handles choreography, is finishing up a game of chess, so he moves the board down to the couch. (I've never seen a group so into chess. These guys even have a computer that they play against—someone lost a game in five moves.) Clyde is setting up in the isolation booth to our right. Richie is late so Clyde's going to give the background vocals a try on "Flying High." About two bars into the first pass, Richie walks in. He tells everyone that he was stuck in traffic on Santa Monica Boulevard, so he turned the radio up and was boogying to a Bee Gees song when he found himself in the middle of the street all by himself. Then he saw an ambulance barreling down on him and got the hell out of the way.

Everyone breaks up, and Richie heads out to the booth where Cal has two RE20s set up. They are running through two LA-3A limiters onto separate tracks, to be bounced together later. Clyde and Richie are going to do the bottom part of a three-part harmony in unison. After a few passes, it seems that they are having a bit of trouble. "Rev" is on the talkback with a few words about diction and intonation. Clyde jokes that the microphone must be in the wrong position, and they make a few more attempts. All of a sudden, Clyde is in the control room, and he pulls up a chair.

"What the hell are you doing in here?"

"It's not working. Let Richie do all the parts himself."

That's eventually what happened. I mention this incident because I've seen this scene many times, in various sessions, but this time there were no hard feelings or ego trips. Everybody in the studio was still having a good time, and Clyde really didn't care if he sang on the tune or not. Here, the song was the important thing.

Clyde had his turn later, on "Such Woman." He was double tracking a verse at a time, when he decided to hit

one line in harmony. Richie was at the producer's desk and was giving some direction. Both he and Carmichael liked the line, but it had to be a little tighter with the first track. It took a while, but the Commodores ended up with a dynamite vocal on that cut.

The Rooms

The console at Motown's Sunset room is a modified Quad-Eight. It has a 24-in and 24-out, and is automated. There is a section in the outboard racks that allows the engineer to preset five different sets of mute functions. The racks also contain an 1176 Limiter, a 4-inch scope to monitor phase on the Stereo Bus and Dolby twenty-four units. The Commodores' album is being recorded on a 3M 79 machine at 15 ips, with all 24 tracks being Dolby-ed.

The monitor section of the console is an Automated Process unit. Engineer Clark usually sets up the monitor mix and balances the stereo cue that the Commodores use. There are also two monaural cue sends available should the need arise.

The control room has a fairly "live," balanced sound to it. The monitors don't look familiar. Explains Harris, "Those started out to be a Westlake system, but they've been modified. Just about every two or three weeks they change *something*. They have two Gauss 15-inch woofers, and a Cetec wide-dispersion horn. We're driving them with Yamaha amplifiers now, and they seem to have made quite an improvement."

Motown has been trying a new echo unit from EMT, the model 250. This analog/digital device has a delay time of up to ten seconds, and costs about $15,000. Jane is playing with the control panel, which looks as though it had come right from the transporter room on the Starship Enterprise.

The way the engineers handle monitoring is like this: they use the large monitors to get the sound they want—and to get the energy in the room cooking—and then switch to the smaller Auratones on top of the console. The Auratones let both engineers and the producer know what the song will sound like on a radio, and also allow chess games and conversation to continue in the control room while the staff attends to whomever is on the microphone.

Production Credits

Producer Carmichael has quite a track record. He first was an arranger for most of Motown's top acts, and then shifted into production duties. Cal Harris and he have known each other since before working at Motown. They have done all the Commodores albums. On the one that is now in the works, Carmichael shares production credit with the Commodores. This album has already "shipped" platinum, and will follow the other six gold and two platinum ones that the group already has collected.

"Rev" is usually the man who calls the session to order. Everyone then gets together near the piano for a little discussion of exactly who is doing what that evening. As far as musical decisions go, everyone gets in on them.

"It's pretty open," says Carmichael. "Everybody that's involved has input, and most things are done the democratic way. More often than not, we'll go with an idea that has more people for it than against it—except in very special cases, when I just have my way about it."

This democratic attitude contributes in a large way to the atmosphere in the Commodores sessions. The six group members, producer and engineers work together as if they *all* were Commodores.

An Aside of History

The Commodores began as the Jays, when everyone attended Tuskegee Institute in Alabama. Richie, King and McClary were Business Administration Majors. LaPread was an Electronics Major, and Williams was an Electrical Engineering student. "Clyde" Orange was the only music major in the group.

After going to New York and finding a manager, the Jays were signed to Motown and became the Commodores —a name picked right out of the dictionary. On their first major tour, they opened the show for the Jackson Five. It was a special event earlier this year, when the Commodores sold out Madison Square Garden, time and again, as the top act of the show. Michael Jackson was in the audience.

As it turns out, the Jacksons are down the hall, and Michael and Germaine stop in to say hello. Clyde comes in from the vocal booth and everyone takes a break.

Richie tells about the first time producer Carmichael met the Commodores in the studio. James had been working with the Jacksons and various other vocal groups, so the guys didn't want to seem unprofessional. James asked who the baritone was, and Richie thought fast and said Clyde was. James asked about the tenor, and Richie said . . . uh . . . he was. Anyway, they divided up the vocal parts. Carmichael then asked them to sing a chord. It was painful, but now everyone is laughing about it because it broke down a lot of the tension and pretentiousness in that first encounter.

Engineer Jane Clark handles the controls while Cal Harris sits in.

Clyde smiles and jokingly suggests that Michael and Germaine sing some background on a Commodores' song, but they have to leave.

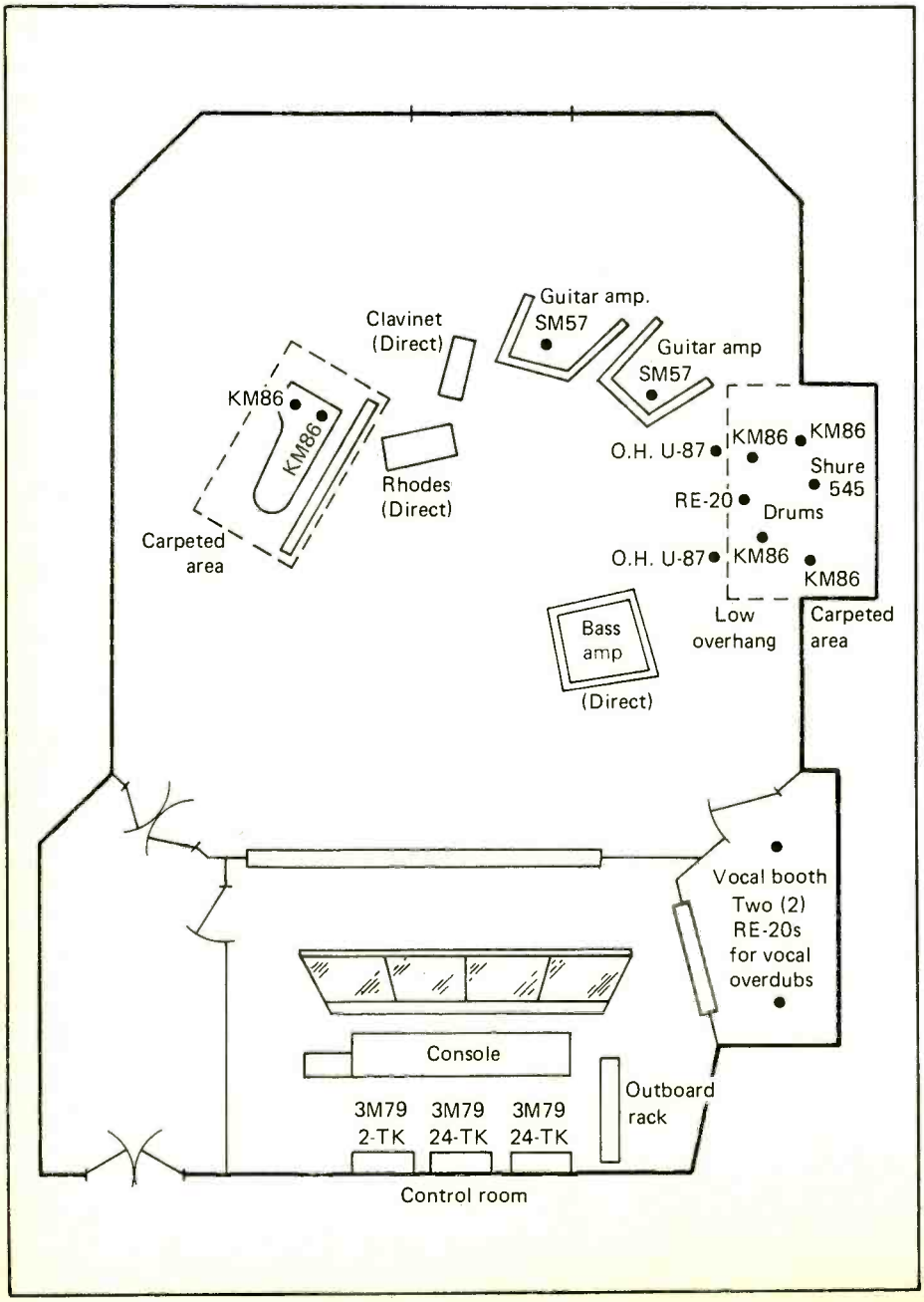
Track Arranging

The general progression which takes place during a Commodores' album was explained to me by Jane Clark. The guys first lay down the basic tracks, then do some overdubbing on guitars and keyboards. The background and lead vocals are put on next. Then Cal and James figure out some synthesizer sounds on an ARP 2600, or an Oberheim, and James uses his arranger's talent to write the string and horn parts, which go on last. Here, too, choice of microphones, for the most part, was not important. I asked Jane what mic had been used for a certain acoustic guitar overdub. She thought about it for a second, and then said that they often use an 86, but they used a U-87 on that one and, well, it sounds fine.

The engineers didn't use a lot of EQ either. I saw a couple of 4 and 6 dB boosts at 3 kHz and 10 kHz, but most of it was pretty straightahead.

Jane seemed to handle most of the punch-ins, and patching. Both she and Cal are very calm, quiet people, and yet they seem to fit in perfectly with the high energy music crashing out of the monitors. They sort of keep the studio on the ground. "Rev" Carmichael spans both worlds here. Having known both engineers for so long, he has total trust in them, and therefore is completely free to handle artistic matters.

There is one thing that happened during the session which I feel almost duty-bound to relate. I found myself in a room with two women engineers at the same time. This is a rarity in the music business, believe me, and I must commend the folks at Motown for their conscientiousness in that area.



36 Hours a Day

The Commodores usually keep at it until 2 or 3 in the morning. That's a good 7 or 8 hours, and they work 6 days a week. They seem to be used to it, though. Tommy says they would work 36 hours a day if they had to.

When they aren't in the studio, they're on the road. You really have to be into your craft in order to survive 90 cities in 150 days, which was only the *U.S.* leg of their recent world tour. They'll be heading out again after this album is complete. And somewhere in there, they've managed to squeeze in a starring role in a new feature film. (I'm getting exhausted just writing all this stuff down!)

A Last Look

Tonight's session ends with general agreement on tomorrow's agenda, and these guys are ready to party until the morning.

I walked out into the studio for a last look. It really is a nicely laid out place. The ceilings must be twenty-five feet high, and have alternating squares of absorptive and reflective material. The isolation booth is in the corner next to the Control room, and this allows for greater communication between engineer and vocalist(s). In the Commodore sessions, the booth's placement had an additional advantage in that the artists' attention was directed towards the console, and whatever crazy scene was happening out in the studio tended to be a bit less distracting.

One feeling that I came away with: everyone involved in this project was a professional, in the best sense of the word. Despite all the joking and kidding around, these people definitely got the job done.

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REVERB OVERDOSE

EVER

By
Peter Weiss

part I

When seen in the cold light of logic, the application of artificial reverberation effects in a recording studio is a little puzzling. The situation regarding such effects is analogous to one a close friend of mine encountered recently. He hired a landscaping contractor to remove some fallen and cut-down trees and branches from his newly acquired property. Soon afterwards, the same contractor offered to sell my friend some bargain-priced seasoned firewood. Well, my friend jumped at the low price, only to discover that his "bargain" looked suspiciously like the stuff the contractor had a few days before hauled away.

Reverberation makes a similar two-way trip in most contemporary recording situations. Typically, in the interest of isolation, studios are designed to provide a minimum amount of actual reverberation, and the effects of the small amounts that remain are usually nullified by baffles, mic placement, etc. However, once the mixdown procedure begins, there is generally a need to *add* reverberation effects. So, after going through all the trouble of eliminating natural reverberation, we find ourselves buying our own wood back —using artificial means to add "liveness" to the mix. On the surface, very illogical. However, the realities of contemporary multi-track—four or more—recording impose their own logic. In order to maximize the production flexibility afforded us by multi-track techniques, many decisions about the sounds of musical elements must be deferred until mixdown. Since reverberation effects are fairly easy to add in a mix and very difficult to remove from a track once recorded, our multi-track logic would dictate that all reverberation effects be dealt with during mixdown. In view of this, we will confine the beginning of our discussion to devices and procedures employed during mixdown.

Working Definitions

To help us keep this discussion clear and relatively uncluttered, we ought to establish some working definitions of the various reverberation effects, devices and related terms.

AMBIENCE—Refers to the acoustical nature of a particular location or environment, whether real or artificially enhanced.

DEAD—Used to describe an acoustical environment that produces very little perceptible reverberation.

DECAY TIME—Narrowly defined, decay time means the time required after the original signal ceases for a reverberating signal (of a specific frequency) to decay in amplitude to a level 60 dB below the level of the original signal. However, in a control room situation the decay time of a reverberation device is seldom referred to in a strictly quantitative way. In most cases where variable decay time is available, it is adjusted to suit the listening tastes or requirements of production personnel, without reference to specific numbers. (However, digital-type echo chamber units have calibrated decay times that are push-button selectable.) The decay time (at a given frequency) of a room or acoustical echo chamber is determined chiefly by physical size and the acoustic reflectivity of room surfaces.

DELAY—The process of storing an audio signal for a very short period of time, and then retrieving that signal. Also, delay refers to the aural effect produced when an original signal and a delayed version of that same signal are combined.

DRY—A descriptive term applied to a signal that has no reverberation effects added to it.

ECHO—Formally, a single repetition (or at most a few repetitions) of an initial sound. However, in a control room situation "adding echo" means the effect achieved when a portion of a signal is sent to an echo chamber and the resulting reverberation signal is mixed with the original signal.

ECHO CHAMBER—A separate, closed room whose surfaces have been

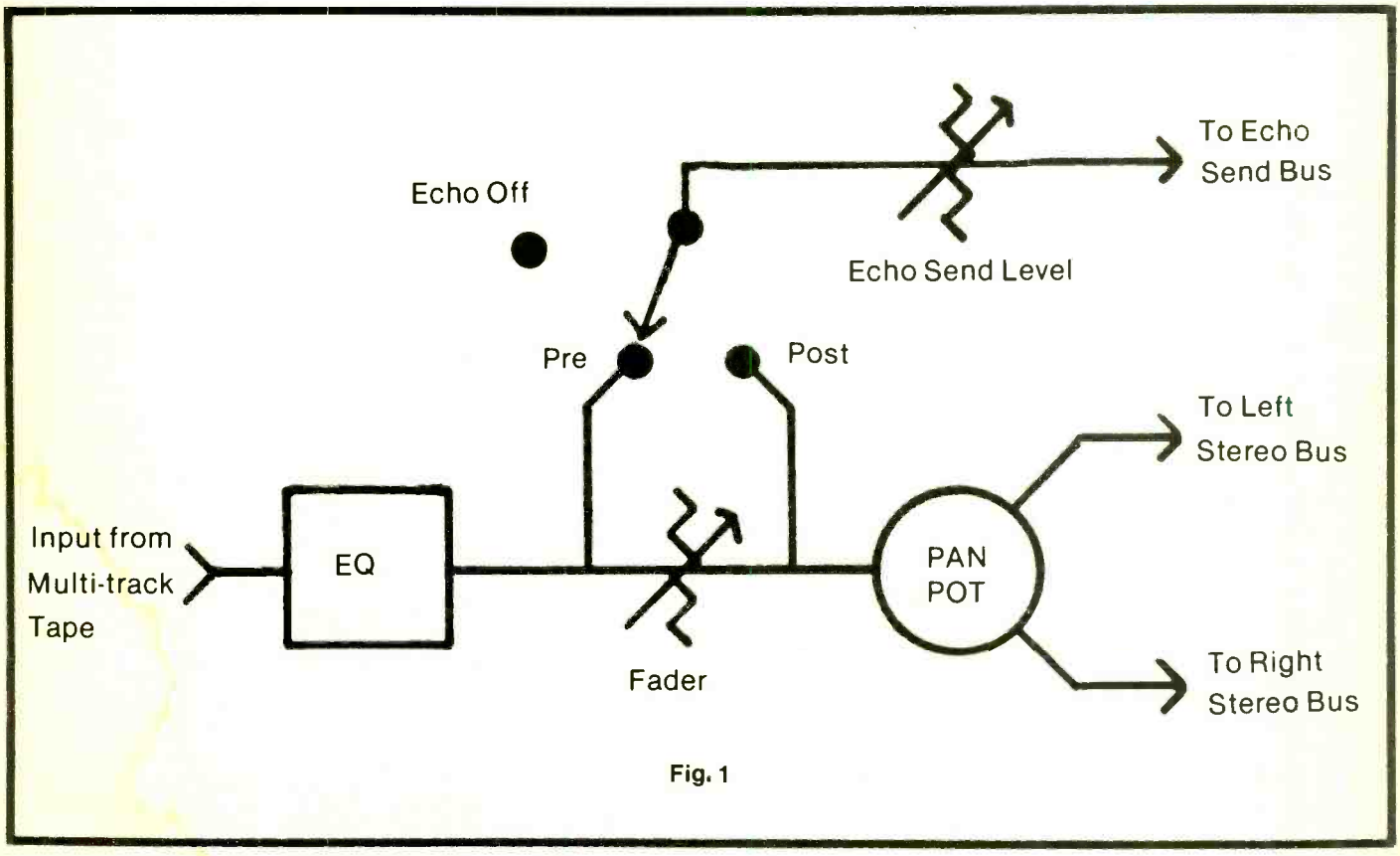

Fig. 1

treated for maximum reflectivity of sound. Generally, a signal is sent from the mixing board via the echo send lines and a power amp to a speaker in the chamber. A microphone is located in the chamber in a place where it receives mostly reverberated (reflected) sound and little or no direct sound from the speaker. The low signal level of the microphone is brought up to usable level by a preamp and is then returned to the mixing board to be mixed as described. The term echo chamber is also applied to electro-mechanical or electronic devices that mimic the effect of an actual room.

ECHO RETURN—The line that carries the reverberated signal from an echo chamber to the mixing board. Also, "echo return" is used to denote the fader or volume control used to set the amount of reverberated signal returning to the mix.

ECHO SEND—This term can be applied to any or all of the following:

1) The individual controls that determine how much of the signal at a particular mixer input or fader is to be sent to an echo chamber.

2) The mixing bus which electrically combines several of the individual controls mentioned in 1.

3) The line feeding an echo chamber.

LIVE—Used to describe an acoustical environment that produces a substantial amount of reverberation.

POST-ECHO—An arrangement, usually switch-selectable, in which the amount of signal sent from a mixer input to the echo send bus is dependent not only on the setting of the individual echo send control, but also on the setting of the input fader (see Fig. 1).

PRE-ECHO—A switch-selectable connection scheme in which the amount of signal sent to the echo send bus from a mixer input is dependent only on the setting of the individual echo send control, and independent of the setting of the input fader (Fig. 1).

"REVERB"—Also known as tape-echo and slap-echo. This is the effect often heard on 1950s rock productions.

Reverberation—The physical phenomena associated with sound waves striking surfaces of an acoustical environment. Also, the aural effects produced by these reflections. In extremely reverberant environments the initially reverberated sound will almost equal the original sound in intensity. In all cases, however, once the initial sound ceases, the reverberating sound diminishes in intensity with time (see "Decay time" above).

REVERBERATION DEVICE—Any means of producing reverberation effects—e.g., acoustic, plate, spring or digital echo chambers, multi-head tape loop machines, tape delay, digital delay, digital "reberb."

REVERBERATION EFFECTS—Artificial effects produced by reverberation devices intended to enhance or mimic natural reverberation. Also, special effects created by these devices that have no natural counterparts. The important reverberation effects are: Echo, "Reverb" and Delay.

WET—Used to describe a signal which has been combined with reverberation effects.

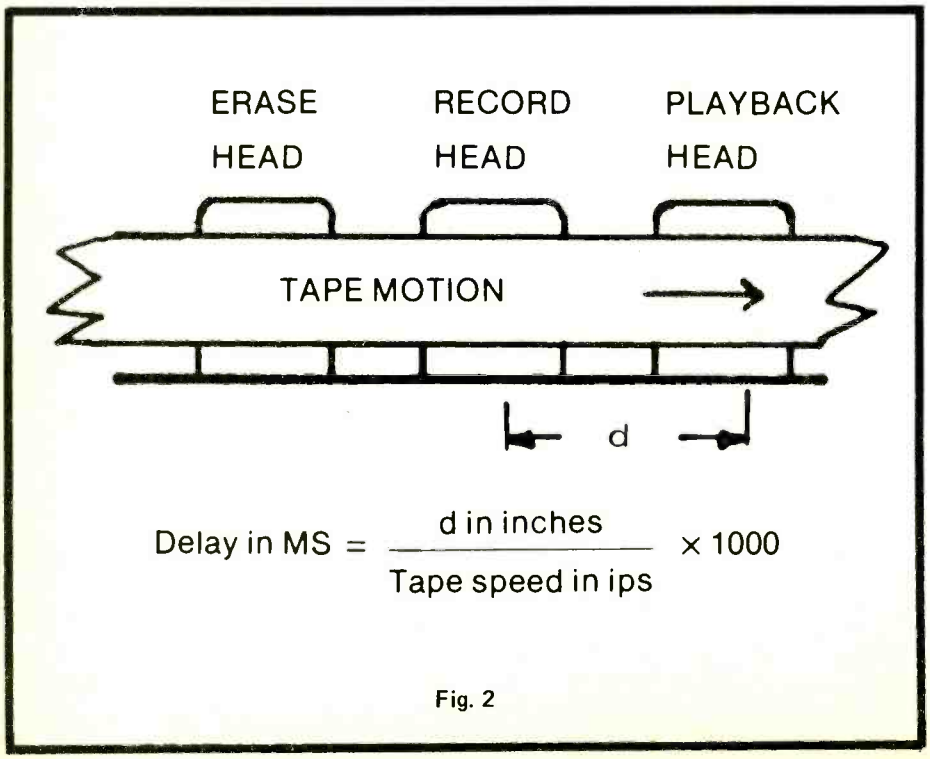

Fig. 2

Need for Delay

The reverberation effect most often applied during mixdown is the kind of echo that closely resembles the natural reverberation of a large room. The systems that produce this effect use an echo chamber (or chambers) and some sort of delay device. Of course, the acoustic echo chamber, when properly designed, gives the closest approximation of natural reverberation, but modern electromechanical (i.e., plate and spring) and digital devices can produce excellent results.

The need for a delay device in producing natural-sounding reverberation effects becomes clear when we consider what happens to sounds and the way they are heard in a relatively "live" room.

The first sound to reach the listener is the sound that comes directly from the source. After a short delay—the length of which is determined by the room size and relative locations of source and listener—the first reverberated sound arrives at the listener's location. Subsequent reverberations arrive after successively shorter time intervals and at diminishing intensities. In very large "live" rooms, like high school gyms, there can be a very noticeable time gap between the arrivals of the direct sound and the first echo or reverberation. Generally though, the first and subsequent reverberations are perceived to blend together to create an overall effect.

The introduction of a delay device in the echo send line of an artificial reverberation system aids in recreating the effect of a large "live" room by providing the initial delay before the generation of the first reverberated signal. This delay can make an acoustic echo chamber sound larger than it actually is. Since most acoustic chambers are built with space-saving in mind, any means of creating an apparent increase in chamber size is desirable.

Delay of some sort is generally required when plate or spring type devices are used to simulate natural reverberation. These systems depend on producing mechanical vibrations in some resilient medium—either a suspended metal plate or slightly stretched spring. The vibrations are produced and detected by electromagnetic drivers and pick-ups, similar in nature to speaker drivers and phono pickups, respectively. The vibrating plates or springs continue to vibrate after the original signal stops, thereby producing a reverberation-like effect. However, since the physical size of the vibrating elements is relatively small, the vibrations begin to be detected after a delay that is much too short to be realistic.

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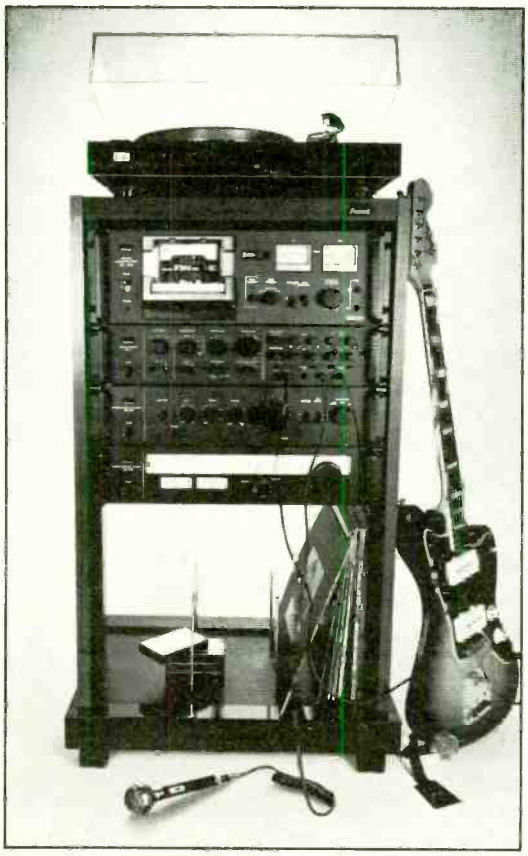

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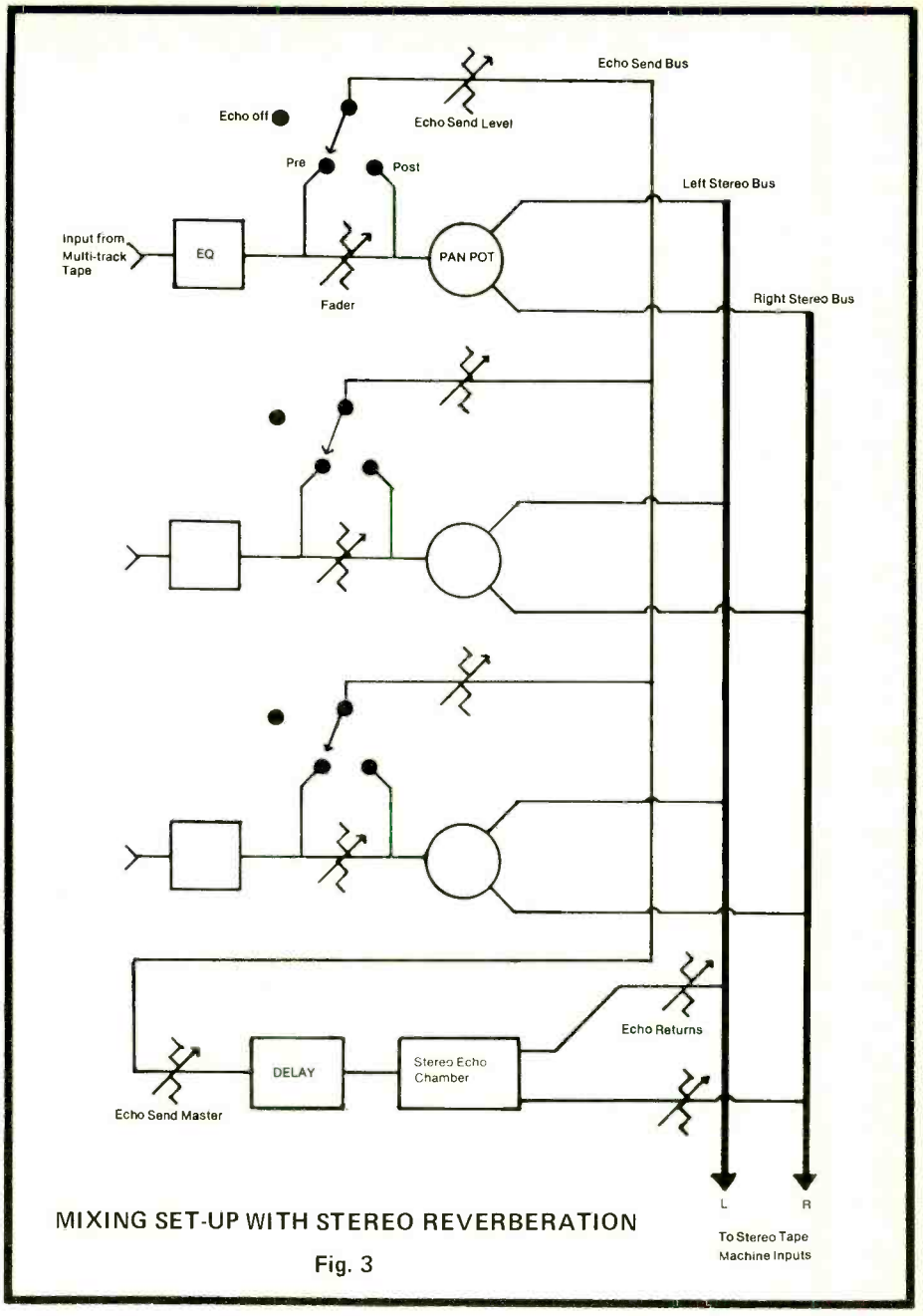
Traditionally, delay for echo-send purposes has been achieved by utilizing the time-lag between the recording and playback of a signal on a moving piece of magnetic tape (see Fig. 2). The actual delay time is then the time it takes for a given spot on the tape to move from the record head to the playback head. At 15 ips tape speed on a professional deck, the delay time produced is about 130 milliseconds (130 thousandths of a second). This choice of delay time may not suit the needs of a particular situation, but unless a continuously variable speed control for the tape machine is available, the user is more or less stuck with two or three fixed delay times as determined by tape speed. The distance between record and playback heads usually is not adjustable.

Digital delay devices, which use a solid-state memory to store and release audio signals, have great advantages over tape machine delays. Delay times of these devices are continuously variable from near zero to the hundreds of milliseconds. Also, a digital delay device will have a frequency response that is the same for any choice of delay time, while a tape machine delay has a frequency response that depends on tape speed. Finally, as a comfort to those who work long mixdown sessions, digital delays do not have to be rewound every thirty minutes.

Direct Applications

Until now, we have not discussed direct applications of any of the reverberation devices mentioned. But, now that we have some understanding of the use of delay in conjunction with an echo chamber we can look at a mixing set-up for producing natural-sounding *stereo* reverberation (see Fig. 3).



MIXING SET-UP WITH STEREO REVERBERATION

Fig. 3

The preferred method of generating stereo echo is with a reverberation device having one input and two outputs. The two outputs would be derived from two different microphones in an acoustic echo chamber, or from two different pick-ups in the case of a plate or spring type. Digital "echo chambers" are available, but they are generally single channel input and output units.

The need for two separate outputs from the echo chamber exists because a single output returned to the mix and placed in stereo-center does not create a broad enough stereo effect. To clarify, let us consider again the situation in a "live" room. The reverberant sound reaching the listener's right ear is different in phase and perhaps other characteristics from that reaching his left ear. Some attempt at simulating this difference must be made in order to achieve pleasing stereo effects.

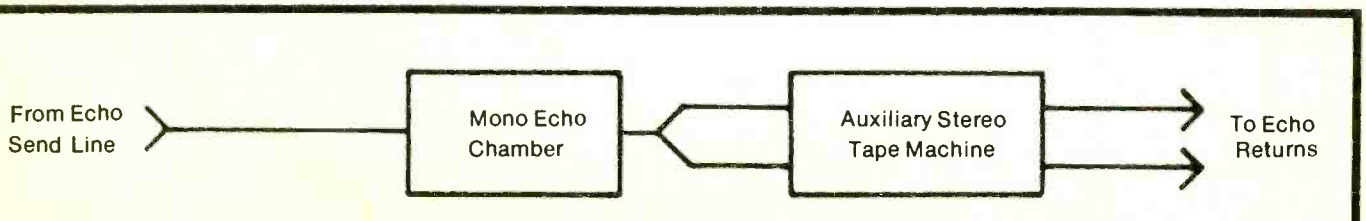


Fig. 4

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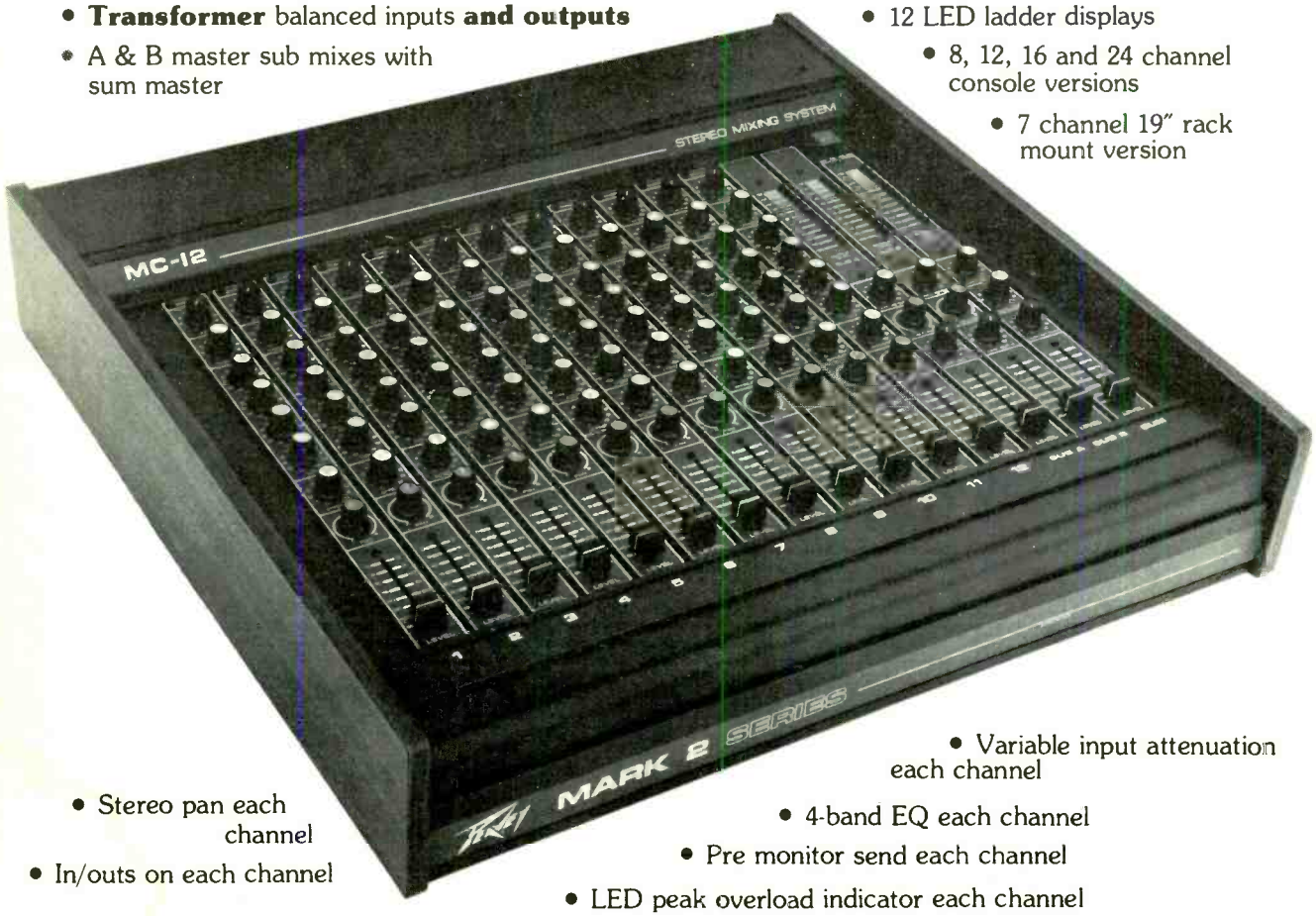

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CIRCLE 89 ON READER SERVICE CARD

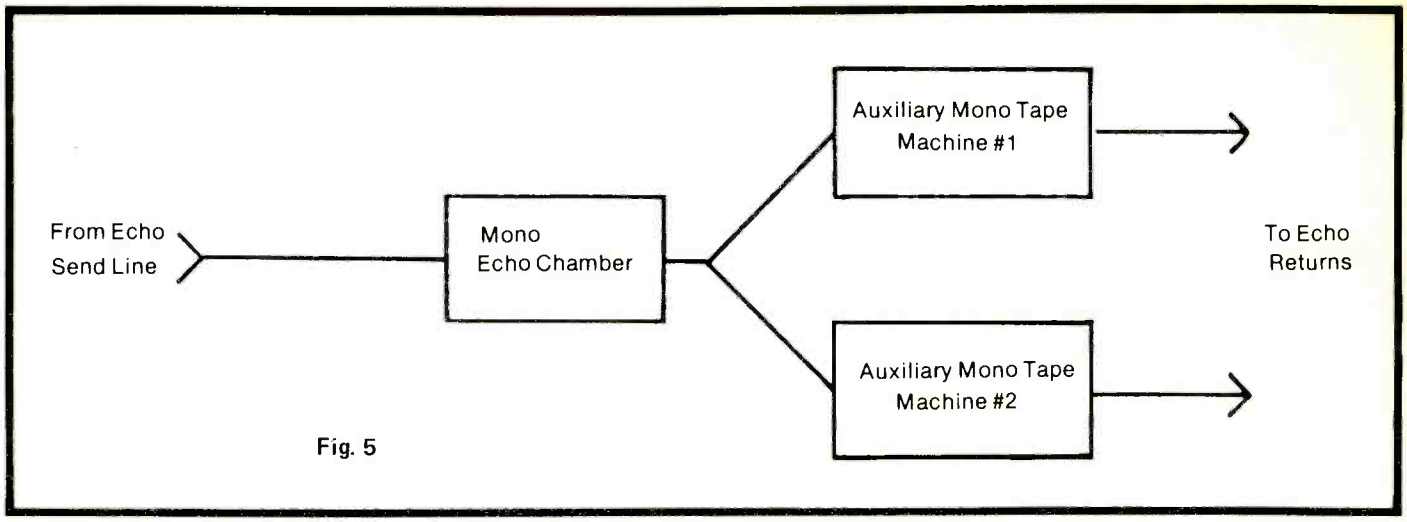

Fig. 5

There is a way to simulate stereo echo with a single-channel echo chamber, but the acceptability of the results is a judgement best left to the user. In this set-up (Figs. 4 & 5) instead of placing a single-channel delay device in the echo send line, the echo return signal is split and sent either to two auxiliary monaural tape machines or to two tracks of an auxiliary stereo tape machine and then returned to the console. If the mono machines are used, the minor random differences in tape speed between the two will produce enough phase variation to closely approximate a stereo effect. If the stereo machine is used, the playback head azimuth can be adjusted sufficiently far off of "normal" to create a small constant phase difference at higher frequencies between the output signals from the two tracks. Some re-equalization of the playback amplifiers in the tape deck is required to offset the loss in high-frequency response.

Next month, in Part II, we will continue to describe methods of achieving both natural-sounding and exotic special effects. In addition, we will list and describe a fair sampling of commercially available reverberation devices. Finally, we will make an attempt at offering some guidance in the application of these devices and the effects they produce.

END Part 1

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CIRCLE 79 ON READER SERVICE CARD

Ambient Sound

BY LEN FELDMAN

New Amplifier Standards Coming

After nearly three years of on-again off-again conferences, meetings and committee reorganization, the Institute of High Fidelity is about to issue new measurement standards for audio amplifiers. By the time you read this, the new standards may have already been adopted by IHF membership and a four-year comedy of errors may have ended. Back in 1974, when the Federal Trade Commission decided to tell the audio industry how it must rate the power output of audio amplifiers intended for consumer use, the IHF panicked and summarily declared that its Amplifier Measurement Standards (which had been in use by the industry since 1966 in its latest revised form) was "obsolete" and was not to be used. Unfortunately, the FTC Power Rule dealt *only* with power output ratings and rated harmonic distortion. As any reader of this publication knows, there are many more parameters of an amplifier that need to be measured and quoted if one wants to describe the performance of that product.

After a cooling off period, the IHF realized that there would have to be new standards written, which not only incorporated the FTC power measuring technique but which also standardized the many other measurements which must commonly be made on an audio amplifier. Under the recent guidance of Mr. Edward Foster, an independent consulting engineer who runs his own laboratory (Diversified Science Laboratories) and also writes for several high fidelty consumer publications, that new standard is now ready for adoption.

As Technical Director of the IHF, I sat in on all of the committee meetings at which the final standard was drafted, and while details of the entire standard cannot be spelled out in this brief space (I will tell you where to write for the entire new standard as soon as it is available in print), I'd like to touch upon what I consider to be some of the important highlights of the new standard.

IHF Dynamic Headroom

Prior to the promulgation of the FTC Power Rule, it had been common practice for amplifier manufacturers to offer "music power" or dynamic power ratings of their products in addition to the continuous power rating. Once the FTC rule came into being, however, many amp makers abandoned this practice because the FTC discouraged (though it did not prohibit) multiple wattage ratings. In addition, the old technique for measuring "dynamic power" did not lead to meaningful ratings, in the opinion of many audio engineers. Still, it felt that *some* sort of dynamic power indication was needed. You have all probably encountered the situation wherein two amplifiers, both having the same *continuous* power rating when delivering music signals, do *not* produce the same loudness levels before clipping. These differences arise because power supply regulation may be quite different between the two similarly rated amps. An amp having very "stiff" supplies will deliver no more short-term transient power than it will "continuous" power, while an amp with "softer" power supplies may be able to deliver considerably more power for a short term (as it is often called upon to do when amplifying musical signals) than it can when fed with a continuous sine-wave signal.

The Committee was faced with two tasks here: how to specify this dynamic power capability *without* using a wattage figure, and what method to use in determining the short term power handling capability of the amplifier under test. With the aid of studies conducted by Hitachi Company (in connection with their highly efficient Class G amplifier circuitry), it was decided to specify a new type of test signal. The test signal will consist of twenty milliseconds of a 1 kHz tone burst, followed by 480 milliseconds of the same frequency reduced in amplitude by 20 dB. Thus, the repetition period of the test signal is 500 milliseconds, or one-half second.

After first determining the rated continuous power output of the amplifier and accurately calibrating an oscilloscope by means of a continuous signal of that power rating delivered by the amp, the new test signal is applied to the amp and the output of the amp is observed on the calibrated oscilloscope. Level of the high-amplitude (20 millisecond) portion of the special test signal is increased beyond the "continuous power" level until clipping of the 1 kHz signal is observed on the 'scope. The voltage at this clipping level is observed and the ratio of this voltage to the voltage equivalent to the continuous power rating of the

amplifier is translated into decibels. This dB figure will henceforth be known as the IHF Dynamic Headroom of the amplifier under test. As an example, suppose an amplifier is rated at 50 watts per channel continuous power. Using an 8-ohm load, that would be an RMS voltage of 20 volts first displayed on the 'scope. Suppose now, that using the special short-term test signal, a voltage of the high-amplitude segment of that signal reaches 30 volts, as displayed on the 'scope face. The ratio of the two voltages is 30/20, or 1.5, which works to be 3.52 dB. Thus, this amplifier would be rated as having an IHF dynamic headroom of 3.52 dB. A high dynamic headroom would not necessarily mean a "better" amplifier but would at least tell the consumer how the amp will behave (with respect to music signals) as compared with its continuous power output rating.

New Signal-to-Noise Reference Levels

In the past, it has been common for amplifier makers to rate signal-to-noise of their products with respect to full rated output for the high level inputs of that amplifier. This makes it difficult for consumers to compare the S/N of products that have widely differing power output ratings. Here's an example. Suppose a 100-watt per channel amplifier has a high-level S/N of 90 dB. That means that the residual hum-and-noise level across 8-ohm loads would be 90 dB below 100 watts, or 1×10^{-7} watts (0.1 microwatts). A 10-watt per channel amplifier, on the other hand, having the same S/N spec (referred to *its* rated output) would only have a residual hum-and-noise power of 1×10^{-8} watts (0.01 microwatts), or one-tenth as great as that of the higher powered amp. Yet an unsuspecting consumer would assume that the two amplifiers are equally "noisy." The new standard proposes that all signal-to-noise specifications be referred to a nominal output level of 1 watt. While this will make all S/N numbers look "poorer" or lower, it will, for the first time, enable legitimate comparisons between amplifiers of widely differing power output ratings. For the higher powered amp used in our example, S/N would be 70 dB (below 1 watt) while for the lower powered unit, S/N would be 80 dB—or 10 dB better, as it should be.

In the case of signal-to-noise measurements of low-level (phono, mic, etc.) inputs the situation in recent years has been even more confusing. Some manufacturers have used an input reference level corresponding to the input sensitivity of their phono-equalizer-amplifier combinations. That is, if 2.5 millivolts were required to produce full output from the preamp-amp combination, signal-to-noise measurements were referred to that level. This approach requires that the master volume control of the system be set at its highest gain setting. Others chose to reference signal-to-noise measurements of low level inputs to an arbitrary input level such as 10 millivolts, 7.5 millivolts, 5.0 millivolts or what-have-you. Using this arbitrary input, they would turn *down* the master volume control until the combined preamp-amp delivered rated output. The input would then be removed and residual hum-and-noise would be measured with reference to the full-output point established. Of course, readings in dB will vary depending upon the reference input level used, and, as in the case of the old high-level input measurement technique, depending upon the rated output of the amplifier in question. Obviously, these diverse reference levels made it impossible to make meaningful comparisons between products insofar as phono S/N was concerned.

To further complicate the matter, some amp makers used weighting networks (which generally roll off high and low frequency hum and noise components in a manner that is supposed to approximate the *subjective* annoyance factor of hum and noise) in making the S/N measurements. More than one weighting network is in common use, including "A" weighting, and the newer CCIR weighting.

In the newly proposed standards, all of these ambiguities have effectively been eliminated. The committee decided that the input level for phono S/N measurements shall be a 5 mV signal at 1 kHz. Furthermore, as in the case of high level inputs, the output of the amplifier is adjusted for a level of 1 watt. In the case of a preamp-only unit (or a preamp-control chassis), output level is adjusted to 0.5 volts. Now, regardless of the "gain" of the system or the power output of an associated power amplifier section, signal-to-noise measurements of the phono preamp section of competing products may be compared fairly and consistently.

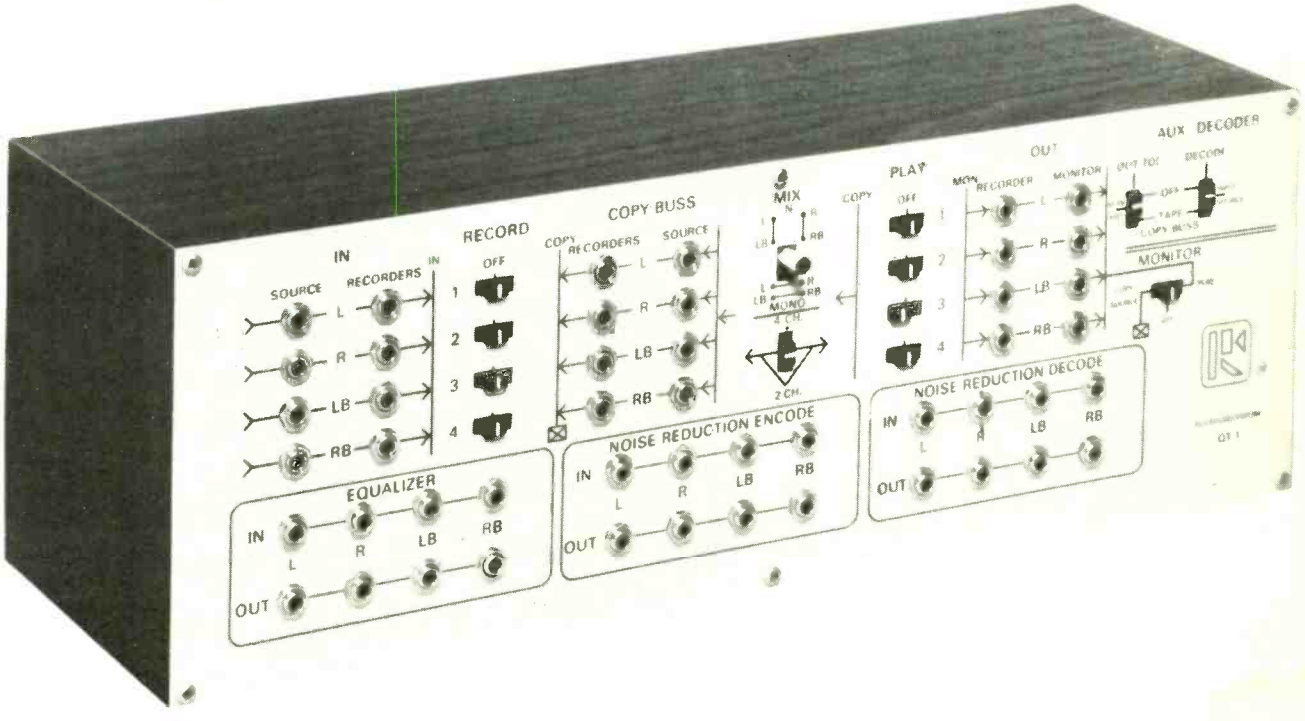
As an example of how this will affect "published" S/N readings for a typical integrated amplifier, let's assume such an amplifier (having a 50-watt power output rating) was measured using the older method and referred to its actual phono input sensitivity (2.5 millivolts) and that, using an "A" weighting network (the preferred network in the new standards as well), the result was a signal-to-noise ratio of 75 dB in phono. Using the new method, this number will be greater by 6 dB because of the difference in input level (5.0 mV as opposed to 2.5 mV) and reduced by 17 dB because of the new standard output reference level (1 watt instead of 50 watts). Thus, the new standard "A" weighted phono S/N would be only 64 dB, a less "impressive" number, to be sure, but one which more realistically depicts the performance of the system under actual use conditions.

It may take some time for manufacturers to become accustomed to the new signal-to-noise measurement approach (especially since it will force them to "back off" on the numbers), but once they do the entire industry (and prospective buyers of audio equipment) will be better off for the change.

The new standard runs some thirty-odd manuscript pages and contains many other much-needed measurement standards. It is the hope of the IHF that once the standard is circulated it will be quickly adopted by conscientious manufacturers in much the same way that the new IHF/IEEE Tuner Measurements Standards issued a couple of years ago have gained almost world-wide acceptance.

NORMAN EISENBERG AND LEN FELDMAN

Russound/FMP Model QT-1 Switching Control Center



General Description: The QT-1 from Russound/FMP Inc. could be described tersely as a switch box that expands the options of an existing tape-monitor facility in a sound system, but that simple formulation does not begin to explain the device's enormous versatility and the vast possibilities of component interfacing it can bring to a sound system—mono, stereo, or four-channel. In fact, it is literally impossible to explain it all fully in the space allotted here, although a good idea can be conveyed.

The QT-1 permits a system to accommodate up to four tape recorders, plus up to four channels of ancillary signal processing devices including external noise-reduction units, graphic equalizers, quadriphonic decoders, reverb enhancers and the like. Signal inputs and outputs, from and to the various units in the sound system, are made at the rear of the QT-1. Operation, including switching and patching, is done on the front panel.

Rear connectors, which are hi-fi pin types, number seventy-two in all. These are arranged in vertical groups of four each for seventeen groups, with designations for left, right, left-back, and right-back channels. In addition there is a stereo pair for input to a

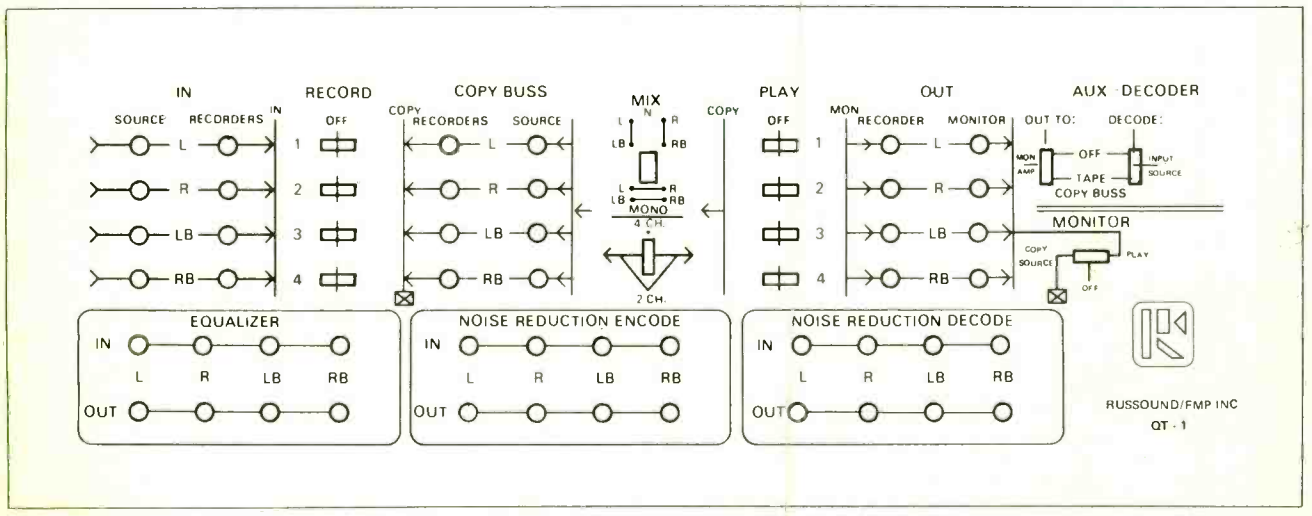
matrix decoder, and a stereo for the "C" bus output. Front-panel connectors are miniature phone-jack types of which there are forty-eight. Sixteen patch cords are supplied with the box; if additional cords are required they should be ordered from Russound; alternately Switchcraft type 770 or type 780 "Tini-Plugs" with low-C shielded cable may be used.

The connectors on the front panel are grouped under general functions: "IN," "COPY BUSS," "OUT," "EQUALIZER," "NOISE REDUCTION ENCODE" and "NOISE REDUCTION DECODE." In addition to the numerous patching options among these connectors, the front panel also provides several switching options: four switches for record; four for playback; a mono/stereo/quad selector; a mix selector; a matrix decode input selector; a decoder output selector; and a monitor selector.

The basic hookup of the QT-1 involves patching the box as a whole, via appropriate rear-panel jacks, into the tape-monitor loop of an existing sound system. From there on, you are "on your own"—weaving signal paths as you please, depending of course on what other equipment is in the system and how you want to use it. The instruction manual furnished with the QT-1 contains details on component hookups, and the use of the patch bay options and controls. It illustrates typical front-panel patch arrangements and includes several loose sheets on which the front panel with no hookups is illustrated—these sheets can be used, suitably marked by the owner, as reference "road maps" for repeating special hookups devised by the owner.

Test Results: The QT-1 is a passive device and so is not subject to the usual test measurements of power, response, distortion, etc. (It uses no power; its "response" is that of the devices connected to it; distortion is non-existent.) By the same token, however, with as many as four tape decks providing signals at the same time, the combined decks may have some loading effect on the signal source unless the output impedance of that program source is quite low, or the input impedance of each deck is sufficiently high so that four of them in parallel have little significant loading effect. Russound has wisely inserted 3.3K ohm resistors in the output line for each tape recorder, allowing mixing without overloading the recorder outputs. It also should be noted that about 6 dB of output loss will be encountered when operating more than one machine due to the mixing network insertion loss.

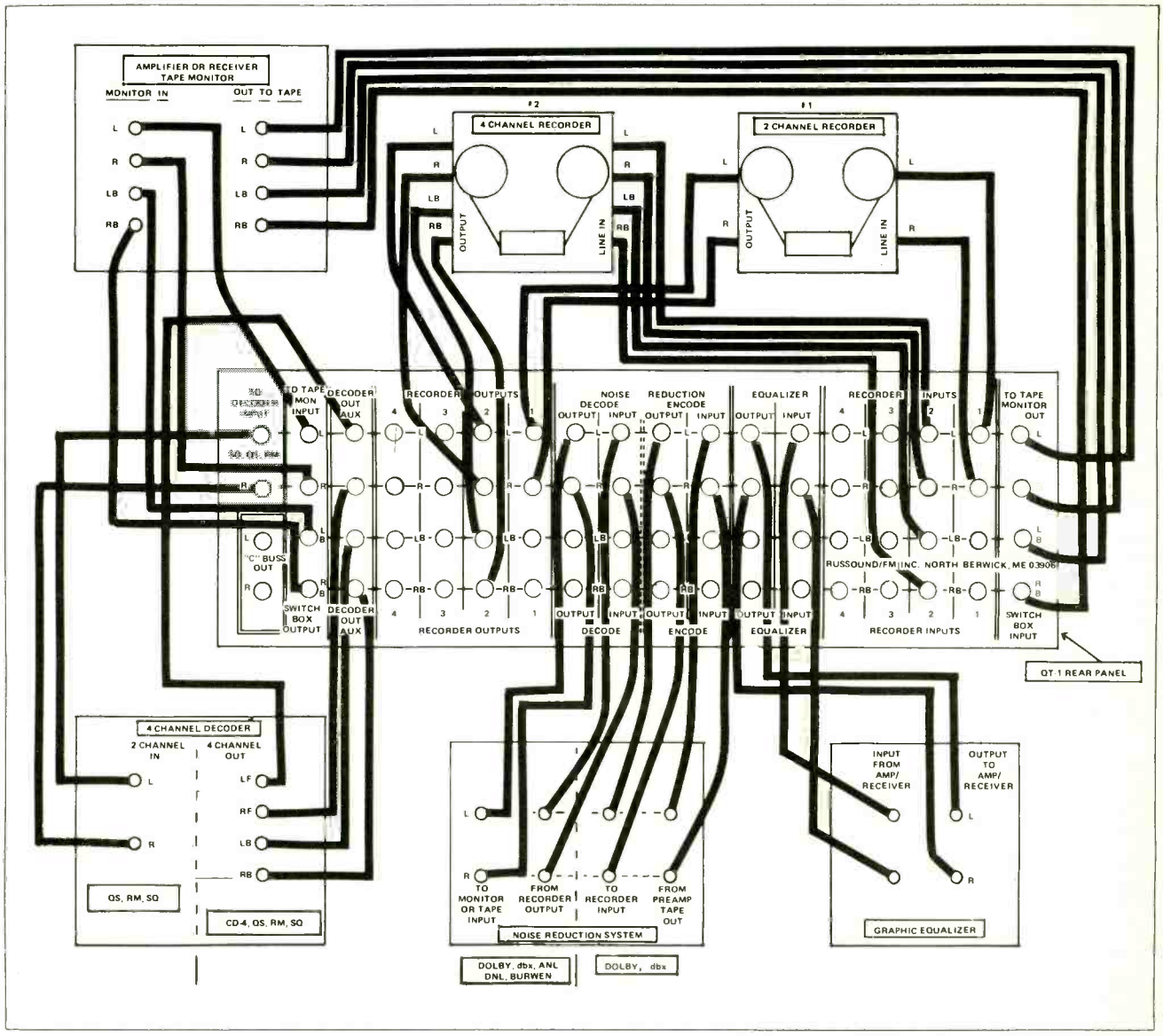
The QT-1 did all that it is intended to do. Examination of its inside revealed the intricate wiring involved in its design. The front panel facilities are linked to a circuit board that runs the width of the device. Chassis metal is sturdy and well finished. The device comes fitted in a walnut vinyl-clad wooden box, but it may be removed for flush mounting since the front panel overlaps the chassis by a generous amount.



Russound QT-1: Diagrams of front panel (supplied) can be used to mark and remember owner's favorite hookup.

A simplified wiring diagram is shown in the accompanying illustrations. Study of it will reveal how versatile the QT-1 is as a control center. In addition to play, record, monitor, copy, decode and equalize options (at any point in the signal path) it is also possible to mix down from four- to two-channel, or from two-channel to mono (this switching capability is not shown in the simplified diagram for the sake of clarity).

General Info: Dimensions are 13 15/16 inches wide; 4 7/8 inches high; 5 1/8 inches deep. Price: $249.95. Supplied in walnut-finish cabinet with operational manual, blank panel prints for reference marking, and sixteen patch cords. Additional patch cords, four for $9.95.



Russound QT-1: All of this equipment (and more) connects permanently to the QT-1, which in turn only requires one set of Tape out/Tape in monitor circuits on your amplifier.

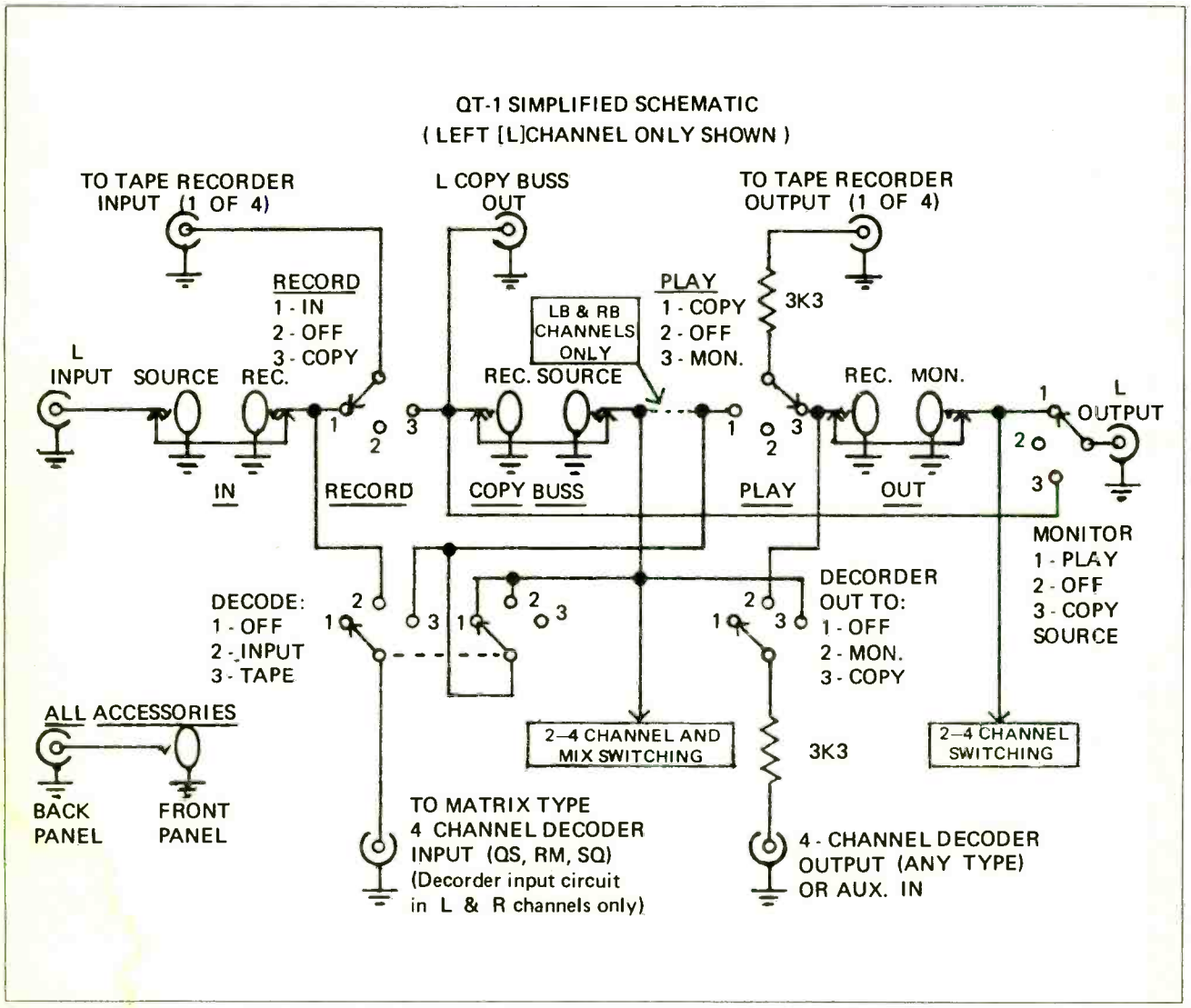
Individual Comment by N.E.: This is the kind of device of which one is tempted to say: "How come no one thought of making it before now?" Actually, the general idea of the QT-1 is hardly new, and over the years many audio buffs, myself included, have fashioned home-brewed "goes-into-and-outa' boxes" in an effort to cope with the ever-increasing number of devices and their attendant interconnections that can find their way into an audio system. And of course the all-out professional patch panel is a staple item in every respectable studio. But to my knowledge the Russound/FMP box is the first of its kind to provide a reasonably compact, and incredibly well thought-out, unit with up to four-channel capability that is vastly more useful than the interface options found on normal system components, and still significantly smaller and less costly than a full-fledged patch bay. As such it fits right in with the "semi pro" interest primarily, although it also would appeal to the advanced home sound enthusiast on the one hand, and to the full professional seeking a handy "interface tool" aside from his regular patch board.

In short, the QT-1 is for the guy or gal who has just about "everything" (or plans to get it sooner or later) in audio and doesn't make full use of it all because of the bewildering maze of cables and plugs involved. Mastering the use of the QT-1 doubtless will take some study and time on the owner's part, but the equipment owner whose collection includes the number of devices this box can handle is likely to find the effort well worth expending.

Individual Comment by L.F.: Asking me to comment dispassionately about the Russound/FMP

Model QT-1 may be a bit unfair since I have owned one of these handy units for some time and have come to depend on it heavily. Before getting it I had been gradually amassing the makings of a home recording studio—including a four-channel open-reel deck, a two-channel mastering open-reel deck, a couple of cassette decks, some separate Dolby decoder/encoders, a dbx model 122 and an equalizer, not to mention a few matrix four-channel decoders and CD-4 demodulators.

I don't care what integrated amplifier, or separate preamp, or receiver you own. If you are faced with that kind of array of components, there's no way in the world you can have enough tape-monitor circuits to handle it all. Of course, many of the items named (such as the equalizer and the dbx 122) give you a tape in/tape out pair to replace the tape-monitor circuit used when connecting the unit. But if you refuse to be locked into a given signal path sequence, you either must keep reconnecting cables each time you want to change a given setup, or you must end up (as I did before the QT-1) with the messiest rat's nest of twisted signal cables you ever have seen. It was while contemplating this mess that I decided to get the QT-1, and I have been enormously pleased with it ever since. The illustrations with our report show the blank front-panel layout and a suggested back-panel connection as published in the owner's manual in which only two open-reel decks are included. Would you believe that in my system I managed to use all but four of the 72 rear panel jacks—outdoing even the diagram supplied by Russound!



Russound QT-1: Simplified schematic.

It is important too to point out that with this complex setup, the QT-1 has never been guilty of introducing any ground or hum loops. My sixty-eight audio cables at the rear are no longer visible from up front, and I no longer have to unplug and replug any of them for any new fancy signal paths I dream up. The QT-1 is truly one of the those devices that prompts the comment: "How did I ever get along without it?"

CIRCLE 23 ON READER SERVICE CARD

Celestion Model 66 Speaker System

General Description: The Celestion 66 is a British-made speaker system distributed in the U.S. by the recently formed company of Celestion Industries, Inc. The parent company is an old well-established firm and the model 66 has been used abroad as a monitor speaker, including at the BBC. Celestion drivers, in addition, are often used in speaker systems made under other brand names including sound-reinforcement rigs.

The model 66 incorporates some design features that have become fairly familiar by now, such as a vertical enclosure and the use of an auxiliary bass radiator (a passive 12-inch cone that responds to air pressure within the enclosure). The active woofer is a 12-inch cone; this driver is crossed over at 500 Hz to a dome-centered midrange driver (2½ inches) which in turn crosses over at 5 kHz to a small dome tweeter. No controls are provided. Cabinet finish may be teak or walnut; the front grille is black cloth on a frame held in place by a screw under the cabinet. Input binding posts at the rear are color-coded for polarity. Nominal input impedance is listed as 8 to 4 ohms. Minimum recommended input power is 10 watts; maximum is 80 watts. The speaker is intended for floor placement.

Test Results: One of the striking things about our tests of the Celestion 66, aside from its excellent sound, was the speaker's power-handling ability which far exceeded the manufacturer's conservative claims. We just kept pumping power into the model 66s and monitored some of the peaks as close to the 400-watt level, which the speakers took in stride. This "loud and clear" aspect of its performance was accomplished with consummate cleanliness of sound and no decrease in the general transparency that was observed at lower output levels. At the opposite extreme, feeding no more than 10 watts into the model 66, we obtained eminently clean, linear reproduction with no "tonal dropout." The system thus satisfied us as being both rugged and capable of very wide dynamic range.

In terms of frequency response, the model 66 is rated—again "conservatively"—for bass down to 50 Hz. The ±4 dB variation given by Celestion was confirmed down to the 50-Hz mark, but there is plenty of clean bass below 50-Hz, albeit with a rolloff characteristic. Our tests showed bass output to at least 25 Hz and most of it was clean, even when pushed very hard.

High-end response was observed to beyond 20-kHz, with a rolloff starting at about 15 kHz. The large important midrange area was of exemplary smoothness and linearity. Very slight directivity effects were

noted above 5 kHz which were in sum less pronounced than in many speakers and which increased relatively little as frequency was raised. White-noise response had a smooth, generally uncolored pattern that was fairly widely dispersed.

The rated impedance of the model 66 is given as 8 to 4 ohms and the actual impedance did average between that—6 ohms—across most of the range. Transient behavior was very good, with the system responding accurately to percussive signals but not with the "over-etched"pseudo-dramatic quality imparted by some speakers.

General Info: Dimensions are 40 inches high; 15 inches wide; 11⅜ inches deep. Weight is 66 pounds. Price per system is $449.50.

Joint Comment by N.E. and L.F.: As readers of Modern Recording must be aware by now, we do not test-report too many speaker systems in these pages because we feel that the vast number of available speakers can be adequately gauged by MR's audience on the basis of their own listening judgements. We tend to confine our speaker reports to those units of special interest in terms of unique design and/or extra-special performance with emphasis on the "monitor" aspect. In the case of the Celestion 66 we discovered a speaker system that qualifies as both a high-class "home stereo system" speaker as well as first-class studio monitor—if by that much-abused term is meant a sound reproducer that is accurate, linear, very sturdily constructed and capable of handling higher-than-usual input power from a driving amplifier. The Celestion 66 has all this plus a "satisfying" kind of stereo-image projection that is quite convincing in terms both of front-to-rear depth and lateral spread. And like all really good speakers it has virtually no tonal character of its own to fool you into thinking you are hearing something that is not really in the source material. With the model 66 you can be pretty certain that what you hear is the program material rather than some designer's notion of what the material ought to sound like.

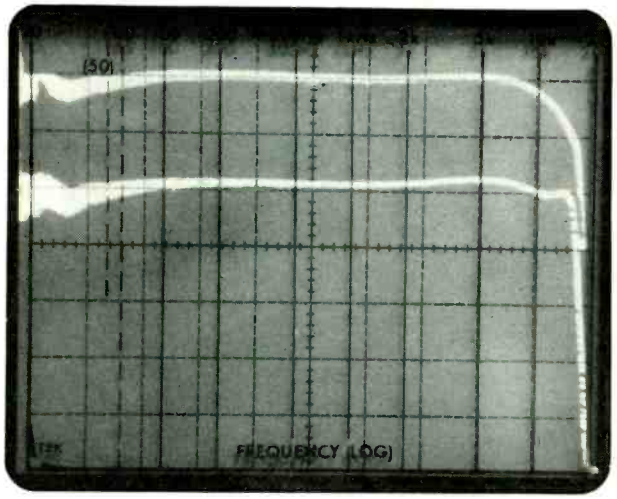
CIRCLE 22 ON READER SERVICE CARD

Fisher CR-5120 Cassette Recorder

General Description: The Fisher CR-5120 is a front-loading stereo cassette recorder that employs two motors and three heads (separate for erase, record and play), a relatively unusual configuration for a cassette deck in its price class. In most other respects it resembles a typical cassette machine in the $400 range, with such expected features as built-in Dolby, bias and EQ selectors, the usual signal input and output connections and so on. At that, the Dolby system here provides for both normal tape encoding and decoding, as well as for decoding Dolbyized FM broadcasts, including a switch to engage the 25-msec FM deemphasis characteristic. Provision also is made for adjusting the Dolby FM level using the CR-5120's VU meters.

The cassette compartment is at the left, with the unit's AC power switch and the transport controls arranged in a horizontal row below the cassette door. The usual controls are provided for record, rewind, fast forward, play, pause and stop/eject. To record, the record and play levers must be pressed simultaneously.

The tape counter and reset button are to the right of the cassette compartment, and to their right are switches for the memory rewind feature and the record-



Fisher CR-5120: Record/play response at 0 dB (upper trace) and -20 dB (lower trace) using TDK-AD tape.

level limiter. Below this group are additional switches for source/tape monitor; the Dolby options; and the bias and EQ settings. The bias switch, which is operative only in the recording mode, has three positions for normal, ferrichrome and chromium-dioxide tapes. The separate EQ switch has similar markings and is operative in both the record and play modes.

Below this group are the signal jacks for headphone output, and for left and right channel mic inputs. There also is a selector switch to choose between mic and line inputs. At the top of the panel are indicator lights for the monitor switch, the Dolby circuit, the memory feature and the limiter.

The VU meters at the right are calibrated from −20 to +5, and above each is a peak indicator which comes on for a line input level of about +3 VU. The record-mode indicator is between the two meters. Below the meters are the input level controls, separate for each channel; below them are a similar-acting pair of output level controls.

Line input and output jacks are at the rear, where the Dolby adjusting screw is found, as well as the FM deemphasis switch. At the rear there also is a grounding terminal and the set's AC power cord.

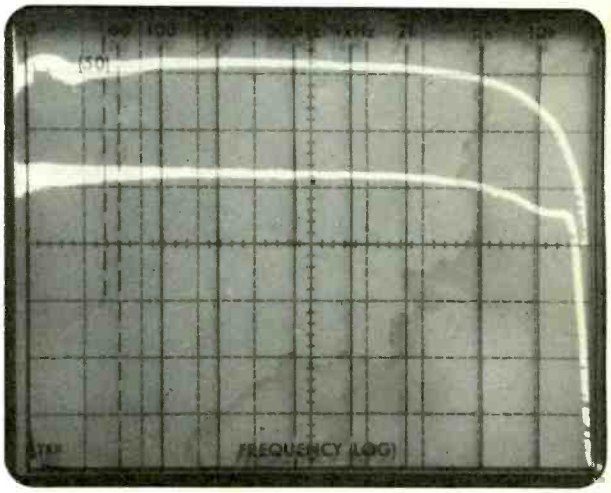
Test Results: Response measurements came in somewhat below specifications for normal high-output tape, and fairly below the specified high end in the "chrome or equivalent" tape test. In the former run, the high end made it within the ±3 dB limit to 14.7 kHz as compared to the 15-kHz mark specified. In the latter run, the high end made it within ±3 dB to 15.5 kHz whereas 18 kHz is specified. Explanations and comments (with somewhat differing viewpoints) on this are found further along in this report.

Spectrum analysis sweeps of response taken at 0 dB and at −20 dB record levels are shown in the accompanying 'scope photos. TDK type AD tape was used for "normal" bias and EQ, while TDK type SA tape (a cobalt-doped ferric type intended for optimum results in the CrO_2 bias and EQ settings) was used for the alternate settings. In terms of uniformity of response within the useful pass band, the AD tape actually did better than the SA tape with this recorder's factory adjustments. The same holds true, oddly, for the signal-to-noise ratios observed, each of which was measured relative to the 3 percent harmonic distortion level of recording. In terms of S/N, by the way, only one figure is specified (for chrome or equivalent tape with Dolby on) and it was not met in our tests. The overall S/N picture however was generally good, though not as good as in some other cassette models (admittedly higher-priced than this one).

Mechanical performance was very satisfactory within the design configuration of the unit. Wow and flutter measurements were low and tape movement in the various modes was smooth. The various features provided all worked as claimed. The peak indicators flash at the equivalent of +3 dB on the meters, but they respond instantly to these levels, even if they occur during musical transients. The limiter could provide useful during "live" mic recordings. The additional Dolby facilities, over and above the usual tape-noise reduction feature, provide the user with a means for listening to Dolby FM broadcast without having to buy either a separate Dolby decoder or a passive conversion box to change tuner deemphasis from 75 to 25 microseconds.

General Info: Dimensions are 17⅛ inches wide; 6⅝ inches high; 12½ inches deep. Weight is 22.5 lbs. Advertised price is $399.95.

Individual Comment by L.F.: One thing is clear from our measurements of the Fisher CR-5120. Three heads do not necessarily make for a superior-performing cassette deck, advertising claims notwithstanding. Certainly, being able to monitor recorded results as they are taking place is a much-needed feature for the serious recordist, and one which of course is not possible with even the best-performing two-headed decks.



Fisher CR-5120: Record/play response at 0 dB (upper trace) and -20 dB (lower trace) using TDK-SA tape.

But being able to monitor this way is only one aspect of recording.

As is clear from our measured results, the record/play frequency response of this machine was not so good as claimed for either of the tapes used. As a matter of fact, were it not for both of these tapes having a tendency to provide a slight high-end peak under most operating conditions, the response probably would have been even poorer.

The reason for this, I believe, has to do with Fisher's particular three-head configuration. The three heads here are contained in three separate structures (unlike some other recent three-head machines in which the separate record and play heads are combined in one head body). This arrangement means that the slightest variation in tape alignment (which naturally occurs from cassette to cassette) will cause an incorrect azimuth relationship between the fixed record and play heads in such three-headed machines. More expensive decks that utilize this sort of three-head configuration almost always provide a means for adjusting the azimuth of the separate record head, an adjustment that should be made for every new cassette that is inserted into the machine. Nakamichi, in its models 700 and 1000-II, uses twin blinking LEDs to indicate perfect alignment as a self-contained 400-Hz tone is recorded. Tandberg, in its model TCD-330D, uses a high-frequency test tone for the same purpose, and the unit's own meters serve to indicate maximum output of recorded high frequency. The Fisher unit has no provision for such alignment from tape to tape, and that—I feel—is its weakest point. We have measured many two-headed cassette decks in this price category which deliver better overall record/play frequency response than did the CR-5120 with our tape samples. Undoubtedly, inserting another cassette and repeating the tests would have yielded different (better or worse) results, depending on how closely the tape path aligned with the final fixed positioning of the record and play heads of this particular sample.

Other features of this machine worked well, but there's one it lacks. In my opinion, a deck in this price class (two-headed or three-headed) should certainly include mic/line mixing facilities. The CR-5120 does not.

Individual Comment by N.E.: I do not always read Len's "Individual Comments" before writing my own, but this time I did. While I agree with Len's general feeling that a three-headed machine should provide a means for azimuth alignment, I also feel that with this machine one must consider the price to begin with, and then the general performance offered by the unit. Obviously, in offering the CR-5120 Fisher is making available at least the convenience of three-head operation, if not the ultimate performance possible with such a format. It may not be the fairest approach to a piece of equipment to criticize it for what it lacks, when admittedly other machines that have those things do cost significantly more. The lack of a built-in input mixing facility may or may not concern the individual buyer. However, at $400, the CR-5120 does have an advanced Dolby feature, and separate EQ and bias three-position switches.

As for response, obviously our test sample did not make published specs. However, the response we did measure was still as good as, if not even a jot better than, response measure on competing models. Signal-to-noise ratio was generally not so good as found on some other cassette models, but a perhaps mollifying factor here might be the generous signal headroom for the 3 percent THD level we observed (+9 dB for AD tape, and +6 dB for SA tape).

In all, it would appear that Fisher has opted to offer a cassette deck that deliberately includes certain features while slighting others, in order to establish some kind of footing in a fairly competitive market. Obviously, the CR-5120 will not be all things to all recordists. But for the buyer whose budget for a cassette machine goes no higher than the $400 mark, it may be worth consideration.

PERFORMANCE CHARACTERISTIC	MANUFACTURER'S SPEC	LAB MEASUREMENT
Frequency response, normal tape	±3 dB, 30 Hz to 15 kHz	±3 dB, 20 Hz to 14.7 kHz
chrome or equiv.	±3 dB, 30 Hz to 18 kHz	±3 dB, 20 Hz to 15.5 kHz
Wow & flutter (WRMS)	0.04%	0.04%
S/N, normal tape, w/o Dolby	N/A	53 dB
w/ Dolby	N/A	62 dB
S/N, chrome or equiv. w/o Dolby	N/A	50 dB
w/ Dolby	64 dB	56 dB
THD at 0 VU, normal tape	1.4%	1.0%
chrome or equiv.	1.4%	0.9%
Record level for 3% THD:		
normal tape	N/A	+9.0 dB
chrome or equiv.	N/A	+6.0 dB
Fast-wind time, C-60	84 seconds	80 seconds
Input sensitivity, mic	0.2 mV	0.15 mV
line	100 mV	75 mV
Output level, line (for 0 dB)	1 volt	1 volt
headphones	N/A	65 mV/8 ohms
Power consumption	N/A	20 watts

CIRCLE 21 ON READER SERVICE CARD

GROOVE VIEWS

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

POPULAR

JOAN ARMATRADING: *Show Some Emotion.* [Glyn Johns, producer; Glyn Johns, John Astley, engineers; recorded at Olympic Studios, London.] A&M SP 4663.

Performance: **Outstanding**
Recording: **Excellent**

A&M seems to have this unwritten agreement with its artists: you hang around long enough and eventually we'll get around to breaking you. I for one am glad that it seems to be Armatrading's turn, for this Linda Ronstadt overkill has become monotonous and boring. What Ms. Armatrading has to offer is the best of several worlds. With everything tinged with the musical air of her native British West Indies, she blends blues, jazz and rock into her own inimitable style. Cap that off with a unique voice and you have one of the most important new finds in music today. Her songwriting deals with feelings and realities—it lives—while Ronstadt and Raitt rely upon recaptured oldies and Joni Mitchell does a hip'n' relevant compilation of Nietzsche and billboard slogans. The first thing one notices—or doesn't—about this album is how inconspicuous the production is—until one deliberately listens for it and comes to realize what an exact job Johns has done. There is nothing overshadowing or lacking, everything is artistically tailored to her style and needs. In short, Glyn Johns did an extremely laudible job as Master Weaver.

The title track, "Show Some Emotion," is one of the many great tracks on this LP. Opening with a jazzy bass put in the center of the mix, and a cymbal ride in full stereo, they are quickly joined by a guitar playing some reverbed jazz chords left, a soft vocal center, with a pinch of vibratoed Rhodes center as well. Suddenly the vocal line turns harsh with acoustic guitar left and electric guitar right, both playing the same descending riff, counterbalanced by a subdued Hammond organ right which adds two chords to the progression. The double riff continues throughout the verses, backed by comping Hammond and Rhodes right, drum and bass center.

Come the chorus, the Hammond is punched up in the mix, adding a rich layered texture of chords. During this, Georgie Fame is playing a Rhodes that is quickly panned back and forth. At the instrumental break in the song the electric guitar drops out in an effort to utilize more space in the music. There's an acoustic riff left, Hammond right, with the drums and bass center, keying on the accents of the music. As the song flows into its last stages, the electric guitar comps right and solos left, replacing the acoustic altogether. A great jazz track!

You guessed it, I'm a firm believer in Joan Armatrading. G.P.

JEAN MICHEL JARRE: *Oxygene.* [Produced and engineered by Jean

JOAN ARMATRADING: Beautiful blend

Michel Jarre at his private studio.] Polydor PD-1-6112.

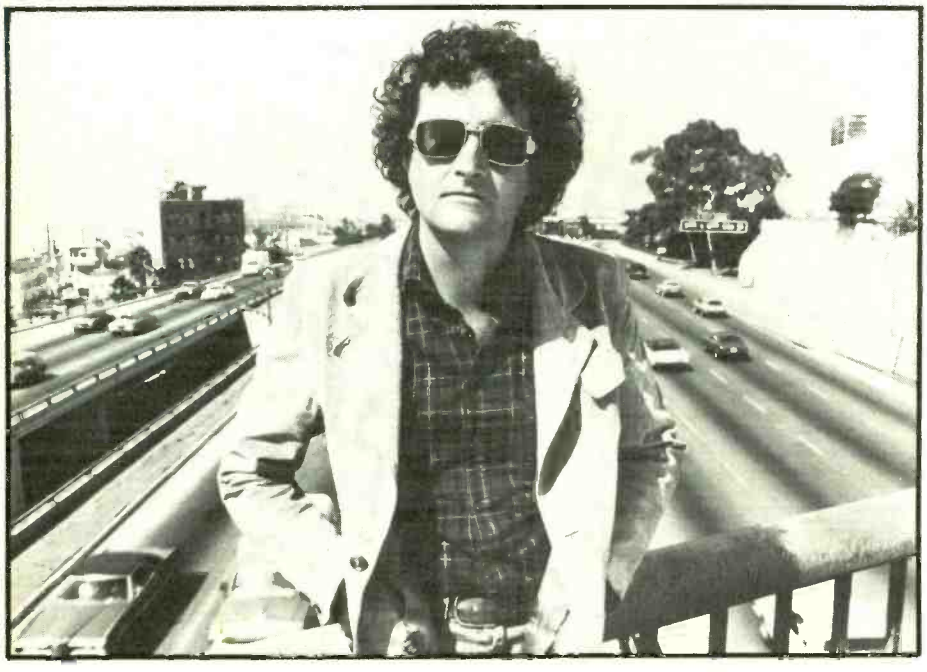
Performance: **Conceptual synthesizer**
Recording: **Very good**

This, the number one album in Europe, offers several points of interest. First, the music was composed by the performer and, unlike most efforts on synthesizer is not Stravinsky adapted to the synthesizer a la Tomita, or a disco-ized movie soundtrack. Secondly, this was all recorded at a home studio, which raises the possibility that "yes, you too can. . . ." Strictly in terms of recording, this is *very* clean and precise. In terms of music, it has its moments—as well as its lulls. The album is divided into "Oxygene, parts 1-6." The third track begins with synthesized wind, giving way to what may be a meteor storm, or rain, panned left to right. Next, a string synthesized chord is held

JEAN MICHEL JARRE: Interesting

center while left a bass synthesized line is played, countered right by its treble cohort. Following that is a very dull thumping kick with a third, higher pitched synthesizer, both centered. The right synthesizer plays most of the melody, accented by the center synthesizer which fades away as the wind reenters (backed off in the mix). It resolves to the chirping of birds as the last thing audible. Interesting for a couple of plays, but a steady diet inevitably breeds monotony. G.P.

RANDY NEWMAN: *Little Criminals.* [Lenny Waronker and Russ Titelman, producers; Lee Hirschberg and Lloyd Clifft, engineers; recorded at The Burbank Studios, Burbank, and Warner



RANDY NEWMAN: Short sighted?

Brothers Recording Studios, North Hollywood, Ca.] Warner Brothers BSK 3079.

Performance: **Eccentric**
Recording: **Intricate, yet "big"**

Randy Newman's *Little Criminals* continues this uniquely talented singer/songwriter's look at life in America and abroad in the past and in the present with peculiar insight into the cynical side of events. Randy's got little melodies and tiny little lyrics, and he's got a raspy little voice that goes "speak, speak, speak." He is America's answer to England's Ray Davies of the Kinks (compare the intro and melody of "You Can't Fool The Fat Man" with Davies' "Look A Little On The Sunnyside"). But while Davies' sharp observations long for a return to the simple life, Newman, with his eye for the little quirks of human nature, attacks his situations full-force, carving the landscapes of his songs from the failings of his characters who are his victims.

For this Newman album producers Waronker and Titelman have put together a group of respected L.A. session players including guitarist Waddy Wachtel, bassist Willie Weeks, and drummers Andy Newmark, Jim Keltner, and Rick Marotta. The drummers' styles are so interchangeable, though, that if their credits weren't listed individually we wouldn't know who was playing on which song. Aside from Milt Holland's percussive contributions and Ry Cooder's mandola on "Kathleen (Catholicism Made Easier)," the real instrumental spice is the addition of Eagles Joe Walsh and Glen Frey on guitar. Frey, along with Tim Schmit, J.D. Souther,

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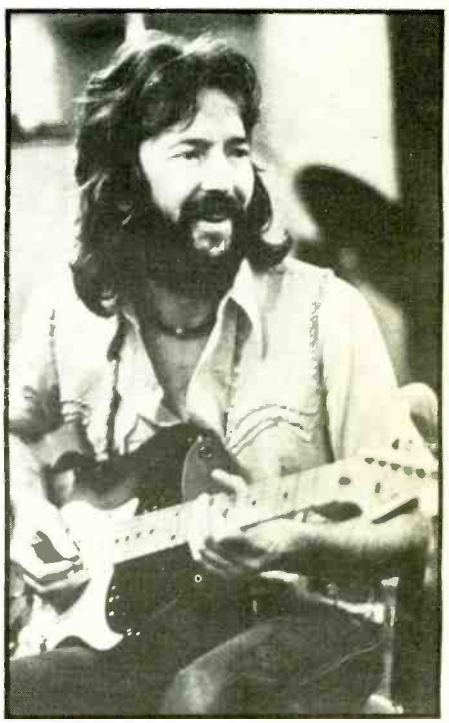
and Eagle Don Henley also lend vocal support on several songs and give credibility to Newman compositions like "Rider In The Rain," a perfect parody of the Eagles' *Desperado* album.

Waronker and Titelman make the production of the record essential to the mood of the songs. For instance, Randy's voice is mixed with varying amounts of echo and delay, creating a changing presence that complements the different points of view of his protagonists. And while his overall vocal work isn't very exciting, the monotone of Newman's voice does serve to underline the plight of his anti-heroes. Also, Randy's keyboard work on the album is consistently good with the stereo piano spread across the front of the mix. And, although his melodies aren't outstanding, the combination of voice, song, and arrangements makes *Little Criminals* a strong contender for Newman's most effective album so far—or at least his most commercial. S.S.



ERIC CLAPTON: Cause for celebration

ERIC CLAPTON: *Slowhand.* [Glyn Johns, producer; no mention of studios or engineers.] RSO RS-1-3030.

Performance: **More consistent**
Recording: **Good**

Eric Clapton has had a seesaw career—primarily by his own doing. His heroin addiction terminated what appeared to be an excellent beginning to a solo career in the form of Derek and the

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THE DINGOES: A polished find

Dominoes. Cured of heroin, he unfortunately slid into alcoholism, resulting in several tours where he suffered stage fright and refused to take the spotlight, passing all solos to his back-up guitarist. The explanation was that Eric wanted a new image, willing to exchange guitar strings for vocal cords. Alcohol and chain smoking had taken its toll. Albums like *461 Ocean Blvd.* and *E.C. Was Here* stiffed. Yvonne Elliman used her participation in his back-up band as a launching pad for a solo career. Carlos Santana jammed on a few dates of a tour and put Clapton to shame. Word had it he was through. Last year's *Blue* LP didn't do much for me, so I was all set to let *Slowhand* be the last nail in the coffin. Surprise! I can't write that obituary yet. Again, Glyn Johns has had a major hand in making a successful album. All these years most of us have been saying, "just play guitar." On this outing we get a compromise—but an honest one. He sings, and his voice, although shakey, is still more pleasant than Dylan's or Jagger's. He doesn't burn on guitar, but there is some good playing and the hint that maybe next time out he'll crank.

"Lay Down Sally," a country skiffle tune, opens with dual electric guitars left and right, playing a short, chunky repetitive riff reminiscent of the intro to "Maybelline," "Hot Rod Lincoln" or Robert Mitchum's "Thunder Road." Behind that is Rhodes, bass and drums, all centered and mixed slightly to the back of the guitar. Clapton's voice comes in on top of that, sharing equal billing with the guitars. Female chorus comes in left and right, a la the guitars, with the left being in a higher, more brilliant register. After two verses the guitar solo comes in left. It is not punched up or in any way highlighted. A couple more verses and "Sally" fades away. All in all, it's okay. It's not vintage Clapton, but compared to his last three attempts, *Slowhand* is cause for celebration. G.P.

DINGOES: *Five Times The Sun.* [Eliot Mazer, producer; Smiggy, Sandra, engineers; recorded at A&M Recording Studios, Hollywood, Ca.] A&M SP 4636.

Performance: **Fluid**
Recording: **Flawless**

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The Australian continent is good for much more than kangaroos, platypus ducks, and Helen Reddy. The Dingoes (named after a dog native to the nation) are probably the most legitimate and polished find ever to waft their way across the International Date Line and into the lobes of American and European listeners.

A young band, they quite resemble early Eagles, with their vaguely countrified fusion textures; little doses of steel, bleating harp, mandolin, and occasional infusions of slightly corny, yet completely credible, outdoor lyrics. The folksy "Way Out West," replete with a bluesy accordian run, brings this to mind.

LOL CREME/KEVIN GODLEY: *Consequences.* [Creme/Godley, producers; Martin Lawrence, engineer; recorded at Strawberry Studios and The Manor Studios, England.] Mercury SRM-3-1700.

Performance: **Erratic to disappointing**
Recording: **Exceptional**

This is the project that started as a solo album demonstrating a new musical device called the Gizmo, then grew in stature and resulted in tearing 10cc asunder. My overall feeling about this collection is, to paraphrase an old 10cc song, "Sound For Sound's Sake." As a

LOL CREME AND KEVIN GODLEY: The Gizmo wasn't worth it

While not of the recital category, the playing is perfect considering the modest goals of the music. John DuBois, a keyboardist of almost unparalleled taste and grace, tinkles softly on many of the tunes. Kerryn Tolhurst, steel guitar player, is another favorite in these quarters, agilely gliding through "Singing Your Song." No Pete Drake (or in a closer idiom, Jerry Garcia) he nevertheless conceptualizes a legitimacy rare for a non-country player.

The production sense is exceedingly appropriate. The pedestrian abilities of the players are stretched to workable limits. Underlying this is a fresh, bubbly appeal, combining innate pop compositional expressions with an airy, light lyrical and melodic approach. R.S.

Creme/Godley/Stewart/Gouldman (who together comprised 10cc) fan of the first row, I will gladly wade through any amount of filler to get to the solid ground, for it's always worth the swim. The average guy on the street, however, is going to balk at the $23 list price (about $15 retail) of this three-record set boasting a man vs. nature theme. The recording of *Consequences* took sixteen months, working seventeen hours a day, seven days a week. Martin Lawrence, who engineered the project, estimated they averaged just over a minute of finished product a day. You can afford to be precise when you own the studio.

Side one ultimately amounts to being a good demo record for the abilities of

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the Gizmo, an invention of Godley/Creme that enables an ordinary guitar to reproduce concert strings with amazing truth. In recording the original prototype, which was held together by tape and string, the attachment emitted noise as well. To compensate, Dolby noise reduction systems and special echo effects to enhance the sound and eliminate the noise were used. After obtaining the proper violin sound, a string section was assembled through multi-tracking. Next, they constructed a voice-bag of the type popularized by Peter Frampton, only larger, to enable a larger sound. By sending the string section through the bag and tracking it several times, they had "The Wind," a three-minute track. The saxophone sound heard on side one was achieved be recording each note of a guitar solo separately and then fading in on the track so there would be no percussive element. The track was then sent through a speaker and out of a rubber hose with perforated cigarette paper on the end. The raspy characteristic of the sax was obtained by putting enough pressure on it to force the sound through the holes in the paper. So much for side one.

Side two sees the addition of piano, percussion and vocals to the Gizmo, resulting in the vocal track"Honolulu Lulu," a song reminiscent of 10cc's "Don't Hang Up." The song opens with a multi-tracked stereo chorus, a la "I'm Not In Love." An electric Hawaiian guitar sound is centered, with acoustic piano and Gizmo strings in the background. The vocal-instrumental interplay continues, with a tympani *crescendo* building in the background, climaxing with the crashing of waves. This effect was achieved by recording more than two hundred buckets of water thrown against the wall of the car park at the studio. In this way, the sound of a wave was built up and the rhythm was added in the studio by dropping small pieces of plasticine into a bucket of water. This was then edited to create syncopated time. As the multi-track voices go into a chorus of "alohas," backed with intermittent Gizmo brass and acoustic piano, a marimba enters playing an Oriental cliche along the lines of "Flower Drum Song." As the song reaches the last refrain, hand claps, bass strings and acoustic piano are the main musical ingredients, all centered. Finally, the tune ends with a diluted choir yelling "wake up!" All this took six weeks to record, with the spontaneity of one idea leading to another becoming the norm for the remainder of the project.

Sides three through five deal with the full spectrum of the human voice, both dialogue and diction, and the orchestration of human diction. With divorce proceedings as the plot, the story begins with parallels to Rick Wakeman's *Journey To The Center Of The Earth*, in this instance using Peter Cook, who does a good Peter Ustinov, as the narrator and cast of characters. To carry this for three sides becomes tedious to the point where you begin skipping around in search of music. You simply don't need three sides to prove the difficulty of recording the human voice. The final side is a *concerto*, though in name only and not in form, using piano and the Gizmo.

The intent of this venture was to prove the worth of the Gizmo, but the manner in which is was done indicates that they bit off more than they could chew, for the end result leaves you searching for a connection between the theme of man vs. nature and what you've just heard. Without the accompanying booklet, one is lost.

Similar to the lesson learned when the Beatles disbanded—for 10cc's impact on studio production is on a par with the Beatles' impact overall—I can only conclude after listening to Godley/Creme and Stewart/Gouldman (10cc) that the collective decisions of the four resulted in successful art, and that two halves do not produce enough quality to make a whole. With this project out of their system, I fervently pray there is a possibility of a reunion, for *Consequences* is not worth the price of separation. G.P.

THE RUMOUR: *Max.* [Robert John Lange, The Rumour, producers; Ted Sharpe, engineer; recorded at Rockfield Studios, Monmouth, England.] Mercury SRM-1-1174.

Performance: **Dreary**
Recording: **Basic**

Why someone decided to let The Rumour record without Graham Parker is beyond me. I think it's safe to assume that by now every label has its own answer to Bruce Springsteen. This band sounds the same with or without Parker, which should tell you something in itself. To put myself out of this misery I'm quickly going to find the least offensive track and have done with it.

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nothing lyrically other than "I'm so glad we're in love." Drums, piano, horns, bass and guitar start the song off, all centered. The vocals enter center, aided far in the background by a Hammond organ. Acoustic piano riffs and flatly recorded horns emerge to take you into the title line/chorus. The Hammond is lost and may as well not even be there. The horns, too, could use a good boost in the mix. There are occasional guitar/piano arpegio riffs that do little more than fill out the song. The bass and drums have the necessary presence in the mix, off-setting the vocals well, but the rest is in great need of some supplementary vitamins. Fade the tune out and that's it. Exciting, wot? G.P.

on Townshend's "Street In The City," producer Johns uses strings to back Pete's high-pitched squeak. Since the song is not much to begin with, the strings don't do much for it. In fact, the public may be the butt of a Pete Townshend joke, for these tracks sound very much like the scratch background tracks that are normally erased.

"Heart To Hang On To," which comes off sounding like Dave Mason's "Shouldn't Have Took More Than You Gave," begins with acoustic guitar, bass and a shuffled snare. First Ronnie sings, then Pete sings the second verse. Next comes The Overused Instrument Of All Time, Keyboard Category: the Fender Rhodes, used in conjunction

PETE TOWNSHEND/RONNIE LANE: Why the collaboration to begin with?

PETE TOWNSHEND, RONNIE LANE: *Rough Mix.* [Glyn Johns, producer; Glyn Johns, Jon Astley, engineers; recorded at Olympic Studios, London.] MCA 2295.
Performance **Half-baked**
Recording: **Completely baked**

This album lacks both continuity and purpose. First Pete does one of his tunes, then Ronnie one of his, and then they both collaborate with Eric Clapton on a third. Why they recorded together is beyond me. Done separately, Townshend would merely have been credited with another ho-hum solo LP and Lane saddled with another bomb. Each track utilizes few instruments, such that they often sound empty. To compensate, as with The Overused Studio Technique, Now A Gimmick, Of All Time, Open Category: instrument quickly panned from left to right. Ronnie and Pete exchange a few more choruses, then the middle is introduced by an electric guitar and background brass, which disappear as quickly as they appeared. Now the whole process is repeated to this point, only on the first vocal exchange suddenly Townshend is singing from an echo chamber. Two lines' worth of natural ambience is pointless, but then that's keeping to the order of things here.

Why Pete became involved with Lane or Johns is beyond me, but the relationship was not fruitful. Rough mix, dumb plot. G.P.

BILLY PRESTON: *A Whole New Thing.* [Billy Preston, Truman Thomas, producers; Michael Schuman, engineer; recorded at Village Recorders, Westwood, Ca., and Kendun Recorders, Burbank, Ca.] A&M SP 4656.

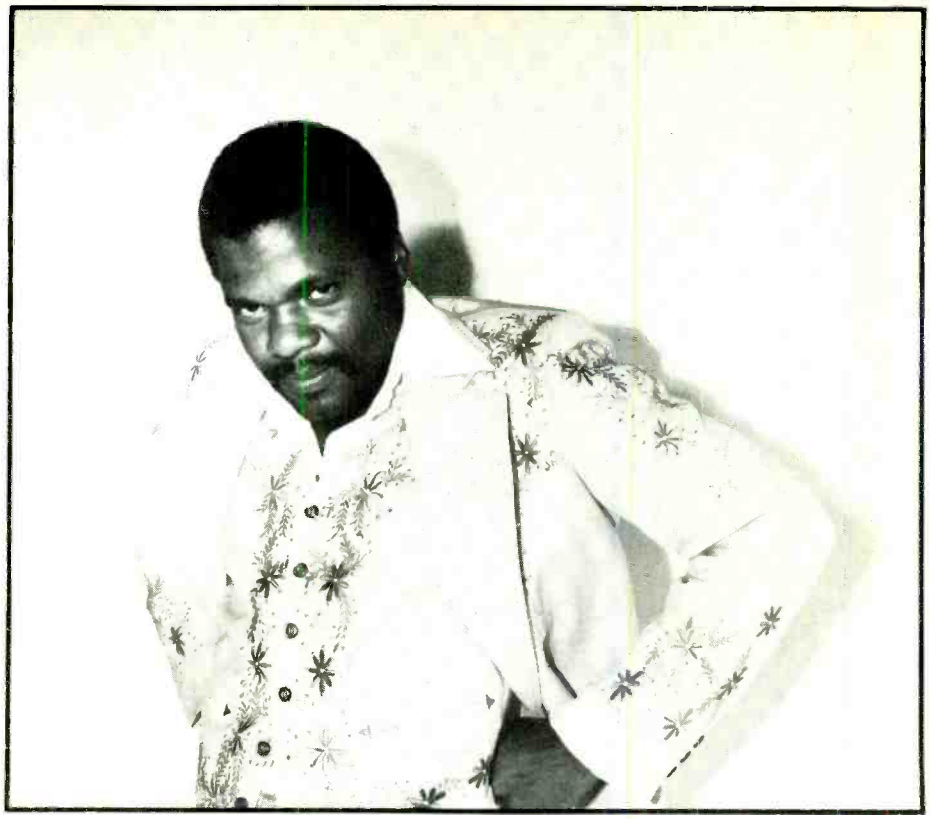
Performance: **Bland**
Recording: **Good**

This guy is not the Randy Newman of soul music. As long as he insists on populating his albums with his own compositions, each succeeding disc is going to suffer from the same fatal flaw—namely a lack of imagination. Most of his works concentrate on either affirmative love statements or declarations of personal state of mind.

As an example, listen to the title track, which is in essence a statement that he, Billy Preston, has his stuff together. That might all be well and good, but if everybody who felt that way went into the studio to tell the world about it, there wouldn't be enough PVC left.

There are, nevertheless, some interesting musical points. As opposed to the stagnant singing numbers, most of the brighter moments come during the three instrumentals. "Attitudes" boasts some snappy piano sweeps and "Happy" features a bouncy synthesizer. Unfortunately, the other nonvocal, "Wide Stride" leaves a solitary keyboard note seemingly hanging in midair.

This is a typical Preston production; an extravaganza featuring loads of horns, backing vocals, etc. This is so much extra show without substance; yet on their own merits, both the mix and flavor are good. Too bad the content is so lifeless and hackneyed. R.S.



BILLY PRESTON: Another extravaganza

MARTHA VELEZ: *American Heartbeat.* [Stephan Galfas, producer and engineer; David Scance, associate producer; studio unlisted.] Sire SR 6040.

Performance: **Polished and potent**
Recording: **Generally germane**

A rare breed of singer it is who can rise above occasionally lackluster arrangements and make a series of personal statements through the muck.

Martha Velez is such a vocalist. Although the generally worthy arrangements behind her sink to disco on a few tracks, she can pierce this veil and make you believe she means everything she sings. It is easy to see how she does it. Although she doesn't have an especially strong voice, her smooth polish, range, and sense of nuance allow her to pass with flying colors just about all the time.

Lord knows, this stuff is not easy to sing. Velez, who had a hand in writing most of the tracks, is an unpredictable composer who places difficult demands on herself. Her scope, also, is seemingly unlimited. She can span the gap from out and out rockers like "Leaving Love That's Good," and the happy "We're Gonna Last" (now that's positive thinking) through the cocktail lounge-y "Once In A While," on to the countrified "Draggin' Your Eyes." And if you don't believe the last description; consider the instrumentation: pedal steel and autoharp.

Producer Stephan Galfas is quite clever at sticking unorthodox axes where you would least expect them, but where they magically fit. Besides "Draggin'," he yanks out a Chinese zither and gong to accentuate trippy, imagistic moments during "Crossover." A bunch of shrewd people are working here. R.S.

MARTHA VELEZ: A rare breed

JAZZ

CHUCK MANGIONE: *Feels So Good.* [Chuck Mangione, producer; Mick Guzauski, Stillman Kelly, engineers; recorded at Kendun Recorders, Burbank, Ca.] A&M SP-4658.

Performance: **Luke warm**
Recording: **Okay**

I've never been excited about Chuck Mangione's music. There's not enough energy behind it to call it jazz, it's not funkified enough to be dismissed as disco, nor bland enough to be relegated to the elevator. It's more like TV or movie score music. He has some nice melodies and themes, and there's nothing wrong with that, but he weaves no spell.

Jazz—the Rejuvenator: From Kansas City to Paris

By Nat Hentoff

In the '30s and '40s, part of the jazz mythology had it that swinging is a young man's game. After forty or fifty, a player had either literally expired, pickled in booze, or had dropped into limbo, his place in clubs and at recording dates taken by a newly fashionable generation of improvisers. But jazz itself was young then. But now, on the other hand, we have a lot more evidence as to how many long-distance groovers there actually are. The old myth does not hold for Count Basic, Benny Carter, Dizzy Gillespie, and many more. Indeed, a case can be made that the jazz spirit can be so rejuvenating that some musicians seem to sound *more* vigorous as they age.

Take Jay McShann. All that most jazz buffs know about him these days is that he once headed a Kansas City band which allowed Charlie Parker to come East. It turns out, however, that McShann has not only been swinging with joyous ease all the years since but has also become a much more authoritative jazz presence than he was back then. The new *Jay McShann/The Last of the Blue Devils* (Atlantic) is one of the most deeply, rollingly satisfying jazz experiences of recent years.

McShann himself plays full-bodied, blues-laced piano and sings with ageless charm while being backed by a zestful combo that includes such crisply youthful elders as trumpeter Joe Newman, bassist Milt Hinton, and tenor saxophonist Buddy Tate. I have been hearing Tate, by the way, for forty years and I swear he sounds stronger and more resilient every year, as on this date. This session is the very model of infectiously relaxed, hot jazz that can also rejuvenate listeners because it really does shake up the blood.

So, too, is Stephane Grappelli a destroyer of the notion that jazz is the preserve of only the young. During the past few years, as he approaches his seventies, this infinitely melodic, broadly swinging violinist is playing more imaginatively, and with more gusto, than he did as a member of the Quintet of the Hot Club of France (which included Django Reinhardt) in the '30s.

Now, Grappelli has made a set, *Parisian Thoroughfare* (Arista/Freedom), which, like the new McShann album, is a classic distillation of the jazz ethos. With a strong, resourceful rhythm section—pianist Roland Hanna, bassist George Mraz, drummer Mel Lewis—Grappelli is brilliantly inventive in the set's title tune (a composition by Bud Powell) as he also ranges with compelling warmth and pulsating grace through such challenges as two Hanna originals and a Chopin prelude.

Grappelli is a particular jazz phenomenon in that his appeal transcends the jazz audience. Trying to explain this, John Lewis (formerly of the Modern Jazz Quartet) talks of the violinist's extraordinarily vital and welcoming "personality." It's not anything Grappelli says on stand; his *music* radiates such good feeling that, as Lewis says, he can play to a Parisian audience of workers and shopkeepers who care nothing about jazz but find Grappelli's sunniness irresistible.

Both the McShann and Grappelli albums have the engineering their music deserves—a fullness of presence (that "live" feeling) and careful attention to the natural dynamics of the music. The Arista is somewhat superior. Rarely has a rhythm section been so excitingly reproduced.

JAY McSHANN: *The Last of the Blue Devils.* [Ilhan Mimaroglu, producer; Jim Crotty, engineer.] Atlantic SD 8800.

STEPHANE GRAPPELLI: *Parisian Thoroughfare.* [Alan Bates, producer; John Timperley, engineer.] Arista/Freedom AF 1033.

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What struck me most was the quality of brightness given the guitar throughout. "Maui Waui" starts off with a short three-beats-of-the-drum centered, acoustic rhythm guitar left, electric guitar right and bass centered. Next comes a double-tracked flute, center, later unisoned by flugelhorn, both of which alternate with the electric guitar. All solos are centered. Interspaced throughout is what sounds like a phased Rhodes. What is interesting is that all this works to an effective end. Made track-by-track, the room ambience for the electric guitar, especially the echoed shift from left to right, is most effective. Pretty tune. Too bad no one wrote a movie script for it. G.P.

CHUCK MANGIONE: Wanted: one plot

EDDIE CONDON: *In Japan.* [Hank O'Neal, producer; recorded by Tokyo Broadcasting Service in April, 1964.] Chiaroscuro CR 154.

Performance: **Vintage jazz exported to the Orient**
Recording: **Better than most recordings Condon made in America**

Japan's leading export to the U.S. may be autos, television sets or hi-fi components but America's leading export to Japan, at least in the spring of 1964, was a band of leading traditional jazz players (Dan Morgenstern's liner notes remind us that Eddie Condon didn't like the term dixieland) under the direction of ol' Slick Condon himself. Among those included in the trades were the great Bud Freeman, Pee Wee Russell and Dick Cary, as well as such near greats as Jack Lessberg and Cliff Leeman. Also on board was a trio of Count Basie alumni who blended in with the Condon crew though they themselves were of a different age and locale. There is no doubting the abilities of trumpeter Buck Clayton, trombonist Vic Dickenson and singer Jimmy Rushing who were all out of that famous Southwestern jazz tradition that centered around Kansas City. Still there's enough common ground that they all spoke the same language. After all, Clayton came from Louis Armstrong and Vic Dickenson had played on recordings with Art Hodes and Sidney Bechet so they knew the tunes and played their horns well.

Yet of all the gems on this album I'd have to single out Bud Freeman's tenor sax and Dick Cary's alto horn as those closest to my own taste. What Freeman does with Bert Kalamar and Harry Ruby's "Three Little Words" is simply magnificent. While I feel that Pee Wee Russell is not playing his best on these sides he's still worth hearing even at less than his best and he does get off a particularly fetching version of his classic "Pee Wee's Blues."

I'm sure I don't have to remind the readers of this magazine how well versed the Japanese are in hi-fi techniques. The sound is excellent, crystal clear and free of gimmicks. I especially enjoy the clarity in those wildly free improvised ensemble choruses in which the integral parts probably come through better on this record than they did "live" in the hall where the record was made. J.K.

THAD JONES & MEL LEWIS: *Live In Munich.* [John Snyder, producer; Scholzen Hans Peter and Heiner Friesz, engineers; recorded September 9, 1976 at the Domicile Club, Munich, Germany.] A & M Horizon SP 724.

Performance: **Thad and Mellow**
Recording: **So "live" you can hear the pretzels snap**

To tell the truth and heresy be damned this is my favorite of all the big bands playing jazz today and that incudes Count Basie, Woody Herman, Maynard Ferguson and Mercer Ellington.

As an ensemble they cook along like mad. They have so many top-flight soloists that this record can only spotlight a few of them such as pianist Harold Danko, saxophonists Jerry Dodgion and Greg Herbert, trombonist Billy Campbell, Earl Gardner's trumpet, and Thad's cornet and Mel's drums. They still have Ed Xiques on sax and Frank Gordon on trumpet and Pepper Adams on baritone sax in reserve.

As for Thad's ability as arranger and composer and general all-around chief in charge of things musical, there seems to be no end to the wonders. Here's an arrangement of "Come Sunday" from Duke Ellington's *Black, Brown and Beige* as a vehicle for Thad's cornet work that is totally marvelous; as is Harold Danko's piano work on Rhoda Scott's tune "Mach II." Unfortunately, the longest track on the album and the one which will probably cause the most talk is my least favorite. I find Thad's "Central Park North" far too rock/fusion for my taste. This band will never play that sort of music as well as Blood, Sweat and Tears or Maynard Ferguson's crew, so why don't they stick to what they are best at?

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Thad and Mel's annual visits treat these appearances as a special occasion. The New York audience which hears them at Max Gordon's Village Vanguard week after week and knows they'll be able to hear them again next Monday are more blase about what is truly one of our national treasures. The band is recorded "live," clean and accurate without the "benefit" of echo or any other gimmick and that's how it should be. J.K.

THE PRESERVATION HALL JAZZ BAND: *The Preservation Hall Jazz Band.* [Produced by Irving Stimler; Skip Godwin and Don Young, recording engineers; recording date and place not listed.] Columbia M 34549

Performance: **Preservation of an era**
Recording: **Preservation of a performance**

You couldn't really call the band from Preservation Hall a revival band, what with more than half of the members of the band having birth dates within the first decade of the twentieth century. Even the baby of the band, tuba player Allan Jaffe, is over 40. If they weren't playing in the dancehalls alongside Buddy Bolden, Joe Oliver and Bunk Johnson; the Humphrey Brothers, Cie Frasier and Narvin Kimball were probably in the second line marching along behind the Tuxedo Brass Band or the Eagle Band at parades and picnics. Maybe they even managed to sneak into the beer halls on a slow night and listen to the giants play. They certainly grew up with the sound of New Orleans jazz in their ears and the taste of red beans and rice on their tongues. Lacking the elusive (if, in fact, it ever did exist) one cylinder recording that it is claimed the Bolden band made around the turn of the century, this is probably as close as we'll come to what those early bands sounded like. Although there have been other recreation attempts in the past, the only one which rang this true to the ears was the band headed by Bunk Johnson in the '40s.

Like Johnson's band, this crew plays what must have been a rather typical repertoire for the time and the place. There are hymns like "Over In Gloryland" and "His Eye Is On The Sparrow." There are early 1900s pop tunes like "Memories" and "Bill Bailey." There are classic early jazz pieces like "Panama" and "Tiger Rag."

The recording is rather straightforward. There are no gimmicks and nothing spectacular happens. It ends up sounding a bit antiseptic, as though the band had been put into a studio and told to get hot, but at least everybody can be heard unlike so many of these recorded "live" LPs where the spirit may be better but the sound suffers from lack of control.

If you're looking for highlights, my personal nominations would have to be the wandering clarinet *obligato* as played by Willie Humphrey throughout and the remarkable banjo virtuosity of Narvin Kimball on Gus Kahn's beautiful evergreen "Memories." J.K.

JO JONES: *The Essential Jo Jones.* [John Hammond, producer; recorded August 11th and 16th, 1955 and April 30, 1958 in New York City; engineer not listed.] Vanguard VSD 101/2.

Performance: **Wonderful Kansas City jamming**
Recording: **Stereo phoney, true but surprisingly good**

In our recent review of Jo Jones' latest LP for Pablo, we took issue with Norman Granz' claim in the liner notes that this was Jo Jones' first record as a band leader. As if to prove our point, Vanguard has reissued two LPs in their "The Essential" twofer series. The two LPs show Papa Jo in two different settings. One of these is a jam session format including, on two cuts, the Count Basie All American rhythm section intact. That's Jo Jones on drums, Walter Page on bass, Freddie Green on guitar and the Count on piano. These cuts are two different takes of "Shoe Shine Boy" the first tune that Count Basie and Jo Jones recorded together for Vocalion in 1936. On the other tunes Count Basie is replaced by pianist Nat Pierce who also filled in for Basie after the Count's recent heart attack and played with the Basie band until the Count was well enough to return to active duty. There are other ex-Basie-ites such as trumpeter Emmett Berry and saxophonist Lucky Thompson on board plus other fine players including Earl Hines' trombonist Benny Green, Duke Ellington's trombonist Lawrence Brown and former Fats Waller clarinetist, Rudy Powell.

The second LP is a trio that Jo Jones had with the Bryant Brothers out of Philadelphia—Ray on piano and Tommy on bass. It was actually a working trio for a time and recorded for Everest as well as for Vanguard. Ray Bryant is one of those funky pianists who never gets too far away from the blues which limits him as a player. Yet, within those limitations he plays very well and while his playing does sometimes get a bit too cute for my taste it can be very listenable especially with Jones' fine drumming to keep things swinging along.

Vanguard admits (if you read the small print) that the 1955 sides are electronically rechannelled for stereo. What surprises me is that if they didn't admit it I would never have been able to tell. I guess even faked stereo can sound good if it's done well and this is done well, providing a good vehicle for John Hammond's superb production. J.K.

CLASSICAL

COLLECTION: *"Clara Rockmore, theremin."* Nadia Reisenberg, piano. [Shirleigh Moog, producer; Robert Moog, engineer, recorded July 1975 at Producers Recording Studio, New York, N.Y.] Delos DEL-25437.

Performance: **Nonpareil**
Recording: **Clean**

When I played this record without explanation for a friend, her immediate question was, "Is that *Spellbound*?" Such is the widespread influence of film. Miklos Rozsa's score for the 1945 Hitchcock opus (and for Billy Wilder's *The Lost Weekend* of the same year) introduced this instrument to audiences at large, and several sci-fi flicks of the '50s clinched the popular conception of Prof. Leon Theremin's brainchild as cosmic confection.

But Prof. Theremin (who presently, at age 79, heads the Laboratory of Musical Acoustics of the School of Music at the University of Moscow) invented his instrument with symphonic intentions, and upon his arrival from Russia in New York in 1927 his first presentation included such onlookers as Fritz Kreisler, Rachmaninoff and Toscanini. In 1928, he and his new students performed a work with four theremins with the New York Philharmonic-Symphony Orchestra. That same year in France, Maurice Martenot developed the ondes martenot, which is now considered the precursor of the modern electronic synthesizer; Honegger and Milhaud, among many others, wrote compositions specifically for this instrument.

Neither the theremin nor the ondes

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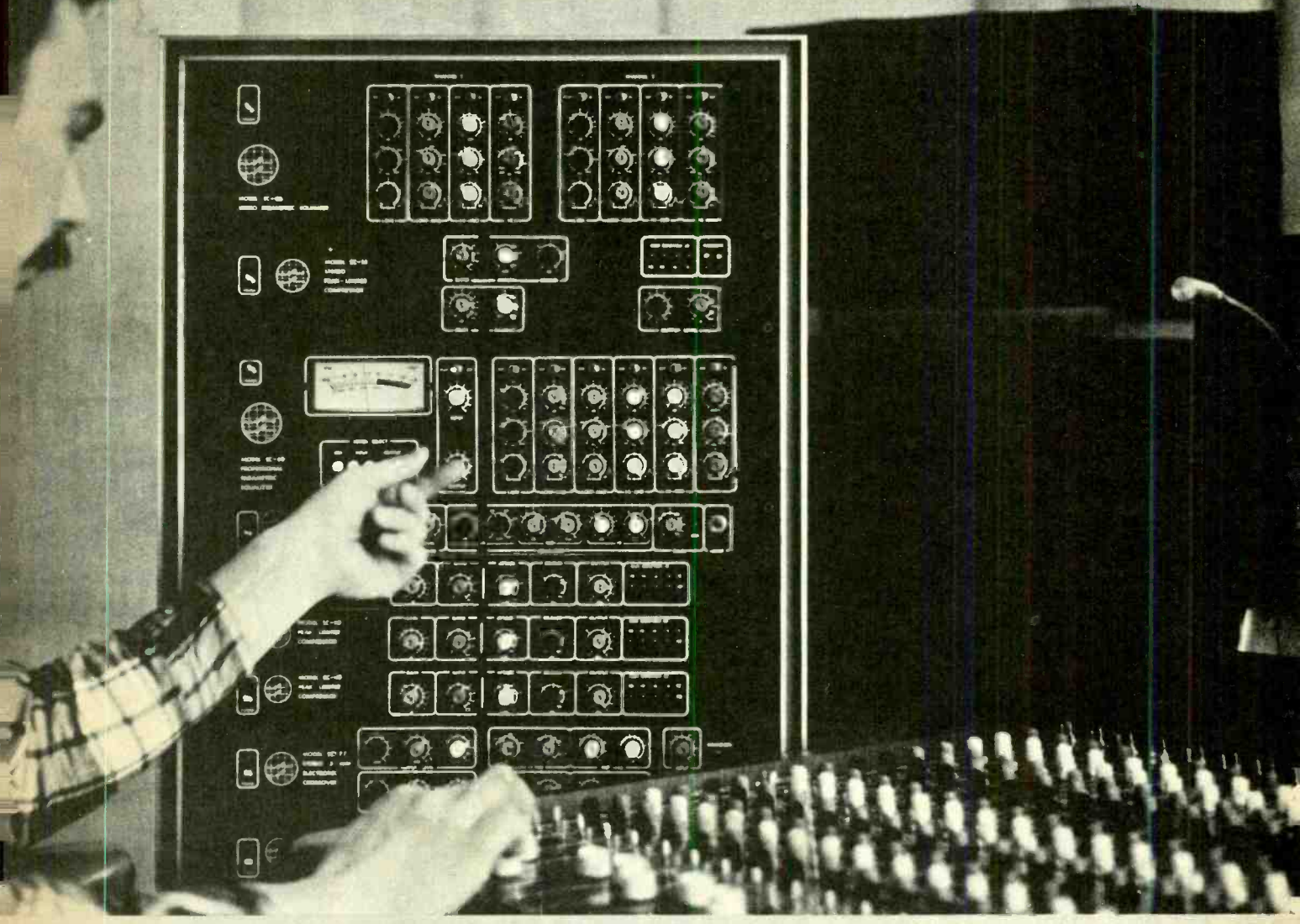

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martenot attained popularity as solo instruments. In the classical music sphere the instrument appears locked—like today's Moog, Buchla and similar synthesizers—into performing works originally written for different instruments (e.g., "Switched-on Bach" and Tomita's concoctions on RCA). For the theremin to establish any permanent foothold a repertoire of recognizably worthy compositions created with the instrument's features in mind would have to exist. As that has not happened, and Clara Rockmore appears to be one of a kind, the theremin's future appears limited, surpassed by more flexible and easily learned electronic instruments.

One thing is certain, however: One could hardly imagine a finer presentation of the artist and her instrument than has been prepared by Delos. The notes by Robert Moog are exemplary in their clarity and thoroughness, covering a history of the theremin, how it works and how it is played, and biographical material on the Russian-born Miss Rockmore and Prof. Theremin. There are also several pictures of Miss Rockmore and the instrument.

Even if the music consists of twelve transcriptions, ranging in length from 2:06 to 7:39, at least one gets a definite idea of the instrument and its qualities. Not surprisingly, the music by Russian composers comes off best: Rachmaninoff's *Vocalise* and *Song of Grusia*, Tchaikovsky's *Valse Sentimentale* and *Serenade Melancolique*, and the Hebrew melody *Achron*—pieces which thrive at the heavy-hearted lower sonorities produced by the theremin.

A note from Prof. Theremin reproduced on the jacket says that Clara Rockmore was "the only one in the world able to achieve the intricate mastery of the instrument. . . ", and I can hardly demur. Her musicianship is sensitive (even though she distorts the rhythms in the Berceuse from Stravinsky's *Firebird*), and her accompanist on the piano, Nadia Reisenberg (her sister), is with her all the way. The sonic presentation is everything one could wish, although Delos' surfaces could have been better.

Who knows? This could be a big seller and introduce the theremin to a new generation equipped by the revolutions in pop music to look upon its distinctive sound as more than a weird noise. When Clara Rockmore performed, people thought she was in a trance (a condition dictated by the subtleties of the instrument). Now, if only Mick Jagger could hold still. . . S.C.

STRAVINSKY: ***L'Histoire du soldat; Septet; Pastorale; Three Pieces for Clarinet; Suite italienne.*** Tashi. [Max Wilcox and Peter Serkin, producers; Ray Hall and Edward Rich, engineers.] RCA ARL 1-2449.

Performance: **Lively**
Recording: **Well-balanced**

Some sharp-eyed A & R man at RCA and the enterprising chamber group Tashi have come up with an enjoyable record of Stravinsky rarities. All of these works are currently represented in the catalogue, but alternative recordings of such infrequently performed music are always welcome—particularly in such appealing interpretations.

TASHI: Appealing interpretations

Tashi (consisting of Peter Serkin, piano, Ida Kavafian, violin, Fred Sherry, cello, and Richard Stoltzman, clarinet) is augmented in the 1953 *Septet* by Bill Douglas, bassoon, Daniel Phillips, viola and Robert Routch, french horn. The present group seems more at ease with this work than the Boston Chamber Players' recording on DG (*MR*, Aug/Sep 1976) and the composer's own Columbia disc; these young players sense more fun and wit, and the stereo layout is far preferable in balance and sonority than the Columbia production.

I had never before heard *L'Histoire du soldat* or *Suite italienne* in these instrumental guises—the former for violin, clarinet and piano performing five numbers from the familiar eight-number suite and the latter for cello and piano performing six sections of the complete *Pulcinella*. One does miss the discarded pieces from the complete works, but these lively performances have their own rewards.

The shortest works here are the *Pastorale* for violin and piano and the *Three Pieces for Clarinet*, rousingly played by Richard Stoltzman; his jazzy rendition of the last piece, in particular, is fascinating in its anticipations of Copland's early works.

Producers Max Wilcox and pianist Serkin obviously work well together. Just as in another highly recommended Tashi collaboration, Messiaen's *Quartet for the End of Time* (RCA ARL 1-1567), the sound is natural, warm and never oppressively close. Surfaces excellent. S.C.

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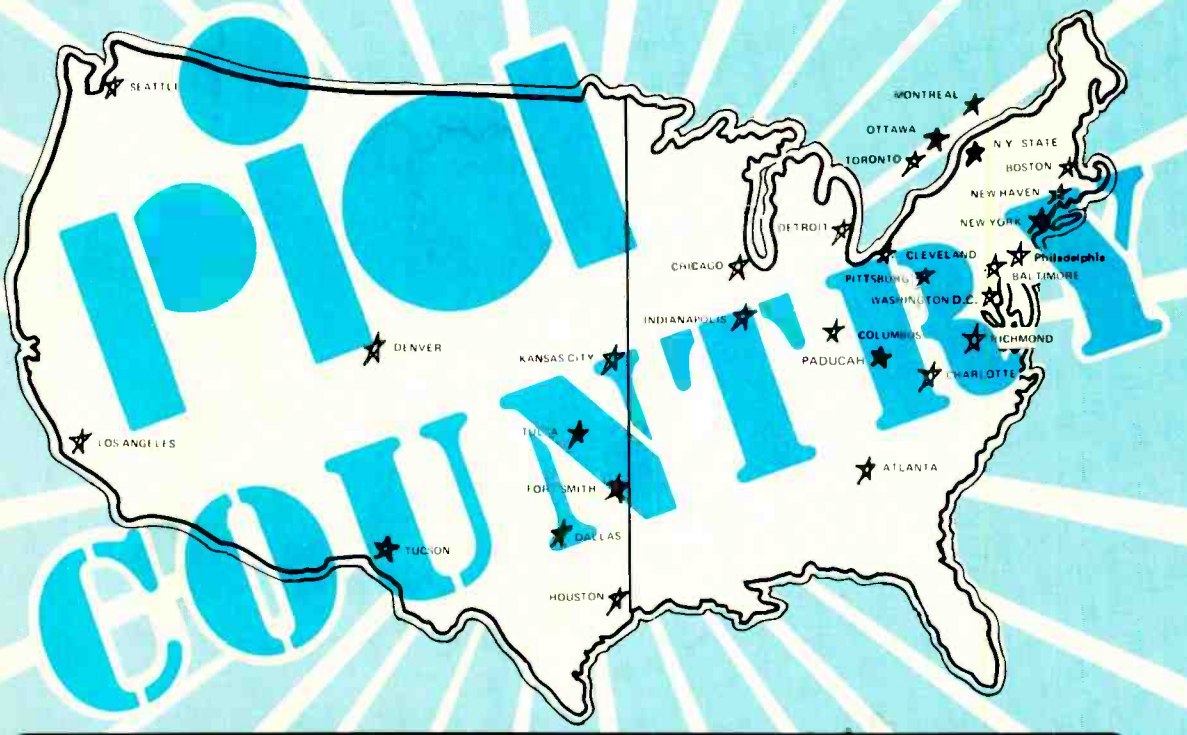

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