

**Building a
Mic Splitter**

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MODERN RECORDING

SERVING TODAY'S MUSIC/RECORDING-CONSCIOUS SOCIETY

VOL. 4 NO. 3
DECEMBER 1978

BRUCE SPRINGSTEEN 'LIVE!'

More On Choosing a Mixer

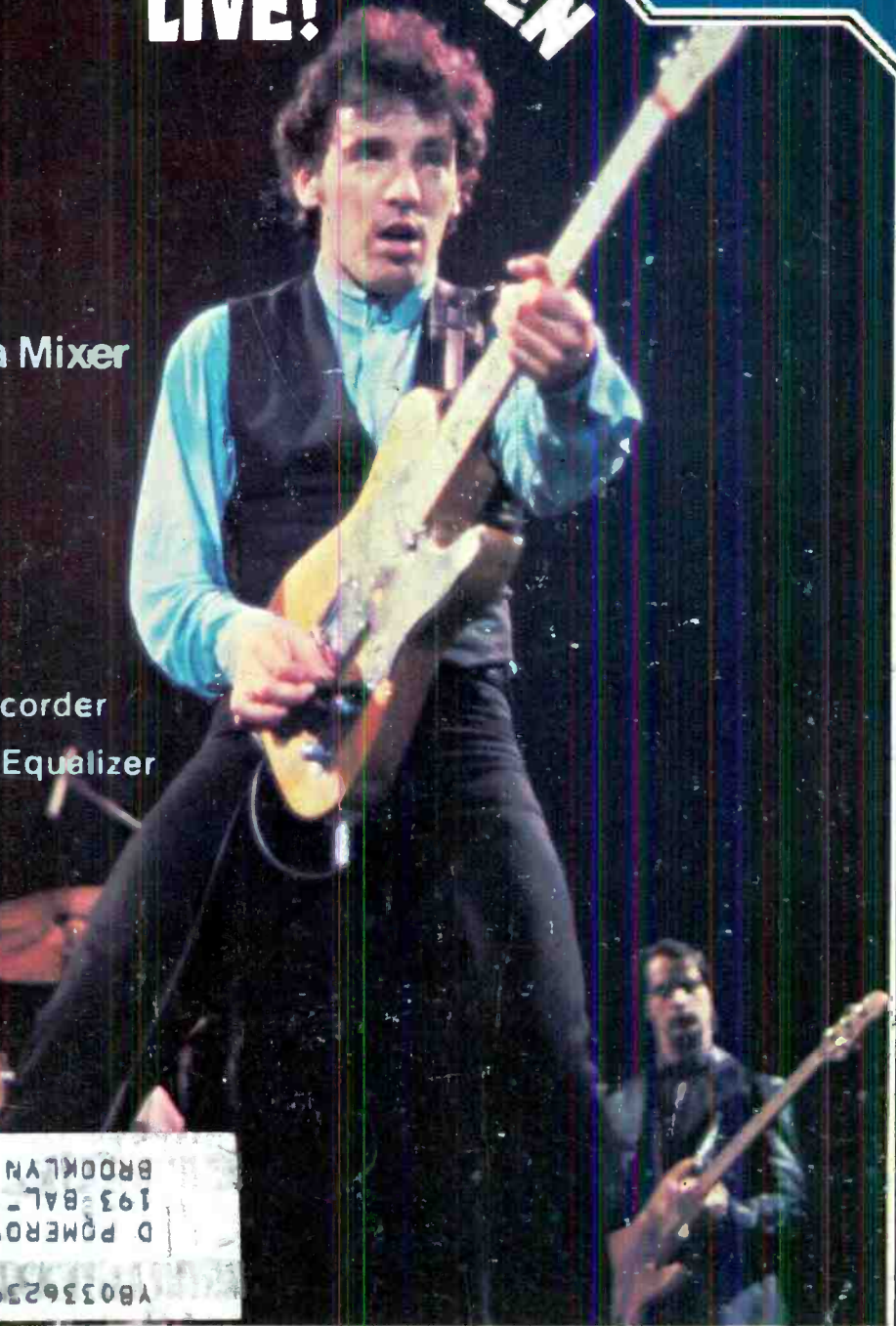
**An Interview with
David Spinozza**

Lab Reports:

- Eumig CCD Cassette Recorder
- White Instruments 4300 Equalizer
- SAE 4100 Time Delay

New Products

Record Reviews



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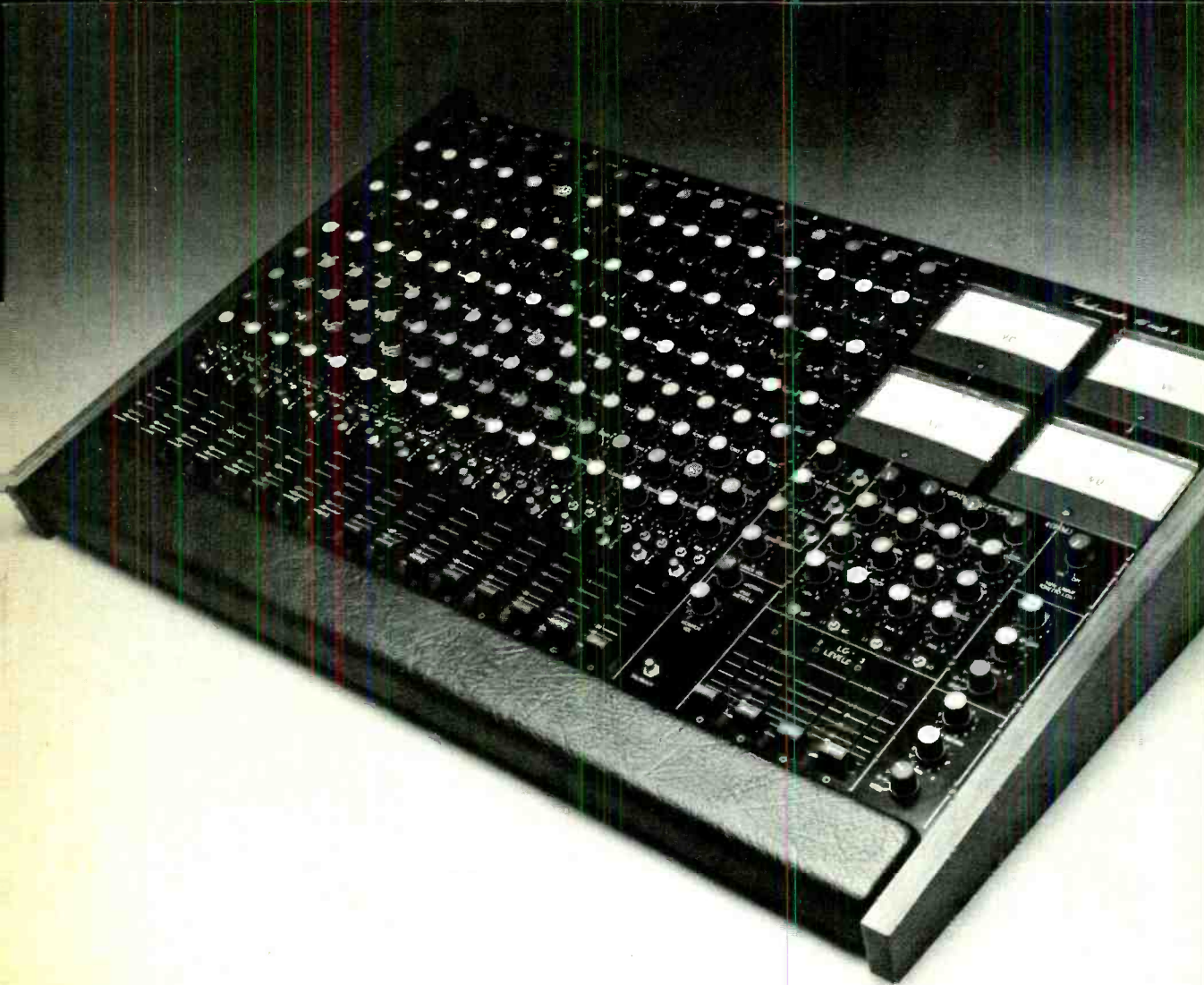
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For more information about our 16X4 and 12X2B mixing consoles, or about a new dealer perhaps closer to your area, please write: Studiomaster, P.O. Box 221, Rowlett, Texas, 75088. In Canada contact RMS, 2271 Kingston Rd., Scarborough, Ontario, MIN-1T8.

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integral part of every mixer we make and they're less visually confusing than a lot of multi-color LED displays we've seen. Compare and see what we mean.

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Where are our specs? In the equipment, where they belong. Because hearing is believing. So be a skeptic. Pick up the phone or drive to a TASCAM SERIES dealer near you. He has all the information and a personal systems planning brochure from us to you. And remember, whatever your recording needs, the TASCAM SERIES mixers are no problem.

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MODERN RECORDING

SERVING TODAY'S MUSIC / RECORDING-CONSCIOUS SOCIETY

DECEMBER 1978

VOL. 4 NO. 3

THE FEATURES

MORE ON CHOOSING A MIXER 46

By Jim Ford and Brian Roth

This issue we complete the "Choosing" articles with a rundown on the remaining features to look for when hunting down a mixer that will best do the job.

BRUCE SPRINGSTEEN "LIVE" 52

By Lohfuss Asheggedbeh

The "Boss" is back and we caught him at Madison Square Garden. Springsteen is one of the few artists who actually attempts to give his "live" audiences as good a performance (sonically) as they receive when listening to his discs. Some innovative techniques went into producing the final sound for this concert.

BUILDING A MIC SPLITTER 58

By Peter Weiss

We continue with our "Building" articles by showing the basic construction plans for a 1 x 3 active mic splitter module. Again, we have opted for the most direct approach (and least expensive) so that you can spend more time using the unit than building it.

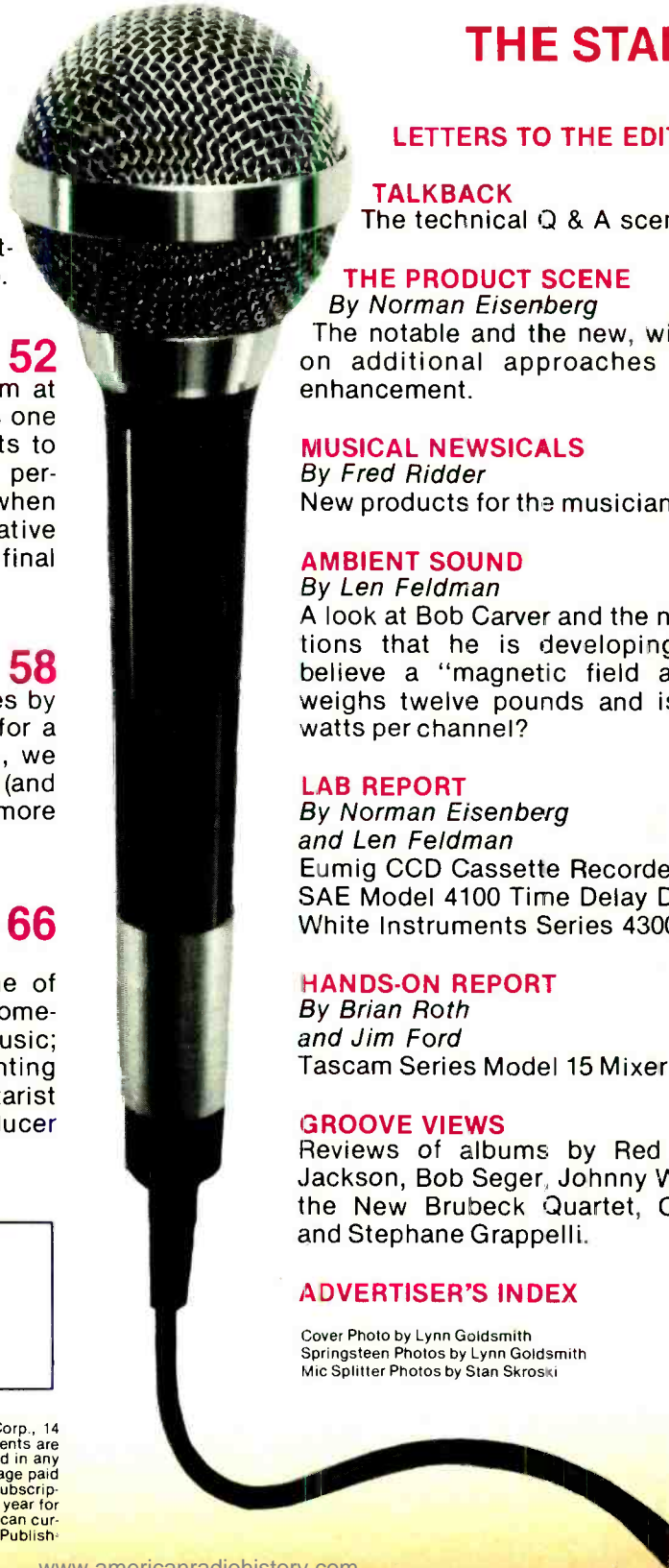
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By Chas Kimbrell

If you haven't heard or read the name of guitarist David Spinozza somewhere sometime then you: a) can't read; b) hate music; c) are lost in the Philippines still fighting World War II. An interview with the guitarist most likely to be called upon by a producer when the job needs to get done.

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Cover Photo by Lynn Goldsmith
Springsteen Photos by Lynn Goldsmith
Mic Splitter Photos by Stan Skroski

Modern Recording is published monthly by Cowan Publishing Corp., 14 Vanderventer Ave., Port Washington, N.Y. 11050. Design and contents are copyright by Cowan Publishing Corp., and must not be reproduced in any manner except by permission of the publisher. Second class postage paid at Port Washington, New York, and at additional mailing offices. Subscription rates: \$12.00 for 12 issues; \$22.00 for 24 issues. Add \$3.00 per year for subscriptions outside of U.S. Subscriptions must be paid in American currency. Postmaster: Send Form 3579 to Modern Recording, Cowan Publishing Corp., 14 Vanderventer Ave., Port Washington, N.Y. 11050.

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LETTERS TO THE EDITOR

Slow Down, You Move Too Fast

We wish to refer to your article "Ambient Sound" written by Len Feldman in your August issue, in which a variety of cassette problems and ideas are discussed.

The main topic of this article is the two-speed cassette deck which was featured [by B.I.C.] at the Atlanta High Fidelity Show in May 1978, and the benefits that supposedly will be derived from the newly marketed doubling of the standard cassette format speed.

We wish to rebut the statement made in the article that this in itself represents any surprise. We did, in fact, consider the same idea in the early 1970s when the BASF Unicassette was introduced to the marketplace. We hesitated, though, to enter into such a scheme, which destroys all compatibility and the convenience that has existed throughout the 1970s.

However, at this particular point in time, with the advent of the soon-to-be-released "metal particle tape", B.I.C. may not only have done the industry a disservice by introducing a new format, but even worse—they may have chosen the wrong additional speed. Rather than *doubling* the speed today, we could consider halving it; to 15/16 ips. Only time will tell the ultimate effects.

At 3¾ ips, head wear will be increased by four times. At even 1⅞ ips, head wear is more of a problem in the cassette format (because of the pressure pad) than even three times the speed in reel-to-reel format. Maximum playing time at 3¾ ips in a cassette will only be 2 [sides] x 22.5 minutes. If we can get a frequency response of 12-14 kHz at 15/16 ips and wow and flutter of less than 0.2% DIN peak, this speed should be absolutely of HiFi quality.

We at Tandberg dare to say that this marketing ploy from B.I.C. was very poorly timed, and if we are really serious about tape recording, it is hard to circumvent the reel-to-reel concept.

—Tor Sivertsen
Technical Director
Tandberg of America, Inc.
Armonk, NY

Len Feldman comments as follows:

I must take issue with Tor's statements regarding the incompatibility of B.I.C./Avnet's new two-speed stereo cassette decks. As I understand it, the new products specifically retain the 1⅞ ips speed for the very purpose of providing compatibility both with other cassette decks and with previously recorded cassette tapes. The higher speed is offered as an option for those recordists who wish to use it for improved frequency response, signal-to-noise ratio and lower distortion.

Admittedly, tape head wear will increase with a doubling of speed (though I am not sure that the "theoretical" quadrupling of headwear will actually occur), but since these days headwear is much less of a problem than it used to be—thanks to improved

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head materials as well as improved processing of the tape itself—I question whether the serious audiophile would regard some greater head wear as a serious detrimental factor in using the new 3¾ ips speed.

I was a bit amused by Tor's statement (despite his dedication to cassette compatibility) that, in fact, a 15/16 speed ips would have been a more proper "second speed" to choose. Indeed, I can go along with that format as well, if Tandberg chooses to produce such a machine, and I would be the first to extol its virtues (increased tape time, decreased head wear) in my column if Tandberg elects to introduce such a machine. My point is that it should be up to the marketplace to decide—and not one licensing company who has managed to dictate *all* of the parameters of cassette recording since its inception. If open-reel machines and their design were governed by such restrictions, they would not have reached the near-state of perfection they enjoy today.

—Len Feldman

Audio Editorial Board
Modern Recording Magazine

Synthesizer Kits

What I'm asking may be the impossible, but hopefully you can point me in the right direction. I'm trying to find either kits or plans for both a percussive synthesizer and a string synthesizer. So far, I've had no luck in finding either. Can you help me?

—A. Bounsall

Ottawa, Ontario, Canada

You've lucked out, A. Bounsall: PAIA Electronics, Inc., of 1020 W. Wilshire Blvd., Oklahoma City, Ok. 73116 (phone) 405-843-7396 markets a substantial range of synthesizer kits and the like, including "Stringz'n' Thingz," a versatile string synthesizer kit; and a few drum synthesizer kits. Prices rise into the mid-\$500s. Aries Music Inc., Box 3065, Salem, Ma. 01970 (phone) 617-744-2400 has a line of modular synthesizers which require greater effort and more money, but you'd be able to put together a system to create most of the sounds you want for about \$1800 in kit form (many models are available pre-assembled as well). Another New England firm you'd do well to contact is CFR Associates, Inc., Box F, Newton, N.H. 03858 (phone) 603-382-5179. CFR carries kits and plans for custom modular and overall synthesizer construction to generate the string and percussive effects you desire.

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We suggest writing each of the above for its catalog and we once again disclaim that these are an encyclopedic representation of the synthesizer kit and plan business. (Any correspondence from readers more in the know is warmly welcomed.)

Urge to Analyze

The Feldman and Eisenberg Lab Reports, as well as all of *Modern Recording*, have been greatly appreciated by me for quite a while now.

As they are two of the most well-known specialists in audio component analysis, may I urge that a test be done by them on a particularly splendid product which has recently appeared on the market? To the best of my knowledge, it has not been the subject of any test report.

The component I speak of is the cassette recorder Eumig Metropolitan CCD, first marketed, I believe, in Austria in the beginning of 1978.

—S. Goldstein
Ottawa, Ontario, Canada

Last month, we ran a description of the CCD in Product Scene; the very issue you hold contains an Eisenberg-Feldman Lab Report on the unit. Through courtesy of Eumig, we were fortunate to obtain and test one of the first production models available in the U.S.

Marshalling Time

I've been a subscriber to your magazine for a couple of years and want to thank you for your informative publication. Some time ago, you reviewed the Marshall Time Modulator. I'm interested in reaching this company. Could you publish their address?

—James Ogilvy
Denton, Tex.

The "Old Line State," where we are told wild ponies frolic on the beaches, is the home of Marshall Electronic, located at 1205 York Rd., Suite 14, Lutherville, Maryland 21093 (phone) 301-484-2220. The Marshall Time Modulator is a voltage controlled, time sweepable analog delay line.

Seen in Product Scene

In the June issue of *MR*, in the Product Scene section, there were described several recorder consoles produced by Ruslang. The reader service number listed was 17.

Unfortunately, the reader service card was missing from this issue and I

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6



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The high-impact cabinet is the toughest enclosure we could make. Built to take the drops and knocks of hard, on-the-road use, yet is amazingly light. Comfortable recessed handles make it easy to carry a pair. Integral rails and grooves allow stable stacking.

One-piece multipurpose cover serves as stage pedestal, monitor cradle, and storage compartment for equalizer, spare fuse and mounting screws.

The all-new drivers feature edge-wound aluminum voice coils for greatly improved efficiency and power handling. The eight drivers are mounted on four separate panels to improve smoothness of dispersion, putting more sound directly out front.

Unique dual reactive air columns provide greatly increased bass output with lower distortion.

The new active equalizer has both balanced and unbalanced inputs. And its new output circuit will drive 600-ohm lines.

The new Bose 802 is powerful. Tough. Easy to set up, easy to carry. And, its unique contemporary styling sets it apart from all others.

But best of all, its sound is Bose. Clean, accurate, full. A sound which tells you that any other professional speaker you may want to look at is now probably obsolete.

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have been unsuccessful in my attempts to locate an address for Ruslang. Could you give me either information on the product or on how to contact the Ruslang company?

—Judson Hixson
Chicago, Ill.

Write Ruslang Corp. at 247 Ash St., Bridgeport, Ct. 06605 (phone) 203-384-1266. They'll give you details and pricing on their tape transport consoles with optional tilt feature and front-panel access.

Index?

Bravo, dear friends! Your article on mic placement in the August '78 issue was a gem. Please—more articles like that; maybe even a similar article by another engineer with a different viewpoint or a different background.

Something else I'd really like to see in the future is an index (unless one already exists and I was just unaware) to articles and topics covered in *MR*.

—Craig R. Neal
Santa Cruz, Ca.

I have all the issues of your magazine back to April 1977. There is much

valuable information, but it is very difficult to find when needed. Do you compile any sort of index, say, yearly, that would make research in your magazine any easier? If so, could you please let me know where I could purchase indexes for past years and how much they cost.

—Peter Many
Middletown, Ct.

Craig, see the November '78 issue for another miking techniques article by Bruce Swedien. You can also expect more on this topic in the near future.

Now, to that tender subject: A Modern Recording Index is something we too have felt a keen lack of and often desperately need. When the staff has a few minutes, we often get together and think on how pleasant it would be were there an index to all the articles and topics that have appeared in *MR*. But it has been largely a matter of "who'll bell the cat?" Any takers?

Is There a Jingle in the House?

I have just opened up an 8-track studio and I wonder if you could tell me how I can locate "Jingle Houses" in the In-

dianapolis area. Of course, I can't find anything in the "Yellow Pages" under such a colloquial heading, so could you please give me a lead on how I can locate such firms? I love your magazine—Thanks!

—John Jeffers
Fountainhead Recording Studio
Anderson, Ind.

It was a bit unclear to us whether you wanted to locate studios that derive the most substantial part of their income from the recording of commercials, or whether you were mainly seeking writers of commercials. For the former, you'd have to contact individual studios and ask; for the latter, you have the "Yellow Pages" already, so do like the Ma Bell jingle and look under headings like "Commercials—Radio & Television," or "Radio Commercials" and "Television Commercials."

Priorities of Claude Abroad

With regard to "A Session With Leo Sayer, [*MR*, Sept. 1978], p. 54: Although I am delighted to hear that my company was mentioned in your magazine, I was a little disturbed to hear further that it apparently belongs to

Sound Workshop professional reverberation at a new low price



Over three years ago the introduction of our 242 stereo reverb set the standard for low cost reverberation. Continuing in the same tradition, Sound Workshop brings you the new standard, at an even lower price... The 242C stereo reverberation system.

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IF YOU OWN A TV AND A HI FI, YOU'D BE FOOLISH NOT TO OWN THIS COMPONENT.



Television has always been fun to look at. But compared to your hi fi, it's an absolute disaster to listen to.

Where your hi fi provides you with rich, undistorted sound, the average TV sounds no better than a cheap kitchen radio.

And how can you seriously expect to experience something like the "thrill of victory" (or even the agony of defeat) through a 3" TV speaker?

As the world's leading audio company, we at Pioneer have long felt obligated to do something about the quality of TV sound.

Which is why we created the TVX-9500.

It's the first TV audio tuner. A high quality audio component that attaches to your receiver or amplifier like a cassette deck, and provides you with rich, clean, clear TV sound. Through your hi fi system, instead of the TV. (When you use the TVX-9500, you turn your TV sound off.)

But the TVX-9500 does more than just make TV sound better.

It makes TV an entirely different experience.

When you watch a football game, you feel more like a participant than a spectator. You hear the signals. Feel the

snap. And almost wince at the tackle.

Movies begin to feel as if you're sitting in the theatre, instead of your living room. Characters like Brando's Godfather remain just as menacing in 19" as they were in Panavision. Musicals like "The Sound of Music" don't end up featuring "the sound of distortion." And for the first time, someone like King Kong will also sound larger than life.

Then there's TV music.

With the TVX-9500, live concerts will, at last, sound that way.

Symphonies will finally be as much fun to listen to as they are to watch. (Which is the whole idea of watching them in the first place.)

And when you view something like "Gone With The Wind" you'll actually be able to hear Atlanta burning.

Admittedly, even the great sound the TVX-9500 offers won't make up for bad TV programming.

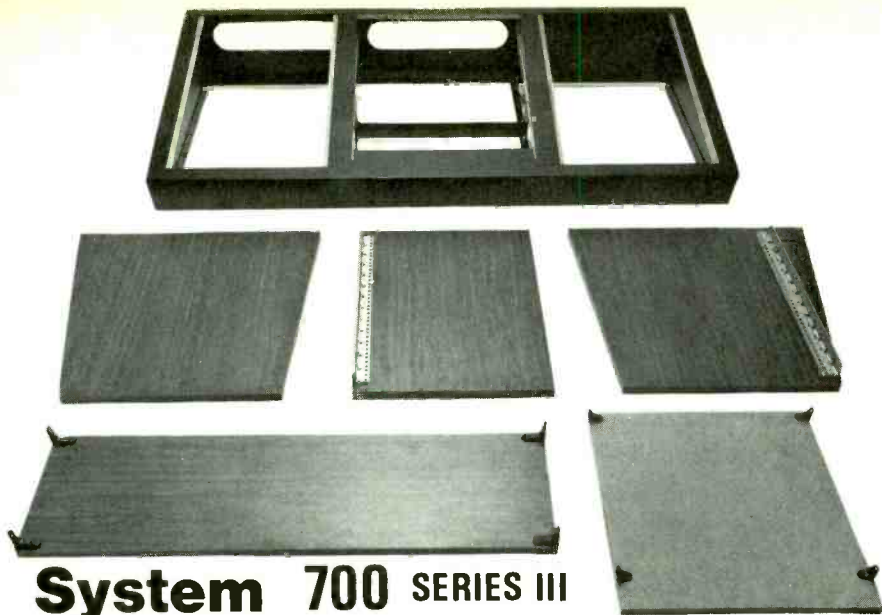
But then, our advice would be to do what you'd do to a bad TV show anyway:

Turn the set off.

And enjoy your hi fi.

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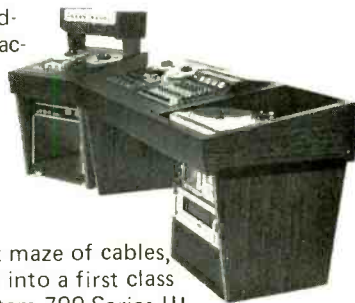
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Several years ago enclosures for semi pro recording gear were as rare as hens' teeth. The manufacture left it all in your hands. As a result, our System 700 approach to packaging the semi pro studio was hatched. System 700 became the only logical answer. However, high cost and long lead times limited availability of these early units.



Now for as little as \$800.00, you can turn that maze of cables, tables and chairs into a first class studio. Our System 700 Series III enclosures come to you as illustrated. Ready for quick assembly, modular construction allows easy updating. Best of all, they are available from stock! Hens' teeth have finally come of age.



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Roger Daltrey. For your information "Claude Abroad" is my company offering independent services to Music Publishers who have an unexploited catalogue here in the U.S. As such, my clients include Hit and Run Music Ltd. (Genesis, Pete Gabriel, Anthony Phillips), Rock Music Company Ltd. (Pink Floyd, Elvis Costello, Nick Lowe, Hummingbird), Towser Tunes Inc. (Pete Townshend, Steve Gibbons, Billy Nicholls), etc.

—Tim Prior
Co-Director
Claude Abroad
Hollywood, Ca.

Writer Michael Gershman never meant to imply that Claude Abroad was owned by Roger Daltrey, but simply that Daltrey has made use of work that a client or clients of Claude Abroad have produced. We hope this clarifies the misunderstanding.

Addendum

The parts list for "Building a Power Supply," (Modern Recording, October 1978) did not specify part number for the power transformer (T1) needed to build the power supply.

The part number for this item is 68-1, and it is manufactured by the Signal Transformer Co., Inc., 500 Bayview Ave., Inwood, N.Y. 11696 (phone) 516-239-7200. It is rated at 115 VAC primary, with two 34 VAC center-tapped secondaries. Any other transformer capable of delivering 1 amp in each secondary winding may be used.

Scooter Asks "How?"

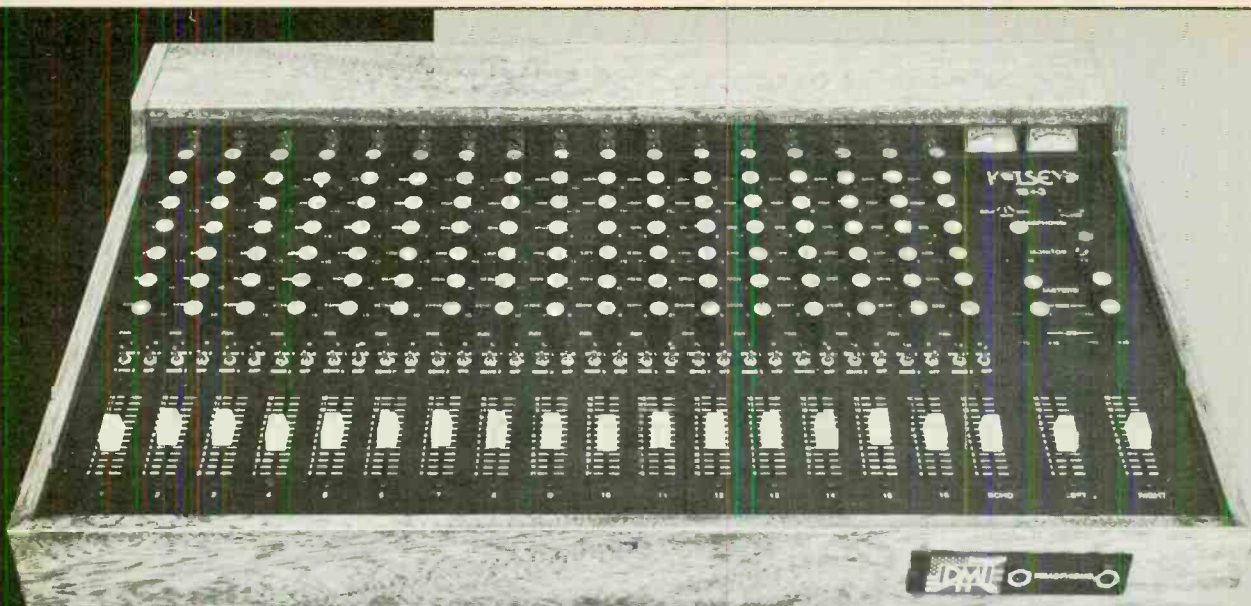
As thorough as your magazine is on most aspects of the technical side of the music industry, you forget one important point: future engineers.

I would like to get into record engineering, or mixing for a band (high-class roadie). I guess to mix for a band you just start out with them, but where do their new roadies come from? Do they carry lights first, then work their way up to "mixer?"

How do recording engineers get to be engineers? Some articles I've seen have authors with degrees in electrical or acoustical engineering. Is an engineering degree necessary?

What about audio engineers? Are they real engineers? Or is it a general name for studio designers, builders, recording engineers, etc?

I've found that the University of Miami offers a degree in Music Engineering. Have you heard about this or



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If you want a 24 channel console with 4 sub-masters, we've got it! Or just 8 channels mono with no frills. We make all kinds of different mixers, but with one thing in common—super quality at affordable prices.

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If we were to try to tell you about all the features and specifications of our new Kelsey 8 - 12 - 16 Channel Mixers, we'd have to take out four-page advertisements. So we're just going to tell you that each input channel has transformer balanced low impedance connector and high impedance jack; gain control; two LED indicators; 3 equalizers; monitor send; 2 effects sends; stereo pan; and on/off/solo switch. And there's an additional effects channel with all the controls of an input channel plus "spin". On the outputs, 2 VUs switchable between main and monitor; left and right faders and tone (high/low) controls; monitor volume; and switchable headphones between solo, main and monitor. And check our specs:

SPECIFICATIONS:

INPUT

IMPEDANCES: Hi Z = 50 K unbalanced; Low Z = 200 Ohm transformer balanced. **MAX. INPUT LEVELS:** Hi Z = +20dBm; Low Z = +8dBm. **GAIN:** Hi Z = 0-46dB, continuously variable; Low Z = 12-58dB, continuously variable. **EQ:** High ±15dB at 10K, shelving; Middle ±9dB at 2K, peaking; Low ±15dB at 100 Hz, shelving. **MONITOR:** Pre-EQ, unaffected by of switch. **ECHO:** Post-EQ, Post-fader. **LEOS:** Green lit from -10 to +21; Red lit from +15 to +21; 6dB headroom left when Red lit. **EQUIVALENT INPUT NOISE:** -110dBm from Hi Z input, -122dBm from Low Z input. **T.H.D.:** @ 1kHz, any level up to clipping typically less than 0.1 percent.

OUTPUT

IMPEDANCE: Nominal 600 Ohm unbalanced. **MAX. OUTPUT LEVEL:** 8.8V RMS @ 10K Ohm (+21dBV). **GAIN:** Mike in to line out +60dB. **EQ:** Hi ±15dB @ 3.5 kHz; Low ±15dB @ 35 Hz. **V.U. METERS:** "0 VU" = +4dBm at output of buss amp., switchable from stereo mix to monitor mix. **FREQUENCY RESPONSE:** Mike in to line out ±1dB, 30 Hz - 20kHz. **SIGNAL TO NOISE:** Mike in to any output - typically 70dB. **T.H.D.:** Any output 1kHz any level up to clipping typically less than 0.1 percent. **POWER REQUIREMENTS:** ±15V DC @ 1/2 Amp.

The Mixers have a separate power supply, a solid mahogany cabinet, and come complete in an SMF Tour Series Road Case included in the price. What Price? \$4,000.00? No Way!

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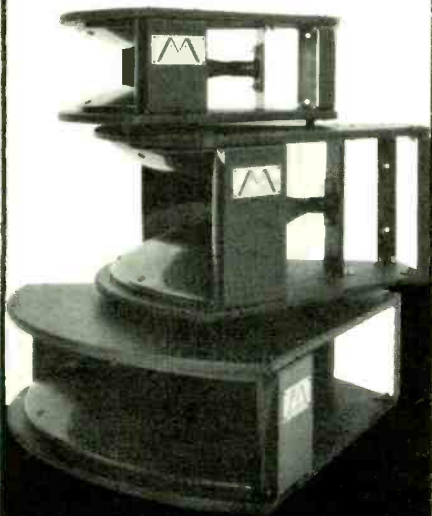
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And there's a full line of Ashford horns for virtually every need; and every one comes in a rugged road case for maximum protection. So if you're in a professional or touring band, involved with disco systems, or have a need for superior PA horns, check out Ashfords today.

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Dealer and rep inquiries invited.



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CIRCLE 33 ON READER SERVICE CARD

any other school which offers such a degree? Any suggestion for getting into the best biz there is? Before the Miami school, I had been considering an electrical engineering degree, and before that, a degree in communications of some sort.

Any suggestion, idea, thought or various other mental exercise will be greatly appreciated. I hope there are others like me. Thank you.

Please print! I need help!

—Scooter Marshall
Harlinger, Tx

You sure do ask a lot of questions. And you really answer many of them yourself. We haven't forgotten the future engineer, though: Our "Artist Profile" and "A Session with" stories contain much information on how people generally get started in the "best biz there is." Yes, often you just start out with bands and get into engineering from the bottom up, carrying lights or the like. Or, you get formalized instruction beforehand. There are a myriad of ways one can get to be a recording engineer—through accredited and degreed programs, through experiential training and self-teaching, and through various other channels, just as is true in any other business.

Our advice would be to first talk to people—write to the University of Miami and to other schools (we're compiling a list, part of which may appear in this very issue). Call and ask if you can drop in at a recording studio to talk or learn through apprenticeship, if they're willing. Keep reading Modern Recording magazine.

We're sure there are others like you. But you sure do ask a lot of questions.

A Scholarly Search

I've been looking for a school that specializes in recording engineering. Most schools I've contacted have four-year programs, with the first two years devoted mostly to prerequisites. I have no objection to a four-year program, but I don't want to wait two years to get down to the "nitty gritty." If you know of a school, or schools that specialize in this field, please advise me. Thank you for your time.

—Bill Harris III
Plymouth, In.

I attend Carnegie-Mellon University, majoring in Electrical Engineering. I plan to change my major to Sound Engineering, because utilizing the lat-

ter education, I can best fulfill my future professional goals. However, I am having difficulty locating a program with this emphasis. Any information you have about schools that offer Sound Engineering as a major course of study is greatly appreciated.

—Adrienne Jones
Wilkinsburg, Pa.

As a resident of Columbus, Ohio, I'm having some difficulty in locating an educational institution in which I can obtain a degree in audio engineering. I'm interested in studio engineering, sound reinforcement and retail of equipment used in those fields. Any information you could give me about educational opportunities in these areas would be appreciated.

—James M. Cunningham
Columbus, Ohio

The amount of mail we receive and the temporal nature of a monthly publication seems to require that we compile, update and regularly republish a list of institutions that offer courses, programs and degrees in the audio arts. Thus, we, spurred largely by Larry Siedentop's letter to the editor in the November 1978 issue (wherein Mr. Siedentop suggests an approach to the search—that persons familiar with current programs write in and tell us about them), are paying greater attention to compiling what we hope will be a comprehensive listing. Meanwhile, we republish here, with some amendments, that now out-of-print July list.

Accredited programs include those at Middle Tennessee State University, Murfreesboro, Tennessee 37130 (B.S.); Belmont College, Nashville, Tennessee 37203 (B.B.A.); University of Miami School of Music, Coral Gables, Florida 33124 (Bachelor of Music, Master of Music); University of Wisconsin, Oshkosh, Wisconsin 54901 (Bachelor of Music); Memphis State University, Memphis, Tennessee 38152 (B.S.); Bradley University, Peoria, Illinois 61625; Syracuse University, Syracuse, New York 13210; West Virginia Institute of Technology, Montgomery, West Virginia 25136; and Northeast Missouri State University, Kirksville, Missouri 63501.

As we stated in July, each of these programs approach recording from a different angle (music, business, engineering) so your particular interests or specialties will narrow down your choice of a school.

Individual courses in the recording

To an extent that no other stereo power amp in its price range can equal, the Peavey CS-400 is a totally versatile amplifier.

The CS-400 offers many features in terms of operation, engineering, and concept never before available.

Up front, the CS-400 features a rugged 5.25" x 19" rack mountable chassis with a steel reinforced, die cast panel for beauty and protection. LED overload indicators, level controls, line outputs, high temperature indicator, and lighted mains switch add to the amp's clean, functional design.

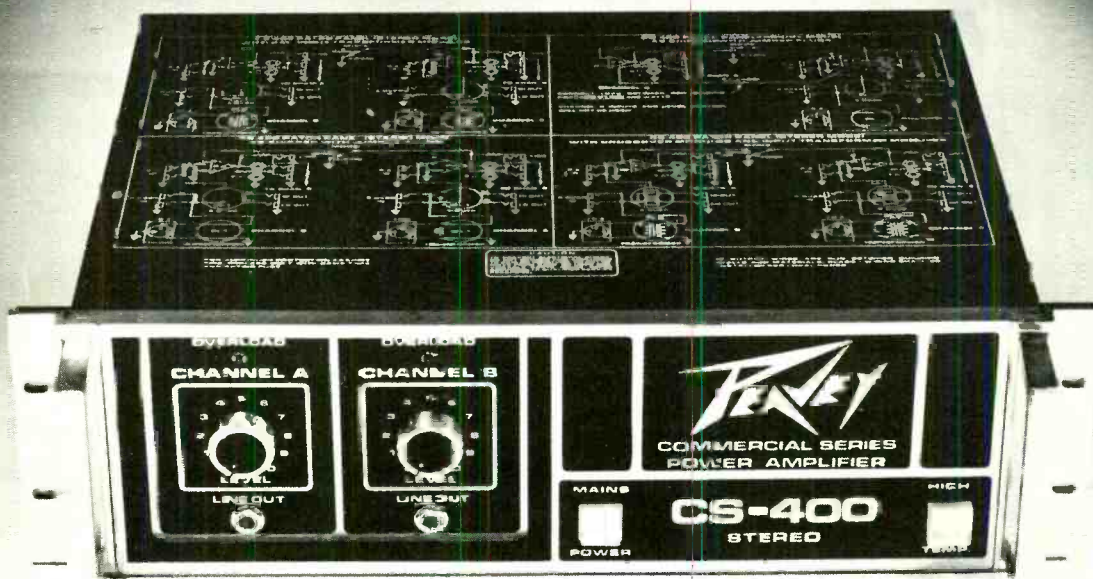
Inside, the CS-400 is an uncompromising fusion of modern, solid-state technology and quality components. 200 Watts per channel into 4 Ohms, less than 0.1% total harmonic distortion, with an extremely wide frequency response (+0, -1 dB 5 Hz to 40 kHz @ 1w, 4 Ohms) make some pretty impressive specs.

But there's a lot more to the CS-400 than raw power and impressive specs. What really makes the CS-400 so special is its versatile back panel and patching system that enable such accessories as input transformers,

crossover networks, and bi-amping possibilities using small interchangeable plug-in modules. With the CS-400's plug-in module system, our engineers have created a method to fully utilize all the performance capability of the amplifier.

Without this unique patch panel, our CS-400 would just be another great amplifier. With it, it'll be another standard for power amplifiers.

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The Peavey CS-400

Power @ Clipping:
(1.0% THD, 1.0 kHz, 120 VAC Line)
260 Watts RMS into 4 Ohms

Total Harmonic Distortion:
Less than 0.1% from 20 mW to 200 Watts RMS
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Intermodulation Distortion:
Less than 0.1% from 10 mW to 200 Watts RMS
into 4 Ohms, typically below 0.5%

Frequency Response:
+0, -1 dB, 5 Hz to 40 kHz (1 Watt, 4 Ohms)

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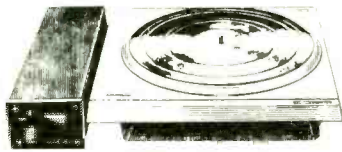
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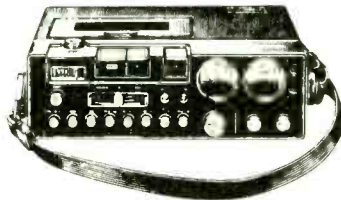
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arts and sciences, though not always represented as such, are to be found in institutions that offer degrees in physics, electrical engineering and communications, among others. We doubt that a compilation of such courses would be anything but impossible to achieve, and we won't be trying, but it is good to know: Those readers not looking for degrees would be wise to investigate attending universities or colleges that offer pertinent individual courses on a non-matriculating basis (that is, without intent and/or plans to graduate).

Both public school districts and colleges often administer community education services or adult education programs, which, if not already offering courses the potential recording engineer could use, will consider instituting them when approached (of course, there would have to be a substantial number of individuals interested before they could do this).

A ten-week course conducted in professional recording studios is offered nationwide by the Recording Institute of America. For more information on these non-credit courses, call or write the RIA at 15 Columbus Circle, New York, N.Y. 10023, 212-582-0400.

P.S. James, really; is it because you're a resident of Columbus that you're having this difficulty?

Grape Carnation

Thank you for an interesting September issue.

I'm wondering if you could get me information on obtaining the live Moby Grape album reviewed in that issue by Gil Podolinsky. I have been a Grape fan from way back, and I would love to check up on their present carnation.

There is no address available for the record company, Escape Custom Record Production, in the review, and I've never heard of it, nor has my full-service record store. I would appreciate being put in touch with the label so I could order a copy of the record and also receive information on the group's previous releases. Let me know, if you can, how I can acquire the album.

—Douglas K. Snyder
Orange, Conn.

The address of Escape Custom Record Production is: Box 44, Felton, Ca. 95018. Copies of Live Grape can be had for \$4.98, plus \$1.00 for postage and handling. The disc is optionally available in purple vinyl for \$1.00 more.



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TALK BACK

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

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

Keep It Cool

I own a Yamaha TC-100 cassette deck and the Nakamichi 250-ADS 2002 car stereo system. Using so-called "chrome equivalent" tapes (mostly Maxell UD-XLIIs), I have noticed—and after only one playing on the Nakamichi—that once excellent tapes become very dull sounding, with a particular loss of highs. This phenomenon is discernible to some extent, though not oppressively so, in playback on the Nakamichi ADS but is startling in playback on the Yamaha with a Soundcraftsmen amp and preamp equalizer and ESS amt 1B speakers. I must emphasize that the tapes are fine in repeated playback on the Yamaha, but once used in the Nakamichi they all exhibit these characteristics.

The only culprit I can point to, in my layman's point of view, is excessive heat in my car. Although it is air-conditioned, it naturally gets very hot inside when parked in the sun and I can't very well leave my windows open with the Nakamichi inside. Could the heat in the car

saturate the tapes, resulting in the dull sound quality; or could a hot Nakamichi playback head or pressure roller be responsible? Or am I off the mark altogether?

This problem is particularly troublesome since I have taken such great care to record the tapes well and I have kept the tape heads, pressure roller and capstan on both machines clean, using denatured alcohol and cotton swabs. I managed to ruin, for home playback in particular (as I find the Nakamichi ADS to be otherwise a bit sibilant with tapes the first time around), some thirteen tapes before making this exasperating discovery, not to mention the weeks of doubt I've experienced wondering about what I thought was a deteriorating Nakamichi ADS when it was bad tapes all along, so please help!

—Willard Baker
Roanoke, Va.

You have correctly assumed that excessive heat is at the root of your difficulties with your Nakamichi.

Although modern tape formulations are very tolerant of extremes in environmental conditions, such as temperature and humidity, the fact remains that it can get awfully hot inside a car parked in direct sunlight. Surface temperatures of objects left inside such a car can actually exceed the boiling point of water (100°C or 212°F).

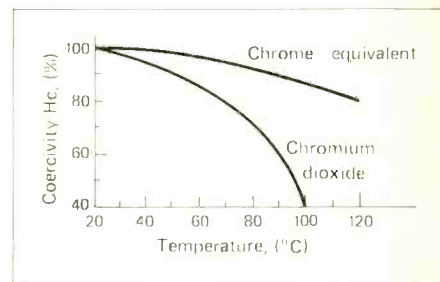
"Chrome-equivalent" cassette formulations, such as Maxell UDXL II, TDK SA and Nakamichi SX, are cobalt-treated ferric oxide tapes exhibiting what, in magnetic terms, is called high coercivity. High coercivity is what enables these tapes to retain relatively large amounts of high frequency information. When subjected to very high temperatures, i.e. in excess of 80°C (176°F), these tapes can lose some of their coercivity. Although actual figures may vary,

laboratory samplings show that a tape such as Nakamichi SX loses 10% of its coercivity at approximately 95°C (203°F). At 120°C (248°F) it loses almost 20% of its original coercivity.

When a tape loses its coercivity, it is less able to "hold onto" high frequency information. Coercivity is restored when the temperature is brought back down to normal, but the high frequency signals which were lost when the tape was exposed to high temperature can never be recovered. Your only recourse is to re-record the tape.

The obvious solution is to take your tapes with you whenever you park your car in direct sunlight on a hot day. If this isn't practical, try to find a parking spot in the shade, and don't leave your cassettes on potential hot spots, like the dashboard or seat. (In certain parts of the country, of course, it's not wise to leave *anything* in your car, even with the windows up and doors locked, but that's for entirely different reasons.)

Incidentally, switching to a different kind of tape really is not the answer. "Chrome-equivalent" cassettes are the most stable formulations on the market today. Just as a comparison, observe the difference between chrome-equivalent tape and chromium dioxide tape in the graph below.



If I can be of any further assistance, please do not hesitate to call.

—Harron K. Appleman
Technical Director
Nakamichi Research, Inc.
Carle Place, N.Y.

Preventing Phase Cancellation

I have a problem with what could be distortion caused by a skew on my TEAC 3300S. But before going into it I think it best to explain my recording and mix situation.

On one particular song, we recorded drums (in stereo) and bass on tracks 1 and 3 of the A2340SX four-channel. We didn't have the facilities to multi-mic the drums so two Shure 545s were used—one near the hi-hat, snare and left cymbal; the other near the floor tom, mounted tom and right cymbal. It proved to be a good, simple, wide mix. Tracks two and four were overdubbed with synthesizer and Rhodes, respectively. These four tracks were mixed down to the 3300s in the following manner: channel one—left of center, channel two—center, channel three—full-right and channel four—right of center. This whole mess sounds great—in stereo. But when the mono switch is thrown on the amp, the high end (especially the hi-hat) sounds as though it's been phase-shifted!

Admittedly it's an interesting effect, but we didn't plan it that way.

I've watched the tape pass over the heads during playback, and it only moves about a hair up or down at any given time. Even the four-channel moves this much. Is there a possibility that this is normal, or is there a problem in the two-channel? If it is normal, can it be avoided? Is my situation similar to that of Mr. Stottlemeyer's as was described in the October 1977 Talkback query, "Skew Solution" (page 17)?

Thank you very much for any information that you can pass on to me. As others before me have said—yours is the greatest magazine I have ever seen!

—Bill Heinen
Salina, Ks.

From the information in your letter, it appears that your problem may indeed have some of its roots in tape skew. However, this is where the similarity to Mr. Stottlemeyer's situation ends. Where his dropout problem was a direct result of excessive skewing, the amount of skew that you describe in your letter seems to be within acceptable limits (assuming that your hair is of average width). Regardless of how minimal tape skewing is, there is always some degree of phasing difference between two stereo channels on a recorded tape. In stereo operation, where these signals

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are processed separately, this effect is relatively undetectable. However, in the mono mode where these two signals are combined, the results are very noticeable high-frequency loss and an apparent phase shift. This phenomena is known as phase cancellation and is caused by the combination of two or more out-of-phase signals.

Needless to say, there are many factors which contribute to the signals being out of phase. In addition to the obvious considerations of mic placement, actual mic phasing, cable and

connections phasing, monitor speaker phasing, etc., etc.; there is still the original question of phasing differences caused by tape skew. Simply stated, a section of tape over the recording head has a particular orientation with respect to that head. During playback, if the orientation is not identical with respect to the playback head, phase shift will occur. It is not unlike an instantaneous shift in azimuth adjustment. If this difference in orientation is excessive, drop out will occur as a direct result, as explained by Mr. Spurney in

response to Mr. Stottlemeyer's question.

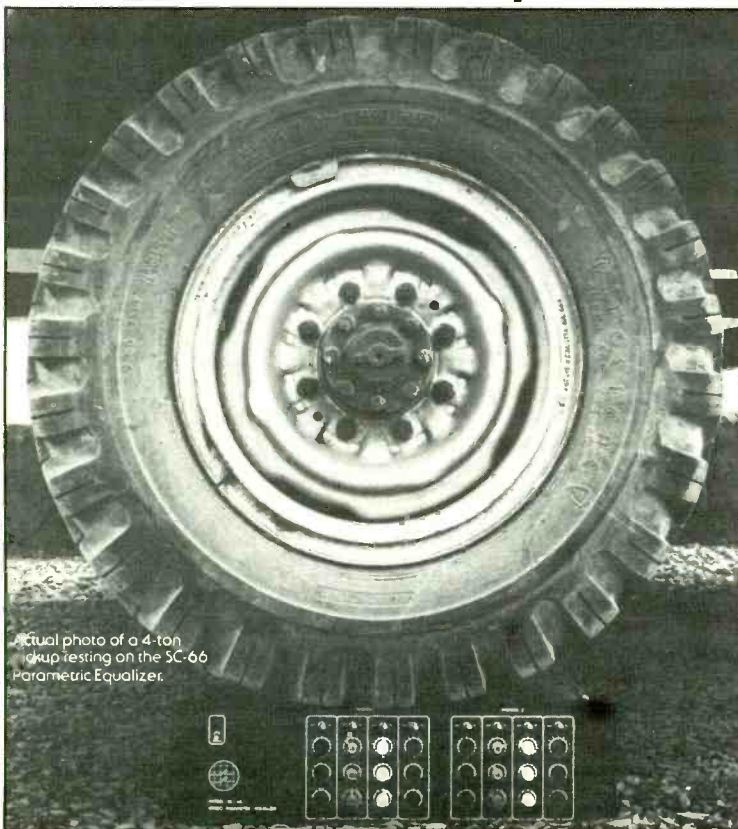
Obviously, head alignment is a critical factor here. It is important to remember that this situation is only apparent in "mono" operation. As you yourself mention, "this whole mess sounds great—in stereo." Since demo tapes and final mixes are usually done in stereo, these problems are thereby minimized. Phasing problems exist throughout the recording process, which is why special care is taken in any professional recording situation to reduce the effects of phase cancellation whenever two signals are mixed or otherwise combined.

If you specifically need a mono mix for your application, there are several steps you can take to reduce these problems. First of all, adjust your decks for absolute minimum tape skew as Mr. Spurney elaborately describes in his Talkback reply. Secondly, have the heads on both of your machines aligned to the tightest possible tolerances. And last but certainly not least, go over every step of your recording signal path and check for any phasing discrepancies. Please bear in mind that an in-depth evaluation of your recording and mix arrangement is beyond the scope of this letter. I have only covered what I feel to be key issues pertinent to your inquiry. If you need any additional information feel free to contact either Mr. Spurney or myself here at TEAC.

—Claude Schnell

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Hooking Up

How can I get an EQ and compander to function within my present system consisting of a model 9060H Dorkorder stereo tape deck and a Tapco 6000RCF six-channel mixer? I'm planning on purchasing a Tapco T-2200 EQ and an MXR compander. Getting down to brass tacks, I need to know how the hook-up would hook up!

All of my output channels use 1/4-inch phone jacks. What would I connect the EQ and compander to in my mixer, or could I possibly incorporate the two into the tape deck at once? (Usually both the line in and the line out are in use when I'm using either the EQ or the compander.)

Also, could you backtrack with me a bit and tell me what the best way to hook up the mixer is in the first place? Is it best to run lines from the

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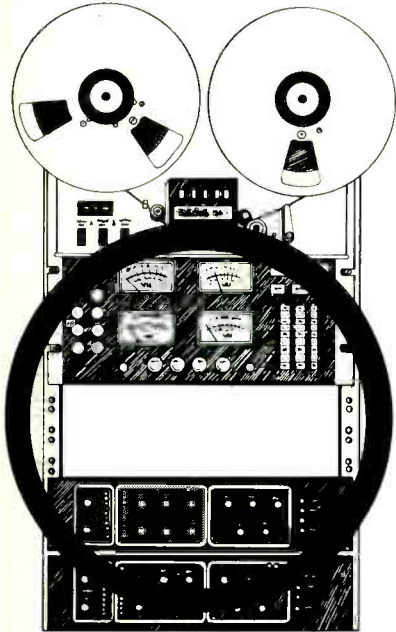
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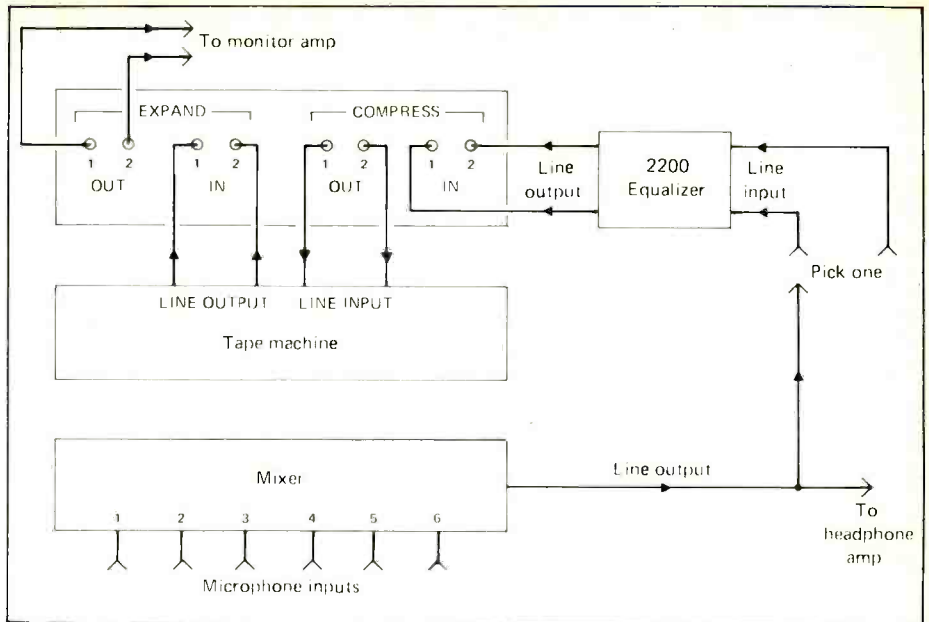


Fig. 1 Note: Arrows indicate signal flow.

outputs of the mixer to the mic jacks, or to somehow connect it to the line plugs? If the second method is advised, how then would my EQ and compander come into play?

If you could pass this information on to me in simple English or uncomplicated diagrams, I'd really appreciate it. I'm just a novice and there really aren't that many people down here that are into recording that can explain a schematic to me!

—Donnie Bedford
Shreveport, La.

I guess that I'll have to start by making a couple of assumptions: 1) You don't want to make stereo recordings (you have a mono mixer). 2) You do want to

use the 2200 EQ to equalize the overall mix going to the tape machine. (The 2200 is designed to work at line signal levels; approximately -10 dB to +8 dB.) You should connect the MXR compander to your tape machine permanently. The 2200 EQ can connect between the mixer output and the compander “COMPRESS input 1 or 2.” The 6000RCF mixer would then connect to either the #1 or #2 input on the 2200 (see Fig. 1).

To do a “live” overdub (sound with sound or a prerecorded track plus new material mixed together and re-recorded on the other track), connect the prerecorded track to the #6 input on the mixer (see Fig. 2). The mixer output goes to the 2200 input corresponding to

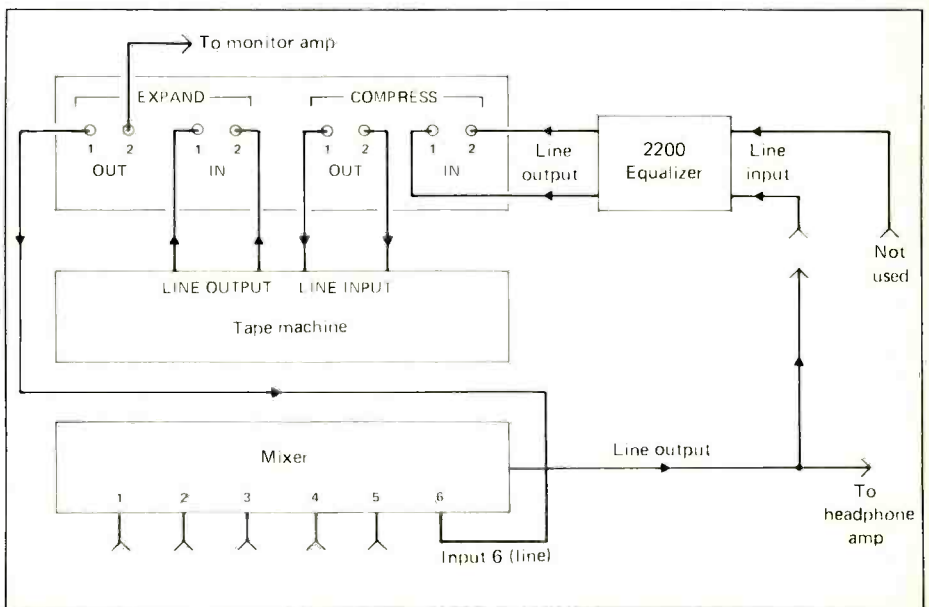


Fig. 2 “Live” overdubs, assume channel 1 (trk. 1) to be prerecorded.

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EC-9P

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the other (remaining) track on the tape. Microphones can go into the other five mixer inputs. Balance the microphone signals with the prerecorded tape signal and record that onto the remaining track. This process may be repeated several times going back and forth between tape tracks. The limit is how much hiss and frequency response degradation you can stand. Each overdub (don't confuse this with overdubbing in sync as on machines equipped with sel-sync capability) amounts to a tape copy, and each succeeding copy will get worse. Please note that you can't use the sound on sound feature of your machine. Since you are using a compander, all signal processing (mixing, equalization, limiting, effects processing, etc.) must be done outside of the compander's expand/compress loop. Doing otherwise will cause encode/decode errors (it won't sound good). Since you only have a 2-track, you can only get a mono finished tape with this process, as it is impossible to get the two tracks on the tape to be time synchronized with each other.

—Rick Chinn
Product Specialist
Tapco
Redmond, Wa.

The Five "Ws" of Calibration Tapes

I would appreciate some information on calibration tapes—where can they be obtained; what is available; how are they made and how good are they? What range of nanoweber is acceptable for 0 dB?

—Mark Jensen
Spartansburg, N.C.

Calibration tapes, or tape recorder alignment tapes as they are commonly called, are manufactured by several firms in the U.S., with the three major producers being Ampex (401 Broadway, Redwood City, Ca. 94063), Standard Tape Laboratories, Inc. (26120 Eden Landing Road, Haywood, Ca. 94545) and Magnetic Reference Laboratory (229 Polaris Ave., Suite 4, Mountain View, Ca. 94043).

Alignment tapes come in many different formats for many purposes. It is not possible to list all of them here, so I will confine myself to the most common type: the reproduce calibration tape.

The idea behind the alignment tape was to provide a universal standard reference which could be repeatedly used to "set-up" and check a tape record-

er's playback and equalization levels, as well as the physical alignment of the playback head. These reference levels would in turn assure proper recording levels and the ability to interchange tapes made on the same reference standard between any tape recorders and achieve the same recorded levels. The reference was established in the early days of magnetic recording by the AES and also the NAB in the U.S., and a European reference entitled CCIR was also formed, which differs from the U.S. standards for alignment tapes.

By playing the reproduce calibration tape on a tape recorder one can set the reference level (called the "flux" level), as well as the playback equalizer, at various frequencies between 50 Hz and 15,000 Hz to conform very closely to the reference standard chosen. The same tape is also used to check and align the various angles of the playback head as it meets the tape oxide surface, such angles being azimuth, zenith and wrap angle. Once the playback head and electronics have been aligned, the record head, erase head and record electronics may also be aligned.

Quality control is essential in manufacturing alignment tapes, which are

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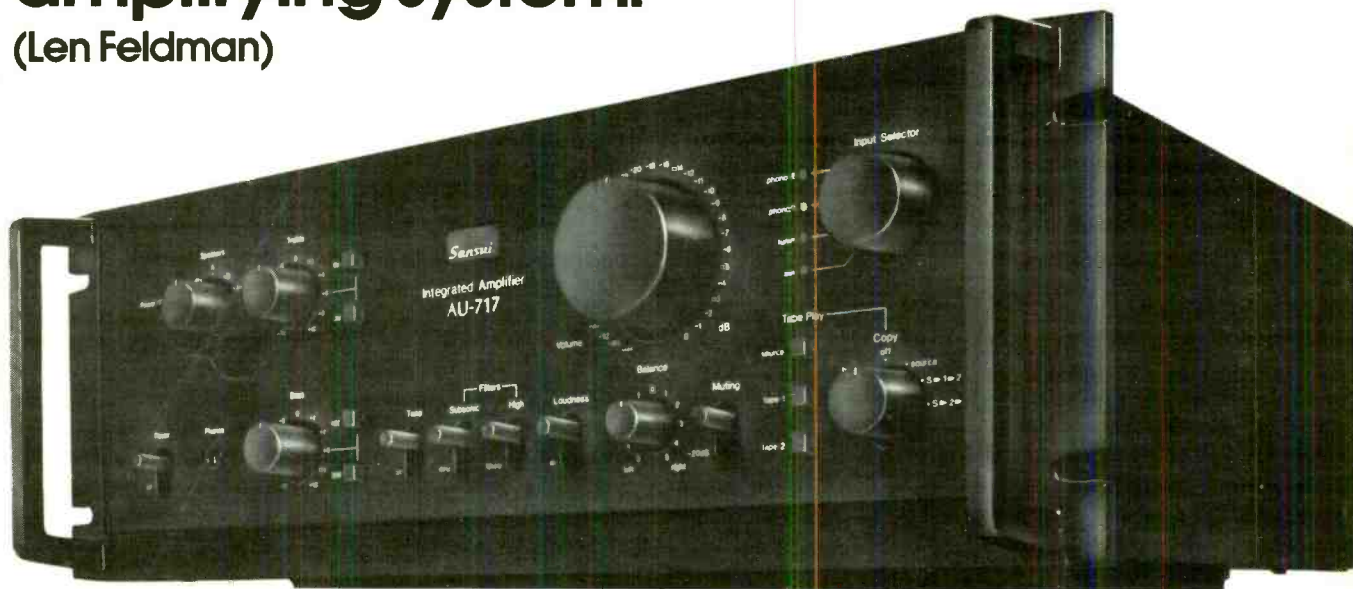
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“One clear advantage of DC design is apparent. Even at the low 20Hz extreme, the amplifier delivers a full 92 watts — the same value obtained for mid-frequency power — compared with its 85 watt rating into 8 ohms....

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produced one at a time, using specially modified tape decks and heads made to very closely defined tolerances. Commonly, whatever width of alignment tape is being produced (from cassette width to two-inch) is recorded across the entire oxide width in one track. Tapes are also made with multiple track formats for special uses.

Jay McKnight of MRL told me that they use the following method to insure that their master record head is in perfect alignment, physically, in reference to the standard defined. The alignment tape produced is played back on a calibrated multitrack alignment tape, first with the oxide facing it, then again with the backing facing it. The goal is to obtain a *zero* time delay between the top and bottom tracks compared in both modes, oxide in and oxide out. Only those tapes which exhibit no time delay from this measurement pass that step. This assures proper phase alignment of the master recorded calibration tape, due to proper azimuth of the record head. The next step is to record the full set of standard reference frequencies at their various "flux" levels (levels of magnetism) to conform to the particular equalization curve desired. The refer-

ence frequency for the equalization is 1000 Hz on MRL tapes, and 700 Hz on Ampex and STL tapes. All recorded levels are checked for absolute accuracy within 1% tolerance or less by a specially made flux calibration head. A graph of the particular flux levels on each finished tape is made, showing those levels at all frequencies, and this graph is included in the package. The strict tolerances and inability to make more than one tape at a time make the manufacturing process time-consuming and costly. Two-inch alignment tapes run several hundred dollars each.

All three major alignment tape producers make extremely high quality products, and the uniformity between tapes of the same type is great. The accuracy of an alignment tape steadily decreases as it is run over tape heads. After several hundred passes, the recorded levels have diminished measurably, first at the higher frequencies, then also at the lower ones, until the tape should be discarded.

For those with a sufficient budget, it is suggested to buy two identical alignment tapes and store one in an air-conditioned vault, using only the other one, while periodically bringing out the

first one to check the accuracy of the second tape.

The common levels of flux in nanowebers in professional use is either 200 or 250 nanowebers, at a reference level of 1000 Hz. The old Ampex standard was 185 nanowebers at 700 Hz, which is about .7 dB less than 200 nanowebers at that frequency. Note that MRL uses 1000 Hz as its reference frequency, while Ampex and STL use 700. So, MRL tapes are made at 1000 Hz at 250 nanowebers, for example, while Ampex and STL use 250 nanowebers at 700 Hz which equals 250 at 1000 Hz.

Since alignment tapes are so expensive, I advise treating them with great care. Always demagnetize the recorder heads and any metal parts which touch the tape before using the calibration tape. Always wind the tape off after using in the play mode, storing it tails out in a cool dry place, away from magnetic fields; and don't get any dirt or fingerprints on the tape. Alignment tapes are available from most major recording supply and professional audio distributors across the country.

—George Klabin
Sound Ideas Studios
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The War Against the Nasties

Help! It seems that the more I clean, protect, remove static from and, in general, "mother" my records, the more dust, dirt and static there is to clean! Could this possibly be some fiendish plot perpetrated by the record companies?

The equipment that I'm using now—a Dual 721 turntable, a Shure V15-Type III cartridge and a Pioneer SA-100 receiver—should do the job of reproducing sound effectively. In my never-ending battle in the war against the aforementioned nas-

ties, I'm using a Watts Manual Parastat and a Zerostat gun. The room in which I keep my equipment is humidity controlled.

The records either date from about 1955 or are of recent vintage (both mono and stereo). The sound I'm getting from my old records is like the steady downfall of rain on a windowsill. The newer ones aren't that bad—yet—but I want them to last a long time.

Is there any method I can use to clean the grooves of my records that would improve the sound as well as

protect the surfaces? Short of buying an impulse noise-reduction unit (which, as we all know, merely masks the problem), I don't know what to try. I just don't want to dump the first thing that comes along on them and watch them dissolve right before my eyes!

—James Wicks
Toronto, Canada

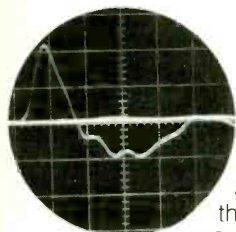
There are several things you can do to and for noisy records, with varying degrees of success. Much depends on what the noise is and what is causing it. If you have very old records, the best you can do is wash them with lukewarm, not hot, soapy water and rinse thoroughly. Then air dry them. An air blast from an air gun is good. Many people are shocked by this idea, but keep in mind the record is only plastic and will not be injured by soap and water, provided that the soap is mild. This method will not work miracles but it will clean them as well as is possible. The improvement is not spectacular because the damage has already been done.

You see, the dirt particles that have resided in the grooves for the past several years have become pretty well embedded in the plastic because the stylus went thundering through under tons of pressure and thus has permanently disfigured the groove. The only way to have clean records, really, is to get clean, quiet pressings from the store and *keep* them that way. The best way to keep a record clean is to keep it in the sleeve and jacket and never play it. But then, why buy the record? To deal with this problem you have to understand how dirt gets on the record. As you pull the record from the sleeve, friction is generated and a static charge is placed on the record. Any junk that is floating around nearby is immediately attracted to the record and adheres with a tenacity that some epoxy makers would love to be able to duplicate.

I would suggest that you use a dust-bug type of device and lightly coat the pad with anti-static compound. Then, after playing, immediately return the record to its jacket. Never touch the playing surface with your greasy fingers (and they are greasy). The record will get greasy enough from all the garbage that permeates our air. And eventually any record will get noisy after a time. The anti-static fluid will cut down on the static generated by the stylus dragging through the groove, whereas the Zerostat will not overcome this unless you want to stand there

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*Outdoor test with Tektronix scope, set for 10V/division vertical, 0.1 μ sec/div horizontal. 22 cal. starter's pistol mounted 15 cm from MD 421 measured pressure of 111,000 dynes/cm² (175 dB SPL). Smooth, rounded scope trace indicates total lack of distortion.

SENNHEISER

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The RTA-2 is convenient. The front panel includes pink-noise unbalanced line/mic and balanced mic outputs, and line and balanced mic inputs. Full or 1/3 octave readouts are switch selectable.

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

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

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

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



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CIRCLE 85 ON READER SERVICE CARD

pulling the trigger every five seconds as the record is playing. The static built up in the groove by the stylus will cause a pop every once in a while that really isn't there, so the Zerostat is useless for that. However, it is excellent for removing the massive charge built up by pulling the record out of the sleeve. The fluid will keep it off and the dust bug will remove any junk that got there in the meantime. Track your records as lightly as your cartridge will permit to lessen static build up and the crunching effect of the stylus on the dirt in the groove. The Shure V15-Type III cartridge you have can track pretty lightly so you're okay there.

The main ingredient is meticulous care and protection of the discs, with minimum exposure to the environment. Don't stack records. Don't lay them down except on a turntable mat. Store them on end. And that is the best you can do for them. You can buy cans of compressed air or some sort of inert gas with a nozzle to help to get dust off a record without touching it, should such an unfortunate thing happen (which it does every time you look at a record). So between a Zerostat dust bug, anti-static fluid (in small amounts) and an air gun,

you should be able to keep your records as clean as possible, without resorting to the construction of a sterile room.

—David Moyssiadis
Contributing Editor
Modern Recording

He's Seen The Light

A small point, but in the Talkback column in the September 1978 issue where AC supplies are discussed (see "And Then There Was Light," page 22), Figure 2 shows a three-phase/four-wire system (the usual "Y"-connected configuration) with a phase voltage (hot to neutral) of 120 VAC and line voltage (hot to hot) of 240 VAC.

Actually, as the three hot legs are at 120 degree phase intervals, the line voltage will not be double the phase voltage as shown, but rather 1.73 times the phase voltage, or 208 VAC. Figure 1 is erroneous for the same reason.

Thanks for filling a great void in the field of the recording arts. As director of Silver Dollar's recording seminars, I recommend to all my students that they read *Modern Record-*

ing cover to cover each month to begin filling in the gaps in their knowledge of business.

—Roger Francisco
Chief Engineer
Silver Dollar Recording Studios
Urbana, Ill.

Perhaps a small point, but one we wanted to clarify in any case. A telephone call to John Gates at Capron Lighting and Sound in Massachusetts (author of the reply) quickly brought us this uninhibited reply—"He's absolutely right!" To elaborate, Mr. Gates' original sketches were altered slightly when given to a company artist to be "spruced up." Artistic license has taken its toll once again. Thank you for bringing this mathematical misnomer to our attention. —Ed.

Model 3 A Model Of Monitor Capabilities

Does the TEAC/Tascam Model 3 mixer have the capability for a musician to monitor himself in the studio? Being an electronics technician, I have all the necessary equipment for constructing and troubleshoot-



Topco Specialists in TASCAM multi-track recording,
AKG we offer all the equipment, plans, advice and
Shure consultation you'll need to make your studio or
Beyer system deliver professional results.
Yamaha

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Crown
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CIRCLE 38 ON READER SERVICE CARD

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

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

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



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

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

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

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

All E-V Pro-Line microphones come with super-tough Merraflex grille screens that resist denting. Designed to

keep your mikes looking like new for a long time. All have a non-reflecting gray finish that won't compete for attention under bright stage lights.

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

Ev Electro-Voice[®]
a gulton company

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CIRCLE 82 ON READER SERVICE CARD

ing anything that might be needed if a modification is indicated.

—Edward Bowell
Johnson City, N.Y.

When using the TEAC/Tascam Model 3 Mixer, it is possible for the musician to obtain a monitor mix in one of two basic ways. This is possible because the Model 3 has incorporated into its design an 8 by 2 stereo mixer, referred to as "Submix" on the board. This submix is independent of the main mix and gives the musician/recordist considerable flexibility. By using the supplied RCA jumper cables, one can patch into the submix section from either the direct out or the cue out on each input channel of the Model 3. The cue out is pre-fader, pre-eq and always carries the audio signal. The direct out is post-fader, post-eq and switchable from the front panel, giving you additional control. Each input on the submix has a separate level and pan control. A master volume control is also provided. The pan controls can be used to create a stereo image, or if left in the center position, two mono mixes. Feeding the outputs of the submix into a stereo power amp will provide either a stereo mix in one room or a mono mix in two separate rooms such as the control

room and the studio. This same submix section of the Model 3 can be similarly used as a stereo effects or echo send. As you can see, many possibilities are created through the use of this section.

Since this type of submix is so useful in almost any recording situation, we have combined it with a headphone amplifier and made it available separately as the Tascam Model 1. Used in conjunction with the main mixer, these relatively inexpensive 8 x 2 mixers can be connected together to provide as many as four additional submixes or sends. This kind of expansion is particularly beneficial to the musician/recordist who is operating on a limited budget but still needs to increase his recording flexibility.

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

Paying Royalties

We will be making commercial recordings of weddings and would like some information about any royalty payments that might have to be paid on the music we tape. Who receives such payments? How are they paid?

Is there a standard rate? Can the material be taped, the royalty paid, and the tape released to the customer; or must permission be obtained from the copyright holder before the taping takes place?

—Walter J. Reznicek III
Point Reyes, Ca.

The key to the question is, apparently, whether the material is being performed "live" or if taped material is being used. If the material is being performed "live," you needn't worry about it. It is up to the performers to make their own arrangements in regard to copyrights, royalty payments, etc. If, however, you will be recording previously recorded materials in the course of your taping, we suggest you do the following: Send a song list, complete with title, author and publisher (if you know it) to the Harry Fox Agency (a licensing agency located at 110 E. 59th St., New York, New York 10022) and mark it to the attention of Howard Balsam. He will, upon receipt of your letter, forward to you a letter of permission for the use of those materials. No royalty fee need be paid. If you should require further advice and information, call Mr. Balsam at 212-751-1930.



CONSIDER THIS: A parametric equalizer without low, mid and high band restrictions. The Audioarts Engineering Model 4200 is a four section stereo parametric equalizer; each section is a dual range filter. **CONSIDER** an equalizer that can handle full +20 dBm studio levels, regardless of equalization setting, but which also has a low-noise preamp input to allow musical instruments to plug directly into those same studio effects. The Audioarts Engineering Model 4200 is a professional no compromise parametric equalization system.

- four dual range filter sections
- EQ bypass switch for each section
- Master Equalization bypass switch
- LED overload indicator
- input gain control
- line level input jack (+20 dBm)
- instrument preamp input jack
- line output jack (+20 dBm into 600 Ω load)
- reciprocal equalization
- 3½ inch rack mount
- Model 4200 (stereo) price: \$599
- Model 4100 (mono) price: \$335

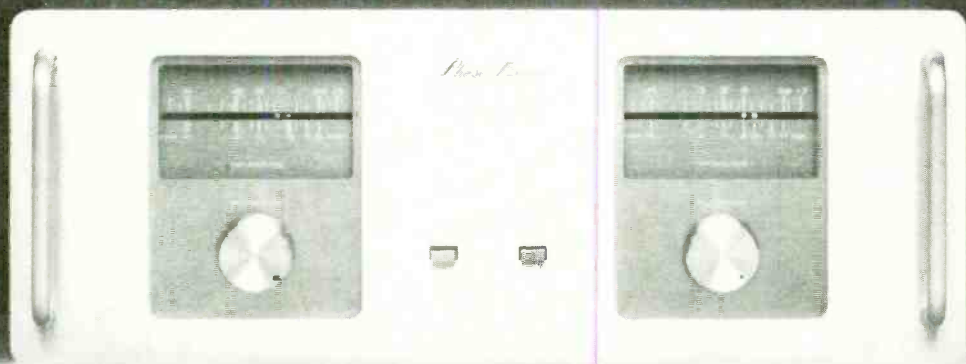
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CIRCLE 37 ON READER SERVICE CARD

ONE OF THE WORLD'S GREAT POWERS.



THE PHASE LINEAR 700 SERIES TWO.

Over seven years ago, Phase Linear took the audio world by storm when it introduced the first truly high-power, high-fidelity amplifier: the Phase 700. Everyone was stunned at the incredible 350 watts per channel, with ultra low distortion. (In those days, popular mythology held that amps would never need more than 50 watts to a side. In fact, who had even heard of clipping?)

Naturally, the skeptics scoffed. But audio critics and music-lovers worldwide listened. And for the first time, they heard recorded music reproduced in the home accurately. No muddy rumble at the low end. No harsh, distorted clipping of the highs. The era of great power amps had begun!

Today, it's generally accepted that you need an amplifier with a massive reserve power to drive inefficient high-technology speakers and reproduce all the musical transient peaks without clipping. The amplifier with unquestioned ability to meet this criteria is the Phase Linear 700 Series Two.

GREATER POWER RESERVES MEAN GREATER HEADROOM

The Phase 700 Series Two is rated at 360 watts per channel,

with distortion virtually inaudible at 0.09%. With this tremendous power, the Phase 700 can reproduce musical transients with ease, giving you almost unlimited headroom. As a result, your music sounds lively, with incredible realism. Even the deepest notes are clearly distinguishable.

INCREASED ACCURACY AND PROVEN RELIABILITY

The original Phase 700 was designed for home use, but it rapidly won the approval of the pros. Its proven dependability on the road made the 700 a favorite touring amp for super groups and sound reinforcement companies.

The Phase 700 Series Two retains this legendary reliability, and improves sonic accuracy by utilizing an advanced BI-FET input stage. This integrated circuit keeps the output virtually identical to the input. Beautiful music in, beautiful music out.

The 700's instantaneous LED output meters move at lightning speed, accurately monitoring the output voltage, with calibrations for 8 and 4-ohm applications. If you're listening at quiet levels, you can activate a Meter Range Switch to upscale the meter by 20dB. You have a visual indication of output activity, in addition to the Electronic Energy Limiters that prevent damage from accidental overloads.

If you demand great performance, don't settle for less than a great amplifier.

SPECIFICATIONS:

Output Power: 360 WATTS, MIN. RMS PER CHANNEL 20Hz-20kHz INTO 8 OHMS, WITH NO MORE THAN 0.09% TOTAL HARMONIC DISTORTION.

Continuous Power Per Channel At 1000Hz With No More Than 0.09% Total Harmonic Distortion: 8 OHMS-450 WATTS, 4 OHMS-550 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: 45 lbs. (20 kgs).

Dimensions: 19"x7"x10"
(48.3cm x 17.8cm x 25.4cm).

Optional Accessories: Solid Oak or Walnut Side panels. E.I.A. standard rack mount configuration.

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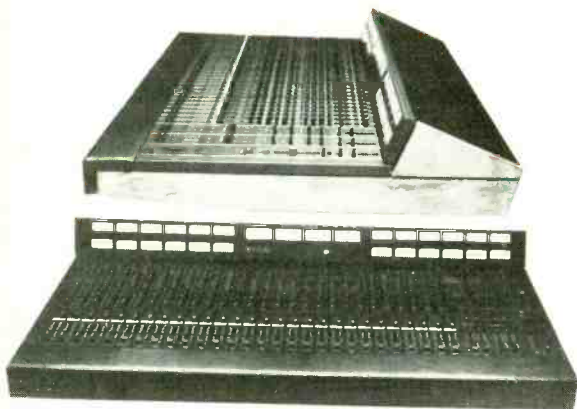
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CIRCLE 97 ON READER SERVICE CARD

THE **PRODUCT** SCENE

By Norman Eisenberg

SYNCON STUDIO CONSOLE



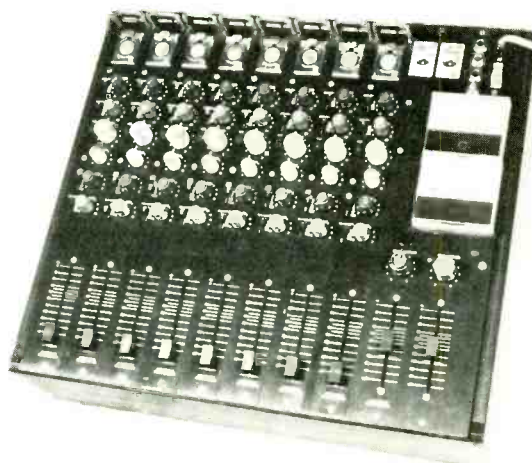
Syncon (so named for its synergistic operational potential) is a new studio console by A & H Electronics, distributed by Audiomarketing Ltd. of Stamford, Conn. Featuring all discrete components, the console is said to achieve "sophisticated results with the push of a button." Its free routing enables any module to be designed as a sub-group master, so there is a relative minimum of switching, re-routing or patching involved.

With the Syncon, the engineer can drive quad, stereo, and mono tape machines simultaneously. Tape monitoring can be switched from 24 or 16 tracks to quad, stereo or mono. Essential multi-track studio requirements are contained in Syncon, including 4-band EQ plus dual parametric controls that overlap in the critical midrange region. Also built-in are: talkback circuit routing; separate monitor level controls for studio, solos, and control room; echo that can be returned to the console in quad; main and main remix faders that are stereo-ganged for quad mastering; quad panning using left-right, and front-back pots (monitor and remix). The main frame of this full 28/28 console is only 57 inches. Prices start at \$12,000.

CIRCLE 1 ON READER SERVICE CARD

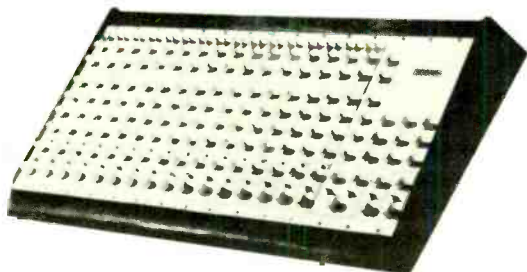
8-INPUT MIXER

Offered for use in any application requiring up to eight inputs and one or two outputs plus echo and cue is the Series 400 mixer from Interface Electronics of Houston, Texas. The inputs can accommodate balanced 150-600 ohm signal sources at levels from -50 dBm to zero dBm. An internal pad switch protects the normal 20-dB headroom at all levels, and each input is fitted with an LED overload indicator to aid in setting input gain. EQ action is handled by three 12-dB equalizers and a low-frequency rolloff. The mid-frequency EQ can be switched to 400, 1000, 2000 or 4000 Hz. The low-frequency rolloff can be switched for flat, or for 12 dB/octave at 50, 100 or 200 Hz. The echo-send can be used for effects (such as reverb requiring a post-slider send), and echo return is provided. The cue-send may be used for cueing or monitoring; it can listen to any single input solo or to any combination of inputs. Using entirely modular construction, the Series 400 also is available on special order with 12 inputs. List price of the 8-input version is \$1300.



CIRCLE 2 ON READER SERVICE CARD

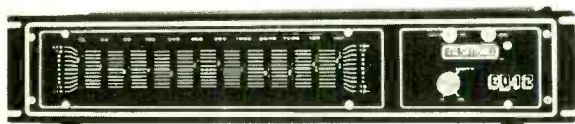
ITEMS FROM MUSIMATIC



Musimatic Electronics Inc. of Decatur, Ga. has announced several products including: professional microphone stage snakes, 100 feet long and in 6 through 24 mic lines; the MMX-2200A, a 12-channel stereo mixer "with high-priced functions"; direct-line boxes for instrument plug-in for use with sound mixers or P.A. systems; the model C-65 stereo 2-way variable electronic crossover; MMX 1700



mixing console for sound reinforcement and recording applications (8 to 24 input channels, stereo or quad output channels or 4-channel or stereo submix capability); the model EQ-12 mono graphic equalizer (12 frequency bands); and two power amplifiers—the model A-250 offering 125 watts RMS per channel, and the model A-125 offering the same power on its single channel.



CIRCLE 3 ON READER SERVICE CARD

TWO NEW MAJOR CATALOGUES

Heathkit's new 96-page catalogue describes a broad variety of products including audio units and test equipment. It is available free from the Heath Co.

Lafayette Radio Electronics Corp.'s new catalogue contains 170 pages, many of them in color. In its 8 × 11 inch size and with higher-grade paper than in the past, this catalogue looks a lot better and is easier to read than the old one.

CIRCLE 4 ON READER SERVICE CARD

NEW BRAND NAME IN AUDIO

Nagatronics Corp., a new name on the audio product scene, is offering an extensive line of phono cartridges ranging in price from \$28 for an induced magnet type to \$220 for a ribbon-movement pickup that requires a head amp priced at an added \$275. The head amp (model HA-9000) uses an operating principle similar to that in a velocity type ribbon microphone. Each cartridge is said to be entirely hand-made and individually assembled and adjusted. The head amp has a gain of 40 dB and rated response within ± 1 dB of 10 Hz to 200 kHz with a THD of 0.01%.

CIRCLE 5 ON READER SERVICE CARD

NEW TANGENTIAL TRACKING TURNTABLE

ReVox has introduced the B-790, its version of a tangential-tracking turntable in which a "cartridge carrier" replaces the conventional tone arm. The cartridge fits onto a mounting plate of aluminum 4 cm. long and weighing a bit over 1 gram. The assembly is mounted to an overhead carrier mechanism that moves the cartridge on special steel rails. Lateral movement is controlled by an opto-electronic sensing system using an LED light source. The B-790 is claimed to eliminate tracking error, the undesirable effects of tone-arm mass, and to reduce stylus force to the optimum needs of the cartridge, while extending stylus and groove life. The table itself is a two-speed model with direct-drive servo motor and quartz crystal control. Speed may be adjusted over a range of $\pm 7\%$, and is shown on an LED display. Price, with the Ortofon M20E cartridge, base and dust cover, is \$799.



CIRCLE 6 ON READER SERVICE CARD

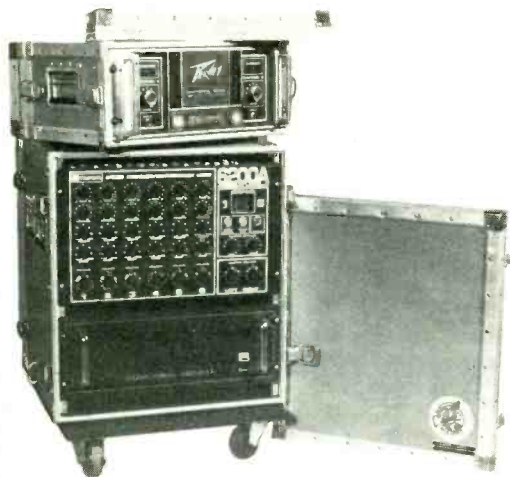
TAPCO CONSOLE

Tapco (Technical Audio Products Corp.) has announced its Catalina series "for users requiring sophisticated control and routing facilities . . . in live performance/recording consoles." As many as 32 input channels, as well as facilities for up to 8-track recording, are available when Tapco's "extender" system is added to either of the 12 or 16 input masters. The complete Catalina series allows the user to select the number of inputs needed in increments of four from 12 to 32 by combining the appropriate master and extender(s). Inasmuch as each expander will handle another expander, the total number of inputs is limited only by the need and budget. Detailed descriptions are available directly from the manufacturer.

CIRCLE 7 ON READER SERVICE CARD

ANVIL RACK MOUNT CASES

Rack-mount cases by Anvil are available in various designs (clamp-on lid, case-within-a-case, pullover clamp lid, etc.). Protection for equipment plus easy access to controls and ease of transport are claimed for these cases which are intended for the traveling musician and sound company. Hardware for mounting is supplied with each case, and front and/or back rack channeling is supplied to the buyer's specifications. As Anvil puts it: "Fan cut-outs, $\frac{1}{4}$ ", $\frac{3}{8}$ ", and $\frac{1}{2}$ " wood thicknesses, recessed hardware, pre-tapped heavy gauge steel rack channels, and several choices of exterior color make Anvil amp rack cases . . . suitable for either rough-and-tumble transit abuse or the elegant simplicity demanded by the recording studio."



CIRCLE 8 ON READER SERVICE CARD

NEW MAXELL CASSETTES

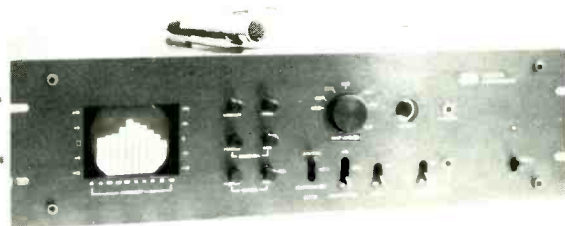


Maxell has announced its new LN and UD cassette lines, both of which employ what are described as new magnetic coating formulations. For the LN tapes, Maxell claims a 3-dB wider dynamic range, and an increase of 2 dB in higher frequency response (compared to previous LN cassettes). The new LNs, says Maxell, can be used on decks adjusted for UD and UD-XL I bias without losing hi-F sensitivity.

For the new UD tapes, the claim is an increase of 2 dB in dynamic range with excellent low print-through; lower modulation noise; lower tape noise.

CIRCLE 9 ON READER SERVICE CARD

AUDIO ANALYZER



American Scientific Corp. has announced its model 910, an audio analyzer designed to provide instant analysis of speaker, component and listening-room performance. Contained in the device are a pink-noise generator, signal analysis circuitry, and a multi-function CRT display to meet various needs such as room EQ, speaker comparison, FM reception improvement in terms of antenna orientation and tuner alignment, basic tests of audio components, acoustic setup of halls, and so on. Supplied with calibrated microphone and suitable for table-top or rack-mounting, the model 910 costs \$895.

CIRCLE 10 ON READER SERVICE CARD

UPDATED DELAY SYSTEM

Audio Pulse has announced a second-generation version of its time-delay system. The new Model Two is said to be the first time-delay system to incorporate both digital technology and built-in amplification at a moderate price. The lower cost is attributed, says the manufacturer, to two innovations — the development of a digital encoder utilizing one-third the number of integrated circuits of the earlier Model One, and the implementation of random access memory ICs (RAMs) as a more economical means of information storage. The Model Two is designed to be used with any conventional stereo system. The required added speakers, says Audio Pulse, can be “a modest pair of bookshelf



speakers.” The Model Two’s built-in amplifier provides 25 watts per channel with separate gain for the secondary channels, plus bass and treble controls for matching the tonal balance of the primary speakers. Other controls include input and output level with LEDs, a short and long delay switch, a secondary defeat speaker switch, and the ambience slider which is adjustable between 0.2 and 0.6 seconds of reverb time.

CIRCLE 11 ON READER SERVICE CARD

SHOW BIZ

The 1979 International Winter Consumer Electronics Show will be held in Las Vegas, January 6 through 9. Over 750 exhibitors are expected, of which more than 275 will be showing audio products. For info, write to Consumer Electronics Show, Two Illinois Center, Suite 1607, 233 North Michigan Ave., Chicago, IL 60601.

AMBIENCE—AGAIN

From England comes word of the Ambisonics system, intended to provide the “total sound field” by recording with specially developed microphones and special handling of phase angles. Playback may involve up to six loudspeakers for what has been termed “full-sphere reproduction.”

I’m getting a little jumpy about schemes like this. The recent ill-fated effort to promote the idea of four speakers on playback (known as quad sound) should have taught the sound industry something.

As for the much-touted acoustic effect of “voices approaching the listener and whispering in his ear,” you don’t need anything more than two microphones spaced as far apart as your ears to record the sound, and then a pair of decent two-channel headphones for playback. This is of course good old binaural sound and if you try it you will quickly see that it gives you all the “directional clues” and “ambient information” you need. The reason is simple: it captures the acoustics of the performance environment on recording while avoiding the acoustics of the listening environment on playback.

That, essentially, is the whole deal. That is the only direct and uncluttered way to “give the listener the impression of really being there” as the familiar hype goes.

The hitch of course is that recordings have to be made for playback over loudspeakers which do play in rooms and thus are at the mercy of room acoustics. In view of this pragmatic reality there are, it appears, three possible approaches (assuming you want more “space” or ambience on playback).

One is to try to use the listening room acoustics to enhance the playback by aiming the speakers at the walls or ceiling, or to use speakers that are designed to do this for you. The “reflected sound” idea does work to a degree regardless of how the material is recorded.

A second possibility (suggested years ago by Dr. Peter Goldmark when he was head of CBS Laboratories) is to record the “hall” itself on a separate track and then make it available as an optional third channel adjunct to normal two-channel stereo. The beauty of this scheme is its simplicity and basic acoustic honesty, plus its compatibility with stereo—that is, it can be either used or ignored with regard to playback.

Third, you can go in for deliberate ambient enhancement via the systems coming out these days—the kind that permits adjusting the delay and the high-frequency rolloff to simulate larger-room acoustics.

Whatever approach is used does presume loudspeakers that present good low-end response where so much of the “room information” signal energy exists. This does *not* mean beefed-up midbass; it does mean smooth midbass. So, whatever route is taken it seems that one thing we need are more linear-responding speakers. Which, come to think of it, wouldn’t be a bad idea, added channels or not.

NEWSIGALS

SOUND REINFORCEMENT

Of interest to those readers who use studio-quality condenser microphones is the AC24 system of phantom power supply modules from Electro-Voice. The system comprises two separate units, the AC24M master module which provides 24-volt phantom power for one or two microphones, and the



AC24S slave module each of which provides additional jacks for four additional microphones. The master module plugs into a standard 117 VAC outlet and may be used by itself, or it may be connected to one or two slave units to accommodate up to ten microphones total.

CIRCLE 12 ON READER SERVICE CARD

SYNTHESIZER EQUIPMENT

An interesting device which has moved from the laboratory into the studio and onto stages in recent years is what is called a vocoder. In simple terms, a vocoder electronically analyzes a vocal signal, either speech or singing, and separates it into two general classes of sound which roughly correspond to vowel and consonant

sounds. Once this is done it becomes possible to substitute any continuous or coherent tone for the "vowel" sounds and any semi-random or non-coherent sound (such as white or pink noise, as examples) for the "consonant" sounds. What results is a sound that retains the intelligibility of human speech, but without the original voice quality. Vocoder have historically been very complicated and expensive devices, but now Unicord, Inc. has introduced the Korg VC-10, which is the first totally self-contained, performance-oriented vocoder available at an affordable price (\$1299). Unlike lab-type vocoders which require external signals to produce their "synthesized voice" effects, the Korg VC-10 has a built-in 32-note keyboard with polyphonic tone source as well as external inputs. Using the keyboard allows the musician to play the desired melody just as on a synthesizer, complete with pitch bend, chorus and vibrato, but to superimpose a speaking pattern on it to create a talking (or singing) synthesizer. By using the external input, the same thing may be done for tape recordings, electric musical instruments, or any other audio signal for truly limitless possibilities.

CIRCLE 13 ON READER SERVICE CARD

SYNTHESIZERS

Roland has added a new synthesizer model, the SH-7, a duophonic keyboard-controlled synthesizer designed for the professional musician. The SH-7 has two VCOs and a sub-oscillator, plus a combinable five-octave square wave output which is said to make the unit effectively a three-oscillator synthesizer which sounds more like a four- or five-oscillator synthesizer. The 44-key unit also features dual voice, touch effect, portamento, ring modulator, 24 dB/octave (4-pole) "super filter" VCF and an envelope follower for generating envelopes from external signals. A unique feature of the SH-7 is the bend control which can be used to bend or to modulate any combination of VCO, VCF and VCA rather than only having the single function of bending the VCO.

CIRCLE 14 ON READER SERVICE CARD

MUSICAL INSTRUMENT AMPLIFIERS

Charles Alden Music Co. has announced that they are now the American distributor for the popular Carlsbro Sound Equipment line, which should be good news for anyone



acquainted with this English company's products. One well-known model is the Carlsbro Stingray Super Combo, which is a two-channel guitar amp with reverb and tremolo. Each channel has a normal and a bright input, and channel one has two special controls for sustain effects. The amp has a master volume control to allow control of the loudness of the 100-



watt power section independent of the preamp level controls which can then be used to vary the distortion of the sound. Speaker compliment for the model is a pair of heavy duty Carlsbro Powertone 60 12-inch loudspeakers for plenty of punch. The unit is furnished to the customer complete with casters, single and dual footswitches and a protective cover.

CIRCLE 15 ON READER SERVICE CARD

The I Lead Amplifier is a new, compact amp from Kustom Electronics Inc. The I Lead features a 35 watt, solid state amplifier section with dual inputs, bass, treble, reverb, volume and master volume controls, and a 12-inch lead guitar-type speaker.

CIRCLE 16 ON READER SERVICE CARD

P·R·O Manufacturing Co. offers a full line of P.A., monitor and musical instrument loudspeaker systems. On the instrument side, P·R·O offers two bass-frequency speaker cabinets and a four-speaker guitar cabinet as well as a small, self-contained amplifier known as the Scamp Amp. The bass models are the B-15S, which uses a special design 15-inch driver in a slanted-front reflex enclosure with rear-loaded horn, and the B-15R which uses the same 75 watt 15-inch speaker in a reverse rear-loaded folded horn. The guitar speaker system is designated the G 210/212 and is an in-

teresting design in that it uses two heavy-duty 12-inch speakers with metal center domes in a tuned, ported sub-enclosure plus two special design 10-inch speakers in a sealed sub-cabinet with a V-shaped, angled baffle board for greater dispersion. Power handling capacity for the guitar system is 200 watts RMS, and the nominal impedance is 8 ohms.

CIRCLE 17 ON READER SERVICE CARD

Music Man, Inc. has introduced a new line of self-contained, single-speaker tube amplifiers with a number of interesting features including line-in-line-out jacks for effects devices and provision for remote master volume control. Four single 12-inch amps comprise the heart of this new amplifier family. Two of the models have built in phasers while the other two have foot-switchable distortion. Each of these types is available as a 65-watt RMS amp with Music Man speaker, or as a 100-watt RMS amp with an Electro-Voice EVM speaker. Rounding out the family is a 100-watt model with a single 15-inch EVM speaker, built-in phaser and remote master volume jack.

CIRCLE 18 ON READER SERVICE CARD



MUSICAL INSTRUMENTS

At the most recent Music Merchants trade show, Ibanez was showing their latest series of original design electric guitars, the Studio Series. This series is designed for those guitarists who prefer a straight-ahead, no-frills type of guitar. The body design is clean and simple with an offset shape for balance and comfort and has an interesting



two-wood construction. The center section of the body and the neck are made of maple for excellent response and sustain, while the outer sections of the body are either mahogany or ash to thicken the tone and provide good sustain without the weight of solid maple. The guitars have a long 25½-inch scale with a 24-fret fingerboard. The Studio Series features the latest Ibanez V-2 pickups which were designed for a tight upper midrange response and which create an aggressive tone without excessive distortion, and has single volume and tone controls for ease of operation. On the frivolous side, Ibanez also displayed a solid brass guitar. The company has no plans to put this model into production, since it is somewhat impractical at a ready-to-play weight of 67 pounds, although there was considerable dealer interest in the guitar what with the current fad for brass parts for guitars.

CIRCLE 19 ON READER SERVICE CARD

Yamaha is by now a well-established manufacturer of quality musical instruments and electronic products. The company has now announced that they are entering the drum market with two drum systems that reflect the usual thoroughness in their design and construction. Yamaha's drums are divided into two basic systems which may be mixed and matched as desired by the individual musician. The YD-9000 series is constructed with all-birch laminated shells for a bright



sound and sharp response, while the YD-7000 series has laminated wood shells of various woods for a slightly deeper response and heavier sound. Among the special features of the Yamaha drums are a unique Air-Seal lamination process for improved tone and sustain, springless tuning lugs to eliminate annoying sympathetic vibrations and tunable floor tom-toms. But as any drummer can tell you, good sounding drums are not enough if the hardware is not up to the job, and Yamaha has put extra effort into their mounting hardware, accessory stands and foot pedals. Nylon bushings are used throughout to prevent squeaks in moving parts like high-hat and bass drum pedals, and to eliminate slippage in adjustment points. Numerous adjustment points are provided to accommodate even the fussiest drummers, and all the routine adjustments, such as bass drum spurs, have memory position features.

CIRCLE 20 ON READER SERVICE CARD

MUSICAL INSTRUMENT ACCESSORIES

A more elaborate and versatile direct box is the DB-1104 from Uni-Sync. This model may be used either between the instrument and the amp or after the amp and features a high performance transformer with dual electrostatic shields and a Mu-metal electromagnetic shield to isolate the input (instrument/amplifier) side from the output (P.A. system) side and eliminate hums, buzzes and ground loops. The unit has three switches on it, a

ground lift switch to help in eliminating hum and ground loops, a pickup/amp switch which adjusts the sensitivity of the box depending on the application and a filter switch which simulates a speaker response curve when the box is in pickup mode. The input and amplifier output connections are via 1/4-inch phone jacks and the direct output is an XLR type connector. Frequency response is given as ± 0.5 dB, 20 Hz to 70 kHz.

CIRCLE 21 ON READER SERVICE CARD

Repeated exposure to sound levels above 90 dBA has long been recognized as a cause of hearing loss. Yet most musicians and concert audiences (and disco fans, also) are repeatedly exposed to sound levels in the 105-125 dBA range, sounds which have as much as 1000 times the energy of the 90 dBA danger level and which are virtually certain to be damaging in the long run. The Occupational Safety and Health Administration requires ear protection for all workers exposed to 90 dBA for 8 hours or 95 dBA for 4 hours, yet there are few musicians or concert-goers who use anything more effective than a wad of cotton to protect their ears against the dangers of



loud noise. Norton Safety Products makes a product known as Sonic II Noise Filters which are designed to protect the wearer's ears without interfering with his ability to hear the music and without the discomfort of conventional ear plugs. They are specifically *not* ear plugs, as they do not block off the passage of air into the ear, which is what makes plugs uncomfortable. Instead, they have a silicone rubber body with three soft flanges which is inserted into the ear canal. Inside the rubber body is a patented acoustic valve which shuts off the passage of sound only when the sound pressure approaches the danger level, particularly loud impulse noises which are among the most damaging. How does one know if one has been exposed to potentially damaging sound levels? It's quite easy, actually, as the body has its own warning system. If your ears ring after a concert, or if sounds seem dull afterwards, you have probably been exposed to potentially damaging levels; if the ringing or dullness persists until the following day, you should have invested \$5.95 in a pair of Sonic II Noise Filters. Remember, once your hearing goes, it's gone for good.

CIRCLE 22 ON READER SERVICE CARD

Rex Bogue Guitars has introduced a new replacement guitar bridge dubbed the Balz Supreme Brass Bridge. The unit is a high-mass brass design for improved sustain, and offers a greater range of fore-and-aft adjustment than competitive models. In addition, the unit is the only model to offer individual height adjustment for each string to suit the player's guitar and style of playing. The Balz Supreme Brass Bridge is available in a choice of chrome or gold plating so that the brass does not tarnish.

CIRCLE 23 ON READER SERVICE CARD

Any musician who plays a wooden instrument, whether it be a guitar, drums, congas or a piano or organ, will be interested in Cream of Carnauba Wax from Tres Amigos Wood Care. This new formula offers the superior protection of a hard carnauba wax without the hassle of applying it in its conventional paste formula. Or, for those who don't need the ultimate protection offered by the liquid carnauba, Tres Amigos also offers 100% lemon oil polish.

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CIRCLE 84 ON READER SERVICE CARD

MORE

On Choosing A Mixer

By Jim Ford
and Brian Roth

This is the third and final segment of non-consecutive articles describing the basic features and operation of small mixers for P.A. and recording. "Part one" appeared in the June '78 issue and "part two" appeared in the November '78 issue. In these first two parts we discussed: number and type of inputs and outputs; high and low impedance; use of transformers; cue, reverb and stage monitor outputs; monitor section for multi-track recording; and equalization. If there are any questions concerning these areas, the reader should refer to the above-mentioned sections in order to better understand the final part.

Solo Buss: The concept of the "solo function" on a mixer originated many years ago in the recording and broadcast industry. The earliest use of

"solo" that we know of is on radio and television audio mixing consoles. On every radio console built there is a position on each turntable volume control that is labeled "Cue." When the D.J. is playing one record, he needs to prepare the next record to start. At the end of the first record, the second record must be in position—on the right song—ready to go for a smooth (and dramatic) segue. But when one record is playing over the "air," how does the D.J. listen to the next record without causing a problem? Easy! He uses the "cue" position on the turntable volume control that he desires to hear. That sounded great, but how does it work?

Each turntable has its own separate volume control that sets the volume of the music to be broadcast out of the

mixer and to the radio station transmitter. On each turntable volume control there is a cue switch that works only when the volume control is rotated all the way counterclockwise. This is the same thing as turning the volume all the way off and then turning the knob a little farther to activate the cue switch. When this is done the audio signal from the turntable is connected to a small amplifier and speaker. The D.J. listens to this cue speaker and proceeds to select the next record. He can play the record and position the needle to the exact point he wants. When he is finished he turns the volume control back out of the cue position and waits until it is time to start the record.

The important point to understand is that one record is playing over the air while the other record is being listened to by the D.J. without affecting what is being broadcast. The cue system is a private monitor system for the D.J. so that he can listen to any record before it is broadcast. By using this method the D.J. switches back and forth between both turntables playing and selecting records.

Also, please note that this "cue" function on a radio and T.V. mixer is not the same cue function on most recording and P.A. mixers sold today. The cue output on the majority of all recording mixers is the audio mix that is sent to the musicians so that they can monitor the multi-track tape over headphones. On recording mixers "solo" is the name that describes the function that D.J.'s call "cue."

Now that we have reviewed some history, what does the solo button do on present day recording mixers? The concept of operation is the same as described above for the radio mixer with some minor changes. First of all, we are not broadcasting, but we are sending audio signals to a multi-track tape machine. Probably there are six to twelve mics set up, and they are going through the mixer to three to six tracks of a multi-track recorder. The outputs of the tape tracks are going into the monitor section of the mixing console, and the musicians are listening via headphones to a cue mix. The engineer has balanced the tracks to his liking in the monitor section and is listening to the mix through the control room monitor speakers. All is going well! The band is recording a hit for sure! But wait, there's something that sounds wrong with the lead guitar!

What do we do? Do we stop the band and ask the guitar to play by itself so we can try to hear the problem? Do we turn some of the tracks off so we can hear the guitar by itself? Both of these solutions would ruin the recording no matter what the problem was. What the engineer really needs is a method of listening to an individual mic or track without ruining the recording process. This means the engineer should be able to listen to any mic, combination of mics, tape track or combination of tape tracks without, a) affecting the signals going to the tape recorders; b) affecting the cue mix going to the musicians; and c) affecting any reverb signals. If this can be done, the engineer will have the freedom to select what he needs to hear as the problems arise. If the bass drum sounds bad, he can listen to it and make the appropriate decisions as to changes of volume, equalizations,

the control room speakers and replaces it with the signal from the solo buttons being pushed. This type of switching between the whole stereo program to a single instrument or track is like going from a complete orchestra to a single instrument. This is as if the instrument were playing a solo, and hence we have the reasoning behind the name.

Up until now all of our discussion has been confined to recording mixers, but do P.A. mixers have solo capabilities too? The lower priced mixers do not, but the higher priced mixers do. The advantage for "live" P.A. is obvious if you have ever been behind the mixing console at a rock concert when the action is fast. There are so many changes and spontaneous happenings that the soundman needs every trick in the book to get the show started on time and pull off a good mix. The P.A. soundman needs a solo-type function badly, but when he

One last word of caution. On some P.A. mixers the solo buttons are labeled "Cue." This means that we cannot be sure what the word "Cue" indicates on most mixers without checking the functional diagram or asking someone who has operated the particular mixer.

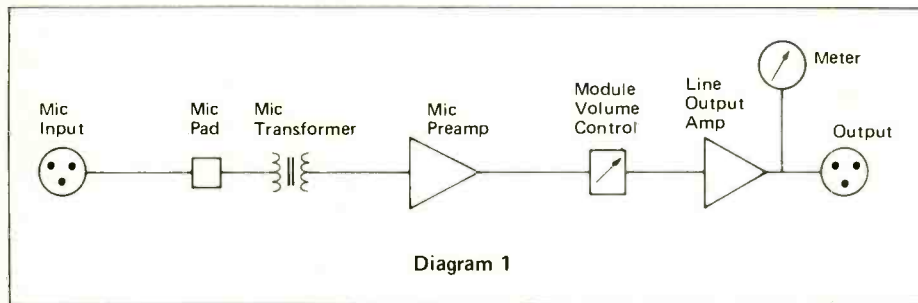
Pre/Post Sends: In the previous parts we have discussed the different outputs that are needed on mixing consoles. We can say that there are two categories of outputs: main and auxiliary. For P.A. systems, the main outputs would be those that go to the amplifiers to drive the main P.A. speakers. For recording, the main outputs would be those that go to the tape recorders.

The auxiliary outputs for recording would be the cue, reverb and special effects sends. The auxiliary outputs for P.A. would be the stage monitor, reverb and special effects sends. Please note at this time that the terms "output" and "send" are used to mean the same thing by most engineers.

When dealing with these auxiliary sends or outputs we encounter another feature and concept that needs to be understood: Pre/Post. Usually, the way that the young sound person first learns about the existence of this feature is when he reaches to turn the stage monitor volume up or down on an input module and sees a switch labeled pre/post. Or just below the stage monitor volume control, he reads, "monitor (pre)" or "monitor (post)." Of course, the same switch and labeling can and will appear on sends for reverb, cue and special effects.

The question is what does pre/post mean to the audio man? On each module of a mixer the volume control for a send (cue, reverb, stage monitor or special effects) must get its audio signal from another part of its module. So, at what point in the module does the signal come from? To better understand the following take a look at the diagram #1. This is a block diagram of one module in a small mixer.

All of the mixing busses for stereo or multi-track recording have been left out for simplification. At the left is the mic input which is connected through the mic pad, through the mic transformer and to the mic preamp. The mic pad is used to protect the mic transformer and preamp from being overdriven due to high voltage levels from the mic caused by high sound levels at the mic. This means when you scream into the mic you probably better use



reverb, etc. If the background vocals are not balanced, he can listen to them separately and all together until the balance is corrected. The "solo" function is indeed one of the most powerful operational features of recording mixers today. Without it, recording sessions would take much longer and would definitely require a great amount of trial and error.

Now we know what the solo function does for us, but how does it appear on recording mixers? Usually each mic/line input has a push button labeled "Solo." As the mixers become more expensive the solo button will be found on: a) the monitor section tape tracks; b) the cue sends; and c) the reverb sends and returns. Having all of these solo positions lets the engineer quickly move from point to point listening and changing the recording and mix as he desires.

Generally the output of the solo signal is applied to the control room monitor system so that the engineer hears the signal through the control room speakers. The solo buttons interrupt the main stereo mix that is usually in

pushes the buttons the signal can't be placed in the speakers or it will ruin the P.A. sound that the audience is listening to. Instead the engineer needs to hear the solo signal in a set of earphones so that the show goes on and the audience never knows the difference. There are several problems with this method, however. First, the engineer must put on his earphones each time he wants to solo an input. This is a hassle, but it must be done. Secondly, after the engineer has the earphones on and pushes a solo button, he must be able to hear the solo signal in the earphones at a volume above all of the sound around him that is being produced by the band and the P.A. system. This is a real problem because most mixers will not produce enough power through their headphone output in order to drive the headphones loud enough to be heard over the band and P.A. So if there are any console manufacturers listening in right now, please check out your headphone output power and gain structure. Try using it at a "live" concert before you sell it!

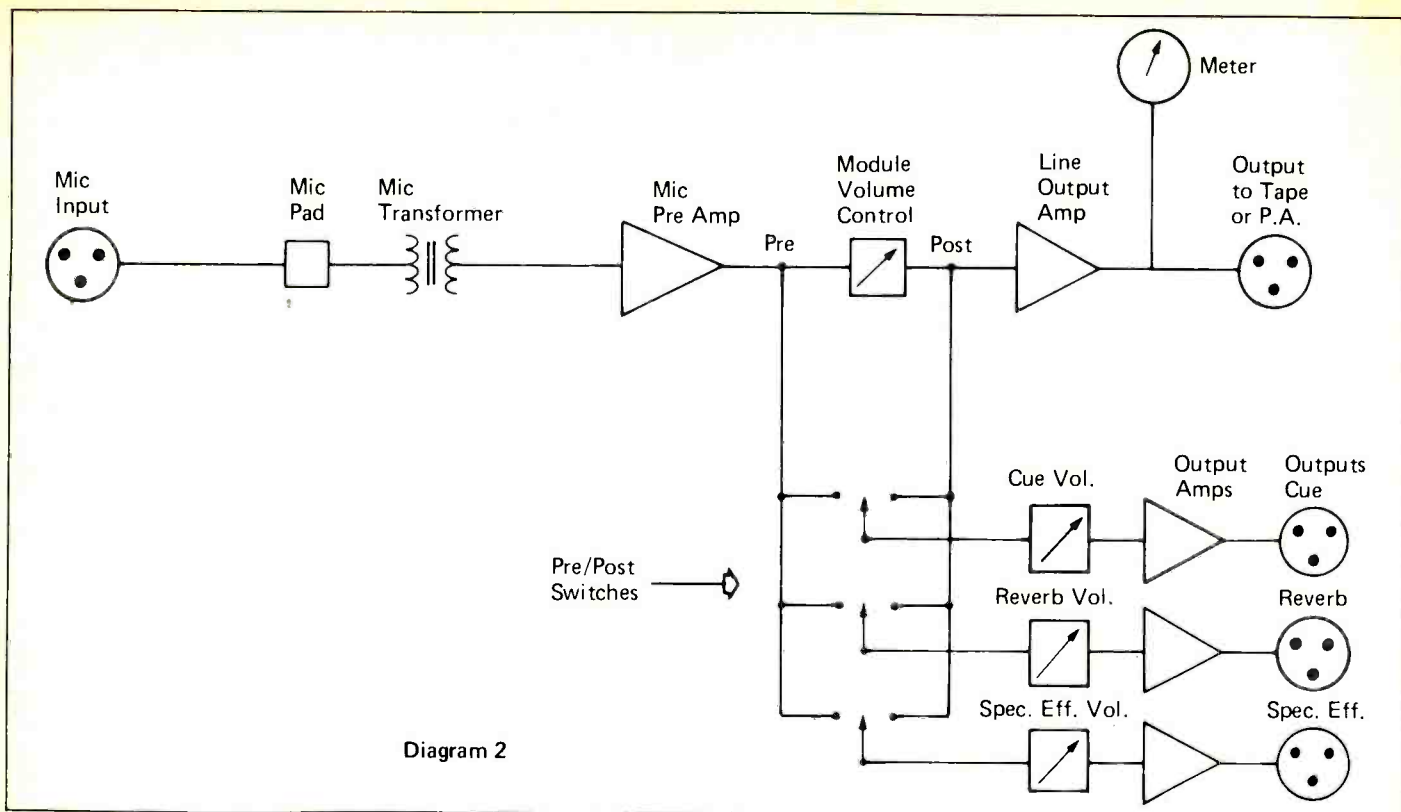


Diagram 2

the mic pad, or the transformer and mic preamp will distort and sound absolutely terrible.

From the mic preamp the signal goes to the equalizer and then to the module volume control. The volume control may be a rotary pot or a linear slide fader. From the module fader the signal goes to a final line output amplifier. At this point a meter of some type is attached to measure and display the output voltage level. This meter could be a VU meter or a segmented light emitting diode array. The final output would go to the P.A. system or to the tape recorder. This basic diagram is like a road map, and it can be followed from point to point to see how the audio signal gets from input to output.

Diagram number one shows us how to plug in a mic and send it to the main output. Next we need to add the cue, reverb and special effects sends. (Refer to diagram #2). One switch has been added for each of the auxiliary outputs. The switches are two position units and are connected to either side of the module volume control. The "outputs" of the switches are connected to the individual module volume controls and output amplifiers for cue, reverb and special effects. The engineer may throw each switch in either direction. If the switch is to the left, it will pick up the audio signal at a point just before the module volume control. This is called "pre-fader." If

the switch is to the right, it will pick up the audio signal at a point after the module volume control. This is called "post-fader." Now the most important part to remember is this. When the switch is in the pre-fader position the signal goes directly to the auxiliary volume controls and is not affected by the module volume control. In fact the setting of the module volume control makes no difference at all upon the operation of the auxiliary volumes. However, if the switch is in the post-fader position the signal goes through the module volume control before it goes to the auxiliary volume control. The result is that the setting of the module volume control has an effect on the signal that goes to the auxiliary volume control. When the module volume control is turned up the signal to the auxiliary controls is turned up. When the module volume control is turned down the signal to the auxiliary volume controls "follow" the changes made on the module volume control.

Most small mixers will have two auxiliary sends and they will most likely be labeled "cue" and "reverb." The cue send is usually permanently wired in the pre-fader position and the reverb send is usually permanently wired in the post-fader position. Depending on the manufacturer, P.A. mixers may have their monitor sends wired either way. Some manufacturers

put two monitor sends on their mixers which are permanently wired. One is pre-fader and one is post-fader. This way no one can complain that the mixer is wired wrong. As the mixers become larger and more expensive the number of auxiliary sends will increase and the switches for pre/post selection will be added.

We've been a long time arriving at a conclusion, but with good reason. When a person spends several thousand dollars on a mixer it will probably be a long time before he gets a chance to buy a second mixer. The electronics under the front panel of a mixer are very complicated and the "ohms and volts" are way beyond the comprehension of most of us. Fortunately you don't have to be a great audio design engineer to be able to understand how a mixer operates. Remember that most "hits" are recorded by musicians and mixing engineers that have good common sense about music. Isn't "good music" what we are all working for?

When it's your turn to buy a mixer, just slow down and get the facts. Talk to people that have used the mixer you are interested in. Decide what you want to do and find out if the mixer in question will do it. Always look for good quality components and craftsmanship. Deal with reputable companies that are interested in you being a success.

And finally, good luck!



START YOUR STUDIO For Under **\$3000!**

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

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

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Open Reel: The format

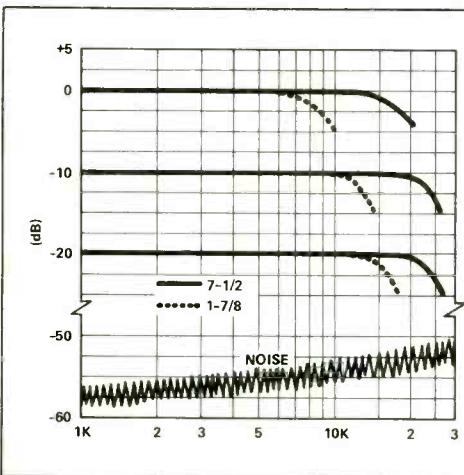
You're looking for a tape recorder. You've heard from friends and salesmen that cassette is the answer. At TEAC we make both cassette and reel-to-reel tape recorders. Because we make each for a specific person and application, you should depend on fact, not hearsay, before spending your money.

IT'S A MATTER OF PHYSICS

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

Take tape speed. Open reel tape running at $7\frac{1}{2}$ ips is running four times faster than a cassette. And speed has more to do with the relationship between frequency response and signal-to-noise than anything else by far.

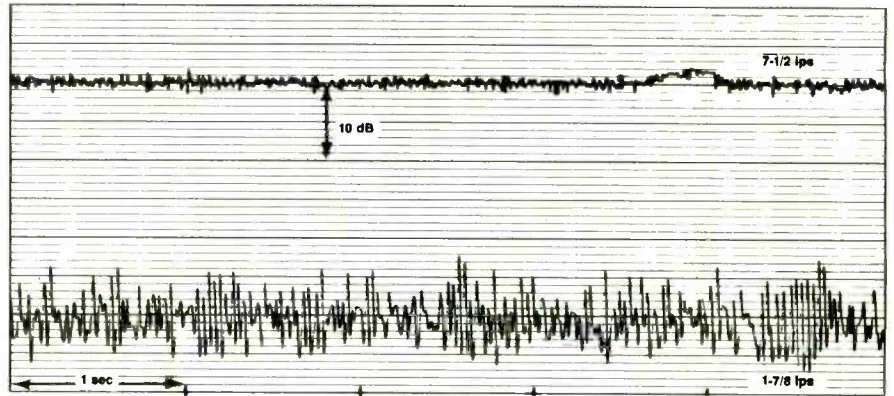
At $7\frac{1}{2}$ ips all audio frequencies can be recorded at full level



Tape saturation vs. level at $7\frac{1}{2}$ ips and $1\frac{7}{8}$ ips.

without tape saturation. Recording at $1\frac{7}{8}$ ips forces you to make drastic compromises in record levels. The more you have to back off on recording levels, the more you hurt the ratio of signal-to-noise.

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



Comparative dropouts between $7\frac{1}{2}$ ips and $1\frac{7}{8}$ ips at 15kHz.

MORE IS MORE

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

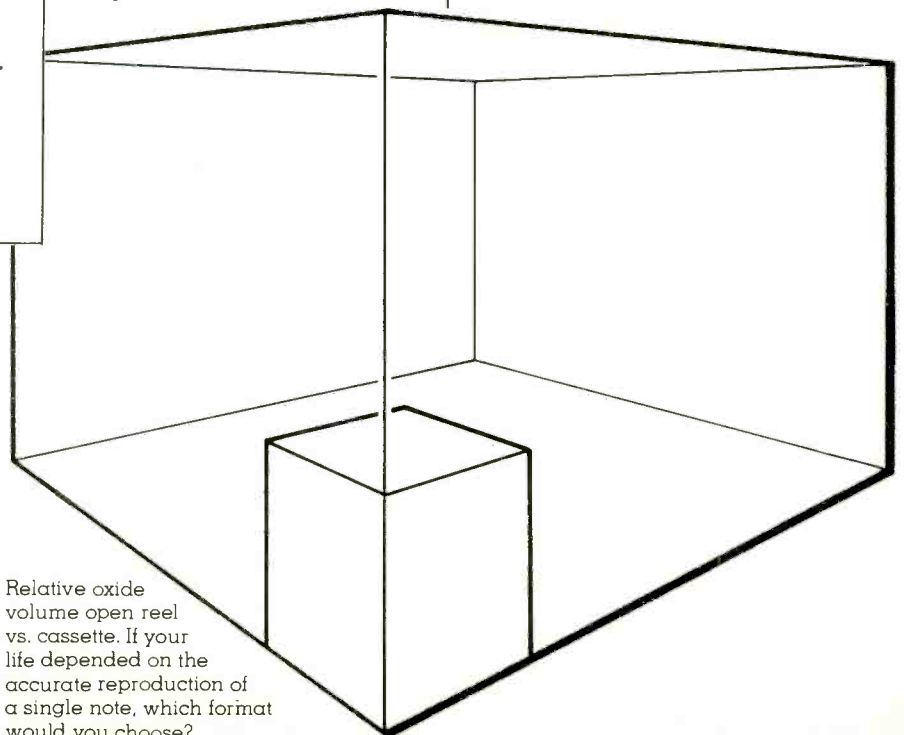
Now take track width. Open reel gives you twice the track width of cassettes. The wider

the track width the higher the output, the higher the output the better the signal-to-noise ratio. A wider track is also less sensitive to dropouts and, obviously, a wider track retains more magnetism.

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

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

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



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

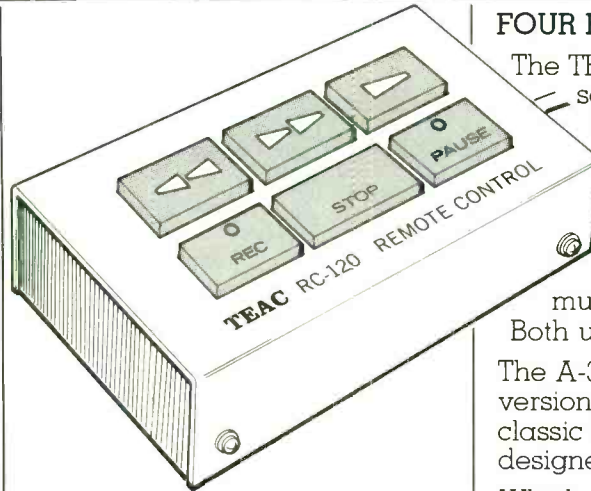
for the informed.

INSIDE INFORMATION

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

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

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



OPTIONAL REMOTE CONTROL

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

TEAC®

First. Because they last.

FOUR EXAMPLES

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

Both use 7" reels.

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

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

FACE IT

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

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



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CIRCLE 81 ON READER SERVICE CARD

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BRUCE SPRINGSTEEN

If equipment selection were the only point that made any real difference in the quality of concert sound reinforcement, then an article concerning a touring sound system would need to be little more than an equipment inventory. However, this is not generally the case. The overall approach and the logic behind equipment design, selection and procedures are the elements, which when combined with the talents of skilled professional operators, that can transform an inanimate array of microphones, mixers, speakers and amplifiers into an integral part of the on-stage musical event.

This was certainly true for Bruce Springsteen's appearances at New York's Madison Square Garden in

August 1978. Clair Brothers Audio, represented by Bruce Jackson, provided first-class sound reinforcement from Springsteen's opening shout of "Have You Heard the News?" to the final moment when an exhausted Springsteen was literally carried off stage after three hours of ultra-high energy performance.

The energy in Springsteen's performance is not derived from volume or from ruminating around on stage (although there was plenty of both). Rather, it is built on Springsteen's charisma, his very personal contact with the audience, the tension inherent in his vocal stylings and intricacies in the musical arrangements. Delivering this energy, and these near-

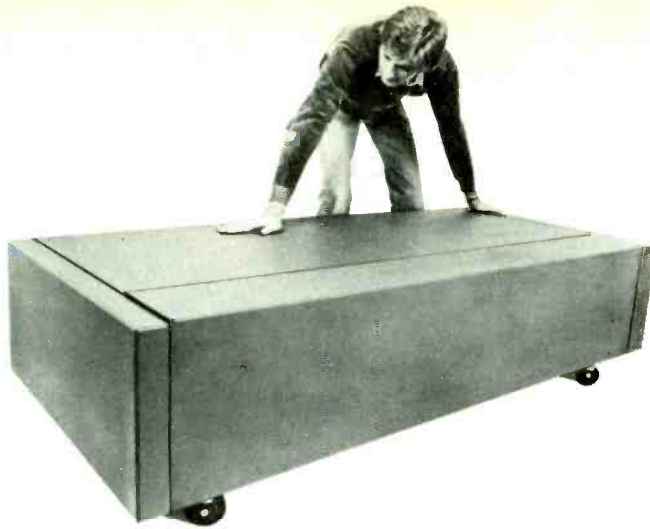
intangible qualities to a sold-out "Garden" is an accomplishment that should be documented.

Back in April 1978, Clair Brothers Audio, a long-standing leader in the concert sound business, informed its chief engineer, Bruce Jackson, that his services as engineer-in-charge would be required on the Bruce Springsteen tour, but only temporarily, as the regular mixer was ill. At the time, Bruce Jackson was engaged in one of his favorite activities—participating in the design and construction of Clair Brothers' state-of-the-art (and beyond) audio equipment. Bruce was certainly no stranger to concert touring, having worked extensively as an independent in his native Australia, and having

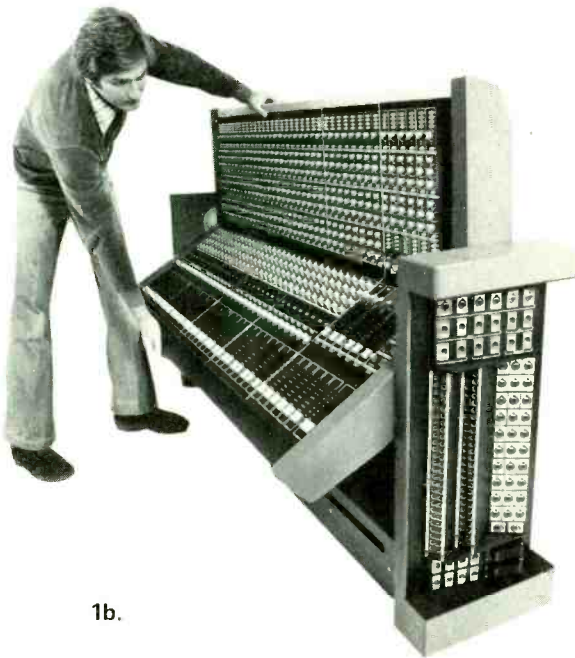


“LIVE!”

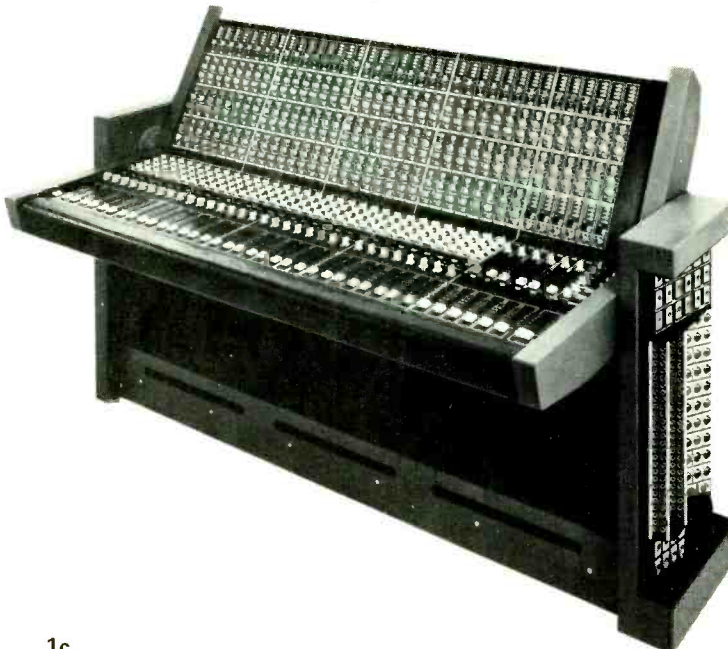
By Lohfuss Asheggedbeh



1a. Bruce Jackson and the hybrid 32 x 6 house mixing console.



1b.



1c.

headed the crews on Elvis Presley's tours from 1972 until the singer's death in 1977. So, he packed for a trip of a week or so and flew out to meet the Bruce Springsteen tour. Due to a combination of circumstances, not the least important of which was the professional rapport instantly achieved between the two Bruces, Bruce Jackson stayed with the tour, to everyone's benefit, and is with it still.

As things turned out, this situation proved beneficial to this writer, as it provided firsthand access to one of the persons responsible for the design of much of Clair Brothers' innovative, sophisticated equipment and equipment-handling techniques.

Equipment

Despite the position stated in the opening paragraph concerning an equipment inventory, such a listing is still a necessary part of this article, and will serve as a framework for explaining the methods employed by Clair Brothers and Bruce Jackson.

The microphone complement is the easiest to arrange in the form of a list, so here it is:

Drums:

Bass Drum	Beyer 88
Snare Drum	Sennheiser 441
Tom-Toms (All)	Sennheiser 421s
Hi-Hat Cymbal	AKG 451
Overhead	AKG 451
Vocals: All	Electro-Voice DS-35s

Guitars:

Bruce Springsteen	Shure SM-58 & direct
Steve Van Zandt	Sennheiser 421 & direct

Keyboards:

Organ	2 Sennheiser 441s on backstage Leslie
Piano	Helpenstill pick-up with Clair Brothers custom mixer/impedance matcher

Glockenspiel	Sennheiser 441
Bass:	Direct
Accordion:	Direct

This flock of signal sources is split between a 24 x 8 Midas on-stage monitor mixing console and the house mixing console. No splitting devices are used, as the input impedances of both consoles are such that two inputs in parallel properly load each signal source. The stage-monitor system also includes custom-built (by SAE) power amps and Banana floor monitors.

The 32 × 6 house mixing console (see photos 1a, 1b, 1c) was designed and built by Bruce Jackson and Ron Borthwick, and is a Clair Brothers exclusive. This piece of equipment exemplifies the attitude that Jackson & Borthwick have towards equipment design. It is as if they were developing a new breed of race horse, constantly trying to improve the breed, borrowing desired traits from different breeds. The console is a high-performance hybrid of audio building blocks, computer components, aircraft-type fasteners and construction materials as well as both advanced mechanical design and packaging.

One of the outstanding features of the console is the means of visual level indication. Each input module is provided with a 100-segment neon-glow bar graph display. Jackson & Brothwick have designed analog-to-digital circuitry that causes average levels and instantaneous peaks to be displayed simultaneously over a 50 dB range (-30 to +20); the display of average level readings, with response and decay times very similar to standard VU meter ballistics, is brighter than the display of instantaneous peaks. This is shown clearly in photo 2. This two-in-one visual monitoring is very easy to become accustomed to, even for old VU meter die-hards (this writer included), and is essential for the exceptionally clean sound (free from clipping) that is Bruce Jackson's ultimate goal.

Each input channel has its own input pad, pre-amplifier gain control, push-button availability of phantom microphone power, submix selector, echo send buss selectors and pan-pot. The parametric equalizers are extremely flexible, with each of the three sections (low, midrange and high) equipped with continuously variable frequency selection, degree of boost or cut, curve-shaping control and a push-button in/out switch. The stereo output of each input module is assignable to any one of the six stereo submix busses (note dual faders for each submix channel in photo 2). There are six echo send/return systems, four of which are used for a MICMIX echo chamber and an Eventide DDL. Two returns are used for the DDL, one carrying multiple-repeat "slap echo" or "reverb," the other a shorter, single-repeat delay for doubling effects.

The construction features of the console are as innovative as the opera-

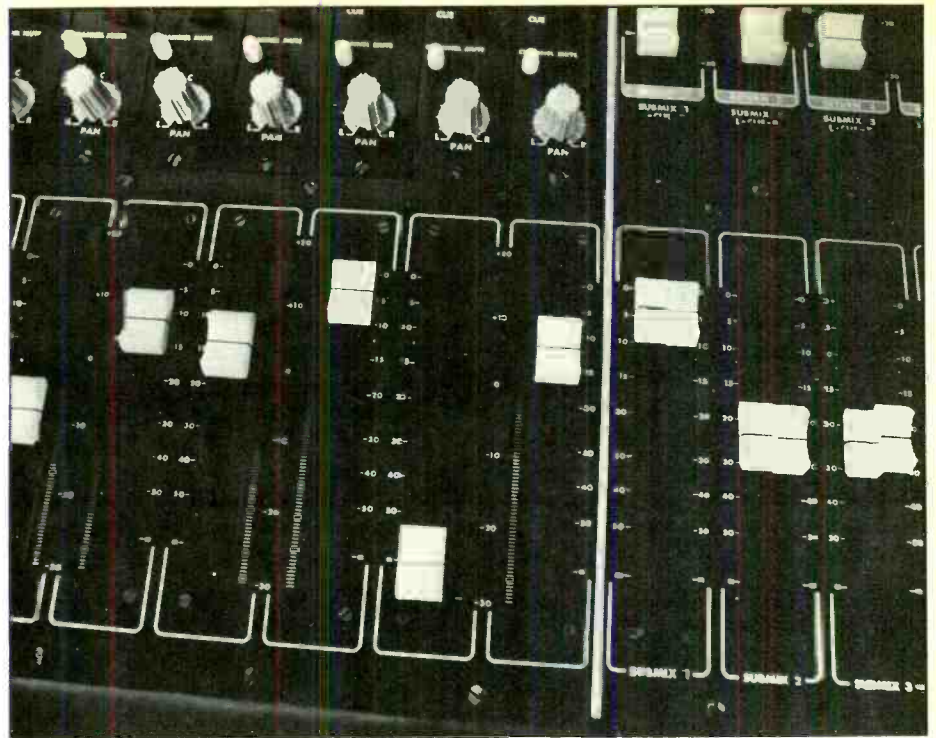


Photo 2: Close-up of the console's advanced average-level-reading's display.

tional ones. Most internal cabling consists of flat, multi-conductor ribbon cable, which allows the mechanical freedom necessary to achieve the compactness and portability evident in the photos. Other than flat cable wiring, practically all other internal connections are made by means of a "Mother Board" which runs the length of the console, under the faders, bar-graph displays, pan-pots and echo sends.

Flat ribbon-type cable, because it does not provide shielding, cannot be used for the main audio cabling to the

stage. For this purpose, Clair Brothers had Belden Wire prepare a special 40 pair Belfoil-shielded cable. The mechanical and electrical interface between the two types of cabling (multi-pair & ribbon) is accomplished by means of a 120 contact Zero Insertion Force connectors provide electrical access to various points in the console.

Associated with the console is a rack for auxiliary equipment. The stereo signal from the console outputs is fed to a 162 stereo limiter, and from there



Bruce Jackson and Bruce Springsteen (r) at the console during the soundcheck.

to two Clair Brothers Custom active 3-way crossovers. (The speaker system is 4-way, but the split between highs & super-highs is made by means of passive crossovers located in each speaker cabinet.) Three more 162s are employed to prevent clipping in the 40 Phase Linear 700 power amplifiers.

Bruce Jackson has developed a sort of belt-and-suspenders method of preventing clipping. In addition to the limiters (which are adjusted to function inaudibly, only on very short peaks that would overdrive the system), there is a calibrated "sampling" system which enables the operator to observe, on bar-graph displays, the levels at the inputs of any bank of power amplifiers. Thus, maximum

inch square cross-section hollow steel girder, which is hinged at its midpoint to swing in a horizontal plane. Six more cabinets are attached under the first six by heavy reinforced canvas straps. This array is then raised to the proper height by means of three modified electric cable hoists (one 2-ton, two 1-ton) attached to the girder and to ceiling beams. The three hoists and the hinged girder enable the array to be "bent" around, above the front corners of the stage. The two 1-ton hoists are mounted adjacent to each other on the girder, but their respective cables are attached to the ceiling at points ten feet in front and ten feet behind the forward edge of the stage. These two cables form a "V," and if one hoist is

poses. This practice is a nuisance for reinforcement operators, but is very necessary for the safety of building maintenance and service personnel. In such cases, the best procedure is to deal directly with house electricians.

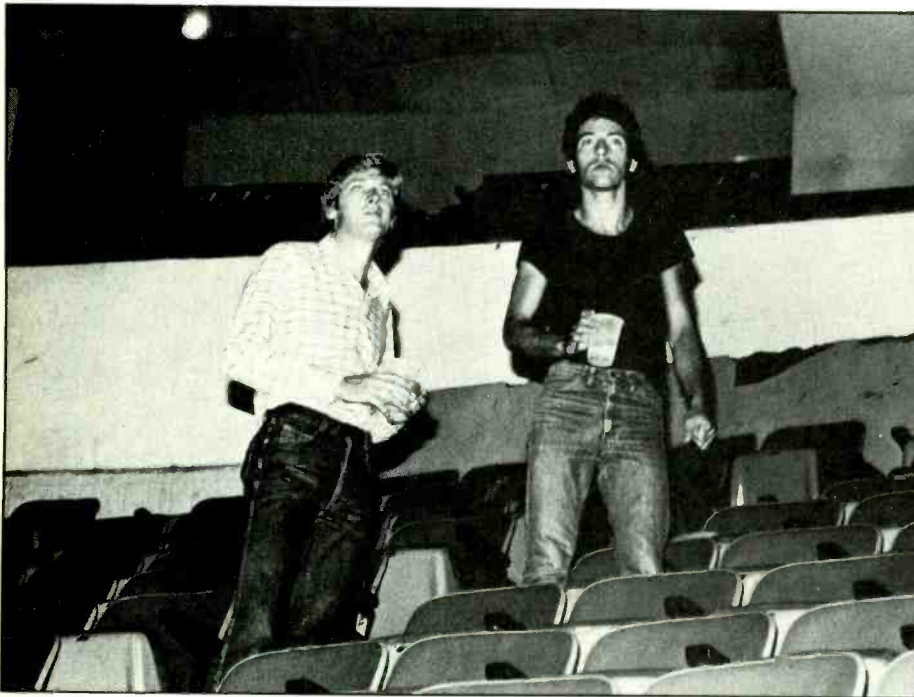
Sound Check

This writer has witnessed sound checks that have consisted of having a "roadie" run around scratching microphone grills and "buzzing" instrument amps. At the other end of the spectrum, there is the kind of check-out procedure that is standard with Bruce Jackson. Each "band" (hi, low, mid) of the entire system is checked for proper functioning. Then, the system is given a preliminary tuning. At this point, Bruce Springsteen brings the band on stage and proceeds through several tunes to warm everybody up and get the individual "sound" and the cues straight. This done, Springsteen leaves the band on stage, cooking along without him, and takes a walking tour, with Bruce Jackson, of the entire location, evaluating the quality of the mix. To paraphrase Springsteen's own words, he wants the audience to be able to hear the concert performance as clearly and as well-balanced as a recorded studio performance. Of course, that is a next-to-impossible criterion to meet.

The Results

As difficult a challenge as Bruce Springsteen presents, both in terms of performing style and sound requirements, the results at the Garden, for three successive nights, were equal to it. This writer, through conversations with one of the band members, was told in advance that the sound at the concert would be something special. This was an understatement. The most difficult musical element for sound reinforcement to handle—drums—came over with crystal clarity and at a level that would rival a battleship broadside. In addition, all the instruments were heard (very) loud and clear, from the pedals on the organ to the glockenspiel.

The overall impression gained from watching and listening to Bruce Springsteen prepare for and execute a concert performance, is one of a performer who realizes how much his audience is a part of his success, and who repays his audience with quality music, quality sound and a very personal contact that only a very few performers have ever achieved.



Bruce Jackson and Bruce Springsteen checking out the acoustics at the Garden.

average level is obtained for the whole system, yet overload distortion (clipping) is practically eliminated.

Details concerning the components of the house speaker system are of a proprietary nature, but Bruce Jackson volunteered that there are two 18-inch bass radiators, four 10-inch midrange units, two compression driver/horn combinations, and two super-high frequency radiators in each of the forty 440-pound cabinets. The deployment of the speaker system is ingenious, and very clean-looking, compared to the typical concert sound set-up. Clair Brothers and Bruce Jackson have devised a means of suspending speaker cabinets above the stage. Six cabinets are attached to a 24-foot length of 4-

made to let out cable while the other is made to haul in, the half of the girder to which they are attached swings about the hinge point. A total of twenty-four cabinets are suspended this way, twelve each stage left and right, with an additional eight on stage, left and right. Control of the cable hoists is centralized in a hand-held remote control box.

There wasn't much discussion about AC power distribution, except that Jackson stressed the importance of getting a common grounding point as close to the main cold-water pipe as possible. Many buildings, he pointed out, encase all cold water pipes in electrical insulating material, thereby preventing their use for grounding pur-

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Building



A Mic Splitter

(OR SAMURAI MIC FEVER)

By Peter Weiss

This article originally was intended to describe the construction of an 8×24 microphone splitter. However, it was decided that such a design would be too restrictive, since some readers would need to split signals from either more or fewer than eight microphones. So, what was finally arrived at was a basic 1×3 active microphone splitter module. This way readers can build as many as necessary to fill their own requirements. Also, since the "splitter" itself is contained on a 3×5-inch perf-board card, it can be supplied with connectors and packaged to suit individual needs. Some specific recommendations on packaging will be offered at the end of the article.

The heart of the 1×3 active microphone splitter is the Harris Electronics HA-911 operational amplifier.

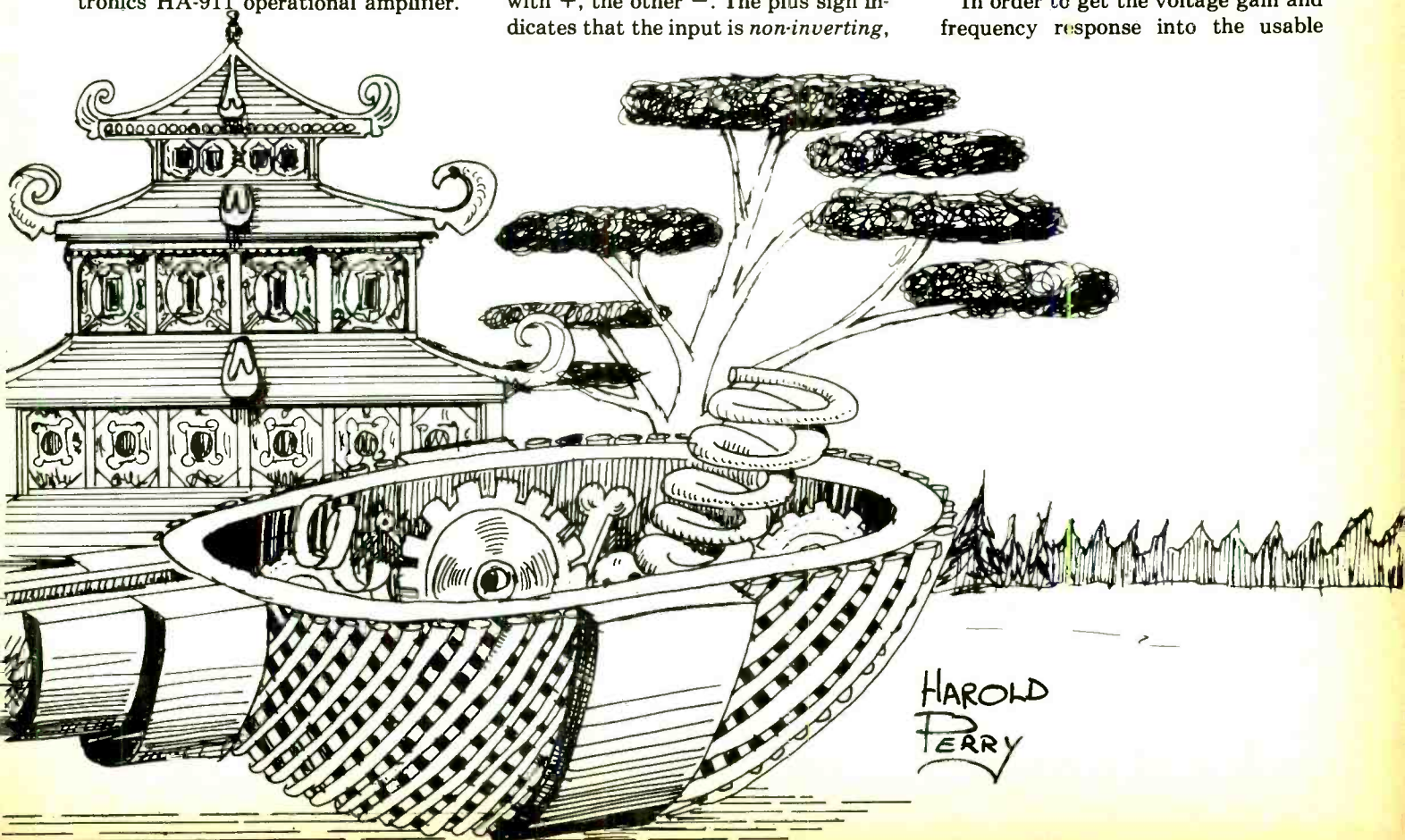
This IC "op-amp" was chosen for its exceptionally low noise figures, high input resistance (250,000 ohms) and easily tailored frequency response. In the splitter, one HA-911 is operated at a voltage gain of 10 (that is, for a 10mv input, the output is 100mv), which expressed in dBv is 20. The output of this amplifier is connected through C1 to each of the inputs of three HA-2605 op-amps. The 2605s are operated at unity gain, and serve as buffer stages, to isolate the three outputs.

Before we go on to describe the construction of the splitter itself, let us discuss how op-amp performance may be tailored to the user's requirements. In Fig. 1, notice that the basic op-amp (power connections have been omitted for clarity) has two inputs, one marked with +, the other -. The plus sign indicates that the input is *non-inverting*,

which for our purposes means that a signal to this input will produce an output signal with no phase shift. The other input is an *inverting* input, so called because a signal fed to it will appear at the output 180° out of phase, or "inverted."

If an op-amp were operated "as-is," with a signal fed to the non-inverting input, the voltage gain would be extremely high, on the order of 40,000 (90 dBv). Also, the frequency response would have a downward slope of 18 dB per octave across the entire audio range and beyond (e.g., the output at 10 kc would be 18 dB lower than that at 5 kc). Neither of these characteristics is particularly useful, and op-amps are seldom used for audio applications in this unadorned configuration.

In order to get the voltage gain and frequency response into the usable



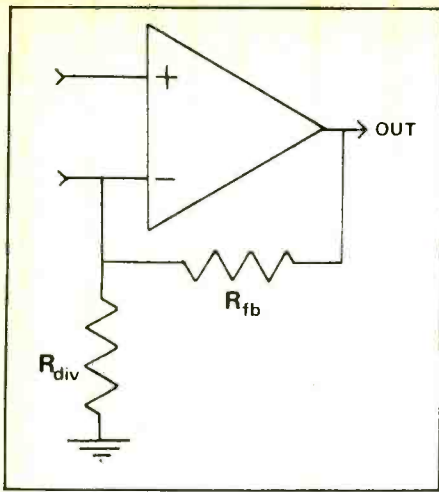


Fig. 1. Basic op-amp with negative feedback. Voltage gain = $R_{fb} \div R_{div}$.

range, and to increase overall stability, negative (or degenerative) feedback is employed in the following way: A resistor, generally (in audio applications) in the hundreds of thousands of ohms, is connected between the output of the op-amp and the *inverting* input. Another resistor is connected between the inverting input and ground. The numerical ratio of these resistances directly determines the voltage gain. In the splitter, the feedback resistor for the HA-911 is 330,000 ohms, and the "divider" resistor is 33,000 ohms. Thus the voltage gain is 330,000 divided by 33,000, which of course is 10. (The HA-2605s have both resistors at 330,000 ohms; therefore, the gain is one.) The feedback also flattens out the frequency response, but this turns out to be an embarrassment of riches, so to speak. Operating under the conditions just described, at a voltage gain of 10,

the HA-911 has a more or less flat frequency response out to one megacycle. This bandwidth is much too broad for audio applications, since it creates the possibility of r.f. (radio frequency) noise entering the circuit and being amplified. Thus, some means of rolling off the high end just above the audio range is necessary. Pin #8 on both the HA-911 and the HA-2605s is designated "bandwidth control," and by connecting a suitable capacitor be-

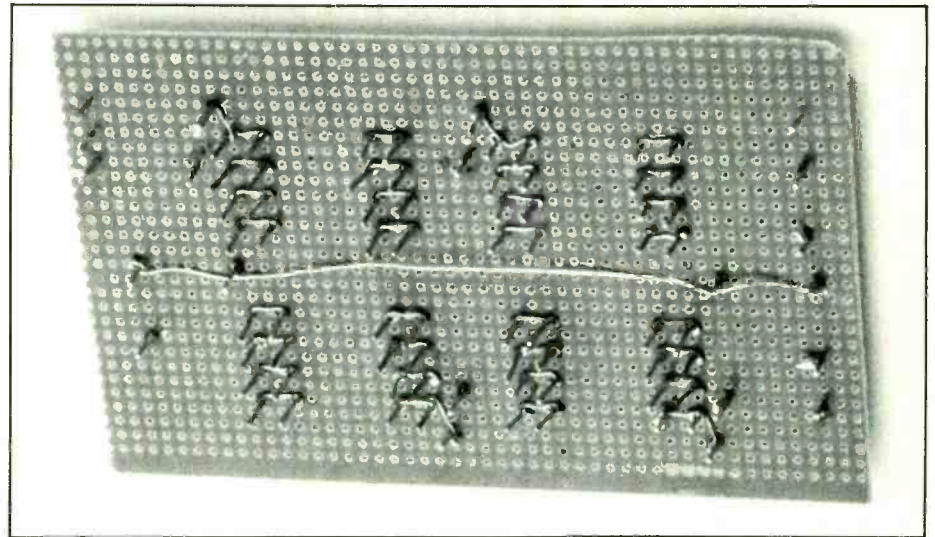


Photo 1.

tween this pin and ground, the desired frequency response can be obtained. In the splitter, a 400 pf capacitor is used to produce a frequency response that is smooth ($\pm 1/2$ dB) from 20 to 20,000 Hz. A 5 mfd. capacitor is used at the output of the HA-911 to "de-couple" or block any DC in that output. A 100 pF load capacitor also contributes to high-frequency stability.

perf board, and the small squares represent the holes in the board. The symbols in the small squares indicate which type of Vector terminal is required in each location. A blackened dot indicates a flag-shaped T42DP terminal; a black square represents a K38DP pin; and an "X" is a T49DP fork-clip. The numbers next to the T49 symbols indicate which op-amp leads are connected to these pins.

The reason that the K38DP pins and T49DP clips are in double rows is that the op-amp units are extremely sensitive to high temperatures. Therefore, soldering the leads directly to pin terminals would ruin the amplifiers. With the terminals installed as shown, all soldered connections can be made without the op-amps in place. After the soldering is finished, the op-amps are installed in the appropriate positions and the fork clips crimped closed around the leads.

The first step in actual construction is to install the terminals as indicated. Then, turn the board over and install thirty-six "jumpers" of #22 bus wire between adjacent K38DP pins and T49DP clips as shown in Photo 1. Make sure that the terminals are pushed in as far as possible, and that

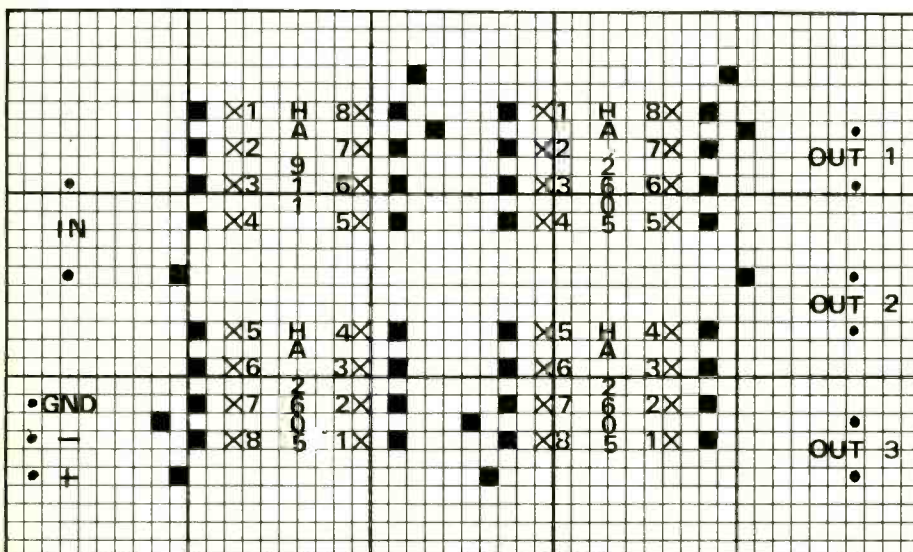
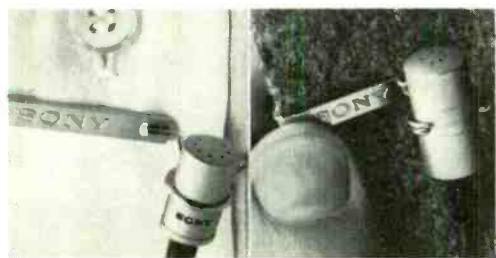


Fig. 2. 3 x 5 grid with terminal locations.

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the jumpers are installed right down on the surface of the card. When soldered, the jumpers will serve the secondary purpose of preventing the terminals from coming loose. At this point, install the ground bus on both sides of the board, between the pins as shown in Photo 1.

Photo 2 shows the components in place on the "underside" of the board. During the installation of these resistors and capacitors, it would be useful to double-check their electrical locations against the schematic diagram. In order to make this easier, here is the standard resistor color code, for those who are not familiar with it. There are mnemonic devices which make this code easy to remember, but none of them are printable.

	1st Band	2nd Band	3rd (multiplier) Band
Black	0	0	X1
Brown	1	1	X10
Red	2	2	X100
Orange	3	3	X1,000
Yellow	4	4	X10,000
Green	5	5	X100,000
Blue	6	6 <td X1,000,000	
Violet	7	7	X10,000,000
Grey	8	8	
White	9	9	

Example: The feedback resistor in each op-amp circuit is 330,000 ohms. These resistors are marked orange-orange-yellow, or $33 \times 10,000 = 330,000$. The "divider" resistors are 33,000 ohms and they are marked orange-orange-orange, or $33 \times 1000 = 33,000$ ohms. A 33 ohm resistor would be marked orange-orange-black. The metallic fourth band (if present) indicates the percentage tolerance to which the resistor is manufactured. Silver=10%; gold=5%; no band=20%.

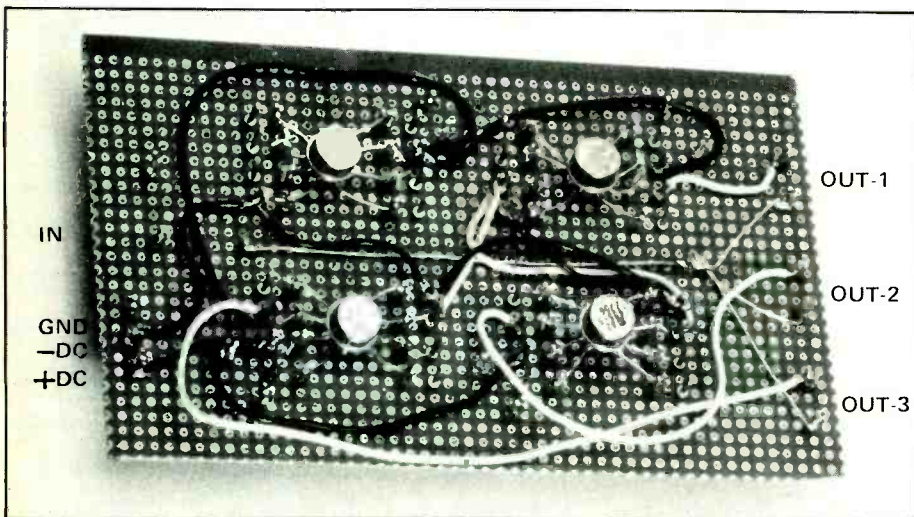


Photo 2.

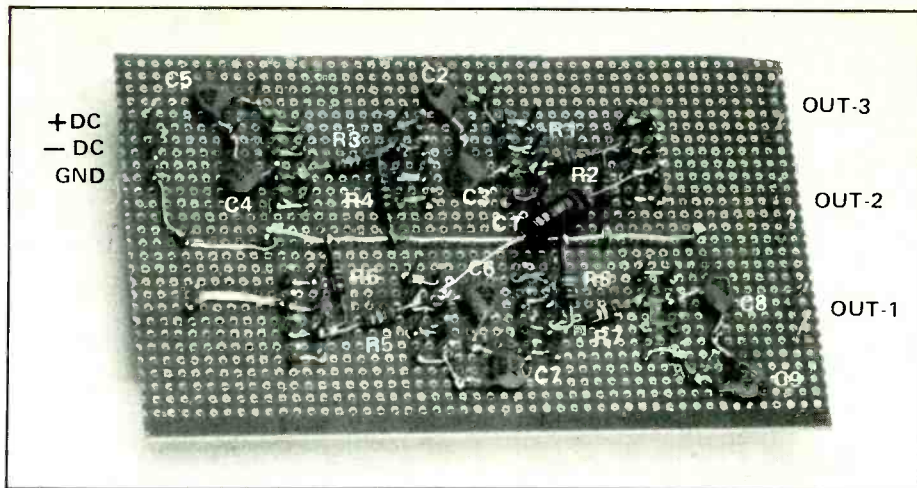


Photo 3.

The capacitors have their values printed on them, but sometimes in the manufacturer's own code. It would be wise to have the parts dealer label them or their packaging clearly for you to avoid confusion.

Once all components (exclusive of the op-amps) have been identified, trim the leads, and wrap them securely around the proper pins. At this time, install the power supply wiring (insulated #20 solid) and all interconnecting audio wiring (#22 solid bus) and solder all connections. See Photo 3 for wiring installation on the "top" surface of the board.

Photo 4 shows an HA-911 in its original form. In order to have the leads of this device (and the HA-2605s) fit the layout of the clip terminals on the board, they must be bent with needle-nose pliers *very carefully* into the "spider" configuration shown in Photo 5. This is a delicate operation, and *twisting* leads is definitely *not* recommended. To help you do this im-

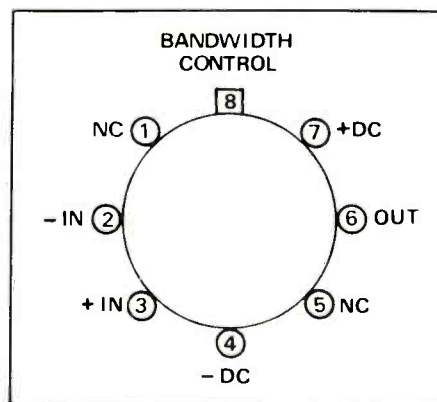


Fig. 3. HA-911 and HA-2605 pin arrangement. (TOP VIEW.)

portant job, think hand-steadying thoughts such as: "This is a five-dollar op-amp, not a five-cent resistor." More realistically, you might inquire at your source of electronic components if there are any "dumped" bargain-priced industrial surplus devices available that are packaged in 8-lead TO-99 cans. These usually cost a tenth (or less) of their original price and would be perfect for lead-bending practice.

After all connections on the board have been soldered, place the op-amps in the positions indicated in Fig. 2. There may be some slight readjustment of leads necessary. Do this carefully, and place each lead in the fork of the proper T49 DP clip. Crimp the clips securely. Power supply, input and output connections are made to the terminals as shown in Photo 6. *Any* audio wiring to the splitter card should be shielded cable.

Applications

There are no provisions in the design of the splitter card for transformers for unbalancing balanced lines at the input and producing a balanced feed at



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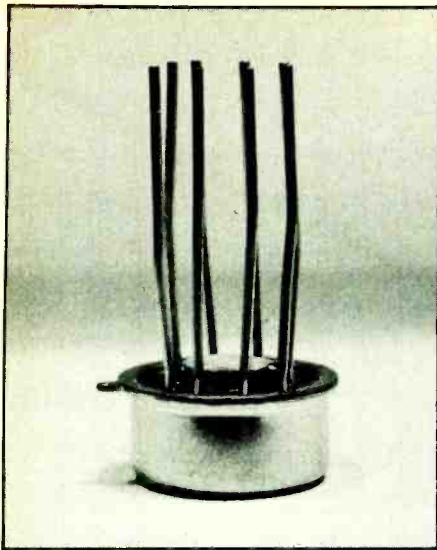


Photo 4.

the output. The card is basically an unbalanced device, with an input resistance of 250,000 ohms, and output resistance of 500 ohms. If balanced input and output capability is required, suitable transformers are necessary. The choice of these is left up to the reader, as the selection of available types is

wide, as are the ranges of quality and price. The use of ground-lifting switches will also depend on the actual application for which the card is used, and such switching should be in accordance with the principle of common-point grounding. That is, there should be only *one* path to ground for all systems. In an all-unbalanced system (for a simple example) the main ground should be made through the console or mixer with which the 15-volt bi-polar power supply is associated. These two devices—the mixer and power supply—will have a common ground, which in turn

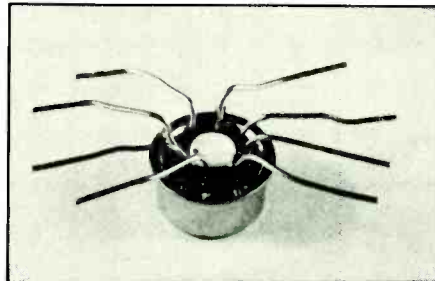


Photo 5.

- ### PARTS LIST
- 1 3" x 5" "P"-pattern perf board
 - 1 pkg. Vector T49DP Fork clips
 - 1 pkg. Vector T42DP "Flag" clips
 - 1 pkg. Vector K38DP pin terminals
 - 1 Harris Electronics Corp. HA-911-2A Operational Amplifier
 - 3 Harris Electronics Corp. HA-2605-2A Operational Amplifiers
 - 7 330,000 ohm 1/4-watt resistors
 - 1 33,000 ohm 1/4-watt resistor
 - 4 400 pF 25-volt ceramic capacitors
 - 4 100 pF 25-volt ceramic capacitors
 - 1 5 mfd 25-volt tubular capacitor
 - #22 solid bus wire
 - #20 solid insulated wire

should be solidly connected to a cold-water or "mechanical" ground. All other audio equipment should be isolated from any contact with grounds other than that established through these devices. Thus, the shields on *all* audio cables (other than hi-level) will be connected to ground only through the ground bus on the splitter cards. AC supplies to other audio equipment (monitor consoles, broadcast or recording equipment, etc.) should be isolated.

Packaging

This writer's recommendation is to use one of Pomona Electric's aluminum shielded "black boxes." They come in a variety of sizes and many models have connectors of various types already installed. Check the Pomona Electric section of an EEM Master Catalog or a Pomona Catalog at your electronics supply house. For the more adventurous or advanced readers, Vector also makes P-pattern perf-board in standard "card" sizes with a strip of contacts at one end that mate with Vector card-holding connectors. A rack of these connectors and cards would make a good permanent installation. Remember, you need at least nine contacts for an unbalanced system, twelve for a balanced system with transformers on the cards. There is extra room on the cards for printed-circuit type transformers. The only strict requirement for transformers is that they be *shielded* types. The signal levels involved are very low, and any hum or other extraneous noise picked up by the transformer windings will be amplified by all subsequent stages in the system.

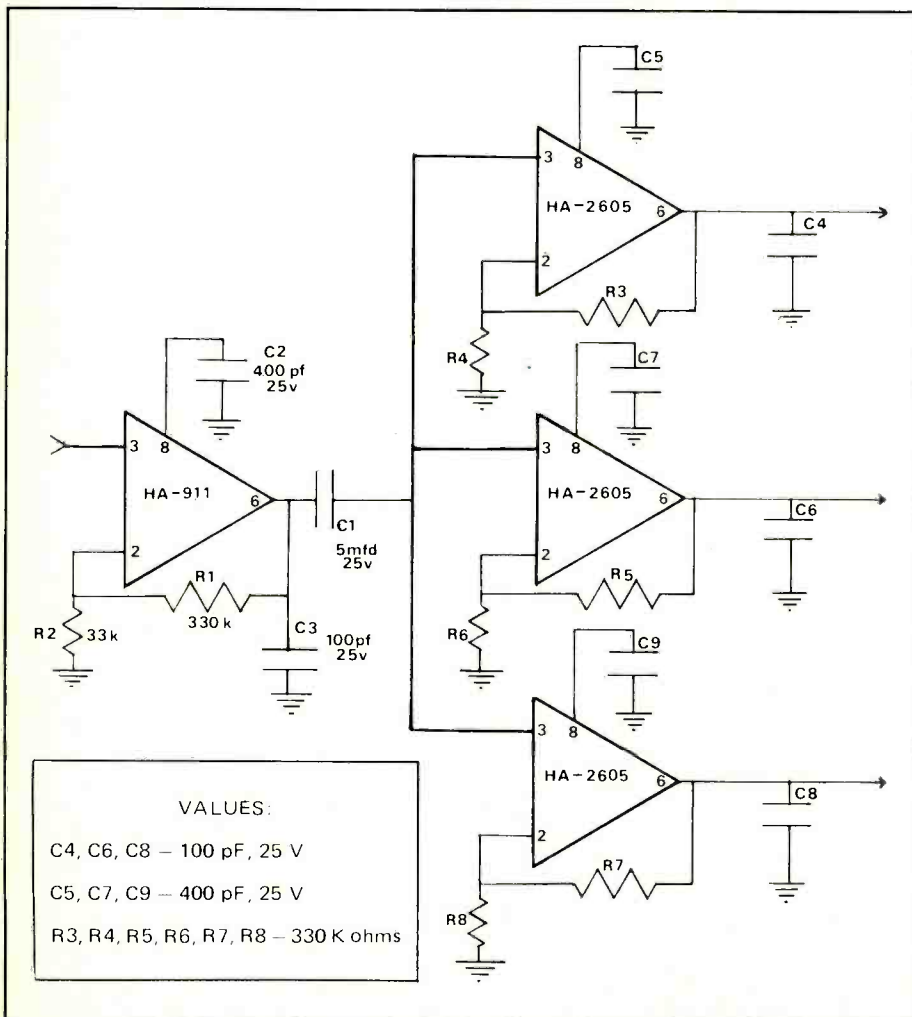


Fig. 4. Signal schematic of the mic splitter (power connections omitted for clarity).

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But that's not all. Because the 163 is an "Over Easy" compressor/limiter, too. Which means that as the signal level crosses the threshold, the 163 gradually adds the desired amount of gain change over the range of several dB. The result is the most natural-sounding compression you've ever heard.

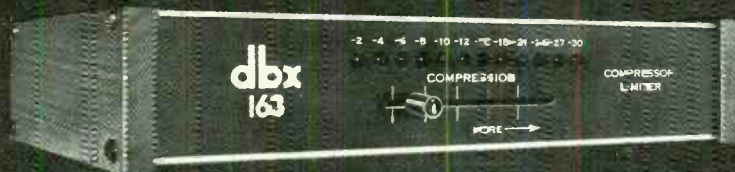
The 163 is as easy to install as it is to operate. It's light and compact—two may be rack mounted in a 1 $\frac{3}{4}$ " space—and it interfaces easily with phono connectors.

But the easiest part of this "Over Easy" limiter is its cost. The nationally advertised value of the 163 is \$189.* With the money you save on a pair of 163s, you can get two extra hands in the studio. You can hire yourself an assistant.

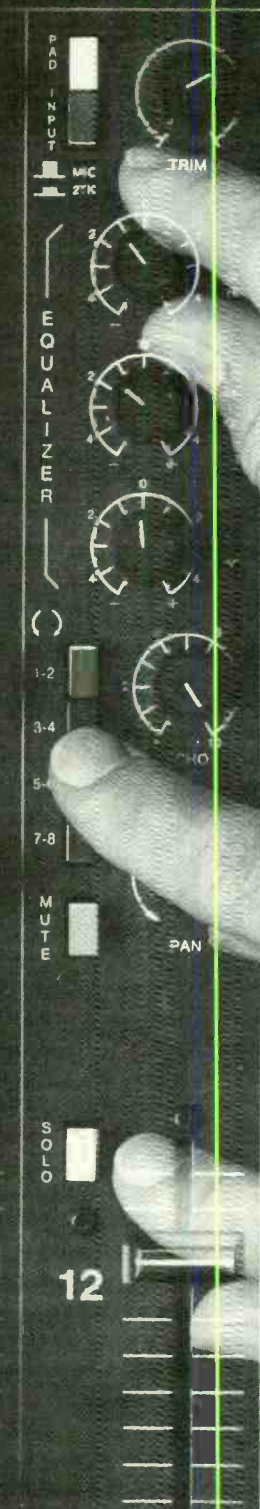
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David Spinozza is a session musician, producer, arranger, writer, orchestrator and conductor. He has played on albums with names such as Aretha Franklin, Roberta Flack, Les McCann, Herbie Mann and Paul McCartney, to name a few. He has written songs for Melissa Manchester, James Taylor and Tom Chapin. At the time of this interview he had just released a solo album titled Spinozza.

Modern Recording met with David at A&M's New York offices to talk with him about his multi-faceted career—how he got there, what he's doing there and what we can look for in the future. Also on hand was Janice Cercone, A&M's New York Publicity Director.

MR: How did you become a session musician? I mean, does anybody actually *aspire* to be a session musician?

DS: I think somebody who would know what it was to be a session musician could aspire to be one. I had no idea because there were no musicians in my family to speak of, so I didn't even know what a session musician was. I just aspired to play

and Frank.' This isn't how I got started in studio work, but it's how I got to see my first session. It's when I became aware of what it was to be a studio musician.

I walked in . . . it's a funny story, because I walked in and they were doing this Scotch Tape commercial or something and it was an hour long and there were all these musicians sitting there. There must have been twenty musicians, strings and horns, and I said to Jimmy, "How do they do this; do they rehearse this music ahead of time?" And Jimmy said, "Oh no, they just come in and they sight read." I said, "Really?" Then I looked at the guitar part; the guitar player there had a guitar that said "Al Ciaola Model" [Epiphone] at the top, so I figured after the session was over, I'd go over to the guitar player and talk to him. I went over and I said, "That's a nice guitar—the Al Ciaola model." I said, "My name is Spinozza, what's your name?" He said, "Al Ciaola." It was very funny. It was a session Al Ciaola was on and he was playing his guitar.

I'd say that's when I became aware that there was such a thing as making a living as a studio musician and that you had to be able to sight read and



AN INTERVIEW WITH **DAVID SPINOZZA**

By Chas Kimbrell

the guitar—joined some bands and stuff like that.

MR: So how did you actually get started in session work?

DS: Well, the first session I ever saw, I think I was 15. At that time, I had a band and we played around all the country clubs, etc., around Westchester County. My friend, Jimmy Frank (who was in the band), his father had a jingle company called "Lauren

play different types of music. So from that point on, I began to think more in those terms. Then when I was about 17, I got a call from Tommy Mottola, a friend of mine who was doing a record; he now is a manager (the Savannah Band and Hall and Oates). Tommy had called me in and asked me to do a session for him—he was doing a singing album. So, I did the session and I met this arranger on the session who had

arranged all the music for Tommy. This arranger took a liking to me and started to call me for other sessions and spread my name around town, and that's really how I got started.

MR: That was Ott?

DS: Yeah, Horace Ott, who is an incredible arranger and a good friend of mine. It was really nice of Horace 'cause it's really difficult to break in on the session scene.

Sometimes you can do that when an artist says he wants to bring his guitar player or something like that, but a lot of times that doesn't work in terms of breaking somebody in on the scene. One arranger or one producer couldn't keep you working enough to pay your rent for a year anyway, so really, word has to spread around. You have to become one of this particular group of people that does dates and if you were to talk to twenty different musicians, you would get twenty different answers as to how they got in. It's all very hit and miss and very "right place, right time." Of course, you have to have the ability, 'cause if you mess up one session . . . I mean, it's like you're as good as your last record date, no matter how busy you are.

I'm not a real believer in "luck." I mean, there's a certain amount of luck, I guess, in meeting somebody for the first time, but there's no luck in having done the job and continually getting the job done to the point where people want to call you back. There's no luck in that; it's just ability.

MR: You've done sessions with such a vast range of artists. Which would you say was your most memorable recording session?

DS: My most memorable session? I can't really say one, in particular. I can think of a few with Roberta Flack that were real good, and there was a session with Aretha Franklin—I think the album was *I'm in Love Again* or something like that. She sang "Masquerade" (you know, *when the masquerade is over*). I tell ya, that to me was a memorable session, not so much for what I did, but just having been part of this amazing experience, 'cause when she sings, it's an event. The *Ram* album by Paul McCartney was a memorable session 'cause we worked long hours and it was my first time meeting one of the Beatles.

MR: Did you work on any of the other McCartney albums?

DS: I recorded, actually, about twenty songs with him and only six or eight of them got on the *Ram* album,

but then later on, they showed up on the Wings albums. Every now and then I'll read my name on a cut. He'll take a cut out of the can that we had and he'll put it on a Wings album.

MR: But they were all cut at the time of the *Ram* album?

DS: Yes, and we cut those within four weeks. I think I was on *Red Rose Speedway* for instance, which I had never played on. That was a year or two years later.

MR: Do you get surprised like that often, by picking up an album and suddenly finding out that you're on a cut and possibly, even forgot about it?

DS: Oh yes, for sure. Especially when you're just doing tracking dates. I mean, now that recordings are done so separately with the rhythm section first and the horns later, and so on; if the part you play is not really significant to you, chances are you won't even know it's you. There are about twelve guitarists in N.Y.C., and they all sound alike. Unless they're in a setting that's really their own band, you couldn't tell the difference. I couldn't even tell the difference between myself and Steve Kahn and Jeff Marino and Hugh McCracken and John Tropez. You take Jeff Layton and Cliff Morris—you take any one of those guys and put them in a certain rhythm section setting and we all sound similar. You just can't help it. You've sat with each other so many years playing, that you start to sound alike.

MR: Let's come back to a question that has something to do with that, a little later. But for the moment, has there been a most difficult session or a session that was hard to cut for one reason or another? Have there been any real nightmares?

DS: Well, there's been two types of nightmares. One kind of nightmare is a session where the music is just hard. For example, for Oliver Nelson, the arranger, who was a real task-master arranger. He came in to do, I think, something for a movie, but he had a big band and it was my first date playing out with a big band where I had to really read a lot. I was about nineteen or twenty at the time. He wrote every guitar line out and it was all unison with the sax section, with really fast moving be-bop type lines. I don't think I was ever so petrified. I practically shit a brick, I was so scared. I mean, I was frozen to my chair and the only way I could get through the part, was to play it really dead slow and memorize it and then try to play it at the

tempo he wanted it at. If the sax section hadn't been scuffling with their parts, which gave me time to get my part together, I would've never gotten through the date. That was one. I think I left that date with the worst migraine I ever had. I felt like I wanted to throw up. That was a nightmare in that sense.

MR: Who was the artist he was doing that for?

DS: I think Johnny Hodges—the last Johnny Hodge's album. He was the alto player who played with Duke Ellington and it was the last album that Johnny Hodges had made. That's what it was, now that I remember.

MR: Getting back to what you were saying about twelve or so guitarists in N.Y. all sounding basically alike, just how creative is session work? Did you, or do you find it limiting?

DS: It's limiting. It's like anything. It's limiting to start with, but every now and then a session pops up where you really feel like you contributed something that was really you. In other words, I'm not saying that we just sound alike, I'm saying that with the settings we're put in, we can't help but sound alike. I don't mean that we all aspire to play like each other or that we're all so dull and jaded that we want to play like that. It's just to fit a certain circumstance. You know when producers come in, they want just a certain amount from you, and for the amount they want it doesn't matter which one of you it is. It's like a baseball player; there are guys who can get home runs and then there are guys who can just get a hit all the time, and that's what they're trying to do. So, from us, they don't really need our expertise every single time, so that's why we end up sounding alike.

MR: Yes, but I was wondering if that [lack of challenge] was one of the major factors that caused you to want to do a solo album?

DS: Yes, because after awhile I definitely got bored with playing the same thing, and I got bored with copying my own sound. People would say, "Oh, I heard you play this on so and so's record—give me that again." And the next thing I knew I was going around being like a clone of myself. That's what made me want to make a record, 'cause it was getting to be not very expressive after a while . . . it's a great living though.

MR: How do you feel your session work relates to you as a producer? Do you think it has helped you?

DS: Yes. The reason being that most producers don't ever get to see each other, but all session guys get to see every producer. I get to take what I've learned from everybody—watching the different musicians and producers and my own capabilities—and put all that together. I figured it would be great to produce.

MR: What is your strongest musical influence currently?

DS: My strongest musical influence? It's probably jazz-rock for lack of a better expression. I like rock and roll and I like to play jazz. I don't consider myself a be-bopper.

MR: Is there a particular musician?

DS: No, I really don't have any idols or anything like that.

MR: Nothing that shapes you?

DS: No.

MR: What about in the production field? Is there any one person who has influenced you as a producer?

DS: Well, I like Richard Perry and Arif Mardin's production.

MR: That's two good people to like.

DS: I don't necessarily like their process. I've always believed that the process of recording could be made more enjoyable and still get the same results. I'm not crazy about the process that they [Perry and Mardin] seem to have to go through to get their records, but in terms of what comes out, the results, I really like.

MR: I notice that on the things you produce, you often contribute musically. Do you think that's one of the things that makes a producer work better with an artist, makes them more a part of the album and makes the artist trust them more and feel better about them?

DS: Yes, I think so. Because artists, in general, feel better when you're participating the same way they are, rather than sitting back and just watching. But, at the same time, I do feel that there is a *time* to do that. Sometimes, if I'm not sure exactly which direction to go with a song, it's better that I sit in the booth and just oversee it, rather than sit in the room with my guitar and play, otherwise my objectivity goes out the window, because now I'm a player. I start listening to my own sound and I get all caught up in my own little world. When you're playing, 100% of your consciousness goes to your playing. When you're not playing, 100% of your consciousness can be out there watching the whole thing. So, sometimes I really think if you're not really

clear which way something is going, it's better not to play. Just watch and overdub later.

MR: What actually caused you to develop an interest in producing?

DS: That was caused, I think, from having watched all these other producers. Like anything, when you're sitting on the sidelines you always think you can do it as good or better. So, that's really what came up. When I was watching all these producers, I said, "Well, they're doing a great job, but I would have done this or I would have done that." Everybody feels like that when they're watching something from the sidelines, but I just went ahead and did it. I said, "Well, I'm going to go and see if I can get some production."

The first productions I did, I paid for myself. I didn't have a deal with a record company; I just had two thousand dollars sitting around. I went in with an artist and picked a song and tried to sell it. I don't think I ever even got the first thing sold that I did, but it was an experience learning all the things you have to deal with. There's a difference between sitting in a seat just playing a guitar and handling the whole thing. Being responsible for communication with the engineer, communication with the musicians, communication with an arranger—if you have one—and communication with the artist so that the artist doesn't feel like you're ruining his song. Out of that, I realized that I liked that sense of responsibility. I like it more than just playing.

MR: The first thing you produced then, was sort of a local band that you tried to get a record deal for?

DS: Yes, that kind of thing. First, I produced a girl singer, then I produced a band which I had still been playing with—I was twenty years old at the time. I was doing studio work; I was doing about five dates a week and on the weekends I kept playing with this band called "Giant." They were friends and we had played together since we were kids—a big horn band. I produced that . . . really messed it up too. It's probably the worst sounding album I've ever heard, but I was so responsible for the whole thing that when it came to my guitar solos on that album, I spent the least time getting the sound on my own guitar. It's the worst guitar sound I've ever heard on a record, but it was my first production. It came out on Mercury. After that, I went from doing something no one had ever heard of, to

things people had heard about—James Taylor; I did the *Walking Man* album.

MR: Was that the next album you actually produced?

DS: I don't know if it was the *next*. There might have been little singles here and there. I can't remember the actual chronological order.

MR: How did the James Taylor thing actually come about?

DS: I was playing on Carly's [Simon] record *Hot Cakes*. James came to this session and said he wanted to approach his recordings with a more musical producer. Not that Peter Asher isn't musical, but he doesn't get as involved in the music as he does decision making and that kind of thing. So, James had said he wanted someone who could arrange and this and that and the other thing and I said, "Oh, that's great. I think you should get somebody to do that." He said, "Well, I'm talking about you. How would you like to do it?" I never dreamed he was talking about me! So I said, "Sure, I'd love to."

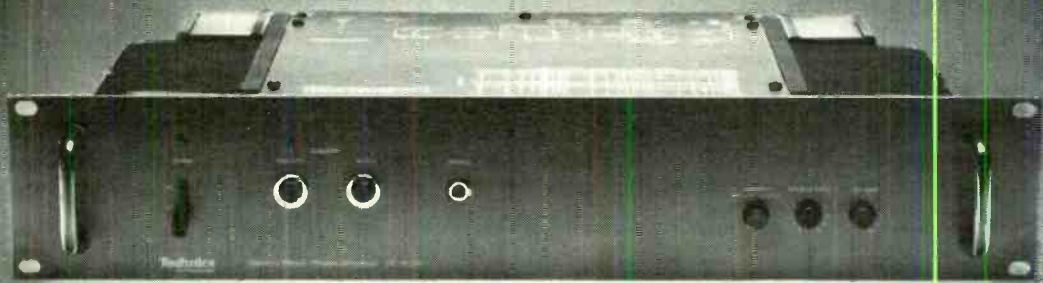
He had recorded this one song, three times; it was called "Let It All Fall Down," which is on the *Walking Man* album. He said, "If you can make this work, you can do the whole album." So, I made it work, I guess, 'cause he liked it and I did the whole *Walking Man* album. That's how it came about.

MR: Did fellow session men find it difficult to relate to you as a producer, or were you readily accepted in your new role?

DS: They hated it. Most of them thought I was a real dictator. Because 'ya know, I was always Spinozza—the guy who clowned around and stuff. As a producer I'm really a task master. I know what I want and I know how to get it, and I don't stop until I get it. So, what happens is, they [the musicians] automatically assume that you're not one of the guys anymore. 'Ya know? You're one of *them*. It's a "them and us" thing. "He's on the other side of the glass." "He's a company boy now," or something. So there was a lot of tension between a lot of people. But one by one, I individually sat down with the guys that I was with and just explained what it was like to be a producer as opposed to being a musician and that there was no way I could be in that same clowning around, irresponsible head because there were many things I had to answer to, like a budget, and for all the musicians, etc.

MR: I noticed that the Brecker Brothers and David Sanborn turn up

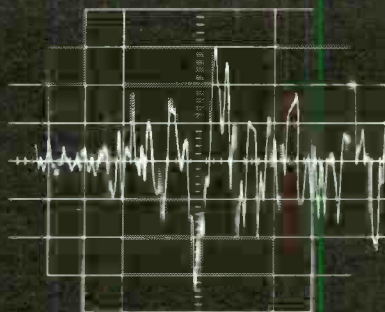
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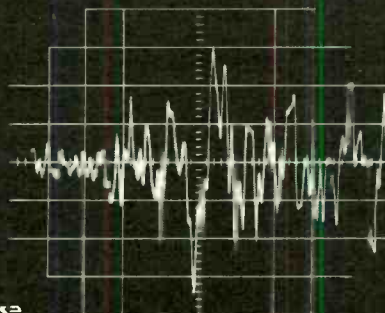
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rather frequently on your work. Are there certain session musicians who you try to use as a nucleus?

DS: Yes, for sure. There are definitely people that I use a lot, like Steve Gadd and Rick Marotta. I use Anthony Jackson on bass or sometimes Tony Levin. It's really down to three or four people on each instrument.

MR: I understand that your earliest influences were R&B, however, most of your production seems to be more MOR or along the country/folk vein and then your own material seems to be shifting to a jazz-oriented sound.

DS: I don't have a particular idiom that I like any more than any other. In fact what I like about music is variance. I like producing different things and I do like playing something other than what I like producing. I don't mind producing MOR albums but I don't really like playing that way. It's like being an actor. You might want to act in *Mean Streets* but, as a director, you might want to direct *Ben Hur*.

MR: Do you have any set techniques, any set approaches regardless of whom you're producing?

DS: What I do is I listen to a song and produce what I think is the best setting for that song. If the song doesn't call for much, I don't try to force it into a bag. I don't think I have a distinctive style of producing like some producers have. Richard Perry has a style; when you hear a Richard Perry record it's his record no matter who the artist is. You can always tell it's Richard Perry by the drum sound, or you can tell by the bass sound. I don't produce from that standpoint. I take each artist and try to figure out where they're coming from and go with that. I put them in that setting. I mean the way I did James Taylor wouldn't be the way I did Garland Jeffreys, and if you put *Walking Man* on and then put Garland Jeffreys on you wouldn't know it was the same producer. I pride myself in that. That's what I'm going for.

One set thing I definitely use is pre-production. I'm really into knowing the song backwards and forwards, knowing what the harmonies of the song are. I still don't feel—as long a way as technology has come—that the record is made by all the recording equipment. The record is made from the music. The point, ultimately, is to capture the music. I don't have any particular recording techniques, but musically I definitely like to write the

song out myself so I have a real understanding of the song. I don't necessarily write everything out for each individual player, but in terms of the chart I like it to be very definitely mapped out when I get in the studio.

MR: Do you like to produce the artist "live" in the studio as opposed to piece by piece?

DS: That all depends on what makes the artist comfortable. If the artist is the type who likes to sing along, like Garland Jeffreys (a lot of the material on his albums was original performances) we'll do it "live," but certain people, like James Taylor, don't like to do that. James liked to overdub, which was amazing. James is the most consistent singer in the world, he really is, pitch-wise and phrasing-wise, but he gets real neurotic. He likes to go in and do the vocal for a week every night and try it a million different ways.

MR: Do you usually like to see the act perform "live" before taking it into the studio?

DS: Sometimes, depending on what type of act it is. And if I don't feel that they're that strong in person, of course I'm going to try to make it sound differently in the studio. I'm not going to try to capture something I don't believe in "live."

MR: The word "Producer" means a lot of things to a lot of people. What does it mean to you?

DS: I have a definite beef about that. I think they ought to change that. They shouldn't call it "Producer" 'cause it brings up images of a guy who puts up the money or something and the people automatically think of a producer the way they think of a producer in the movie world. Once I told someone I produced James Taylor and they said "Oh wow! You mean you had the money to produce James Taylor?" I said, "No, I didn't have any money."

Y'know if I had to have the money to produce James Taylor I would have been starving to death, so really, I think they ought to call it directing, I think that's more accurate. What a producer does in a studio is direct. He directs the engineer, he directs the musicians. He puts the thing together and chooses or makes the decisions that allow a thing to come out the way it comes out. It's just a series of decisions, that's all producing is.

MR: There are producers who choose to function merely as a liaison or mouthpiece between the artist and the engineer and there are producers who take charge of the whole direction of

the music, and begin to change things as they see fit. What do you feel the producer's role should be?

DS: Well, I think that a producer's role should be not to change anything but just to heighten or broaden whatever it is. If the band sounds big, he should make it sound bigger; if the guitar sounds fat he should make it sound fatter. I think what goes on the record has to be made bigger than life.

Sometimes you might hear something that the artist doesn't hear and just suggest it, and if the artist is really opposed to it then I won't necessarily do it unless I really believe in it 100%. Even then I'm not going to force it down somebody's throat. How could you make an album if every decision you made the artist hated and you just enforced it? I wouldn't even finish the record if it came to that.

MR: Was the Spinozza album a dream fulfilled or was it just the next logical step?

DS: It was just the next thing to do; it seemed like a good idea at the time.

MR: In other words it wasn't an end product that you had been working toward?

DS: No, I don't see how anybody could do that. The minute you put down the tape whatever it was that you thought was going to be the end thing, that's already gone and you're already in the next place. I can't wait to make the *next* album. I'm not saying I don't like the first album, but y'know it's just one of many.

Janis Cercone: David's been signed to A&M for five years now, so he could have done the album anytime.

DS: The album was always there for me to do. I had the deal and everything but I didn't feel comfortable enough. I felt there was still some loose ends I wanted to tie up before I went in the studio. I didn't want to be at the mercy of my own lack of knowledge about recording and stuff.

MR: You were signed to the label as a session musician?

DS: No, I was signed to the label as an artist.

MR: But you didn't put out any product?

DS: No.

MR: That's strange. How could you sign five years ago and stay on the label without putting out a product?

DS: Magic.

MR: Was the album actually very long in the making?

DS: No, actually the album only took two months; I really liked the

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way we did it. I knew that if we went in and cut the (rhythm) tracks first, that when I started doing the guitar overdubs it was going to be real neurotic—when all the other tracks are down you can just keep doing guitar licks forever. You can go nuts. So I said let's go for "live" performances, and as a result all the things on the album are "live" with the exception of "The Ballerina" because of the guitar in the prelude. I was conducting the orchestra so I couldn't conduct and play that section; I had a guitarist play it then I overdubbed it. Every-

thing else is "live." All the solos are "live;" there isn't one punch in, nothing fixed. In fact, there are blatant mistakes on the record, but I didn't care because the moments were there, the band was there, it was a happening. If I had gone in there and tried to overdub it wouldn't have worked. Maybe on a different type of record where you're doing songs it's different, but when doing blowing, improvisational playing I can't see overdubbing to a moment that was already.

It's funny how everybody has his opinion of what overproduced is and

what underproduced is and what clean is and what clean isn't. I did a radio interview and this jock said to me, "the only criticism I have about the album, that a lot of people have said, is that it's just too perfect, it's too clean. It sounds 'machined.'" I said, "Well that's very funny because I did everything 'live.'" "

JC: It's kind of like saying, "You played too well."

DS: I didn't tell anybody on the session to play any particular way. There was a map of the song; we'd play the head [arrangement] then I'd say okay I'm going to solo for the next 32 measures then we're going to play this interlude. So, there were things mapped out so that from time to time we'd come together, but what ever happened within the space of my solos was totally spontaneous. I didn't tell anybody to play this or not to play that. Therefore, the comment the jockey made was so off-the-wall. If it came out sounding perfect, that's simply the way it came out. *Not* because I was nit-picking. He made it sound like I was a little nit-picker who kind of tied everybody's hands and said don't do this here and do that there. It wasn't like that at all, actually.

MR: Most of the musicians on the album . . . I guess *all* of them are session musicians.

DS: I'll tell you, with all due respect to the musicians and aspiring musicians I've played with, and I've played with thousands of musicians, I've never come across better schooled—yet loose—and more well-rounded musicians as I have in the studio. When people say "How come those same names keep showing up, it's boring." Well, those names don't keep showing up because they can't cut it.

I see producers constantly trying to use other people and give new people a break, but when they're really certain that they have a hit and they want to make sure it comes out, they call the Breckers [Michael Brecker, saxophone; Randy Brecker, trumpet] and they call [Steve] Gadd [drums] because they know it's going to work. They know that these guys are going to make it work and that they're going to play tastefully and that they are in fact over the whole ego thing. The problem with new players when they come on the scene is that they want to give you all their shit in two measures. There's a lot of drummers out there who can play as fast as Steve Gadd. There's a lot of guitar players who can

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play as good as me. I go into clubs, I hear guitar players on the bandstand making \$25 a night that can play as good as me. But, it doesn't mean that when they get in a studio that they know what's appropriate to play. That's the difference. It's like pacing. Like you may be a fast runner, but, can you run for ten miles?

Take Michael Brecker, for instance, he gets criticized all the time especially by the jazz world 'cause he's one of those guys that . . . as far as I'm concerned, he's *the* tenor player today. He's *the* guy. He's the genius that's around now. He's the guy that people are gonna be transcribing solos from twenty years from now. Yet, all the jazz people say, "Oh, Michael sold out; he plays on rock and roll dates." This, that and the other thing. Michael loves to play *all* the different stuff. He could sit in with a jazz band and do what any of them do without all that jazz die-hardness about it. That [the above tirade] was just in defense of studio players; I'm so tired of hearing this stuff about studio players. You've got to sit next to these guys for ten years and find out what musicians they are.

MR: Getting back to the album, why were the horns cut at A&R [N.Y.C.]?

DS: The horns were cut there because "Prelude to the Ballerina" required forty-five men, and we couldn't fit them into the studio at the House of Music [West Orange, N.J.]. So since we were going to be in with the tapes anyway we figured we might as well do the horn overdubs in New York too. So we did "Ballerina" and "Airborne" there.

MR: Larry Fast, who did all the synthesizer programming for your album, is considered by many to be the best. Had you worked with Fast before?

DS: No, that was the first time I had met him. I had met him at House of Music and told him I wanted to do some synthesizer stuff. They (House of Music) said he was the best programmer and he really was good.

MR: Most of the players on the album were people you had worked with, I guess with the exception of the horn players . . .

DS: You mean for "Airborne?"

MR: For the orchestration for "Ballerina."

DS: I had known all those guys too. Those were all studio guys I'd played with before. I mean it. I knew all the string players, all the woodwind players, and the French horn players from different dates I've done. I've

seen them all for the last ten years.

MR: Oh, they weren't just called in by the musician's union? Like, we need ten violins and five violas, etc.?

DS: Oh, no. Y'see that's another good thing about having played in the studio—I really do know the string section, the horn section. And in each, I know who the best players are.

MR: So they were all hand picked?

DS: Absolutely. Out of 45 guys, those were the exact 45 guys I wanted.

MR: More about "The Ballerina." It is, I take it, part of a work you have composed and orchestrated for ballet.

DS: It actually never got to be a ballet. Right now we're looking for a ballet company that would be interested in doing it. I wrote it because this girl Lilly Samuels—who I'm now seeing [socially]—dances for the New York City Ballet. I was inspired watching her, having seen her for a year or so watching her get up in the morning and do what she does . . . I thought it was amazing. The discipline was uncanny. I couldn't understand it. So, it inspired the song. Also I have always liked orchestration, but never had the chance to orchestrate something without a rhythm section. It's really kind of self indulgent on my part, but if I didn't do it on my album, where else would I have a release for it? I'm hoping that a company picks it up.

MR: For a person who writes, orchestrates, conducts and produces, it would sound as though movie soundtracks would be a very natural next step. Do you have any aspirations to do a score for a movie?

DS: Yes. I was approached a couple of years ago. I was up for *Cotton Comes to Harlem* but Galt MacDermot got it because he had an amazing name; he did *Hair*. And I was approached to do another thing which I just didn't like—*The Legend of Nigger Charlie* or something like that, and I just didn't want to do it.

I still need a little more training working with the film counts and stuff like that; I don't really have all that straightened out—the technical end.

MR: If you *had* to choose, if David Spinozza could only do one thing, be it write, produce, perform, play sessions, whatever, what would you do?

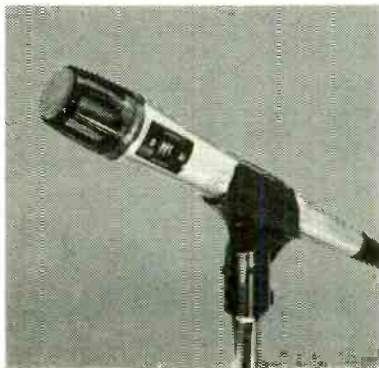
DS: I'd play my guitar.

At this point, Janis Cercone re-entered the room to remind David that he had an appointment to keep that afternoon. You guessed it, another session.





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Ambient Sound

BY LEN FELDMAN

Far Out Audio Ideas

I am often asked by some of my friends who fancy that I know something about audio and hi-fi whether we haven't, in fact, reached the "ultimate" goal in sound reproduction. After all, they argue, we've now discovered Transient Intermodulation Distortion and even know how to measure it and get rid of it. We have mastered the design of direct-coupled DC amplifiers that "go down" to zero Hz and up to broadcast frequencies. Our loudspeakers are being designed by computers these days and must therefore sound perfect. Digital tape recording is already headed for the larger studio mastering situations and it won't be long before some form of digital tape deck becomes available for small studio and home use. Even in the realm of analog tape recording, metal particle tape looms and along with it come new noise reduction techniques and companders that will give us the much needed dynamic range we have all been looking for. So what's left to invent?

All of which reminds me of a bit of history I once read about years ago. It seems that in the 1840s or thereabouts, a couple of serious congressmen put forth a bill which would close the U.S. Patent Office. After all, they argued, everything had just about been invented, so why waste money in the form of salaries and administrative expense for a patent office that would shortly have nothing to patent? Happily, wiser minds prevailed and from the few thousand granted patents that had been issued at that time, the number of patents issued by the U.S. Patent Office now numbers well above 4,000,000.

So, if you think that everything we need to know about audio reproduction is already known, let me tell you about a recent visitor to my lab. The visitor was Bob Carver who, along with his wife Diana, has just formed a new company. It was Carver who in 1970 or 1971 started a company called Phase Linear. He now has sold his interest in Phase Linear and has gone on to design some new products.

A Magnetic Field Amplifier

It has been rumored for some time that this young maverick of the audio industry was about to announce a new significant breakthrough in audio

amplifier design and, during his visit to my lab, Bob confirmed that this was true. The new amplifier is called a "magnetic field" amplifier and, try as I would, Bob was not about to draw me a schematic of the device. Seems that he was about two days away from filing his final patent application for the new device and wasn't about to disclose his idea prematurely. Despite my boundless curiosity, I couldn't blame Carver for keeping mum about the principle of operation of his new amplifier. This much he did tell me: the proposed amplifier weighs about 12 pounds and its power output rating will be (are you ready for this?) 200 watts per channel! And he claims that he can bring the amplifier to market at a suggested retail price of around \$300 and still make a profit.

According to Carver, the idea for the magnetic field amplifier came to him one day as he was looking inside the guts of several Phase Linear power amplifiers traveling down the production line. He was appalled at the massive power transformer in each amplifier which served no other purpose than to step down line voltages and supply energy to be stored (and later used) in those big electrolytic capacitors. Bob felt that there ought to be a better and more efficient way of doing the job—one that didn't require a large power transformer, or, for that matter, huge heat-sinks which do nothing but dissipate the useless heat generated by the output transistors. As he and we all know, even a Class B audio amplifier is relatively inefficient, achieving its so-called higher efficiency only when delivering maximum power out to the speaker loads. Even then, the efficiency is of the order of 60% or a bit better, while most of the time (music duty cycles being what they are) efficiency is actually a lot lower. And that low efficiency means that much of the energy stored by those electrolytic capacitors (and supplied to them by that massive power transformer goes up in the form of heat instead of audio sound power. According to Mr. Carver, his new magnetic field amplifier will have an efficiency of around 94%! And with that kind of efficiency will come cool operation that requires no heat sinks of the type commonly encountered with today's solid-state amplifiers. He reports that after feeding music signals into the new breed of amplifier for an hour or so at levels which pushed the amp into 10 dB worth of clipping

repeatedly, the amplifier was still cool to the touch, just a bit above room temperature!

The only hint that Bob would offer regarding the operating principle of the amplifier was to remind us that if capacitors can store energy, well then, so can inductors. . . . With that little teasing bit of information, I ran back to some text books which I seldom consult (the kind edited by a professor who gets other professors to contribute scholarly and highly mathematical quick summaries of everything you ever wanted to know about electronics) and looked up "Magnetic Amplifiers." I found that previous applications of magnetic amplifiers have been confined largely to line-frequency applications and control—and not to audio amplification. How Bob Carver makes magnetic amplifiers work over the entire audio frequency range is something I'll be glad to tell you about . . . just as soon as Carver tells me.

Nor is Carver's as yet un-named company slated to be a one-product company. During his visit to my lab he disclosed the fact that he was also working on a "holographic sound reproducing system." His notion in this case is that just as it is possible to create apparent visual images in space using holography (and laser beams), it should be possible to "beam" sonic energy in such a way that sounds can appear to come from any point in the listening space. Again, Carver was not about to disclose the entire scheme but did go so far as to tell me that, in addition to the two

primary speakers now used for stereo reproduction, some five or six very tiny transducers (smaller than a fist), capable of reproducing frequencies over a limited bandwidth from 200 Hz on upwards would be required. To add to the mystery, Bob insists that when his system is operative, you will not be able to actually *hear* anything coming from these individual transducers themselves unless you get up real close to them. All you will hear is music coming from various points in the listening room where they are intended to come from. He admits that program sources will have to be specially encoded (he didn't say how) to create this total effect, but he already has a scheme which he calls "synthesized holographic sound" which would enable the listener to achieve an effect very close to the pure holographic sound imaging even with existing stereo program sources.

Recognizing that not everyone is "ready" for some of his far-out audio products, Carver plans to produce more conventional power amplifiers and preamplifiers in his new company—at least at the outset. But if his magnetic field amplifier becomes a reality in the next year or so I suspect that its introduction will have some of the larger well entrenched amplifier companies running back to their engineering labs and making that much-repeated pronouncement to their engineering teams: "Why didn't you guys think of this first?"



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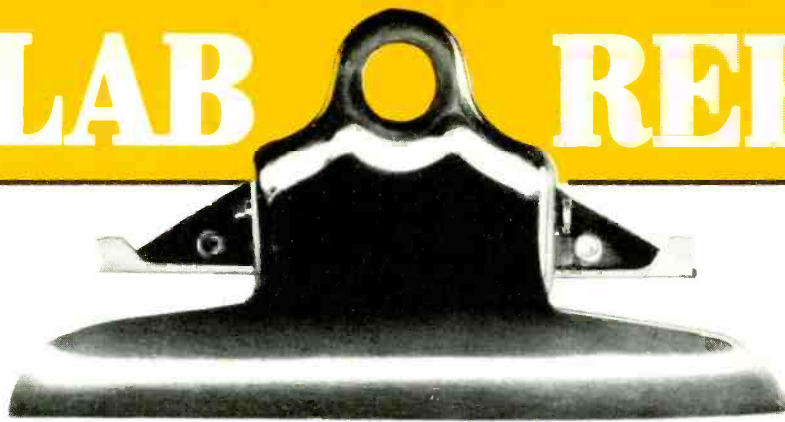


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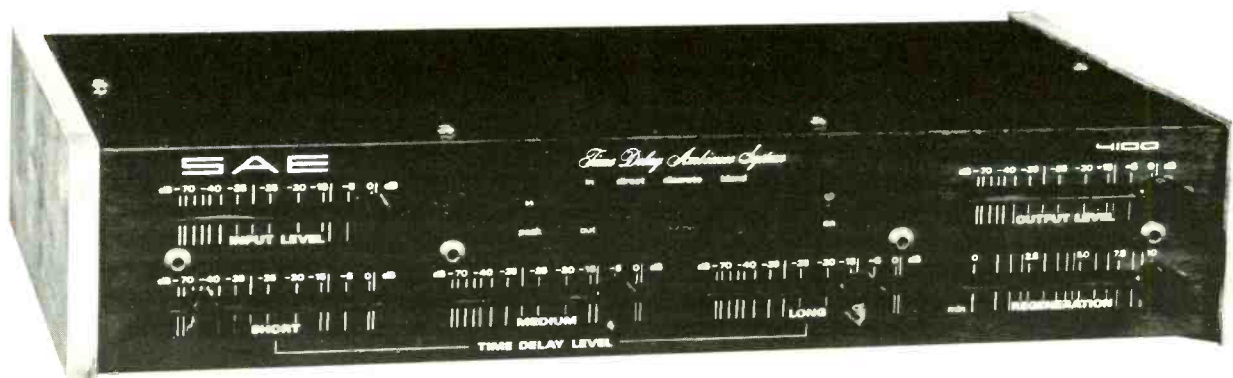
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NORMAN EISENBERG AND LEN FELDMAN

SAE Model 4100 Time Delay Ambience System



General Description: The SAE 4100 is a time delay device designed to add ambience to amplified sound. It is connected into a playback system between the preamp and power amp. One pair of outputs feeds the original power amp, while another pair feeds a second power amplifier that is driving its own (rear positioned) loudspeakers. Controls on the 4100 permit sending various combinations of signal to the front and rear pairs of speakers.

These controls are a group of three pushbuttons top-center of the front panel, labeled "direct," "discrete" and "blend." With the "direct" button engaged, the normal stereo ("front") signal from the system preamp is sent to both the front and rear outputs of the 4100 with no time-delay effect. Pushing in the "discrete" button channels the front input to the front output and any rear input (if one is connected, as in a four-channel quadrasonic system) to the rear output. Again, no time-delay will be introduced.

If the "blend" button is used, a portion of the delayed signal will be sent to the front channels.

The actual "normal" position of all three buttons is "out" so that all three are defeated. This activates the 4100's time delay system so that the front channels

are sent directly through the unit with no ambient effect, while the rear channels are modified by the circuitry of the device, in accordance with the use of its other controls.

There are six such controls. Five are sliders calibrated from 0 to -70 dB for the functions of input level, output level, short, medium and long time delay level. The sixth is a slider called "regeneration" and marked from 0 to 10. The input control is adjusted in conjunction with a peak LED indicator to its right. The output slider is used to balance the front and rear speakers. The three time delay level controls are designed to select various degrees of time delay to simulate different room sizes. "Short" covers a time delay of up to 10 milliseconds; "medium," up to 30 milliseconds; "long," up to about 50 milliseconds. These delays can be selected individually or in various combinations; the general idea being that the higher the delay, the "larger" the room becomes.

The "regeneration" control selects the percentage of the delayed signal that is re-fed into the delay circuits. By controlling the system's delay factor it sets the reverberation in the simulated room environment selected by the other controls.

Standard hi-fi jacks at the rear handle all in and out signals. The model 4100 is supplied in a metal case with walnut wood side panels.

Test Results: Lab measurements indicated the model 4100 had lower distortion than claimed, and a better S/N ratio on the rear channel than claimed. Front S/N ratio was a little shy of specs. Measured frequency response of the rear channels came very close—the low end was better than claimed, the high end was 1 kHz short of spec.

To show graphically something of what happens to a signal processed through the model 4100, a tone burst was used as an input signal. The 'scope photo of Fig. 1 illustrates the use of the "short" delay (the top trace is the input signal; the lower trace is the signal at the rear channel output). Fig. 2 shows similar results for longer delay and a great amount of regeneration or reverberation. These photos give an indication of the responsiveness of the controls and the correct circuit behavior of the device.

The high-frequency rolloff of the rear outputs of the 4100 should be understood as a normal phenomenon for the intended use of this device, since it has been ascertained that reflected or reverberant sound in a large hall contains little frequency content above the midrange. The acoustic explanation for this is simply that highs are more easily and completely absorbed by walls and other hall surfaces and do not, therefore, figure prominently (if at all) in reverb effects.

In using the model 4100, it was found that the ideal setup is one in which the listener does not actually hear sound coming from the rear-positioned speakers, but senses an apparent enlargement of the listening space.

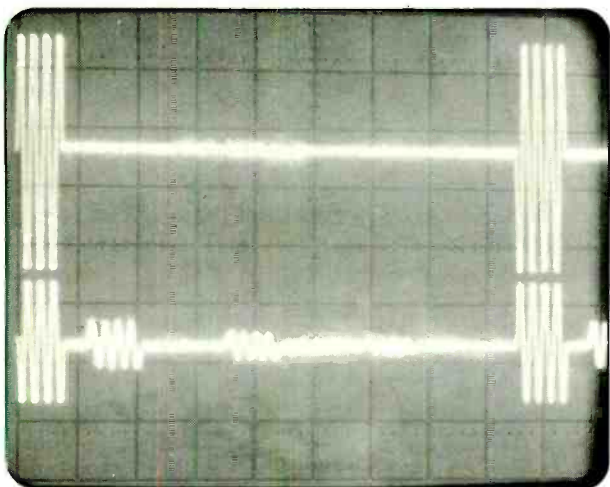


Fig. 1: SAE 4100: Output for rear channels (lower trace) when short delay and a moderate amount of regeneration is used.

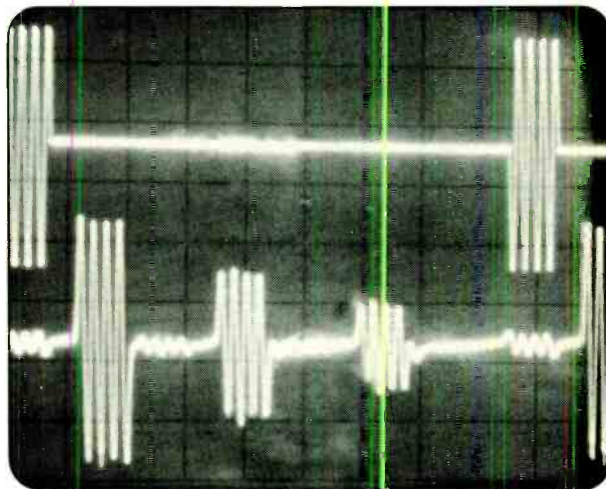


Fig. 2: SAE 4100: Time delayed output (lower trace) with long delay and maximum reverberation.

General Info: Dimensions are 15 inches wide; 2 $\frac{3}{4}$ inches high; 8 inches deep. Weight is 15 pounds. Price of the model 4100 is \$500.

Individual Comment by L.F.: If the quadraphonic debacle of the early 1970s did nothing else it succeeded in firing the imagination of several manufacturers and prompted them to come up with add-on devices designed to achieve the original goal of 4-channel sound—the recreation of the ambience of a concert hall listening experience. The SAE model 4100 is another such device and I must say that time delay units have come a long way since I measured the first-generation consumer version of the Audio Pulse digital time-delay unit a couple of years ago.

The essence of the SAE model 4100 is its range of control. Everything from a subtle moderate enlargement of the "listening environment" to the creation of a cavernous listening chamber is possible with this device. Yet, there is no sense of false or twangy echo common to earlier, mechanical reverb units. The 'scope photos we took in our test are impressive, but they cannot begin to convey the actual perceived sensation when using the model 4100 in a home music system or in a small control room of a studio.

It should be noted that it is possible to add reverberation and time delay to the primary (front) speaker channels as well as to two separate and discrete rear-channel speakers, but the effect is not nearly as impressive.

A bit of level adjusting and experimentation is necessary to achieve the "ideal" sensation (not hearing the rear speakers but only sensing their effect). Once set up, however, the model 4100 offers a great deal of

the "live" listening quality that was supposed to be one of the attributes of quadraphony. And the nice thing about it is that it works with any stereo program source and does not require specially encoded material.

Individual Comment by N.E.: The question about a device such as this has to do with what I have always considered one of the big stumbling blocks in the way of four-channel sound as a consumer item—and that is the need for a second stereo amplifier and two more loudspeakers. It could be argued that if one is going to add this equipment, one may as well go the full quadraphonic route. On the other hand, many

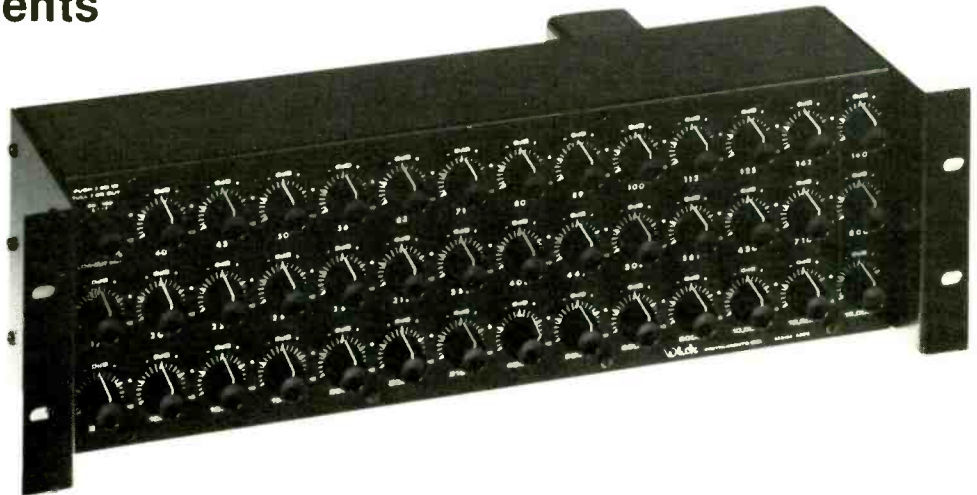
enthusiasts already have invested in that extra equipment and are finding that it is almost impossible to buy new four-channel material to play on it. The ambient enhancement idea then could be applied to regular stereo (or mono) music—but so, come to think of it, can matrix enhancement in a quad system. Frankly, I just don't know how much sense this type of product makes for a significant number of sound equipment owners. It does add "something" and it can be fun and games for a while, but—I just don't know. Beyond the home consumer listener, of course, the unit may have appeal to personnel seeking to "sweeten" a small performing space or studio.

SAE MODEL 4100 TIME DELAY AMBIENCE SYSTEM: Vital Statistics

PERFORMANCE CHARACTERISTIC	MANUFACTURER'S SPEC	LAB MEASUREMENT
Total Harmonic Distortion	0.5%	0.3%
IM Distortion	0.5%	0.2%
Signal-to-noise ratio, front	95 dB	90 dB
rear	60 dB	77 dB
Frequency response, rear	± 1 dB, 50 Hz to 5 kHz	± 1 dB, 36 Hz to 4 kHz

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White Instruments Series 4300 Equalizer



General Description: The Series 4300 from White Instruments is a professional active equalizer offering one-sixth octave bands on 28 center frequencies from 40 Hz through 894 Hz, and 13 additional one-third octave bands from 1 kHz through 16 kHz on I.S.O. center frequencies. In addition, the device may be converted to an electronic crossover for bi-amping and tri-amping by the insertion of special plug-in crossover networks. Both 12 dB/octave and 18 dB/octave passive LC networks are available. Standard frequencies are 500 Hz, 800 Hz and 1200 Hz; others are available on request.

EQ controls are knobs arranged in three rows on the front panel. There are 41 knobs for EQ, plus one knob (the first on the left in the top row) that handles a low-cut or high-pass filter). This knob also doubles as an EQ in/out switch (when pulled out it bypasses all EQ

functions). The bi-amp or tri-amp functions are not affected by this switch. Three screwdriver adjustable level trimmers are accessible through convenient holes on the front panel.

All EQ knobs are calibrated from -10 to +10 dB. The low cut knob runs from 160 Hz through 20 Hz. The 42 knobs are mounted on the panel whose left and right ends project forward and form flanges that permit the device to be rack-mounted, and with an optional cover in place so that once adjustments have been made they will not be casually changed. A hole in this cover, just over the power/on LED, permits checking that the device is operating.

Inputs and outputs at the rear are arranged as screws on barrier strips. In addition there is an octal socket for plugging in the crossover accessory which, when introduced to the unit, sits directly on it as part

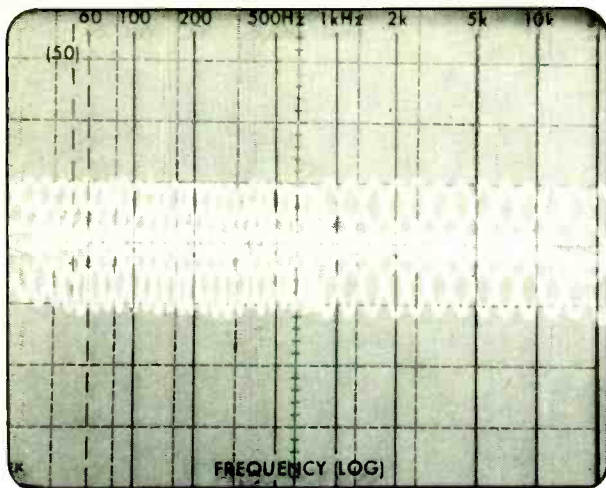


Fig. 1: White 4301: Total control-by-control equalization range. Note 1/6 octave controls up to 894 Hz.

of the device. The unit's AC line cord (fitted with a three-prong grounding plug) is here as well as an adjustment to permit using the device on either 115 or 230 volts AC.

Suggested applications of the White Series 4300 include equalization (program shaping for recording or broadcast, playback and monitoring EQ, and EQ adjusting of sound-reinforcement systems), plus the bi-amp and tri-amp options. The model 4301 (which we tested) has a transformer-isolated input, with single-ended outputs. The model 4303 has transformer-isolated outputs for fully balanced operation.

Test Results: The White Series 4300 was supplied with a fairly long list of performance specs, all of which were confirmed or exceeded in *MR's* bench tests of the device. In use the unit introduced no apparent increase in noise or distortion, and with its controls set for flat response, and gains properly adjusted, we could detect no difference in sound coloration when the equalizer was bypassed or inserted in the signal path. The 4300 also was set up to go through its paces as both an EQ device and as an adjunct to bi-amping or tri-amping, all of which it accomplished most competently.

Some idea of the precision and accuracy of the unit's filter bands may be had by examining the composite response 'scope photo of Fig. 1. Note that the narrow up and down responses at the left of the photo show the 1/6-octave bands, while the broader responses at the right show the 1/3-octave bands.

In addition we set up an arbitrary, complex response curve on the device, which is shown graphically in the 'scope photo of Fig. 2. It is unlikely, in *MR's* view, that this kind of response could be achieved with an octave-by-octave equalizer, or even with a 1/3-octave unit.

Almost as important as the precision equalization possible with the White instrument is its low-level electronic crossover plug-in capability, which actually makes of it two instruments in one. When used for bi-amping or tri-amping, the device still provides—within each of the two or three bands—total equalization

capability. Without the plug-in accessory, all three available outputs yield the same signal content, and each is buffered so that it is possible to feed that many power amplifiers without any adverse loading effects.

Fig. 3 shows another kind of response possible with the device, while Fig. 4 shows the action of one plug-in module (model 4315) which produces frequency cross-overs at 800 Hz and 6 kHz, and with 12 dB/octave slopes. In our tests, we set the output level controls for the mid-and-high outputs all at unity gain. However, if you were tri-amping a system with amplifiers whose gains varied from one another, it would be possible to balance signal levels perfectly by means of attenuators provided on the 4300 for two of the three outputs.

Examination of the model 4301 indicated that it is very well built, and surprisingly compact for all the circuitry it contains.

General Info: Dimensions are 19 inches wide (standard rack-mount); 5¼ inches high; 9½ inches deep. Weight is 15½ pounds. Price is \$1190. Optional plug-in crossover, \$166 extra.

Individual Comment by L.F.: Talk about the ultimate in equalization control and you've got to be talking about this White Instruments device. My only real problem with it was the fact that I couldn't resolve equalization results to better than 1/3-octave, and so I could not really *confirm* absolutely flat system-plus-room response down to 1/6-octave precision. But seriously, I suspect that the reason White Instruments went to the trouble of providing 1/6-octave bands up through the midrange frequency of 894 Hz was not so much to enable the user to exercise that fine degree of control, but rather to enable us to tame those narrow, but wild, feedback problems often encountered in sound-reinforcement systems. In such applications, the more accurately you can tune out the offending feedback frequency, the easier it is to raise the overall gain without sacrificing tonal fidelity.

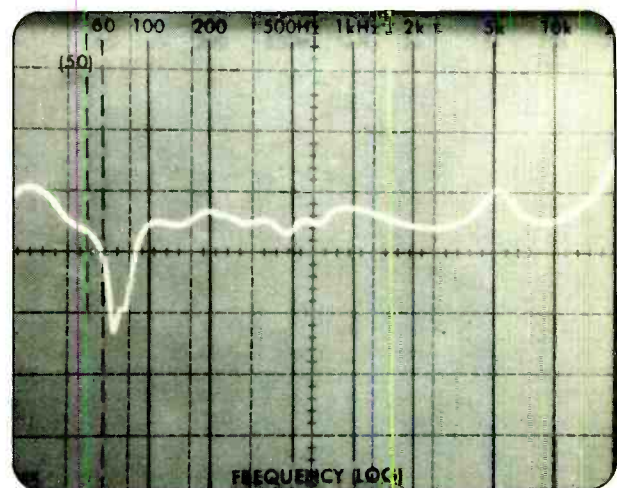


Fig. 2: White 4301: One of an almost infinite variety of response curves obtainable with the unit.

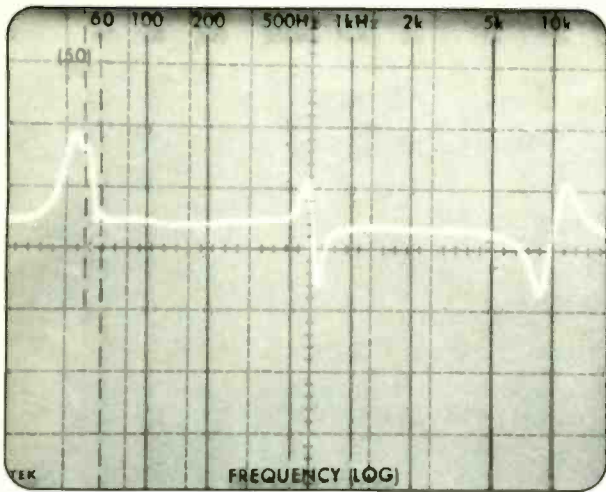


Fig. 3: White 4301: Response obtained by boosting two adjacent 1/6 octave controls (left), or boosting and cutting two adjacent bands (center and right).

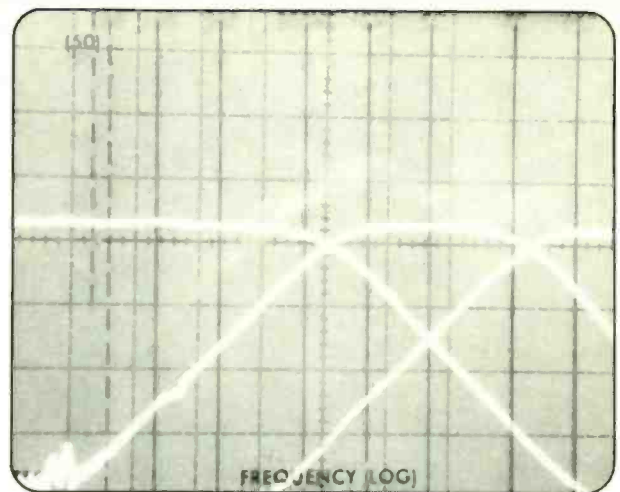


Fig. 4: White 4301: Using the plug-in 4315 crossover yields response curves as shown from the three available outputs.

It can be argued that rotary controls on an EQ device are not as easy to manipulate as sliders—but in order for the manufacturer to have used in-line sliders, the device would have had to be about a yard wide what with its 41 separate frequency centers.

I would have been a bit happier to find XLR input and output connectors or 3-circuit phone jacks instead of the barrier strips terminal, but that's a small matter considering the fact that the unit needs to be installed only once by the user.

Obviously, not every sound system or studio requires as fine a degree of equalization as can be provided by the series 4300, but for those that do, I know of no other equalizer with its degree of precision.

Individual Comment by N.E.: It should be emphasized that the Series 4300 from White Instruments is no hi-fi gadgeteer's sometime plaything. It is strictly and seriously professional, and my guess is

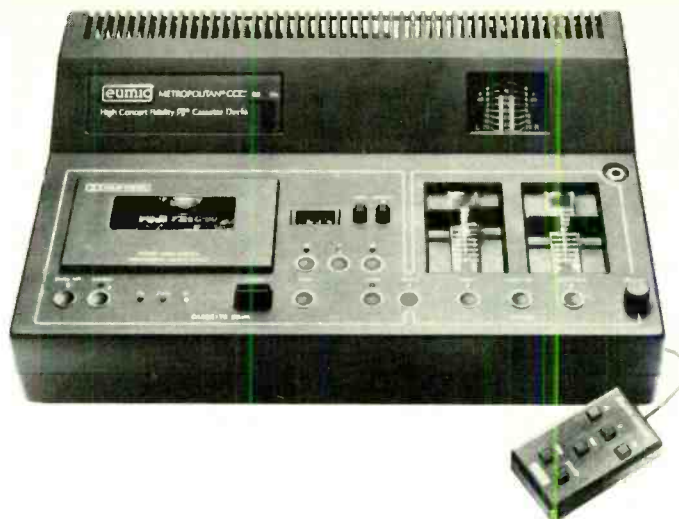
that its controls arrangement (42 front-panel pots, 3 additional screwdriver level trimmers, and its rear-panel options) are not going to win any awards for cosmetic beauty, but, by the same token, will appeal to the pro user for their business-like no-nonsense "feeling." Plug-in connectors for signals in and out would be more convenient, but the need to strip and tin shielded cable for wraparound over barrier-strip screws reinforces this product's image and further underscores the notion that once set up in a system—using care, and most likely with the help of additional equipment such as a sound analyzer (White's own Series 140, for instance), and the recommended laboratory-grade nondirectional microphone—the device will not be tampered with or its settings changed unless some major alteration in the system or the room occurs. The front panel cover, of course, also conveys this idea since, once in place, it hides all the controls.

WHITE INSTRUMENTS SERIES 4300 (Model 4301) ACTIVE EQUALIZER: Vital Statistics

PERFORMANCE CHARACTERISTIC	MANUFACTURER'S SPEC	LAB MEASUREMENT
Frequency range	20 Hz to 20 kHz (– 2 dB)	20 Hz to 20 kHz (– 1.5 dB)
Control centers	28 1/6-octave bands from 40 Hz through 894 Hz; 13 1/3-octave bands from 1 kHz through 16 kHz	confirmed
Control range	± 10 dB, calibrated	confirmed
High-pass filter	12 dB/octave, variable from 20 Hz to 160 Hz	confirmed
Recommended operating level	0.775V	—
Input circuit	transformer-isolated, 20 K ohms	confirmed
Input attenuator	unity gain to – 20 dB	confirmed
Output circuit	3 buffered single-ended outputs	confirmed
Output attenuators	mid and high: unity to – 20 dB	confirmed
Maximum output level	+ 18 dBv	+ 19 dBv
S/N ratio	90 dB	90 dB
THD	<0.2%	0.0045% at 1 kHz
Power consumption	5 watts	confirmed

CIRCLE 25 ON READER SERVICE CARD

Eumig Metropolitan CCD Cassette Recorder



General Description: Eumig, a major manufacturer in Austria of high-technology photographic equipment, has entered the U.S. audio market with the "Metropolitan CCD" cassette recorder. A three-head deck, the CCD is styled as a top-loader, for horizontal installation. The back portion of the top panel is raised at an angle to permit easy viewing of the signal level indicators at the right. Instead of conventional meters, the level readout is done by two parallel columns of LEDs (one column for each channel). In different colors, the LEDs cover a range from -20 dB to $+6$ dB. Instant peak recording levels are displayed. The power off-on switch is found toward the left of this raised section of the top panel.

The Eumig deck can accommodate ferric (normal or standard LN), ferrichrome and chromium-dioxide tapes. Bias and EQ switching for chrome tape is automatic. To adjust for ferric or ferrichrome, there is a switch inside the cassette compartment. One of three LEDs indicates which tape is being used. This group of LEDs is below the cassette compartment. To their left are the buttons for Dolby and for monitoring. These, like most of the controls on the Eumig, are light-touch button switches. The cassette eject switch, a larger control, is at the right of the tape-selection LEDs; this opens the cassette door and ejects the cassette.

Centered on the top panel are the tape index counter and reset button, plus a memory rewind button. Below them are the transport controls, solenoid-operated and with full logic to permit fast-buttoning. Functions include rewind, forward or play, fast forward, stop, pause and record. All of these, except the stop button, have their own LEDs.

Input selectors and channel level adjustments, which also serve as recording mixers, are at the right. Centered between the two input selector buttons is a third that permits automatic or manual level control. When activated (the manufacturer suggests its use for non-music recordings), this control will cause the yellow LED on the signal readout to light up during loud passages, while the red LED (showing $+3$ dB) will flicker on the loudest sounds. A stereo headphone jack,

and its own level control, are to the right of the signal adjustment area.

In addition to these controls are several more, not immediately evident. On the front apron of the deck (referred to in the owner's manual as the "front panel") are the Dolby calibration adjustments, a button to activate a built-in test-tone generator, the microphone input jacks and a mic attenuator switch. The generator signal is used for Dolby calibration and for record-head azimuth adjustment. The latter adjustment is found inside the cassette compartment, and is accessible only with the lid open, and when a cassette is in place and switched to the record mode.

On the underside of the deck are additional switches. One adjusts the machine for use with DIN (European) signal cables and their associated signal levels, or for use with standard (U.S. and Japanese) phono connectors and their associated signal levels. The other switch engages a 19-kHz multiplex filter on the "input 1" line for use, if needed, when making off-the-air FM recordings from a station broadcasting in stereo.

The rear of the deck contains the standard and DIN signal line input and output connectors, a socket for use with a remote-control device and a voltage selector to suit the machine for use on line AC voltages of 130, 200, 115, 240, 100 and 220.

The remote-control device is supplied with the deck and provides full duplication of the transport functions found on the deck itself.

The transport uses a low-mass, servo-controlled motor for capstan drive. Instead of a flywheel, mounted on the capstan shaft is a disc engraved with 2500 precisely spaced radii. As the shaft and capstan rotate, the disc produces approximately 15,000 pulses per second which are detected by an optical sensor consisting of an LED and photo transistor. The generated pulse rate is compared with a fixed reference, and an error voltage is produced which is then instantly applied via the capstan motor to correct for speed changes that would otherwise produce wow and flutter over the specified 0.05% (WRMS) rating. The capstan and the engraved disc revolve in self-lubricating prism

Tascam Series Model 15 Mixing Console

By Brian Roth and Jim Ford

General Description: The Tascam Model 15 is one of the most complex mixing consoles that we have reviewed to date. Thus, we will begin the description immediately by covering the major features, starting with the input module:

- A) Straight line fader with $3\frac{1}{16}$ " travel.
- B) 20 dB microphone attenuation switch.
- C) Switch for input selection of mic, line or auxiliary line.
- D) Input level trim control (affects both mic and line sources).
- E) 4 knob, 6 frequency equalizer section (described in detail later).
- F) Two echo/cue send pots, each selectable pre- or post-fader.
- G) Output channel assignment switches for routing to the 8 main busses.
- H) Pan pot that works in conjunction with the channel assign switches.
- I) Input channel mute pushbutton with LED indicator.
- J) Input channel solo pushbutton.
- K) Overload indicator LED.

The rear panel of each input strip contains a standard 3-pin "cannon" jack for microphone inputs as well as connectors for the line input, accessory send and receive (for patching outboard processing gear into the normal signal path), and a direct output. All of the latter jacks, as well as the various line level jacks on other modules, are of the RCA phone variety.

The equalizer is divided into four bands. The low frequency range has a fixed frequency of 75 Hz and the high band is fixed at 10 kHz. The two midbands each have a switch that selects between a choice of two frequencies per band—200 Hz or 800 Hz for the lower midrange, 3 kHz or 5 kHz for the upper midrange. Each of these frequency select switches also has an "off" position to eliminate the effect of the equalizer in that band. The "off" position for the lower midrange band also disables the bass control, with a similar relationship existing between the upper midrange switch and the treble control. Thus, setting both frequency select switches to "off" will cancel any equalization, regardless of the settings of the four pots.

The output assignment switches consist of four pushbuttons; these can be transferred to operate either on busses 1-4 or 5-8 as determined by the position of a fifth pushbutton. Two LEDs on each module indicate which group of busses is being fed by the assignment switches.



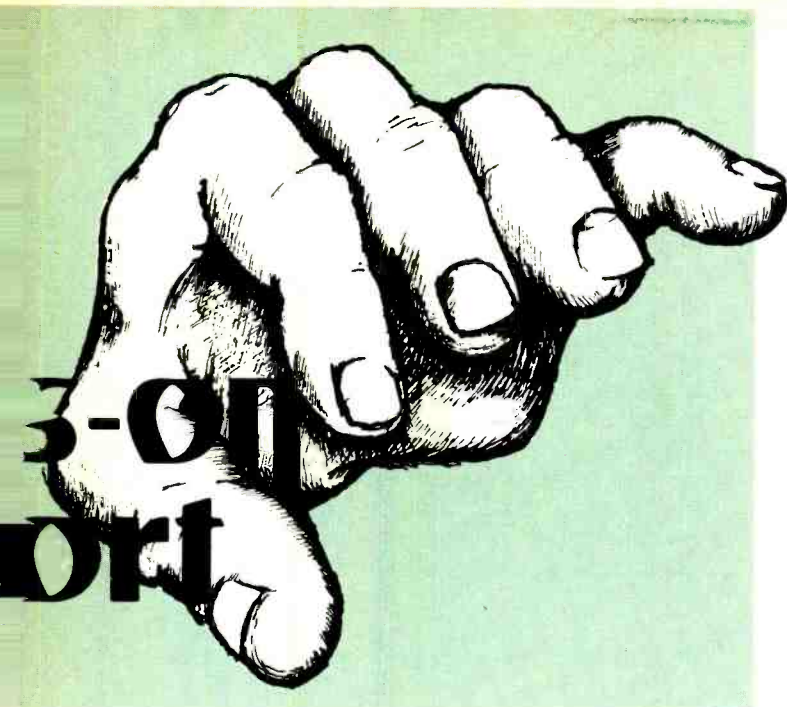
If two buss assign switches are depressed, the pan pot will engage and allow the signal to be panned between the two busses selected. Pressing three or all four assign switches will allow panning between whatever is selected from the lower numbered pair of busses and the higher pair of busses. Thus, if assignment switches 1, 2 and 3 are depressed, panning left will feed busses 1 and 2 while panning right will feed buss 3. The echo/cue send controls, called Aux 1 and Aux 2 on the console, are both arranged such that clockwise rotation from a detented "off" position in the center of the pots' travel will feed a variable amount of post-fader signal to the auxiliary buss. Counterclockwise rotation from the detent allows a pre-fader signal to be sent to the aux buss. Both pre and post signals are picked up after the equalizer.

With the main functions on the input modules covered, we'll move on down to the submasters. On each of the eight submaster modules is found the normal straight-line fader in addition to a buss trim pot. This trim control allows up to a 20 dB reduction in buss output level and thus helps prevent overloading the buss summing amplifier.

Each submaster also features an echo return section with a level pot and pushbutton assignment switches that allow the echo return signals to be routed to the program buss, the monitor mix system (described next) or to one of the auxiliary mix busses (to allow adding reverb to the cue mix).

On each of the eight submasters are located two smaller faders that generate an independent stereo mixdown for monitoring. These sixteen faders can be used as a dual 8-in/2-out mixdown section or as a single 16-in/2-out mixer for 16-track work. Either the console program busses or tape playback can be selected as a signal source for each of the sixteen monitor faders. Separate pan pots for each fader are also provided.

Auxiliary send pots on the sixteen monitor channels feed two additional mix busses, "Aux 3" for the first



eight monitor channels, and "Aux 4" for the other eight. These pots are the center detent type as found on the input modules, except clockwise rotation injects the tape playback into the auxiliary buss and counterclockwise rotation picks up the console line output. Consequently, the "Aux 3" and "Aux 4" mixes can consist of both tape return and console output signals.

Two auxiliary master modules allow the user to mix the four auxiliary busses into two final outputs, "Aux A" and "Aux B." It is thus possible to balance these final auxiliary outputs between a mix from the input modules and from the monitor section.

Many other functions are included such as volume controls and source selection switches for control room and studio feeds, comprehensive talkback functions and a built-in oscillator. As we mentioned at the beginning, the Model 15 is one of the most complex mixing consoles we have reviewed, so we suggest that the prospective purchaser examine a block diagram of the Model 15 as well as the control layout to fully appreciate the extensive capabilities of the console.

Field Test: We interfaced the Model 15 with an 8-track recorder as well as a control room amp/loudspeaker system. We proceeded to record the rhythm tracks for four tunes, and then later overdubbed some extra instrumental parts and vocals.

We found the sound quality of the console to be quite good. Noise seemed minimal at all trim settings except toward the highest end of its range where some hiss was apparent over the normal room ambience picked up by the microphones. We also noticed that the trim control was rather touchy at higher gain settings, requiring careful adjustment to establish the desired gain. At lower settings, noise and "setability" were quite adequate.

During the course of the recording sessions, we had occasion to use the equalizers and found that their effect was acceptable. We did find that we preferred

the sound of the high- and low-frequency equalizers over the two mid bands.

The control layout was very good, although the fact that the numbering of the inputs starts from the submasters and goes toward the left required some adaptation on our part. Once familiar with this configuration, we appreciated it since it groups the inputs next to the submasters, even with only sixteen input modules out of the possible maximum of twenty-four (the eight blank panels wind up at the extreme left rather than between the input modules and submasters as in most typical configurations).

We observed that there were some limitations on buss panning since one cannot pan between any of the first and last four output channels for example busses 4 and 5. By planning ahead we circumvented this situation.

The monitor mixdown section worked out very well due to its flexibility. We were pleased to note that the tape return signals that are sent to the monitor section are also routed to the third position of the source selection switch on the input modules. Thus, it is possible to have the tape playback fed to the inputs for mixdown without having to repatch the recorder's output lines; one merely flips the switches on the input modules to establish mixdown status.

The auxiliary send pots worked adequately, although we weren't completely satisfied with the "center-off" type of control since it meant that only half of the pot's rotation could be used for either pre- or post-fader sends, thus requiring more care in adjusting levels. Also, the pre-fader send mode required that the pot be rotated counterclockwise to increase the level which is backwards from the usual convention. However, this type of control does eliminate the need for a separate pre/post switch which would increase the cost of the console.

The control room and studio sections provided plenty of monitoring flexibility since three outboard stereo sources (such as tape decks) and the "Aux A" and "Aux B" line outputs could be selected to feed the control room or studio amps in addition to the normal feed from the monitor mixdown section.

The solo function (which incidentally did not ever cause any disturbances to be printed to tape) featured an LED to indicate that a solo pushbutton had been depressed. This small, but extremely helpful, feature was most welcome.

We noticed that the mute switch did not affect the post-fader auxiliary sends or the module direct output. This created a problem upon mixdown since only the "dry" portion of the signal was muted while still allowing a signal to be sent to the reverb unit's input. We could use the mic/line selector switch as a mute by flipping it to the unused "mic" position. An examination of the circuit revealed that the mute switch probably could be rewired by a competent technician to eliminate the problems, although the stock arrangement could be useful for "live" P.A. situations when the auxiliary sends are being used for monitor feeds.

A switch on the Model 15 allowed the sensitivity of

the input overload LEDs to be varied. In the "normal" position, the LEDs were calibrated to indicate impending preamplifier overload while the "mix" position caused the LEDs to perform as "signal present" indicators. This was a very useful arrangement.

The power supply (which is a separate unit to minimize hum radiation) did not include provisions for "phantom" powering of condenser microphones although a connector was included to allow an external supply to be interfaced. The user must also install the appropriate precision resistors into the input modules. Tascam decided on this course since there are several different configurations for powering condenser mics (however, it seems that the 48-volt system with 6800-ohm resistors is now *almost* universal).

All in all, we were impressed by the multitude of useful features found on the Model 15. The patching facilities at the rear of the console should prove to be comprehensive enough, even for the "patch-happy" recordist. The sonic qualities of the mixer were also quite good.

Lab Test: The various tables outline the electrical performance data of the Model 15. Overall performance equaled or exceeded the manufacturer's specifications.

Frequency response was very good, although we observed a small peak in response at around 15 kHz through the microphone inputs. This likely accounts for the slight overshoot in the square wave response of the mic preamplifier.

Distortion was low, usually with distortion products being masked by residual noise. Line input THD was practically identical to the mic input THD. The 20 kHz at +20 dBv measurement indicated the presence of some slew rate limiting, although this is one of the better figures we have observed at that frequency. The Model 15 would appear to have a somewhat higher slew rate than many other mixers, and this is *most* desirable.

All of our tests were performed with the eight main outputs calibrated for 0 VU=0 dBv (.775 volts) since an internal switch allows operating at this or at a lower (about -8dBv) level. Under these conditions, we checked all of the various overload indicators and observed that the input LEDs would light at 5 dB below input preamplifier clipping in their "normal" mode and at about +5 VU in the mix mode. The LEDs in the VU meters triggered at about +10 dBv. All of these calibrations are internally adjustable, but the stock settings are probably perfect for most any situation. We should mention that we were able to overload the inputs with high input levels and the equalizers set to full boost, and the LED did not indicate this. However, we had to pull the input fader way down to avoid pinning the VU meters, so if the fader is operated anywhere near its normal "0 dB" point this problem probably won't exist in actual use.

Tascam does not recommend operating any of the outputs into a 600-ohm load (as found with some limiters) but we have included these measurements for reference.

The microphone input could handle high-level input signals before clipping, even without the mic pad which would increase the figures by an additional 20 dB. There is probably no microphone that could ever overload the preamp, a *very* important plus.

We examined the internal workings of the Model 15 and found that parts quality was adequate and workmanship was very good. We were happy to observe that the input modules had guide "fingers" so reinserting modules wasn't a game of "Where's the mainframe connector?" This is superior even to some extremely expensive studio consoles we have seen.

It was unfortunate that opening the meter turret (which is necessary to remove and install modules) was a somewhat involved operation, requiring that the two wooden trim panels on the ends be removed in addition to two other screws.

Overall, though, the Model 15 checked out very well on the bench.

Conclusions: There are a vast number of features on the Model 15, and as such it should be considered for any application requiring its 16 or 24 input/8 output configuration. All controls operated smoothly and basically performed as they should. Audio quality was very good as was the preliminary instruction manual that we examined. The Model 15 should prove to be one of the hottest products available in this class of mixers.

**Signal to Noise, Main Outputs, 20 Hz-20 kHz unweighted;
0 dB=0 dBv (0 VU)**

Master fader off	-92 dB
Master fader normal, no inputs assigned	-84 dB
Mic preamp set for 40 dB gain	-82 dB
Mic preamp set for 60 dB gain	-64.5 dB
Equivalent input noise	-124.5 dBv

Note: Mic preamp noise measurements made with 200-ohm source

**Total Harmonic Distortion vs. Frequency Mic Input,
-40 dBv Input Level**

Frequency	THD at 0 VU (.775 volts)	THD at +20 VU (7.75 volts)
20 Hz	.04%	.05%
1 kHz	.015%	.025%
20 kHz	.025%	.6% (see text)

Intermodulation Distortion

Test Signal: 60 Hz and 7 kHz mixed 4:1

Microphone Input, -40 dBv equivalent level

0 VU (.775 volts RMS) output .02%

+20 VU (7.75 volts RMS) output .01%

Line input, 0 dBv (.775 volts RMS) equivalent input,

0 VU output .02%

+20 VU output .008%

Maximum Input Levels

Microphone input, no pad, 200-ohm source

20 Hz	+2 dBv	(.975 volts)
1 kHz	+8 dBv	(1.95 volts)
20 kHz	+7 dBv	(1.75 volts)

Line inputs—in excess of 8 volts at any frequency
(test oscillator output limit)

Maximum Output Levels Before Clipping

Frequency	High Impedance Load	600-ohm Load
20 Hz	9.5 volts (+21.75 dBv)	5.25 volts (+16.5 dBm)
1 kHz	9.75 volts (+22 dBv)	5.5 volts (+17 dBm)
20 kHz	8 volts (+20.25 dBv)	4.9 volts (+16 dBm)

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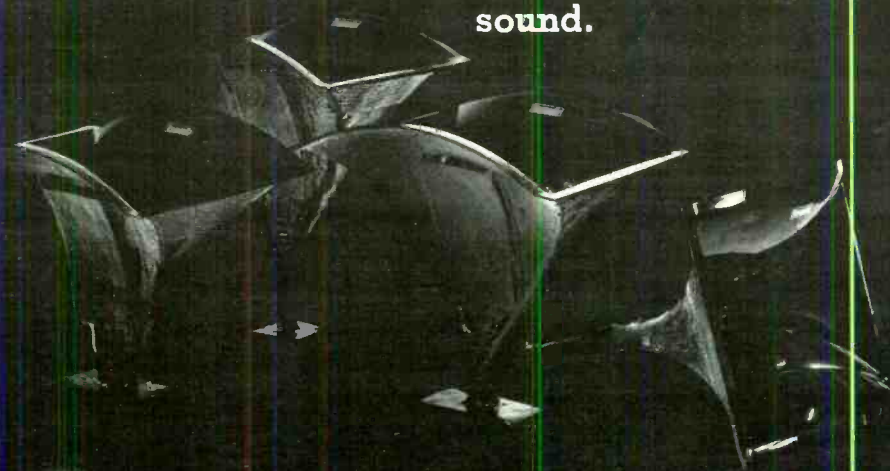
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GROOVE VIEWS

REVIEWED BY:

SEDGWICK CLARK
ROBERT HENSCHEN
NAT HENTOFF
JOE KLEE
STEVE ROW
JOHN SUNIER
JEFF TAMARKIN

POPULAR

JOHNNY WINTER, *White, Hot & Blue*.
[Johnny Winter, producer; Dave Still, engineer; recording locations not given.]
Blue Sky JZ 35475.

Performance: **White, hot & blue**
Recording: **Righteously primitive**

There is really nothing new about this Johnny Winter album, but who says the blues is supposed to change, anyway? In fact, Johnny Winter has taken pains to insure that the only thing new about *White, Hot & Blue* is that it successfully recreates the ancient sound of the early blues recordings of the 1940s and '50s, while maintain-

ing its value as a modern interpretation of the blues form. What's more, the blues on this record is really hot!

Johnny Winter has fashioned a reputation for himself lately as the Phil Spector of blues, arguing the merits of a back to simplicity movement, and doing his best to make it a reality. Apparently, Winter's association with Muddy Waters has sent him running back in the direction of his own blues roots, and the payoff is nothing less than the best Johnny Winter blues album since his debut for Columbia Records almost a decade ago.

White, Hot & Blue sounds something like a Muddy Waters album, save for Winter's trademark growl. The instruments are miked so as to give the record a primitive sound characteristic of the early Chess Records blues classics. There appears to have been little or no

overdubbing either, and the mix is drastically stark compared to the elaborate standards of the day. All of this one-take-and-leave-it-alone approach is enough to send those of more progressive persuasions running away from this LP in fright, and quite likely it'll do just that. Unless you happen to be a blues fan as well, in which case you may rejoice, for this is a truly contemporary, no-nonsense blues album.

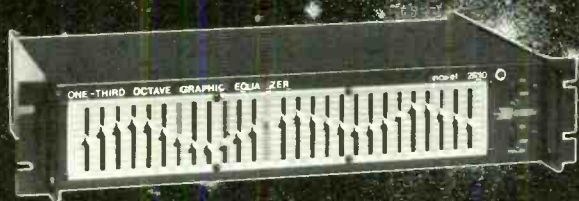
Winter has had a spotty history at best. He began as the great white blues hope from Texas, hyped by a six-figure signing and catapulted into overnight sensation status after years of groveling in Texas clubs. Before long, he switched to rock and recorded, along with his brother Edgar, some of the strongest heavy rock of the early 70s. He was then plagued by drug and other problems throughout the mid-70s, recording a decent LP here and there among less noteworthy offerings, and finally resurfacing as Waters' producer in 1977. This LP is the second of his blues revivals, and could be his ticket to renewed success if its sales match its musical merits.

"Walkin' By Myself" opens the album and showcases Winter's standard, lightning-fast slide guitar work. Winter covers the gamut of blues stylings on this LP, from slick, Chicago-style ("One Step At A Time") to sleepy, Robert Johnson-style country blues ("Slidin' In"). It is the second side of the record which is truly illuminating, though. Taj Mahal's "EZ Rider" is stunningly lively, and the following slow blues, "Last Night," contains Winter's most imaginative solo on the LP. The closer is a Jimmy Reed tune, "Honest I Do," recorded by the Rolling Stones on their



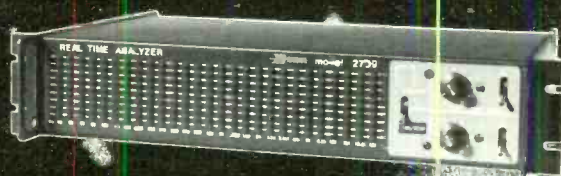
JOHNNY WINTER (shown here with Bobby Torello, Jr. and Jon Paris): Authentic

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first album, and surfacing here fifteen years later without much alteration.

There are no other white artists today playing the blues with the force and authenticity of Johnny Winter. There are variations and modernizations, but most are miscarriages of this deliberately simple genre. Winter has no pretensions about being a progressive, and in fact he delights in his regression. But there's nothing wrong with that—this is simply the local bar band's blues, brought into your home for your convenience. And it's just as well that way, because if your local bar band was *this* hot, that bar might just become your home away from home. J.T.

BOSTON: *Don't Look Back*. [Tom Scholz, producer, engineer and arranger; Bob Rosati, Dennis Coscia and Eric Carr, assistant engineers; recorded at Tom Scholz' Hideaway Studio.] Epic 35050.

Performance: **Competent, entertaining, often innovative**
Recording: **Scholz' second Boston basement blitzkrieg**

To say that Tom Scholz has done it again in his basement recording studio is to point simultaneously to both the

strengths and weaknesses of Boston's second album, *Don't Look Back*. Two years in the making (minus time for tours), the album has much the same sound as the group's debut, and this is both good and bad.

Mark Kernis, a music critic for the Washington Post, has noted that "in the two years since its debut, Boston has taken a giant step sideways," and this is not an unfair summary of this effort.

Scholz and his colleagues *did* look back, or at least failed to look forward enough, in the creation of the new album. What struck audiences and critics alike about the debut album—its refreshing vocal and guitar harmonies, its intelligent approach to hard rock, the expertise with which the project was completed—has been carried over to the new album but little has been ventured beyond that. The major musical devices that Boston uses (key changes from verse to chorus and back, and key changes from major to minor and back, for example) are on display here again to such an extent that some songs sound as if they might have been included on the first album.

The title track and "It's Easy" are the best example of this, with guitars and more guitars massed together for an incredible effect, driving percussion, and sweet vocal harmonies by lead sing-

er Brad Delp (thanks to overdubbing, Delp becomes several tenor voices at once), all going into the sound.

But now to the good: Boston creates a whale of a sound, and for anyone seeking an antidote to the plastic blandness of disco, nervous twitches of reggae or cacophonous anger of punk, Boston is your band. At least on record, the band seems to have the best engineered sound of massed guitars for guitars' sake since Stephen Stills' short-lived group, Manassas. There are guitars everywhere, and it's a wonder that Delp's vocals, Fran Sheehan's bass and Sib Hashian's drums are not lost behind a wall of guitar sounds.

Don't hold your breath for any long guitar solos, however, even though the album is dominated by guitars. That's not the Boston (or Scholz) style. Instead, you will find brief solo passages played in fluid, single-note style, crashing power chords, fuzzy notes and even occasional spacey sounds made without the benefit of a synthesizer. Most of the guitar work is heavily amplified, but here and there the crisp sound of an acoustic guitar can be heard on either a melody or rhythm role.

The music is, for the most part, up-tempo. "The Journey" is a brief otherworldly-sounding fragment that serves as an introduction to "It's Easy," while



BOSTON: Tom Scholz's latest basement blitzkrieg has moved them one giant step sideways

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"A Man I'll Never Be" starts off as a ballad and ends as a hard-charging rocker. "Feeling Satisfied" features interesting interplay between the power chords and quick hand-clapping, and a guitar sound not unlike either the James Gang or Mountain. "Party" is a throwback to early 1960s rock-and-roll songs and contains one of the few long solos of the album. "Used to Bad News" is a slightly lighter arrangement that recalls something Manfred Mann might have done, while "Don't Be Afraid" could have been a Led Zeppelin number.

This could mean that Boston isn't much more than a derivative group that happens to reflect some of its more innovative predecessors, but Boston has created its own sound, one that likely will spawn imitators. Scholz and the band obviously know now what they are trying to do, and they have the skill to carry it off. The debut album and *Don't Look Back* might best be considered four sides of the same release, and it will be interesting to see what the third album is like. If this were Boston's first album, it would probably be as phenomenally successful as their first album actually was two years ago. S.R.

WILBERT LONGMIRE: *Sunny Side Up*. [Bob James and Jay Chattaway, producers; Joe Jorgensen, engineer; recorded at Sound Mixers, New York, N.Y., February, 1978.] Columbia Tappan Zee JC 35365.

Performance: **Warmed over**
Recording: **So bright and shiny it hurts the eyes**

If you like George Benson's new brand of MOR voice and guitar, if Bob James' glossy production filler suits your sweet tooth, if you revere routinely great studio all-stars playing routinely great, *Sunny Side Up* is for you. Guitarist Wilbert Longmire fronts this likeable, immediately forgettable exercise in homogenized crossover music, a com-mixture of light jazz, light pop, and light soul that sounds decidedly—light.

Fortunately, there's only one Benson-cum-Stevie Wonder lead vocal by Longmire, "Love Why Don't You Find Us," pleasant but un compelling. Better are flashy upbeat numbers like "Black Is The Color" and "Lovely Day," where Wilbert's electric guitar is melodic and fluid, David Sanborn breaks things up

all-too-briefly with his alto sax, and the arrangements feature crispy horns. "Starflight," guesting Eric Gale and Cornell Dupree on rhythm guitars, is almost a substantial finale—but also a reminder that Gale's own solo projects are a lot tastier.

Lack of playing personality hurts the musician/leader, but *too* much pizzazz frequently spoils the talent of producer/boss Bob James. Given substantial material, Bob can often bring classical-rock life and appeal to jazz compositions, imbuing them with depth, identifiable melody jags, and plenty of dynamic "oompf." But there are no biggies on *Sunny Side Up*, just warmed over ideas from today's Easy Listening mainstream, and James' glistening production becomes so shiny and bright it hurts the eyes. R.H.

BOB SEGER & THE SILVER BULLET BAND: *Stranger in Town*. [Bob Seger, Punch, and Muscle Shoals Rhythm Section, producers; John Arrias, Greg Hamm, Steve Melton, Daniel Cole, Mark Calice, Hugh Davies, and George Tutko, engineers; recorded at Criteria Sound, Miami, Fl., Muscle Shoals, Sheffield, Al., and Cherokee Sound, Capitol Records, and Sound Suite Studios, Detroit, Mi.; dates unlisted.] Capitol SW-11698.

Performance: **Telling the truth, mostly**
Recording: **Your basic basics**

Bob Seger rides the fine line between repetition and consistency on this album, and he swerves just once or twice. *Stranger In Town* kicks off strong with an excellent rocker "Hollywood Nights," follows with the gigantic pop ballad hit "Still The Same," and keeps on truckin' through nine solid tunes. In a Motor City otherwise known for its mass production of steel and chrome, the Silver Bullet Band is putting platinum on wheels.

More than a little of the legendary Motown soul helped put feeling in Bob's music, but it's down-to-basics rock & roll that makes Seger a standout. Side two's six and one half minute "Brave Strangers" cuts from a simmering rock pace into a slow blues complete with gospel chorus, then back into propulsive sensual fantasy. "Old Time Rock & Roll" is even more overt in preferring those emotional essentials that, at root, make for generally effective rock: "Call me a relic/Call me what you will/Say I'm old-fashioned/Say I'm over the hill/Today's music ain't got the same soul/I

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BOB SEGER: Platinum on wheels

like that old time rock 'n' roll." And while this isn't one of Seger's more appealing tunes, the statement of policy is backed up by an honest, no-gimmicks approach to pop music. (It's only in concert that saxophonist Alto Reed is suspended from arena ceilings.)

The biggest problem on this disc is "Ain't Got No Money," a Frankie Miller song that crunches along well enough, but sounds *exactly* like Seger's previous macho classic "The Fire Down Below"

from *Night Moves*. Both tunes were inked in 1976, so who influenced who, if at all, is a mystery. Other cuts repeat copycat boogie guitar and honky-tonk piano riffs, but not to excess.

Seeger's vocal interpretations of slower songs and ballads, with laudable, self-penned lyrics, give *Stranger In Town* a surprising depth. "We've Got Tonite" and "The Famous Final Scene" are sensitive beauties, while "Still The Same" and "Till It Shines" rock softly but effectively. Other raspy-voiced rock screamers (Joe Cocker, Rod Stewart) might handle this kind of material with less believability and more affectation. But when Seger sings something, it's intimate and real, more like the truth. And when the Silver Bullets rock, they *definitely* rock. R.H.

CHET ATKINS & LES PAUL: *Guitar Monsters*. [Bob Ferguson, producer; Bill Vandervoort, recording engineer; recorded at Sound Masters Studio, Nashville, Tn.] RCA APL 1-2786.

Performance: **Guitar by the guys who wrote the book**

Recording: **The big sound complete with a tendency to distort**

The full story of Chet Atkins and Les Paul is briefly alluded to in the final cut on side one of this LP, "I'm Your Greatest Fan." Chet Atkins' brother, Jimmy Atkins, was the rhythm guitarist and vocalist with the Les Paul Trio when they broadcast as part of Fred Waring's Chesterfield broadcasts back in the late 1930s. It was Les Paul who served as an inspiration to the younger Atkins to take up the guitar.

As guitar virtuosi these gentlemen need no further credentials than the mere mention of their names. There should be little difficulty in distinguishing Chester from Lester since Atkins plays acoustic guitar for a good portion of this set. Aside from this, it should be simple for guitar fans because Les Paul is the man with the flat pick and Chet Atkins is the one playing finger-style.

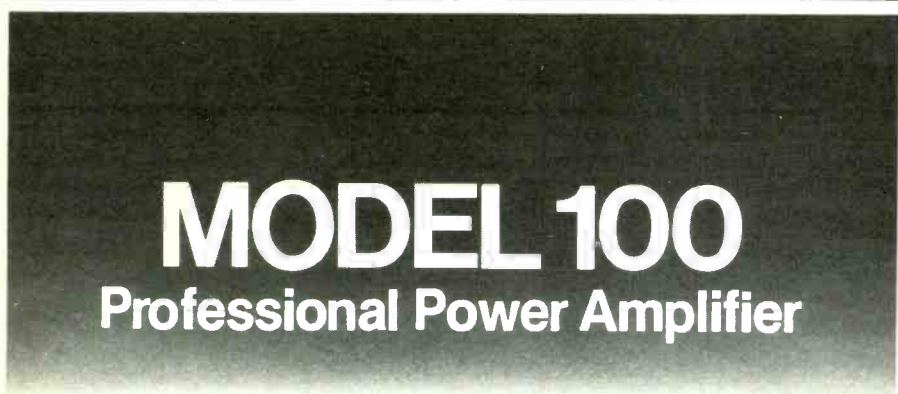
What the record amounts to, just as their first recording a while back did, is two technically fiery guitarists having a good time getting together exchanging licks and swapping tales. If I'm permitted a favorite cut on this album, it would have to be "Over The Rainbow." It's an example of how pretty Les Paul and Chet Atkins can play when they're not trying to prove something about speed and technique. There's also an interesting version of Antonio Carlos Jobim's "Meditation" which Chet, in his first chorus, plays as a two-step rather than a bossa nova. There are also two tracks where Atkins and Paul turn singers. Frank Sinatra and Tony Bennett they're not, but their charm not only makes the vocal choruses forgivable but enjoyable as well.

Unfortunately, in an effort to go for that big Nashville Sound, it sounds to me as though more than a little distortion has gotten in there.

While a record like this is bound to be of major interest to guitar players who'll have a lot of fun trying to figure out just what these cats are up to, the general public will have a good time with it, too. It's quite simply two masters of the art having a grand time making music together. J.K.



THE NEW BRUBECK QUARTET: *A Cut Above!* [Joe Overholt, executive producer; Tom Semmes, producer and mixing engineer; Russell Gloyd, musical director; recorded February 27 & 28, 1978 at



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Sound Stage Studios, Nashville, Tn.] Direct-Disk Labs DD-106 (2 discs).

Performance: **Terrific, but we miss Paul Desmond**

Recording: **One of the ten best direct discs so far**

What has Dave Brubeck been doing since the famous Quartet broke up in 1967? Certainly not sitting on his laurels and looking at his 1954 *Time* cover. He has been composing like mad, mostly massive works for chorus and orchestra, but also ballets and a delightful musical, "The Real Ambassadors." He has appeared and recorded with a new quartet featuring Gerry Mulligan. But most of all he has been raising three sons, with no plans to form a musical group with them. However, that is just what has happened. Darius, now 30, plays electronic keyboards including the Fender Rhodes, Roland Space Echo and several different Arp instruments. Chris, 26, plays electric bass as well as trombone, and Dan, 22, is the group's drummer.

No excuses whatsoever need be made for the musical talents of these young men. The very name of the group, omitting mention of Dave's name entirely, indicates that Dave is not "carrying" his sons in any way—they can stand by themselves. Dave gets more chance to stretch out with good long solos in this album than was the usual practice on his old recordings. What takes a bit of getting used to is the absence of the late Paul Desmond's glorious silky-sounding sax and its replacement by additional keyboards instead of reeds. Contin-

ued listening shows the tasteful contrapuntal lines laid down by Darius Brubeck do provide a fine modernistic electronic compliment to Dave's acoustic grand piano.

The first side of this two-disc \$25 album set is devoted to a sparkling Duke Ellington medley that mixes the Ellington and Brubeck styles in fascinating ways. The entire second side contains two excerpts from Dave's oratorio "The Light in the Wilderness" in instrumental versions. Sides three and four display five tracks from the early 60s "Time" albums, playing with unusual time signatures such as 10/4 and 15/8. The most familiar here are "Blue Rondo a la Turk," and "Take Five."

The beautifully-packaged set features extensive notes on Brubeck's place in jazz, beginning with his path-breaking Octet in the late 40s. The cover art shows Dave and his offspring running across the negative groove walls of a hugely-magnified metal stamper, chased by a new Stanton negative stylus that is designed to ride on the top of the groove edges (really the bottom of the groove of the finished record) for checking purposes. The miking and mixing is exemplary, achieving a noticeable stereo image placement of the instruments even though two of them are electronic in nature. A new super-quiet mic preamp, the Trans-Amp, was used on three of the four sides. A testament to just how good direct cutting can be is the fact that when listening closely on excellent equipment—especially with headsets—it is possible to tell the difference between the sides with the



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old and the new preamps. The overall clarity is slightly improved, as are the stereo imaging and extreme high end such as the cymbals and brush work.

You may want to go back to your old Columbia and Fantasy Desmond/Brubeck LPs after hearing this one. If you do, be prepared for hiss, noise, distortion and narrow dynamic range compared to this superb direct disc set. J.S.

STEPHANE GRAPPELLI: *Homage To Django*. [A. De Froberville, producer; engineers not listed; recorded in London, England, June 1972.] Classic Jazz CJ 23.

Performance: **Stephane looking back**
Recording: **True, if a bit antiseptic**

Once upon a time there was the Quintet of the Hot Club of France, well, not exactly. There was Stephane Grappelli on violin and Django Reinhardt on guitar and whoever showed up on rhythm guitar and bass. Stephane and Django were really the whole show. The other guys were there and they played their chunka chunka backgrounds but they lent absolutely nothing to the character of the band. They were interchangeable and they were changed as frequently as suited everybody's convenience. Django and Stephane, however, were unique. Each played with other partners after breaking up their alliance, and while they were (in Django's case) and still are (in Stephane's) excellent players regardless of their surroundings, it was never quite the same as it was those years in prewar Paris.

So here we have Stephane Grappelli in 1972 looking back almost forty years and trying to remember how it was. Sometimes it works, sometimes it doesn't, and when it does it works for entirely different reasons than it did in the '30s. The best example of this is the Reinhardt-Grappelli classic composition, "Tears." Played romantically, lyrically, even rhapsodically by Stephane accompanied only by the Fender-Rhodes electric piano of Alan Clare it is a totally different piece than it was when originally recorded in April of 1937 at a decidedly quicker tempo with Django playing gypsy guitar against the chunka chunka rhythm. I will admit to preferring the newer, schmaltzier version. But then, on the other hand, tunes like "Daphne" and "Swing 39" suffer a loss of charm under the spell of the rather stuffy British equivalent of a good studio version of Count Basie's rhythm section.

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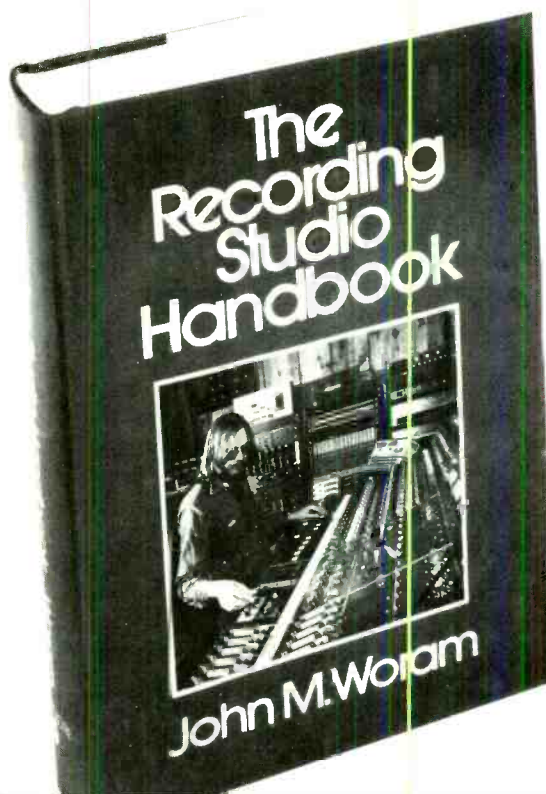
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John Woram is the former Eastern vice president of the Audio Engineering Society, and was a recording engineer at RCA and Chief Engineer at Vanguard Recording Society. He is now president of Woram Audio Associates.

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Yet as a statement by a venerable and excellent musician looking back on places he has been and music he has played and with whom he has played this music this double LP set works admirably. One can't expect Stephane's head to be in the same place in the 1970s that it was in the 1930s. He's a more mature player now. Some of the youthful exuberance has gone but it's been replaced by the mellowness and wisdom that only age and experience can provide. Grappelli has wisely chosen his rhythm section with his current playing in mind. The style of rhythm guitar that was so right for the Quintet of the Hot Club of France would be as out of place here as Alan Clare's Fender-Rhodes piano and Ernie Cranenburgh's amplified guitar would have been in the old Quintet in Paris.

As for the recording job, there's really nothing wrong with it but it doesn't communicate the kind of warmth and esprit that the old 78s by the Quintet did. It's a little too smooth, a little too perfect, a little too cut and dried. Nobody hollers encouragement during a final out chorus the way they used to. Nobody begins a solo slightly off mic moving in for an on-the-nose finish. But then those days are gone and you really can't go home again. You can only remember.

J.K.

HIDEHIKO ("SLEEPY") MATSUMOTO:
The First By Sleepy. [Hideaki Takahashi, producer; Tameo Kawada, Ken-ichi Kotsuge, engineers; recorded and mixed at Toshiba EMI Studios, Tokyo, Japan.] Toshiba Pro-Use Series Direct Cutting LF-95008.

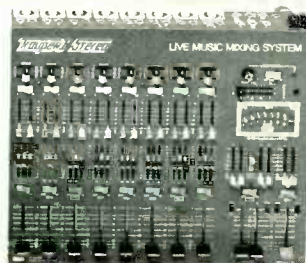
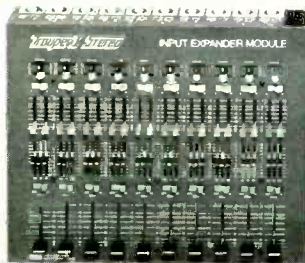
Performance: **No-frills, modern jazz tenor man**

Recording: **Clean, with the tremendous impact of drums, as only good direct cut can provide**

Matsumoto was one of the first Japanese jazz musicians to receive attention in the U.S. (as a result of his appearance at the Monterey Jazz Festival some years ago). He remains probably the best known—that's not including Toshiko Akioshi, who is based in the U.S., not Japan. His tenor sax style is clean and direct, neither overly-rich nor harsh in tone. The album surveys four jazz standards and two Latin-ish originals. "My Funny Valentine" begins with a lovely introduction, but the straight treatment of the tune really

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doesn't say anything new. Brubeck's "Take Five" is a vehicle for some really bone-crushing percussion work aptly transmitted into your living room—if your audio equipment is good enough to handle it without distortion or groove-skipping.

Pianist Norio Kotani really doesn't come to the fore in this album, leaving the spotlight for Sleepy's sax, and on one number, for his flute. The un-ornamented, no-tricks approach employed by Matsumoto seems very Japanese, tending toward a minimal, rather ascetic feeling. Fans of Paul Desmond, Ben Webster or Phil Woods will find Sleepy rather dry.

This album is called *The First* because of it being Sleepy's first direct cut session, not his first recording. The tremendous pressures of recording by this method have tied up more than one top performer in tight knots, especially if there are complex arrangements where one little blooper can ruin the acetate and force everyone to start all over again. If this happens a minute or two from the end of a so-far-perfect fourteen- or fifteen-minute side, it can be very distressing to everyone concerned—not just the sideman responsible for the bloop. Peter Nero told me that after his Crystal Clear Records session he went straight home and slept for two days. Simpler jazz-blowing sessions such as Matsumoto's album seem superbly compatible for direct cutting, and some of the best direct cut discs so far have been modern jazz ones. This album certainly belongs in that group.

J.S.

CHARLIE PARKER: *The Very Best Of Bird.* [Presented by Bob Krasnov, Stewart Levine and Raymond Lofaro; original recordings produced by Ross Russell during 1946 and 1947 in various studios in Hollywood, Ca. and New York, N.Y.] Warner Brothers 2 WB 3198.

Performance: **The Bird in full flight**

Recording: **What you'd expect in the mid-40s**

I have only two quarrels with this double LP set excerpted from a set of the complete Dial masters on six LPs made available briefly as a very limited edition from Warner Brothers. One is the fact that a need was felt to excerpt the complete set. The other is the title of the current album. This is not, I repeat *not*, the very best of Charlie Parker. Charlie Parker was a player who had, between

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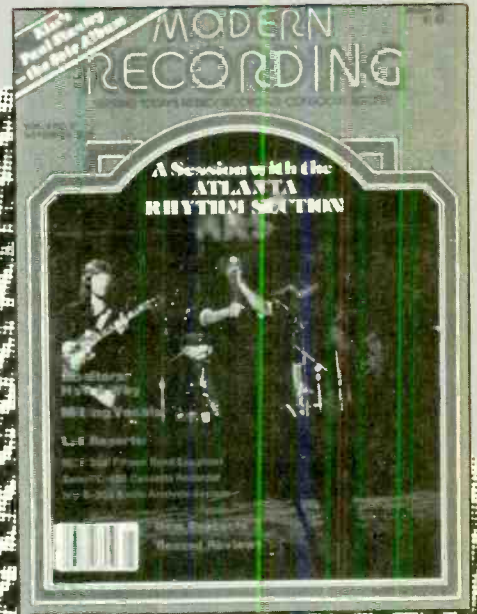
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CIRCLE 50 ON READER SERVICE CARD

two definers of JAZZ TIME/RED GARLAND and milt jackson

By Nat Hentoff

I think that I shall never hear again a rhythm section as overwhelmingly satisfying as the one Miles Davis assembled in the mid-1950's. Night after night, at Café Bohemia in Greenwich Village, I would marvel at Miles' own surprises, of course, and then share his manifest pleasure in the work of Paul Chambers, Philly Joe Jones—and Red Garland. Paul is dead, Philly Joe is back on the scene, and Red has, at last, returned from voluntary semi-exile.

Around 1965, Red decided to stay close to home in Dallas. Some say he didn't like the way rock was taking over the land. But whatever the reason, there were no more Garland albums for a very long time. That has now changed, with Red recording for Galaxy (part of the Fantasy complex) and playing such prestigious venues as the 1978 Montreux Festival.

On *Red Alert*, it's glowingly clear that Red has retained that flowing, lyrical lucidity which used to make him the very eye of that hurricane which was the Miles Davis rhythm section. Also vibrantly untouched by the intervening years is the easeful, precise sureness of his time. Red's return set is divided into various small units, and the supporting cast is formidable: trumpeter Nat Adderley, tenor saxophonists Harold Land and Ira Sullivan, bassist Ron Carter and drummer Frank Butler. (Adderley is especially incisive, witty and cohesive.) The recording is very well-balanced and clean, but I think you'll enjoy it more with the volume well up.

And now, speaking as at the beginning of rhythm sections, I am going to tell you about a sleeper. A just about perfect set, released on Pablo under the rather ordinary title, *Soul Fusion*. The

leader is Milt Jackson, and he is joined with subtle though enormous rhythmic self-assurance by pianist Monty Alexander and his trio (bassist John Clayton and drummer Jeff Hamilton).

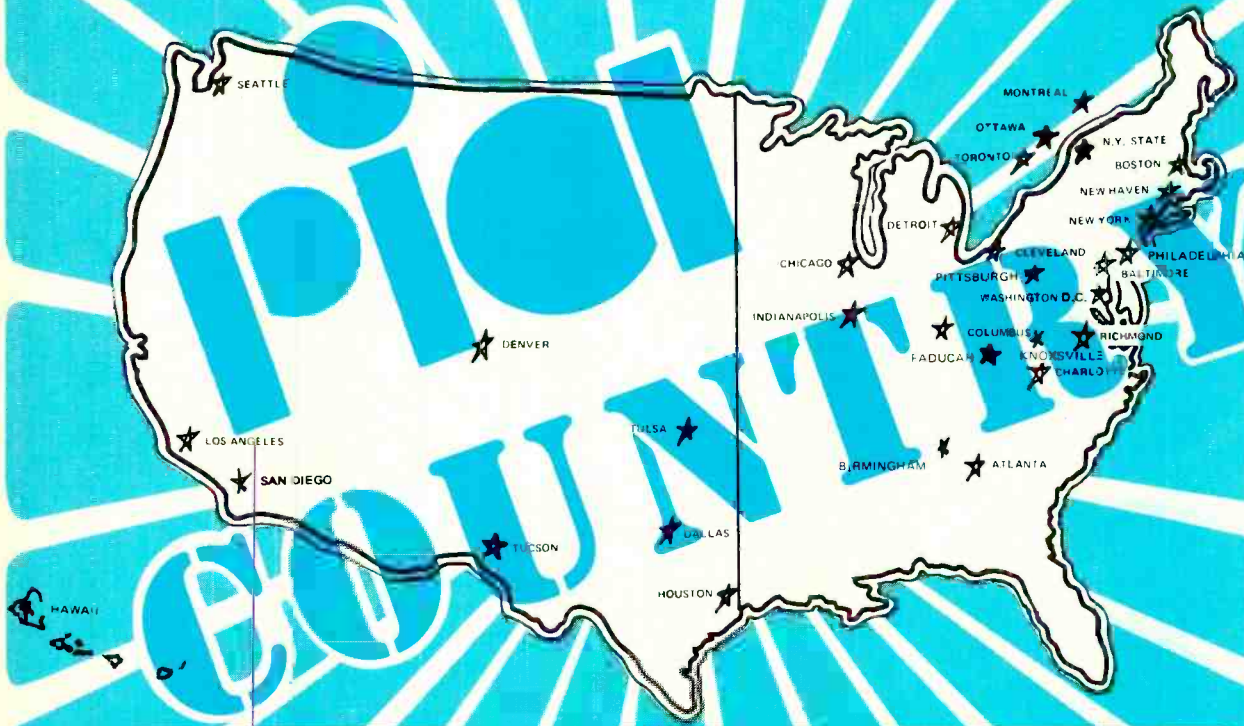
To say that Milt Jackson swings is like stating that rain gets you wet. No one in jazz equals his natural time, but Milt does much more than lay down an irresistible groove. He is a master at sculpting silences to make the swinging have even more momentum and, of course, there is also his seemingly endless melodic inventiveness—each line, each variation, deeply fusing into the overall pulse of the performance.

Monty Alexander—originally from Kingston, Jamaica—is both a superbly unostentatious accompanist, utterly attentive to the subtlest turn of time by Milt. But Monty is himself also a soloist who, as Doug Ramsey has noted, is expert at placing notes "at precisely the correct strategic spots." Hearing the two, backed by a very "together" bassist and drummer, is to experience the essence of jazz time-feeling. It is almost impossible to say, in words, what swinging actually is. You have to *feel* it all through your body. And that's what happens throughout this classic series of swingscapes, from the blues to bossa nova. The recording is as perfectly matched—in terms of dynamics and rightness of placement—as the players.

RED GARLAND: *Red Alert*. [Ed Michel, producer; Baker Rigsby and Wally Buck, engineers.] Galaxy GXY-5109.

MILT JACKSON AND THE MONTY ALEXANDER TRIO: *Soul Fusion*. [Norman Granz, producer; Val Valentin, engineer.] Pablo 2310 804.

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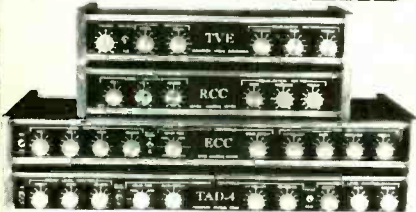
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his emergence on the scene with the Jay McShann band in the late '30s and his last public note in the middle '50s, so many styles and periods that no one or two years of his productive career could ever be called "The Very Best" which is the inference here. A more correct title would have been "The Very Best Of Bird (1946-47)" and even that might be stretching a bit since there were sessions in 1947 for Savoy which produced tracks such as "Donna Lee." The very best of Bird would have to include some blues playing from the Jay McShann Deccas, the first Comet sides with Red Norvo, the historic Guild session with Dizzy Gillespie, the pre-Dial and post-Dial Savoy's, the Mercury "Bird With Strings" sides, plus a lot of the bootlegs and airchecks that have turned up since the death of this great artist.

Certainly the Dials were an important period in Bird's development. He had done his experimenting during his early days with Savoy and was, by the time he came to California and signed with Dial, not only a finished artist but one who knew pretty well where he was going and how he was going to get there. Tracks like "Ornithology," "Night In Tunisia" and "Relaxing At Camarillo" are well known to anyone who cherishes and collects Charlie Parker. Others may be less familiar. All are good. Those with Howard McGhee on trumpet are better. Miles Davis was still a young giant trying his wings. He'd been put in with company he wasn't ready for just yet, however, notice how much better Miles was playing on the sides recorded in New York in 1947 than he was on the West Coast sides in 1946. He was learning fast.

Another interesting feature about the Dial period is the opportunity to compare Bird's playing before his stay at Camarillo (a psychiatric institute) on "Max Making Wax" and right after his release ("Bird's Nest" and "Cool Blues"). I wish that this album included the entire pre-Camarillo session including the "Lover Man" for which Bird vowed he'd get even with Russell for releasing. It's my contention that, while he came out more physically healthy than when he went in, the dehumanizing process of institutional living took its toll on Bird's heart and the flights weren't ever to be as free again as they were, for example, on the discarded version of "Night In Tunisia" issued here as "Famous Alto Break." For the story of what happened to the rest of that take, read Ross Russell's liner notes; don't take them for gospel though. As produc-

er of these records in the days of 78s, Russell's views do tend to get a little biased especially when discussing Charlie Parker and his relationships with record companies. J.K.

CLASSICAL

BEETHOVEN: Concerto in C for Piano, Violin, Cello and Orchestra, Op. 56 ("Triple Concerto"). [Beaux Arts Trio, London Philharmonic Orchestra, Bernard Haitink cond.] Philips 9500.382.

Performance: **Burly**
 Recording: **Gutsy**

Haitink's Beethoven symphony cycle (MR, Feb/Mar 1977), impressive though it was, stopped short of complete identification on the part of conductor and engineers in most of the symphonies. But here, Haitink has the London Philharmonic digging in with burly wit and rhythmic point, perfectly comple-



BERNARD HAITINK: Most delightful

menting the Beaux Arts Trio's usual superb musicianship, and the uncredited production staff provides an ideal balance of gutsy presence and warm resonance. It's especially good to hear cellist Bernard Greenhouse take the lead after so many of the Beaux Arts' excellent Haydn trio recordings on Philips in which he has only a *quasi-continuo* role to play.

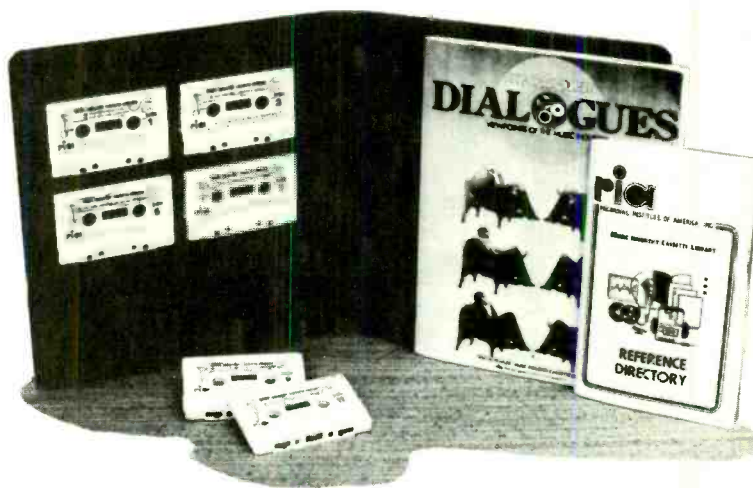
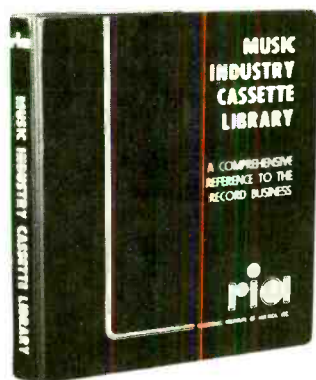
Beethoven's "Triple Concerto" is one of his most delightful works—an armistice from the sobriety of his contemporaneous Third Symphony ("Eroica"), "Waldstein" and "Appassionata" Piano Sonatas and the opera *Fidelio*. Look no further for a recommended recording.

S.C.



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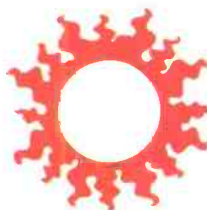
TASCAM 80-8, w/DX*, Tascam 40-4 w/DX4, Tascam 25-2, Tascam 5A, Teac 3300-2T, Ampex 354 w/cases, Fairchild 659A reverb. 303-988-2156.

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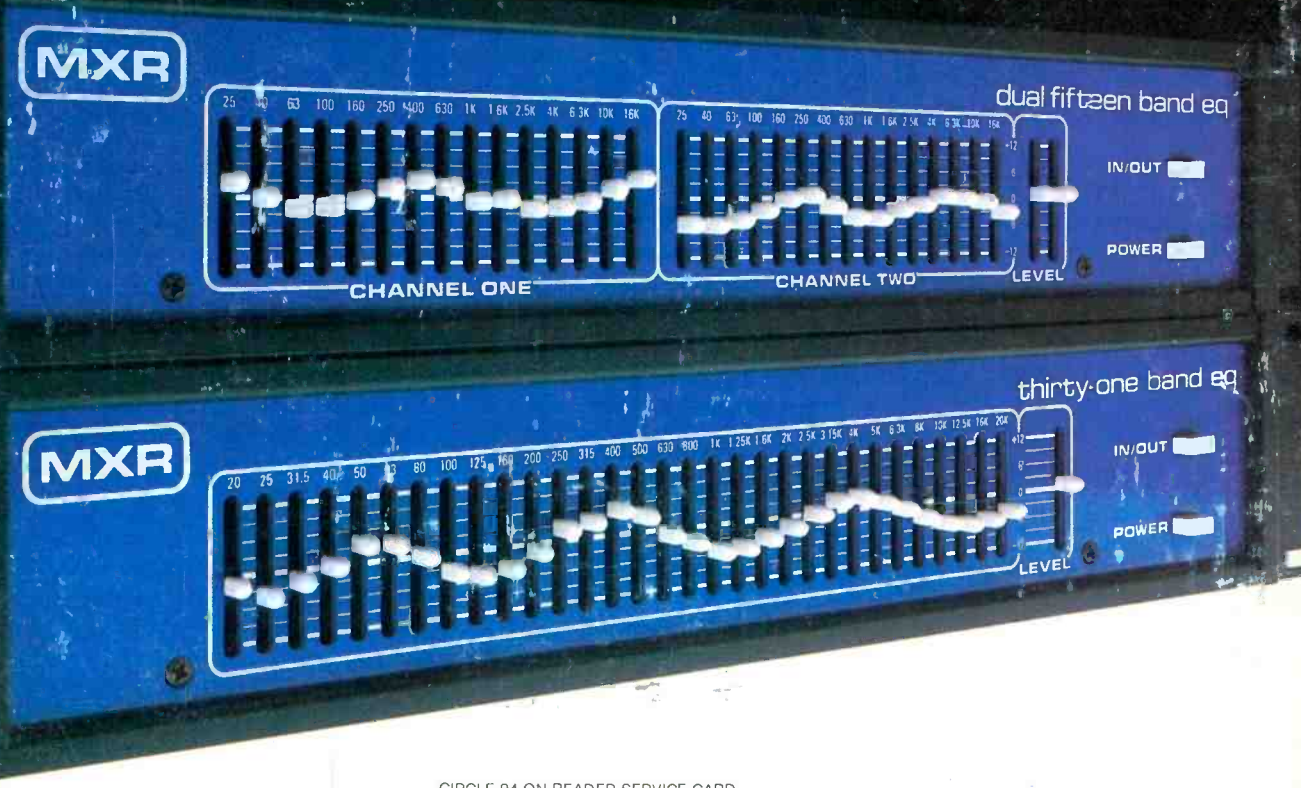
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