Profile: Lester Bowie

MODERN RECORDING & MUSIC

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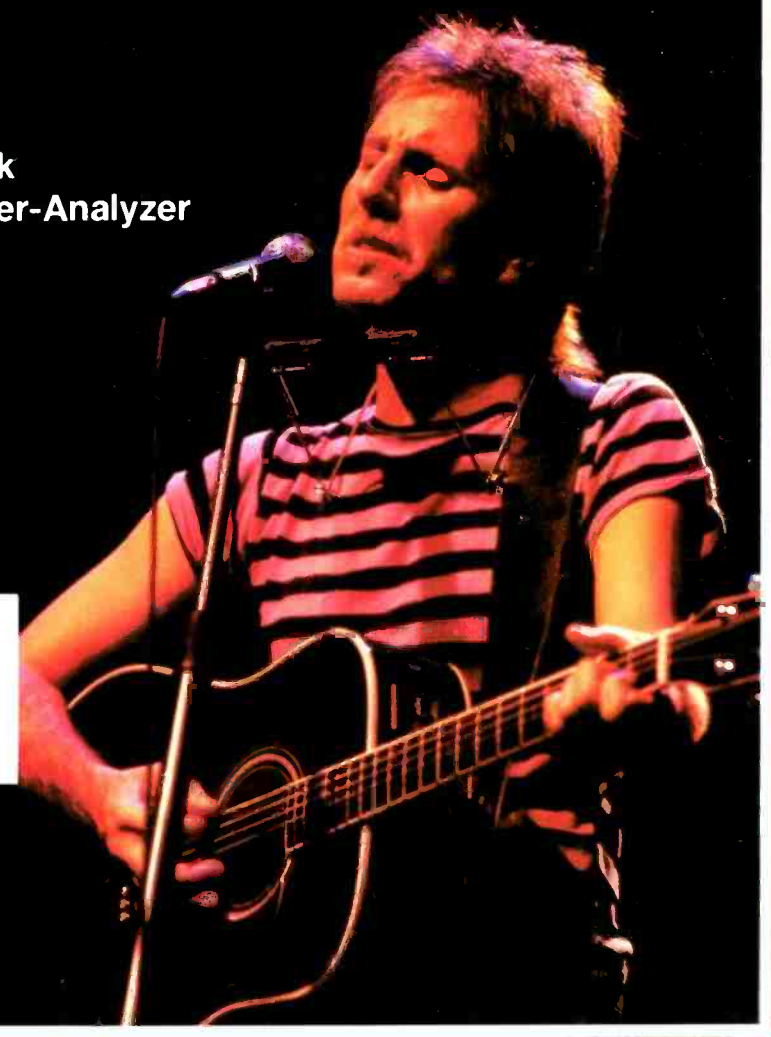
APRIL 1983
VOL. 9 NO. 4

Graham Nash



Recording Techniques

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Nakamichi Dragon Cassette Deck
Soundcraftsmen AE2000 Equalizer-Analyzer

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RECORD REVIEWS

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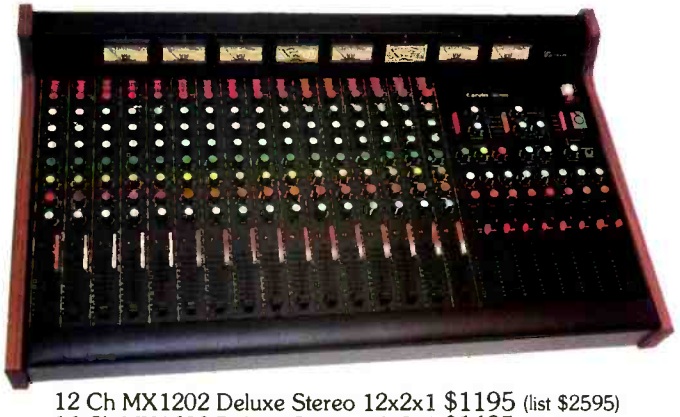

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APRIL 1983
VOL. 9 NO. 4

MODERN RECORDING & MUSIC

THE FEATURES

THE STAPLES

COMING NEXT ISSUE!

Profile: Luther Vandross
Lab Reports: The Aphex Aural Exciter,
The Sony PCM-F1 Digital Audio Processor
Recording Techniques: Part XII

Cover Photo: Henry Diltz
Graham Nash Photos: Henry Diltz
Full page Lester Bowie Photo: Courtesy of Outward Visions, Inc
Other Lester Bowie Photo: Courtesy of ECM Records

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Typographers

BERNADETTE WEBER
Circulation

LARRY ZIDE
Publisher

Editorial and Executive Offices
MR&M Publishing Corp
1120 Old Country Road
Plainview, NY 11803
516 433-6530

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LETTERS TO THE EDITOR

Becoming Part of the Industry

I have been reading your articles on recording techniques in the '82 issues of *Modern Recording and Music*. I am very interested in working in the technical phases of the recording industry.

In early May I will be finishing my first year at Willamette University, Salem, Oregon. Besides having some musical background I will have completed a course in audio-synthesis/Recording.

I would appreciate it very much if you could furnish any information or advice as to where I should look for some summer experience in the recording industry; where I could receive an apprenticeship, if needed, and would it be appropriate now or later; what type of experience would be best; and what kind and where I should look for more training.

I know the information I seek is very basic, but you are so well versed in the part of the industry I am interested in that you seem the ideal source. Your cooperation is so appreciated, since this industry seems to be rather difficult to enter.

Thank you for your help and advice and especially for your fine articles.

—Claudia B. Carle
Salem, OR

We received the following response from Bruce Bartlett:

I'm happy that *MR & M* has provided you with some technical background. It's also important to get practical experience as soon as possible.

For starters, check the Yellow Pages of several local cities under "Recording Service." Look for small studios that do narration recording, tape duplication, audio/visual work, or 4-track demos. A directory of recording studios is available from *Billboard* magazine, 1515 Broadway, New York, NY 10036.

Don't rely on employment agencies or mailed resumes. Visit several studios in person and ask to speak to the studio manager. Volunteer to work unpaid as a "go-fer" or assistant, just for the experience. Find out what the studio needs and provide it. It helps if you can tell the manager that you know a lot of potential customers, such as school bands, choirs, and small musical groups.

Later you may advance to making tape copies or operating tape machines during sessions. Gradually you can work your way up to larger studios. When applying for a position, bring a demo tape of your best work (15 ips, ½ track, tail out, leadered) and a polished resume. You may eventually become an assistant engineer, and finally a mixing engineer. Most of the major studios are in New York, Los Angeles, Chicago, and Nashville.

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On-the-job training is an apprenticeship. Ask lots of questions, but maintain a low profile. It's important to remain calm under pressure, keep track of details, show diplomacy with clients, and be self-effacing.

In the meantime, get all the experience you can with your own equipment by taping local musical groups, doing sound reinforcement for a rock band, or whatever. Study music, basic electronics, and applied acoustics. A college degree is not necessary but may help. Read magazines and books on recording. Some are listed below:

db magazine, 1120 Old Country Road, Plainview, NY 11803.

Recording Engineer/Producer magazine, P.O. Box 2449, Hollywood, CA 90028.

Practical Techniques for the Recording Engineer, by Sherman Keene. Sherman Keene Publications, 1626 N. Wilcox, No. 677, Hollywood, CA 90028.

The Recording Studio Handbook, by John Woram. Sagamore Publishing Co., Plainview, NY 11803.

Careers in Audio Engineering, Audio Engineering Society, 60 E. 42nd St., New York, NY 10017.

There are several recording courses available that do not provide job placement but do offer the essential hands-on experience. Some are listed below. Thoroughly investigate them and check accreditation.

Institute of Audio Research, 64 University Place, New York, NY 10003. 212/677-7580. This school offers a summer session.

The Recording Workshop, 455-A Massieville Road, Chillicothe, Ohio 45601. 800/848-9900, Ohio & outside U.S.A. 614/663-2544. This also offers a summer session.

Eastman School of Music, Rochester, NY 14604.

Institute of Audio/Video Engineering, 1831 Hyperion Ave., Hollywood, CA 90021. 213/666-3003.

Omega School of Applied Recording Arts and Sciences, 10518 Connecticut Ave., Kensington, MD 20895. 301/946-4686.

College for the Recording Arts, 665 Harrison St., San Francisco, CA 94107. 415/781-6306.

The Recording Center, Inc., 25 Van Zant, East Norwalk, CT 06855. 203/853-3433.

Every recording engineer has a different story about starting a career. Many times it involves luck, knowing people in the business, or sitting in at the console when the regular engineer is ill. The openings are few and the waiting lists are long. But if you love the work, the rewards can be great. Good luck!

—Bruce Bartlett
Contributing Editor
Modern Recording & Music

Two Games to Play

We received the following in reply to Paul Becker's letter which appeared in the January '83 issue concerning the lack of realism in many recordings:

One goal in recording classical music (and often folk music or jazz) is to accurately reproduce the live performance. This is a worthy aim because the sound of a live orchestra in a good hall can be quite beautiful. The music was composed, and the instruments were designed, to sound best when heard "live" in a concert hall. So the recording engineer, out of respect for the music, should try to translate that sound to tape with as little technical interference as possible.

The goal in recording *popular* music, however, is not always "accurate reproduction." Here the aim is either (1) to reproduce the original sound, (2) to play with the original sound to create a new sonic experience, or (3) to do some of both. The artistic manipulation of sounds through studio techniques has become an end in itself. Apparently the philosophy is this: Creating an interesting new sound is as valid a goal as re-creating the original sound. There are two games to play, each with its own measures of success.

If the aim is to reproduce an instrument as it sounds in the studio, then the live instrument is the reference (as you pointed out). If the aim is to create an enhanced sound, then anything goes—such as the tasteful use of equalization, special effects, and so on.

Copying the sound of pop records is a way for a beginning engineer to achieve a commercial, fashionable sound—but not necessarily an accurate one! You can go for a natural sound or an unusual sound, and that's why this magazine covers both approaches. See "Recording Techniques, Part 4" (July '82) for some techniques aimed at natural reproduction.

I hope your comments encouraged

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Omnimedia Corp. Ltd., 9653 Côte de Liesse-Doval, Quebec H9P 1A3, Canada. (514) 636-9971.

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some engineers to refresh their memories on the sound of real instruments.

—Bruce Bartlett
Contributing Editor
Modern Recording & Music

Back to Nature, Yet Again

This is in response to reader Paul Becker's letter,"Back To Nature." Becker wonders what happened to the notion that a "recording should reflect the actual performance" and that, "monitors/recordings should sound like the *Live Performance.*" (Emphasis his.)

That idea has the weight of historical acceptance on its side, and was given wide visibility nearly thirty years ago, when Acoustic Research, Inc. founder Edgar Villchur wrote in his book, *Handbook Of Sound Reproduction*, "The purpose of recording equipment is to reproduce with as great accuracy as possible sounds that have existed, not to create new and more exciting sounds."

Unfortunately, that concept has little validity today outside the relatively narrow confines of the classical, folk and traditional jazz disciplines, where at least some attempt is made to preserve for the listener an acoustical performance that happened in a specific space and time. No, today's consumers of recorded music, be they radio listeners or record store shoppers, want new and more exciting sounds, and electronics technology has provided musicians and engineers the means to deliver on that requirement.

Can you imagine a producer today asking any group to go into the studio and make a record in one pass using only their voices and acoustic instruments that are struck, plucked, blown, bowed, etc? How many of our top chart performers could hold an audience or sell a record without their equalizer, flangers, phasers, enhancers, synthesizers, echos, reverbs, digital delays?

We expect our musicians and producers to wax ever more "creative" in bringing us ever more dramatic musical illusions. Given this imperative, can they be blamed if they try to play "audio god" in this creative endeavor?

—Bruce Mallion
Stoneham, MA

Too Much of Anything...

We felt that we should clarify certain points brought up by Jim Wright of Unicord in the December 1982 issue of *Modern Recording & Music.*

Before the introduction of the Scholz Power Soak™, early model power attenuators damaged amplifiers because they simply diverted power from the speakers without any consideration for the load that the amplifier actually wanted to see. Thus, the output voltage and current would vary considerably from their prescribed levels, and damage could ensue.

The matched impedance design of the Scholz Power Soak™ is what makes it different from the previous attenuators. The load impedance remains at a relatively constant, totally safe level for all Power Soak settings. In fact, the voltage and current output are maintained within ±10% of normal operating values. The point is, from the amplifier's point of view, feeding a Power Soak is no different from feeding a speaker cabinet.

Therefore, if amplifier failure occurs during correct use of a Power Soak, that failure would also have occurred with the amp volume controls at the same settings without any Power Soak.

The Power Soak does permit a musician to set his amp controls on 10, and play at low volume for hours. This could bring out problems inherent in the amplifier. For this reason, the Power Soak instructions have many warnings, including one in large red letters; "Running your amplifier at full power puts maximum stress on amplifier components, thus making any weak parts more likely to fail."

In answer to Mr. Nechvatal's original question, if he connects his amplifiers in parallel, he would need a Power Soak for the output of each amp.

—William Clack
Engineering
Scholz Research & Development
Weston, MA

Frank With Us?

I am interested in Frank Zappa—in his music and recording techniques. Could you tell me what past issues if any he has been reviewed in? I wondered, for example if he'd ever been reviewed in the Profile section of your magazine. If he hasn't already been reviewed, do you think he will in the near future? Any information concerning his recording techniques or music in whole would interest me enormously.

—Kjartan Gudnason
Reykjavik, Iceland

No, we have never run an article on Frank Zappa, and do not have one scheduled for the near future. But who's to say what may come up in the months ahead. If we have an opportunity, we will surely consider an interview with him. Thanks for your interest. Hopefully any article that we publish on him will cover his recording techniques as well as his music.

A Silly Millisecond Longer

I know that your magazine deals mostly in recording techniques, but besides playing in a band, I also run sound from the stage. I had a discussion with someone the other day, and was told that running different length wires to the multiple speaker stacks causes an unbalanced length of time for the signal to transport to the speakers, which in turn creates a muddy or out-of-phase sound. Is this fact true, and if so, how can such a problem be corrected? I have done little work with multiple speaker stacks, but I find I may do so in the near future. A reply to this question would be much appreciated.

—Jack Boucher
Ellicott City, MD

Craig Anderton responds:

I'm no physicist, but I believe that electrical signals travel very fast—about the speed of light (186,000 miles per second). So, let's assume that the speaker wires going to one speaker stack A are one mile long, and the speaker wires going to speaker stack B are two miles long. Therefore, it would take 1/186,000 of a second for the sound to travel to stack A, thus producing a delay of 5.37 microseconds. The delay going to stack B would be 10.74 microseconds (of course, anyone running two miles of speaker cable *desperately* needs a refresher course on PA operation, but that's beside the point right now). Thus, there is about a 5 microsecond (0.000005 second) time

The EV/Tapco Entertainer™

Singer-guitarist Johnny Stewart is one of a growing number of on-the-go performers who are conquering the road and winning new audiences with the EV/Tapco Entertainer. As Johnny puts it, "The Entertainer is the most portable, powerful, professional sound reinforcement system I've ever traveled with—it's worth a truckload of bulky speakers, mixing consoles, equalizers, amps and cables."

Johnny Stewart isn't alone in his praise of The Entertainer. Here's what Ed Schilling of *Frets Magazine* had to say: "The Entertainer is an extremely portable PA system from EV/Tapco that packs the features of more complex equipment into the size and shape of several small suitcases. You can carry around the (Entertainer's) 100M mixing board and two 100S speakers as easily as you can carry spare guitars."

Terrific! The Entertainer is incredibly portable. But what about its sound quality? Once again, Johnny Stewart and Ed Schilling found the Entertainer outstanding.

Johnny Stewart: "I was quite surprised that something so small could give such a big sound. The Entertainer provides a pure sound whether you're ten feet or thirty feet away on any axis."

Ed Schilling: "In actual testing, we found that the 12" speakers delivered a solid low-end, while the high-end potential of the Superdome tweeters wasn't even tapped by instruments such as the guitar or mandolin."

The Entertainer also scores high in versatility and convenience. At a total weight of under 100 lbs., The Entertainer offers 100-watt per channel power, 10 inputs, three-band equalization on each mike input, phantom powering and many other "big-system" features.

"THE ENTERTAINER LETS ME CARRY A TRUCKLOAD OF SOUND IN THE TRUNK OF MY CAR."

To learn more about the EV/Tapco Entertainer and how it can help you put your "Sound in Action" on the stage and on the road, see your EV/Tapco dealer—or send for our new Entertainer brochure. Write to: Greg Hockman, Director of Marketing, Music Products Division, Electro-Voice, Inc., 600 Cecil St., Buchanan, MI 49107

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difference between the signal to the two stacks. Now consider what happens when you feed a 10 kHz signal to the two stacks. The period of a 10 kHz signal is 0.1 millisecond (0.001 second, or 1,000 microseconds). For the two stacks to be 90 degrees out of phase with each other, there would have to be a 500 microsecond delay between the two stacks. As you can see from the above math, even with a two mile cable run, we're talking about a difference of 5 microseconds—creating a phase difference of 1% of 90 degrees, or 0.9 degrees. It's hard to imagine a 0.9 degree phase shift producing a noticeable difference in sound, and the shorter the cable run, the less the phase difference. Thus, at least according to my trusty calculator, I really don't think that wire length is very significant in terms of its effect on the total sound.

—Craig Anderton
Contributing Editor
Modern Recording & Music

You Call This Atonement?

We owe Jeff Tamarkin apologies this month! We neglected to give Jeff a byline on page 45 of the January 1983 issue of MR&M *in the Profile article on Barry Mann and Cynthia Weil, and in the Groove Views column of that same month, in which he reviewed Marvin Gaye's album, Midnight Love. His initials were omitted from the end of the article, and his name was omitted from the list of writers which normally appears at the top of the column (next to the turntable). We have nothing against you, honest Jeff! Editorial slips are not like Freudian slips. They're better made, for one thing. But they're not quite as sexy.*

We also neglected to list the Musical Newsicals column in the Table of Contents, along with its writer, Fred Ridder. Apologies to you too, Mr. Ridder.

Lastly, on page 4 of the February issue, we printed a letter entitled "Uni-Sync: They Stayed Afloat." Well, they didn't. Uni-Sync had formerly been owned by BSR (an English company) as is dbx. dbx took over some of Uni-Sync's stocks as Uni-Sync began to close out, and gradually Uni-Sync closed out entirely. Sorry—you can no longer reach them. If you'd like any more information, you can get in touch with BSR U.S.A. Limited in Blauvelt, N.Y.—914-358-6060.

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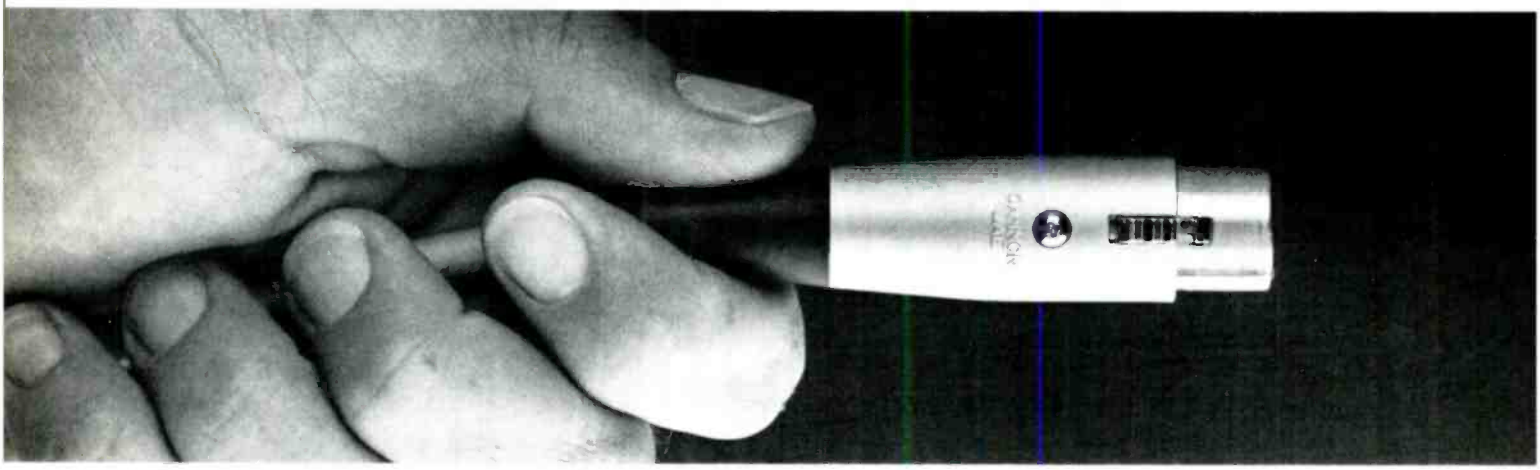
Protect your investment with a cannon.



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An audio connector by any other name is simply not an ITT Cannon audio connector. Which is precisely why so many audio engineers continue to specify Cannon® connectors for use with their audio equipment.

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The AP LNE and AX LNE are specifically designed to handle the special needs of mains and other power supply applications.

For more information, please contact International Products Marketing Manager, ITT Cannon, a division of International Telephone and Telegraph Corporation, 10550 Talbert Avenue, Fountain Valley, CA 92708, (714) 964-7400.

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Getting Your Hands on the Goods

I have had a recurrent disappointment with the products advertised and reviewed in your magazine. For all intents and purposes, they are inaccessible to me. A case in point is the Technics digital recorder in the November issue (SV-P100, page 65).

When I find a local retailer in the yellow pages who claims to carry that brand, he tells me he might stock it, "...in about five years, after the price comes down." The Technics ad has no address, but invites me to send in a reader-service card. If I do, in about six weeks I might receive a form letter and a brochure that is not much more informative than the ad. If I am very lucky, I'll get a list of three dealers east of the Mississippi—the nearest of which would kill a whole day of travel, if I chose to examine the product. Mail to the dealer will be answered in late July, if at all.

In a word, the distribution system for pro' or semi-pro audio products stinks. There doesn't even seem to be a competent mail-order firm around (narrow specialties aside), in spite of a proliferation of pricey catalogs for just about anything else one might want to buy.

The question I would like to see addressed in your pages is: How does the poor reader go about finding and buying products of interest, with a modicum of convenience?

R.W. Jones
Uncasville, CT

In the case of a limited-edition, high-ticket item such as the SV-P100, you're faced with a modicum of in-convenience. *Unfortunately, the nearest Technics PCM dealer is in New York City, some 100 miles from Uncasville (pop. 1,350). Unfortunately for* MR&M *readers who don't live close to large metropolitan areas, a lot of the good stuff just doesn't reach the shelves of the stores listed in the local yellow pages. And we're afraid that anything we say here about the laws of supply and demand won't be of much consolation either.*

As for those ads with no address, and the Reader-Service card system, believe it or not there's some logic to it. Let's take Technics as an example. The Technics (that is, Panasonic) U.S. headquarters is a mammoth complex with several football-field-size parking lots (our way of saying it's a big place). The mailman drives a tractor-trailer, and it could take the better part of a week for your letter to find its way to the right desk.

Enter the Reader-Service card. Your request, along with hundreds of others, winds up at our service center in Clinton, Iowa. (A nice central location, but a long, long way from Uncasville.) Here, mailing labels are prepared and sent to each manufacturer whose products interest you. When the manufacturer gets your name this way, there's no doubt about what it is you want. Hopefully, the information you need will be on its way to you a lot faster than if you had written for it directly.

With one or two exceptions, most manufacturers are better able to respond via the Reader-Service route, since it makes it a lot easier for them to handle a large volume of requests for information.

All this is certainly not as easy as dropping in on your local PCM dealer and getting an on-the-spot demo. But if there's no dealer within 100 miles, or you're just looking for information, the system works pretty well.

If the reply you get is not very informative, it's not the fault of the Reader-Service system. You're getting the same response you would get if you had written directly for product information. If it doesn't tell you what you need to know, get in touch with us and we'll bug the manufacturer for you. And of course, if you have a specific technical question, the system won't help at all. In this case, drop us a line, and we'll try to help in our Talkback or Letters sections.

Schwann Songs

I would like an address or information on how to receive the Schwann catalogue of recordings. Thank you in advance for your help.

—Eddie Sands
Taftville, CT

Send a request to:

Schwann Record Catalogs
535 Boylston Street
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You can also purchase Schwann Record and Tape Guides in record shops throughout the United States and in many foreign countries.

Suddenly, everyone else has to start over.

Series Three from QSC. From this point on, every other power amplifier takes a step backward.

We've designed what will be the standard from which everything else is measured.

Series Three combines high-performance, reliability, and microscopic attention to detail, design and the execution thereof.

Our overall goal was to provide a series of reference-quality professional amplifiers designed specifically for major studios, touring companies and engineered sound installations.

We met our goal. As a matter of fact, we significantly exceeded it.

Take a look at the features of our Series Three amplifiers. High-efficiency circuitry, extended dynamic headroom, true dual-mono configuration, front-removable modular design. And we've packaged it all in a low-profile chassis. More power, less rack space.

We were so impressed with our prototype Series Three amps that we decided to take them into the field for numerous "A/B" listening comparisons. They were compared for audio quality and performance under a wide range of power requirement conditions. As we had expected, the response was overwhelmingly positive. The Series Three amplifiers stood a significant step above the others.

The moral of the story: Why settle for a product that's only outstanding in a few areas? QSC Series Three is a comprehensive design approach that combines exceptional audio performance, solid reliability, state-of-the-art features, and more power in less rack space.

So we urge you to look into our Series Three amplifiers. Because while everybody else is looking where they've been, QSC is stepping into the future.

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TALK BACK

Cable Decision

A friend told me that using shielded cable (like guitar cords) for my P.A. speakers is the same as connecting a giant capacitor across the leads, and is not a good practice. Is this true? How about for headphones?

Also, I am using a pair of Electro-Voice Sentry 100s for playback in my studio, and necessity demands they be laid on their sides. Should the tweeters be put on the inside or outside for the best stereo imaging?

—David Moore
Norman, OK

The use of guitar cords (assuming you are referring to the "coil" type cords) will add some capacitance to the speaker circuit but, because of the low impedance (say 8 ohms) of the speaker circuit, this capacitance would have no effect on the response.

More important is the fact that this type of cord has a very small wire (23 or 24 gauge) that results in a higher DC resistance, and this resistance, since it is in series with the speaker, is a real power robber.

As an example, a wire having a 3.3 ohm resistance and driving a nominal 8-ohm load would rob half (3 dB) the power from the amplifier, and the only benefit (?) would be the heat generated in the wires.

In a practical sense, the larger the wire (10 to 16 gauge,) the less resistance and more of the valuable amplifier power reaches the speaker.

With headphones, there is usually a voltage divider (resistor network) in the headphone circuit to avoid applying the full amplifier power to the elements. Therefore, wire resistance is of little concern.

In regard to the stereo imaging of the Electro-Voice Sentry 100s, there is really no hard and fast rule. If the speakers are close together (say less than 5 feet) a bit more separation would be realized with the tweeters towards the outside.

The final decision would be determined by whatever sounds best to you in your application.

—Joe Katowich
Technical Communicator
Electro-Voice, Inc.
Buchanan, MI

Headphone Junctions

Could you give me some advice/plans on cue headphone junctions for use with, say, 1 to 6 pair of 8 ohm stereo headphones? I have seen junction boxes advertised but I would rather build my own. My Tascam Model 3 has a 1 Watt amp for this, but I assume just plugging in a bunch of headphones would cause problems. I had considered wiring several jacks in series, but I'm not sure that is the solution.

—John Donato
Connellsville, PA

This is a more complex question than it might initially appear. Wiring several jacks in series *might* work if all the headphones are identical, but it's more likely that you'll need to add isolating resistors between the various jacks. So, assuming you have a stereo amp feeding stereo headphones via stereo jacks, the easiest option would be to connect a low value resistor (10 to 100 Ohms) between each jack hot and ring connection and the amp's stereo outputs. The exact value depends upon what types of headphones you're using, how much power output you need, and so on. Damping may also be affected by these resistors.

As to whether a 1 Watt amp will do the job or not, again, that depends mostly on the sensitivity of the headphones. You may be able to drive multiple headphones from a 1 Watt amp, or you may not. According to an applications note written by Dennis Bohn for the Rane Corporation, the typical headphone jack on a hi-fi receiver provides 10 to 20 mW of output power. The power output of a Sony Walkman is about 12 mW. On the subject of sensitivity, the applications note also mentions that with 1 mW of input signal, the SPL can vary from 89 dB with something like the Koss HVX to 131 dB with the Technics EAH830!

For best results, I would suggest building a low power (approximately 1 Watt) amp for each headphone you wish to power, and driving each of these amps from your cue buss output or whatever you normally use to feed your headphones. Project #4 in my book, "Electronic Projects for Musicians" (published by Music Sales), tells how to build a low power, high fidelity mono headphone amp which would be suitable for your intended application if you build two amps for stereo.

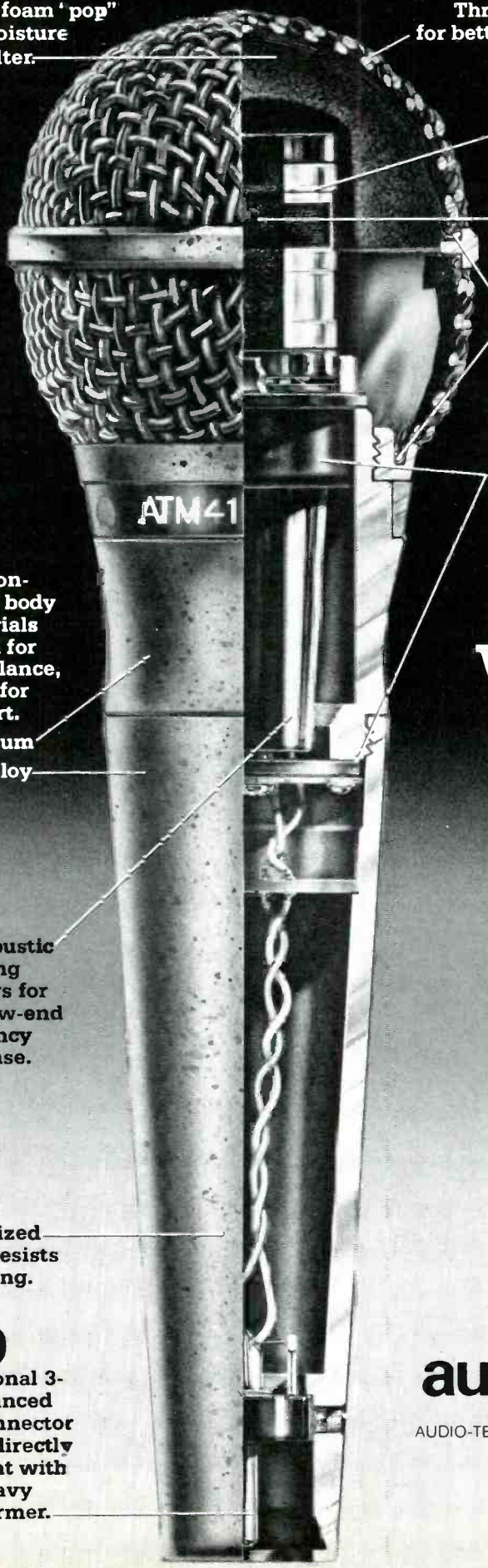
Finally, if you decide to buy rather than build, Rane makes the HC 6 headphone console, which drives six pairs of phones and includes overrideable inputs so that different headphones can have different program material (different mixes, for example). If you build your own headphone console, you might consider including this feature as it seems quite useful.

—Craig Anderton
Contributing Editor
Modern Recording & Music

My Padding or Theirs?

In the September 1978 issue, you presented a Talkback by Rick Chinn ("Tapco Conversion"); in October 1979, one by Brian Roth and Rick Chinn ("Clarifying Comments"); in November 1980 by Will Parry ("An Effective Solution"). Each of these pieces dealt with the padding of microphones, but gave different resistance values.

I am interested in assembling some pads to use with Neumann U-87 and AKG 451 mics. I have a pair of Shure 15 dB attenuators which give me about what I need, feeding through Shure A95 transformers directly to a Pioneer RT2022/2044 deck. My primary recording purpose is that of a Wurlitzer 3/27 theatre pipe organ which has a



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very high level and frequency extremes. For this purpose, condenser mics are ideally suited.

I prefer to use as little outboard equipment and/or connections as possible, any one of which can and do introduce glitches of some sort. I cannot capture a good balance of the organ since it is spread over a wide area, and I need two additional mics and would like to do it in the manner explained above.

I would like to assemble attenuators of 15 dB, 20 dB, and 25 dB to use in various combinations with the 20 dB attenuators built into the Pioneer. The 20 dB with the 10 dB in the Neumanns works fine; however, the AKGs have no pad and I'm in trouble.

AKG specs indicate a load impedance of 500 ohms; I don't know the load for the Neumanns since I don't have the specs. The Shure A95 input impedance is 35-50 or 150-250 ohms (I am using 150-250). Pioneer mic input is 0.11 mV—100 mV/27 K.

Now the crux of the problem: For the best performance in the chain: Which configuration should I use? Which of the values given in the three articles would apply? Why was there a difference in the values in each article in the first place? I would guess that it is based on input and output impedances, although I certainly don't have the electronics background to back up this notion.

Regarding pads

The values given in my 9/78 TALKBACK are my preferred values for pads to be used as you describe. The pads shown in my reply with Brian (10/79) were used to illustrate the general form of a balanced H pad. Since the writer's question was phrased with direct reference to Tremain's Audio Cyclopedia, we (Brian & I) elected to not rock the boat. Therefore, we did not discuss the effect of termination impedance on the microphone. Thus, the values given in the 10/79 reply are taken directly from the Audio Cyclopedia's table on page 236.

In a modern audio system, impedances are NOT matched, they are bridged. There are exceptions, but generally, impedance matching can be ignored. You can plug something that is low impedance into something that is high impedance (it still may not work, due to other reasons, but it is permissible). On the other hand, don't plug something that has a high impedance output into something that has a low impedance output. As long as you do not load the source (sending device) by less than about 10 times its actual source impedance, you are BRIDGING that source. Don't confuse the term "actual source impedance" with the term "load impedance."

The actual source impedance is defined as the impedance looking back into the output terminals. It may or may not be equal to the load impedance. In most modern audio equipment, it is generally about one-tenth the load impedance.

The load impedance is defined as the minimum impedance that the equipment will operate into. This may or may not be equal to the actual source impedance. In most modern audio equipment, the load impedance is about 10 times the actual source impedance.

The advantage is: if you bridge the source, you can take advantage of almost the entire output voltage swing of the source. Since most equipment today is voltage-actuated, bridging will result in almost 6 dB more signal at the input terminals, and a subsequent improvement in S/N.

If you terminate the source with its own impedance (150 ohm source, 150 ohm load), you lose 6 dB of voltage in the process. If you grind through the numbers, you will find that when you do terminate a source in its own impedance, the POWER delivered to the load is at its maximum (power, measured in watts is the product of voltage and current: P = EI). This is fine when maximum POWER transfer is desired. This is also fine if the source demands that it be operated in a terminated (loaded) condition. Passive equalizers and filters are good examples of devices like this.

Most modern microphones (like your AKGs and Neumanns) are not designed to be terminated. Thus, operating them with pads designed for use in a matched system (i.e. input impedance equal to source, output impedance equal to load) may cause changes in the performance of the microphones. Specifically, the changes might be distortion and overload characteristics. Additionally, dynamic microphones may have their frequency response altered.

The values given in my September '78 reply were based on a microphone source impedance of 150 ohms, and a microphone preamp input impedance of 1000 ohms. These values represent the values likely to be encountered in contemporary audio equipment. It was also assumed that the microphone was not to be loaded (in its source impedance), but was to be bridged. Now 1000 ohms is not 10 times 150 ohms, but it is high enough to be considered a "bridging" load.

If you drag out your calculator and massage the keys, you will see that the input impedance of my pads is about 900 to 1000 ohms or so, and the output impedance is about 150 ohms. I feel that this is important for a couple of reasons.

First: there is some controversy as to the audibility of pads. Some engineers claim that you can hear them when inserted into the signal path. By designing the resistive network so that the impedance presented to the microphone is the

Loss	10.09	15.15	20.09	25.4	30.59	34.93	40.09	045	50.43	dB
R_1	600	780	940	940	940	940	940	0940	940	ohms
R_2	390	200	120	62	33	20	11	6.2	3.3	ohms
R_3	0	0	44	94	112	136	150	0150	150	ohms
Z_{in}	880.58	946.67	1047.63	998.67	972.05	959.65	950.9	0946.17	943.29	ohms
Z_{out}	256.58	164.60	152.10	152.66	144.03	155.64	160.89	0156.16	153.29	ohms

Loss = Calculated loss
Z_{in} = Calculated input impedance
Z_{out} = Calculated output impedance

Fig. 1. Calculated resistance values for various attenuation pads.

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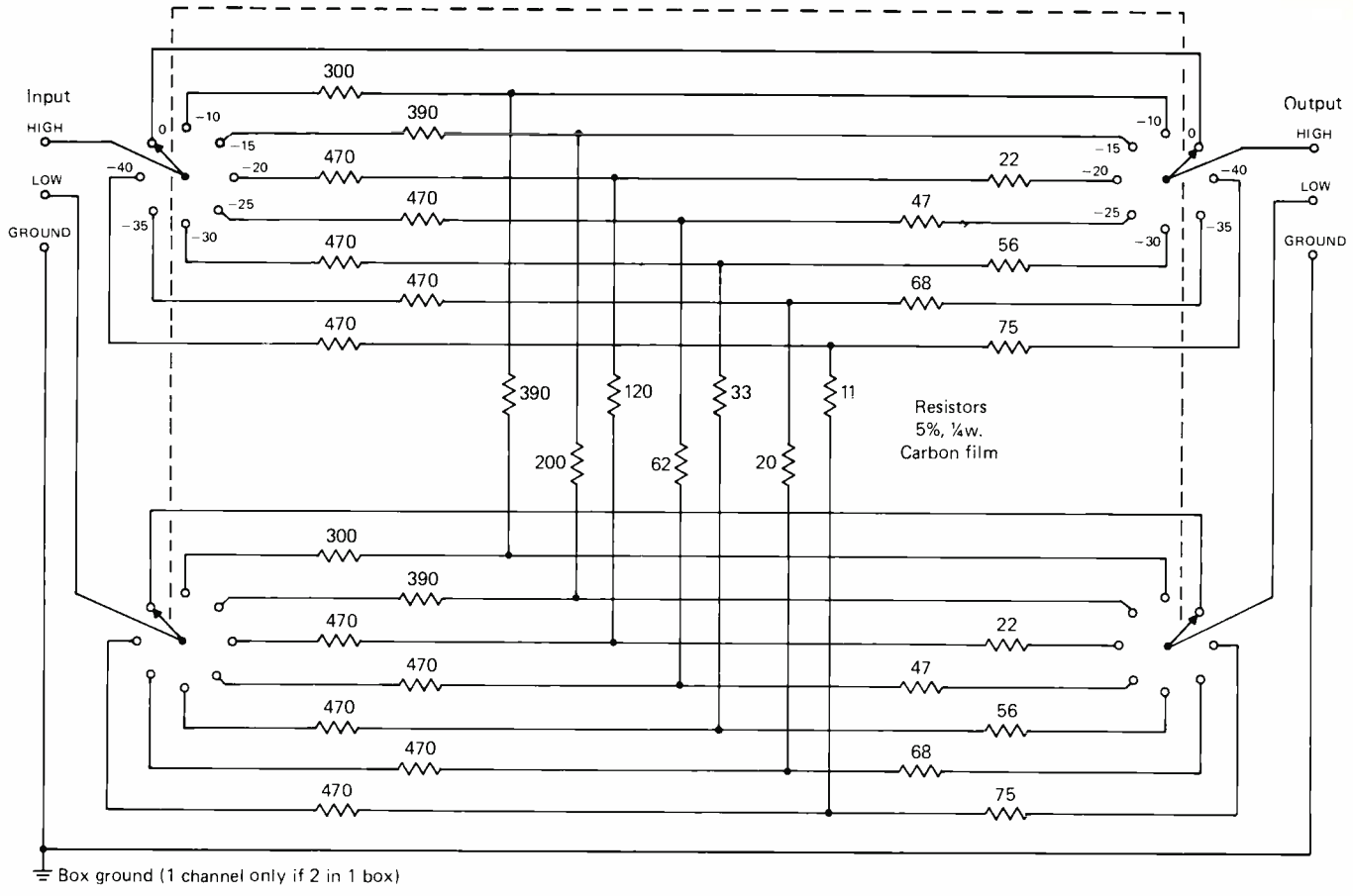

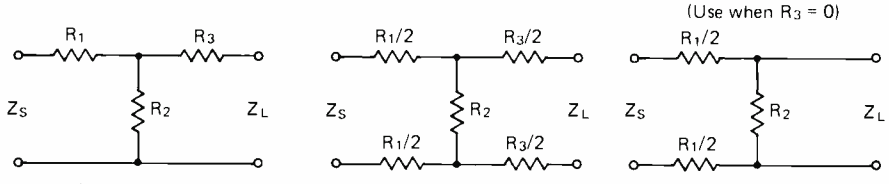

NOTES:
Z_S = Source impedance (150Ω)
Z_L = Load impedance (1000Ω)
10dB and 15dB pads are a compromise between actual input/output impedances and loss.

Fig. 2. A variable attenuator schematic.

same as with no pad, the microphone's operating conditions are preserved, and the "sound" of the microphone should be preserved.

Second: the mixer's input transformer (if used) is designed to see a certain source impedance. Altering this will change the transient response of the transformer/preamp system. Again, by preserving the "no pad" conditions when the pad is inserted, the preamp sees the same source impedance regardless of padding.

The only factor not allowed for in this line of thinking is if the microphone and microphone preamp interact in some fashion. This could be caused by the microphone's output impedance curve or the mixer's input impedance not being flat (i.e. not a resistive load). In either case, the addition of a resistive pad could alter the "sound."

Some Suggestions

After dragging out my calculator, I discovered a 3 dB error in my original calculations. I have enclosed the revised values. I am also enclosing a schematic of a variable attenuator using these values and a rotary switch. I suggest that you build a couple of these and stick them in a minibox with some XLR connectors. Then you can dial up whatever value of attenuation you need.

If you are really feeling courageous, you should get some "real" microphone preamps. I recommend the "Trans-Amp LZ" made by Valley People in Nashville, TN. The Trans-Amp is a transformerless, low impedance, balanced microphone preamp. Its equivalent input noise is extremely close to the theoretical limit. Since there is no input transformer, the low frequency limitations and inherent distortion of the transformer are non-existent. The Trans-Amp is a small epoxy module and applications information as well as complete ready-to-run products are available from Valley People. The gain is continuously adjustable via a pot over a wide range. In their standard circuit, the overload point at minimum gain is somewhere around +8 dBu. Therefore, you may only need a 10 dB input pad, at best. The microphone preamps designed into most consumer tape machines are many times an afterthought. Your present solution represents (to me) a limiting factor to the overall performance capabilities of your microphones. I feel this would be a far superior solution to your problem than a bag of pads.

—Rick Chinn
Contributing Editor
Modern Recording & Music

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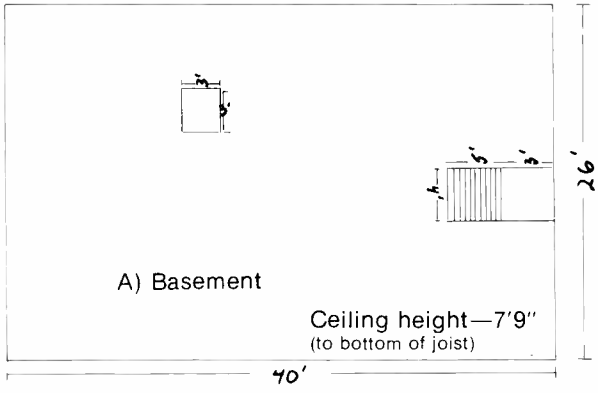
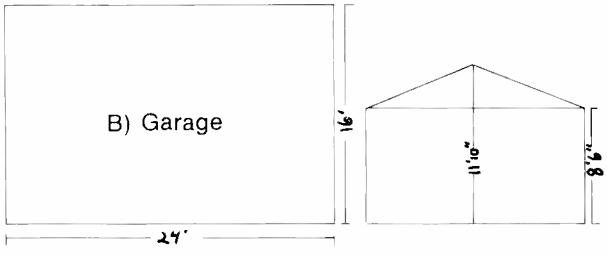
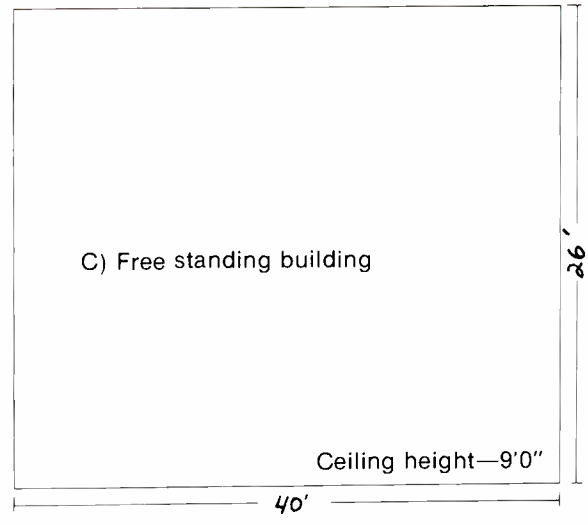
Studio Notebook #13

By James F. Rupert

Hooray! We made it through the tedious details about raising the necessary screaming eagles for your new studio, and it's time to get back to the fun part. (Now that you've got a few grand stuffed into your mattress, don't you feel a little better about it all?) The next project looming before us on the recording horizon is the actual design and construction plan to convert your present basement or garage into a hallowed hall of worship for those who kneel at the altars of the great gods of audio. (I know, I know. I just read that last sentence and I don't believe it either.) In simpler terms, let's figure out what we're going to do before we start swinging a hammer or snipping through 220 volt line conduit pipes.







Reader mail concerning this series of "how-to" installments has been gratifying in its appreciation, but sparse in its suggestions and reader input. We'd like to turn this around and therefore are proud to announce the first-ever-perhaps-never-to-be-repeated-rush-out-and-enter-today Modern Recording & Music *Design-A-Studio Contest! This is a contest designed around you the reader and your knowledge, innovation and practical application of studio design and construction principles. The object is to spread a little of the wisdom possessed by* MR & M's *readership around with those who are puzzled by the seeming intricacies of acoustical engineering and basic carpentry.*

How does it work you ask? Well, by now you've no doubt noticed the line drawings of sample rooms and

their dimensions that accompany this article. We've included a sample basement layout, a garage and an average-sized room in a free-standing older building. Your challenge is to design a basic recording studio into these existing spaces. You can design one room or all three if you so wish. (Is this the fun part? Are we having fun now?) Measurements have been included so that you might transfer the drawings to your own scale to make them easier to work with. This page is not an official entry form, simply the starting dimensions.

Our mail seems to indicate that basement studios are the overwhelming favorite among beginning and semi-pro installations. Notice in the basement drawing we've already provided you with a 4-ft. wide staircase instead of the conventional 3-ft. to make equipment transporting easier. Basement walls are poured concrete in a decorative molded brick pattern. Please also note there is a furnace in the middle of the drawing. It will be up to you how to handle this potentially noisy eyesore, but we will give you the hint that moving it probably will not be practical. To be merciful, we have included no heat or air conditioning ducts in this basement plan. You can custom design the placement of these ducts in an arrangement that will work best for you. Just pencil those babies in on the final drawing.

Please notice in the garage plan that you are suddenly dealing with a slanted roof. If you wish to incorporate this ceiling arrangement into your design, more power to you. Otherwise, you can plan a basic flat ceiling at the 8 ft., 6-in. level.

This garage also has a sad lack of duct work in it. This is because our problematical garage has no furnace or air conditioning units built into it. This also is a problem that your creative imagination can deal with in any way you see fit. If you decide to run ducts from the adjacent house, that's great. Maybe self-contained units somewhere in the garage building is more to your liking... It's entirely up to you. (We're talking fun here!)

The same holds true with the free-standing building design. Ventilation, windows, interior wall placement, entry doors, rest rooms, office spaces, reception area—all of this is at the whim of your judgement.

Regardless of which floor plan(s) you choose to work on, please state rough material costs if you know or can verify them. Neatness will not count as much as innovation and reasonable economy measures. If you are using acoustical formulae in your computations (bass trap dimensions, absorptive qualities, reverberation time), please show your work on a separate sheet. The object is for all of us to learn from each other. In addition to these three floor plans, if any of you have an unusual, clever or unique design that you've already used in your own studio, give us all a peek at them as well. Share the wealth, if you please.

Equipment installation and selection is not necessary in your designs, but could be a lot of fun to try. If you're in the mood for such fun, remember to keep your equipment drawings to the same scale as you've drawn your room plans. 24-track elephant recorders rarely fit into phone booth-sized control rooms.

In these floor plan examples, there is no excess noise or electrical interference problems in the neighborhoods the buildings are situated in. All buildings lie approximately 50 feet from the street, where noise levels fall in the 45 to 60 dB volume range. In no way are we withholding information or trying to trip you up with special conditions or circumstances. If additional information is needed, drop me a note here at MR & M. I'll try to help in any way I can. That way, it'll be fun for all of us.

For those of you inwardly protesting, "But I'm not an architect!", let me politely ask, "Who were you planning to have do the design for your studio?" You don't have to be an architect, but you do have to do your homework. If you can afford the big money an architect will charge to lay out your studio design, then you don't need to be reading this. (If you do have such funds, just give me a call personally. We'll take your problems—and your big money—off your hands simultaneously!)

To gain a headstart on the art of audio recording studio design, hop in the Studebaker and head for your local library. Some recommended literature would include Acoustic Techniques For Home and Studio and How To Build A Small Budget Recording Studio From Scratch by F. Alton Everest, Building A Recording Studio by Jeff Cooper, and The Recording Studio Handbook by (smile when you say that) John Woram.

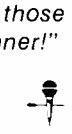
Winning entries will be published in MR & M and their designers will also receive a copy of George Martin's marvelous book, All You Need Is Ears. There can be more than one winner for each floor plan, so don't think your ideas don't stand a chance. Remember, our intention is to see who can do the most effective job for the least amount of money.

Since this contest is hardly a project to be whipped out on the odd Sunday afternoon during breaks in the roller derby match, we'll leave it open to entries for the next three months. Who knows? A winning design might be crouching right now in your no. 2 lead pencil, screaming to be let out on paper!

So good luck to all of you. All entries will be reviewed by the staff of MR & M, certified architects and acoustical engineers. Once submitted, all entries become the property of MR & M Publishing Corp. and cannot be returned. Submission to the magazine constitutes release by the contributor for possible publication by MR&M magazine.

So c'mon! Give it a try. Think of it as your chance for immortality. Send your entries to Design Contest, Modern Recording & Music, 1120 Old Country Road, Plainview, Long Island, New York 11803. If you can, send along a snapshot of yourself to accompany your published design should you win. In the words of those sweepstakes guys, "You might already be a winner!"

See you next time.



The Augmented "Effectron"

by Craig Anderton

The Effectron, profiled in *Modern Recording and Music*'s November 1982 "Notes" column, is a cost-effective digital delay with many useful features and good sound quality. This article describes how to make it even more versatile by adding the following features:

• *Vibrato pedal jacks.* With any standard volume pedal, this option lets you bring vibrato effects in and out smoothly and will create more randomized flanging and chorusing sounds. You may also slave two units together using the TO PEDAL jack, or send other control voltage patterns into the Effectron via the FROM PEDAL jack.

• *Increased vibrato speed.* This lets you obtain vibrato speeds above 10 Hz.

• Feedback-loop jacks. This option lets you insert equalizers, wa-wa filters, phase shifters, pitch shifters, etc. in the regeneration path. We'll discuss the importance of this under *Applications.*

• *Stereo simulation.* Using the FEEDBACK-LOOP SEND jack, a signal panned oppositely from the standard output will create various kinds of stereo simulation from a mono signal.

• *Infinite repeat footswitch.* This supplements the front-panel INFINITE REPEAT switch, and lets you bring the infinite repeat effect in and out via a footswitch.

If these sound like features you'd like to have (I sure did!), then read on.

Cautions

If done properly, a modification can greatly enhance the usefulness of a unit...but if done poorly, you may permanently damage the unit you're modifying. The modifications described in this article have been thoroughly checked out, and they will work *IF* you're patient and careful. Naturally, you're going to void the warranty as soon as you start cutting traces and drilling extra holes for jacks, so proceed with great caution—and don't expect much sympathy from the manufacturer if you damage the unit while trying to modify it.

I should add, though, that DeltaLab has certainly produced an extremely durable unit. There were many times a test probe slipped, or I hooked the wrong wire to the wrong place (resulting in sparks and horrible sounds), yet the Effectron carried on like a real trooper. I mention this not so that you'll feel cocky and ignore the previous paragraph but rather to let you know that if you're careful, the Effectron will meet you halfway.

A final caution: *manufacturers are not set up to perform custom services.* If you like these modifications, but lack the technical expertise to do them yourself, consult a local electronics shop which deals with repair and modification. Calling or writing the manufacturer about modifications will only waste your time and theirs.

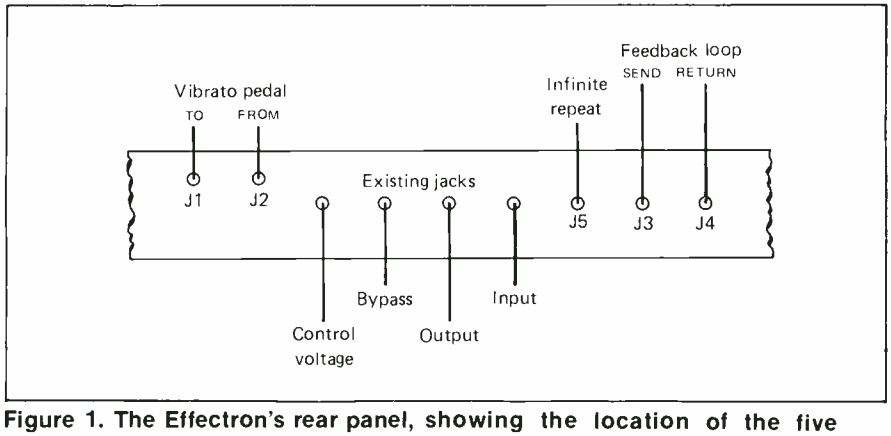


Figure 1. The Effectron's rear panel, showing the location of the five new jacks.

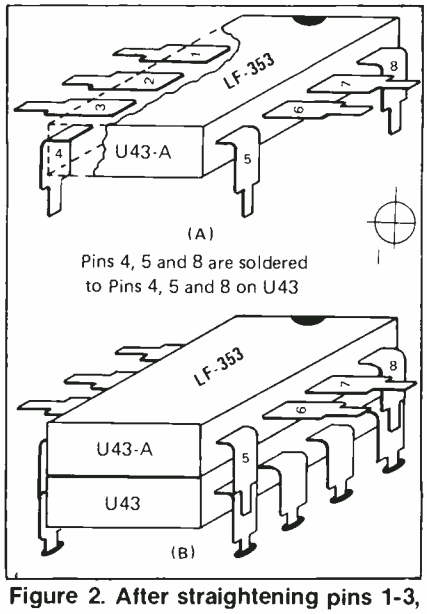


Figure 2. After straightening pins 1-3, 6 & 7, solder pins 4, 5 & 8.

What You Will Need

The first thing you will need is a fine-tip soldering *iron* rated at no more than 25 to 40 watts, preferably with a grounded tip. This is an important consideration! If you use a soldering *gun*, or a heavy-duty iron, you can kiss your unit goodbye. You'll be doing some very fine work, and you need the right tool.

All required parts are available from Radio Shack, including: three open circuit ¼-in. phone jacks, two closed-circuit ¼-in. phone jacks, two LF353 dual op amp ICs, one 1 k ¼-watt resistor, two 2.2 k ¼-watt resistors, two 10 k ¼-watt resistors, one 100 k ¼-watt resistor, one 470 k ¼-watt resistor, a few feet of thin shielded cable, hookup wire, solder, drill with *sharp* ⅛-in. and ⅜-in. bits, small pliers, and small diagonal cutters. Ready? Let's go!

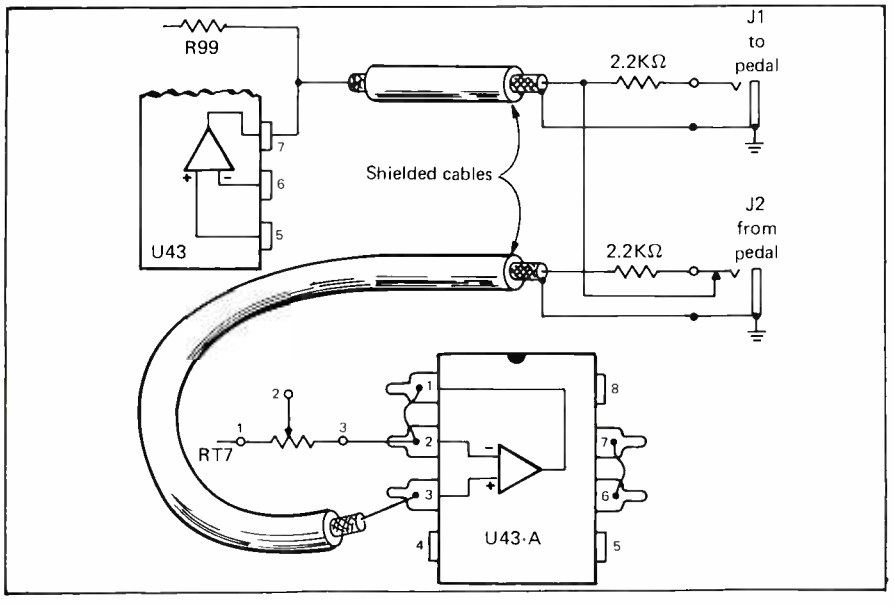


Figure 3. Wiring details for U43.

Taking It Apart

First things first: *Make sure the unit is unplugged before you do any work on it.* Next, to gain access to the circuit board, remove the six upper and six lower screws holding the upper and lower panels in place. Note that all parts designations are screened on the component (top) side of the board, which makes life much easier.

Drilling Holes

You will need to drill five ⅜-in. holes on the rear panel. Fortunately, there's plenty of room, so you shouldn't have too much trouble with this part of the operation. However, as you drill be *extremely* careful that the bit doesn't damage any of the components mounted on the circuit board. Drill pilot holes first with the ⅛-in. bit before drilling the ⅜-in. holes for the jacks.

Viewed from the rear (see *Figure 1*), add the vibrato TO (J1) and FROM (J2) PEDAL jacks to the immediate left of the CONTROL VOLTAGE INPUT jack. This is a tight fit; drill the holes so that the jacks may be installed as high up as possible so that they don't interfere with components on the circuit board. Be very careful not to damage C48, C49, and C50 as you drill. By the way, you might be tempted to mount the jacks further to the left (next to the power supply) where there's more room. *DON'T!* There's high voltage running around there and you don't want any part of it.

Drill and mount the INFINITE REPEAT (J5) jack and FEEDBACK LOOP (J3,J4) jacks to the right of, and on a line with, the existing jacks. Remember, drill carefully.

Increasing Vibrato Speed

In some instances, you want vibrato at a faster rate than the 10 Hz top end provided by the Effectron. Simply locate resistor R92 (it's about 2 inches behind the speed pot), and solder a 470 k resistor in parallel with it. This shifts the range of the speed pot very slightly upwards.

Installing the Vibrato Pedal Circuitry

Viewed from the front panel, locate the right-most lug (lug 3) of potentiometer RT7—the modulator section's WIDTH control. On the bottom of the board, a trace goes from this lug to the end of R99 closest to the front panel. Break this trace at its midpoint using an X-acto® knife or equivalent tool.

Next, take an LF353 op amp, and straighten out pins 1, 2, 3, 6, and 7, as shown in *Figure 2A*. We'll call this IC U43-A. Mount it piggyback on top of U43 (which is about 1 inch behind the

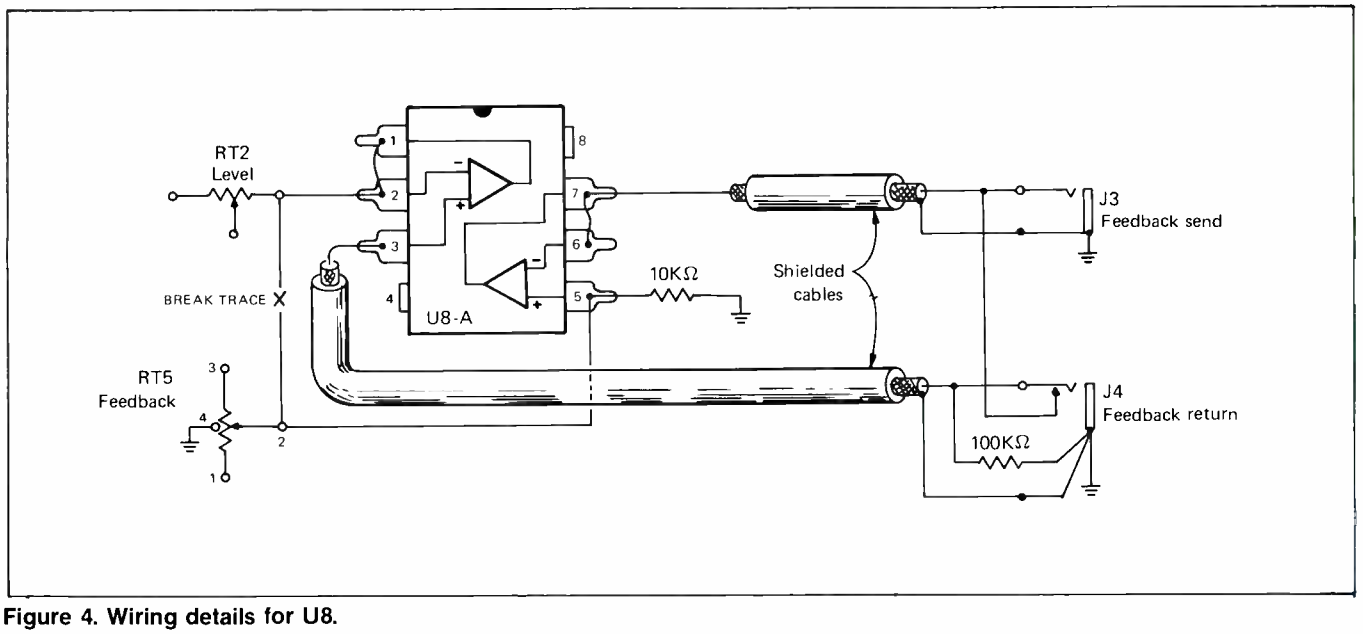


Figure 4. Wiring details for U8.

modulator section) and solder pins 4,5, and 8 to the corresponding pins on U43 (see *Figure 2B*). In order to not overheat either IC, solder quickly and carefully, and tin all connections before soldering.

Now let's proceed to wiring; refer to *Figure 3*.

Prepare a length of shielded cable by stripping the insulation from one end, and the insulation *and* shield from the other end. Connect the end without the shield to the end of R99 closest to the front panel. Connect the other end to one end of a 2.2 k resistor, and attach a short piece of hookup wire to this junction. The other end of the 2.2 k resistor connnects to the hot lug of J1, while the other end of the hookup wire connects to the switching connection of J2. Connect the cable shield to J1's ground lug.

Now run a wire from lug 3 of RT7 to pins 1 and 2 of U43-A, and while you're at it, solder pins 6 and 7 of U43-A together. This disables the other half of U43-A, which is not used.

Prepare another piece of shielded cable as described above (only one end of any shielded cable we'll be using should have the shield connected). Connect the hot wire from the end without the shield to pin 3 of U43-A; connect the other end of the hot wire to a 2.2k resistor, whose other end connects to the hot lug of J2. Connect the shield from this cable to J2's ground lug, and there you have it—vibrato pedal jacks.

Installing the Feedback Loop Circuitry

Take another LF353 op amp, which we'll call U8-A, and prepare as shown in *Figure 2*, except this time, also straighten out pin 5. Solder pins 1 and 2 together, as well as pins 6 and 7. Solder U8-A piggyback on top of U8, and solder pins 4 and 8 of the two ICs together (similar to *Figure 2*, except don't solder pins 5). You must tin pins 4 and 8 on both U8 and U8-A before soldering. Be careful when soldering pins 4 together not to fry the nearby R43. This operation will forcefully bring home the reasons for using a fine-point soldering iron.

Now, looking at FEEDBACK pot RT5 from the front panel, locate the second lug in from the left (lug 2). A trace on the bottom of the board connects this lug to the lug on RT2 closest to the *rear* panel. Break this trace at its midpoint, using the techniques mentioned earlier.

Referring to *Figure 4*, run a wire from lug 2 of RT5 to pin 5 of U8-A. It's almost impossible to solder to the pot lug itself, so I'd recommend soldering this wire on the *bottom* of the board to the trace emanating from lug 2. Note that you'll have to scrape off some of the green solder-mask material in order to be able to solder to the trace; scrape *only* until you see the bright metal shining through. Solder the wire to this trace, and work the wire between the circuit board and front panel so it comes out on the top side of the board, just to the left of RT5, and then connect it to U8-A (pin 5). Also, solder one end of a 10 k resistor to lug 5 of U8-A, and connect the other end of the resistor to ground. To find a convenient ground pad, locate C28, which is between C2 and the front panel (C2 is right below pins 4 and 5 of U8). When viewed from the front panel, the left-most lead of C28 connects to ground. Solder the other end of the 10 k resistor we just installed to this lead.

Next, solder a wire from the terminal of RT2 which is closest to the rear panel to pins 1 and 2 of U8-A. Now prepare two pieces of shielded cable as described earlier. Connect the hot lead of one cable to pins 6 and 7 of U8-A; connect the other end of the hot lead to the hot lug of J3, the FEEDBACK LOOP SEND jack. The shield from this piece of cable connects to J3's ground lug. Also, connect a piece of hookup wire from J3's hot lug to J4's switching lug.

The hot lead of the other shielded cable connects to pin 3 of U8-A. The other end will be connected to the hot lug of J4, but don't do this yet. First, connect one end of a 100 k resistor to J4's hot lug, and then solder the shield cable's hot lead to J4's hot lug. The other end of the 100 k resistor, as well as the shield of the shielded cable, gets connected to J4's ground lug. The feedback loop circuit is now complete.

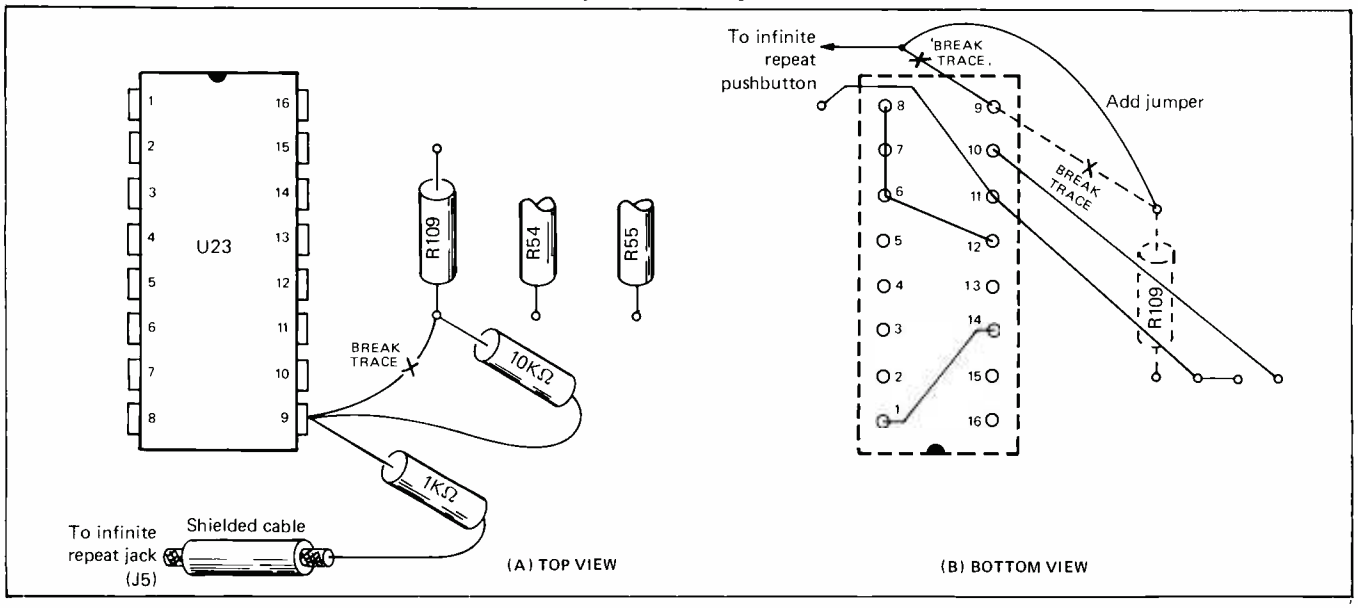


Figure 6. Wiring details for U23.

Infinite Repeat Jack

We're almost done. Locate IC U23, which is slightly to the right of the middle of the circuit board when viewed from the front panel. Note the trace on the top of the board which connects pin 9 of U23 to R109. Break this trace (see *Figure 5A*). Now flip the unit over and locate pin 9 of U23 on the bottom of the board. A trace goes from this pin to the INFINITE REPEAT pushbutton. Break this trace and then solder a jumper wire to R109 on the bottom of the board, as

shown in *Figure 5B*.

Now, on the top of the board, solder a 10 k resistor from pin 9 on U23 to R109. Also attach a 1 k resistor to pin 9 (see *Figure 5A*). Again, solder quickly and carefully, since you're soldering very close to the IC. Prepare a piece of shielded cable. The hot lead goes to the free end of the 1 k resistor we just installed, while the other end of the hot lead goes to the hot lug of J5 (INFINITE REPEAT jack) and the shield connects to J5's ground lug. That's all there is to it. Make sure none of the leads are shorting out to any other wires or components.

Applications

Now comes the reward. Plug in the Effectron, but don't patch anything into the new jacks just yet. The unit should work exactly as it did before. If you experience any trouble, immediately turn the power off and recheck your wiring. One possible source of trouble might be the closed-circuit jacks; make sure that the switching action works properly.

• *Using the vibrato pedal jacks.* Any standard volume control-type pedal will work with these jacks. I use a PAIA/DeArmond, but have also used Goodrich photocell pedals as well. Patch J1 to the pedal input (also called "instrument"), and J2 to the pedal output (also called "amp").

When you want vibrato, push down on the pedal, and when you don't, pull back. Note that the front-panel WIDTH control acts as a master depth control for the pedal. So, if you only want a little vibrato, keep the width control trimmed back. If you want a dramatic warble, turn up the width.

These jacks have other uses as well. To slave two modified units together, run a patch cord from J1 on the master unit to J2 on the slave unit. Any modulation applied to the master unit will also be applied to the slave unit, and the slave unit's internal modulation will be automatically disconnected. Of course, you could also throw an inverter stage in between the units so that they sweep in opposite directions, or use J2 as an external control voltage input from some other modulation source.

Another way to use a footpedal is to add a randomizing effect to the sweep. Bring the pedal in and out with the music, and you'll be selecting different portions of the modulation signal rather than the usual, continuous whoosh-whoosh-whoosh.

• *Using the feedback loop jacks.* Patch J3 to an external effect's input, and J4 from the effect's output. Typically, you would use a filter or equalizer to reduce high frequencies or introduce response anomalies. However, a wa-wa or envelope-followed filter also give some great effects, especially if you can voltage-control the filter with something exotic, like a sample-and-hold waveform. Phase shifters are good candidates for patching into these jacks as well.

For simulated stereo effects, patch the regular output to one channel and the FEEDBACK LOOP SEND jack (J3) to the opposite channel. It will take some experimentation to find the best effects, but the results will be worth it. Most of the time you'll want to set the delay mix and feedback controls oppositely—in other words, if the delay mix is turned halfway clockwise, then turn the feedback control counter-clockwise. Note that the output from the channel fed from the SEND jack may be louder than the output from the normal channel; trim the channel faders for best results. Remember, experimentation is the key. Also remember that this is SIMULATED stereo, so cancellation effects may occur when in mono. As a result, simulated stereo is most useful "live," but if you're careful to check for cancellation, it can work while recording or mixing down too.

• *Infinite repeat jack.* Patch any standard hot-to-ground closing footswitch into J5 and depress the front-panel INFINITE REPEAT pushbutton. When the footswitch is shorting the hot connection of J5 to ground, you'll be out of the repeat mode. When the footswitch is open, you'll be in the repeat mode. Setting the delay time to a submultiple or multiple of the song's tempo, and bringing infinite repeat in or out on the beat, adds a musically useful effect with much potential.

So there it is...the Augmented Effectron. I hope that you enjoy these extra capabilities as much as I have. They've certainly added a whole new dimension of applications to an already useful and cost-effective unit.

THE PRODUCT SCENE

PEARL OF A SOUND PROCESSOR

Pearl International, Inc. has introduced the Sound Choice Series. The series consists of a Chorus Ensemble, Analog Delay, and Phaser. The Chorus Ensemble (CE-22) features dual programmability with stereo output, user-variable chorus rates, and delayed vibrato. This delayed vibrato may be varied in rate, depth and delay time. The Analog Delay (AD-33) is a complete electronic delay device using a BBD (Bucket Brigade Device). The AD-33 provides stereo output, time variation effects such as delay, echo, reverberation, and voice doubling, and reduces poor transient response. The Phaser (PH-44) provides maximum control of phasing effects from peak to dip locations. Slow phasing rates (0.3 to 0.8 Hz), fast phasing rates (6 to 8 Hz), and rotating speaker effect are features of the PH-44. The rate change of the rotating speaker effect is not instantaneous, but winds up and winds down.

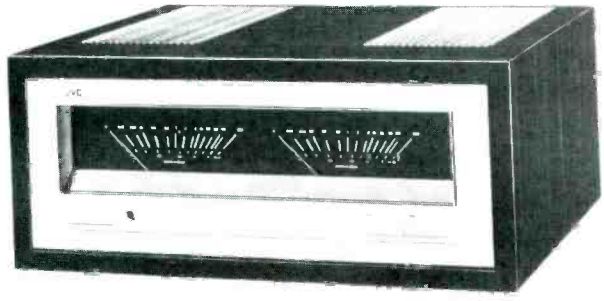
Circle 32 on Reader Service Card

FOSTEX REVERBERATION UNIT

Fostex's new two-channel reverberation unit, the Model 3180, features a multiple spring design and a delay matrix. There is a built-in delay before the signal reaches the spring transducer. This delayed dry signal is then added to the reverberated signal at the output via a matrix system. Other features of the 3180 are an LED overload indicator located just before the drive circuit for effective level matching, built-in limiter, independent reverb and dry mix controls, remote jack for foot switch operation, and both front and rear panel inputs/outputs.

Circle 33 on Reader Service Card

JVC's POWER AMPLIFIER



JVC's power amplifier, the Model M-L10, achieves a low distortion rating through its Power Cascode Super-A circuitry. Voltage is stabilized through an active Bias Circuit used in the Super-A design. Specially developed power transistors feature low voltage, high current linearity and low saturation.

The M-L10 delivers 160-watts per channel, minimum RMS, both channels driven into 8 ohms from 20 Hz to 20 kHz, with no more than 0.002% total harmonic distortion.

Additional features include a pair of wide-range, quick-response meters to monitor the power output for 8-ohm loads, connections for two pairs of speakers, and a polished rosewood cabinet.

Circle 34 on Reader Service Card

PROTECH'S MICROPHONE PREAMPLIFIER

Protech Audio Corporation has introduced a new dual channel microphone preamplifier with built-in compression or limiting. The new configuration of the Model 72509 eliminates first stage overload. The 72509 features two independent channels with built-in mic input transformers, adjustable gain and threshold settings, and offset trim. The amplifier circuitry is built around low-noise, fast slewing op-amps, with all decoupling and reverse polarity protection components built-in. The unit can be mounted in any of four different Integra III enclosures.

Circle 35 on Reader Service Card

ALTEC-LANSING'S LOW LOW FREQUENCY SPEAKERS

Altec Lansing recently announced the introduction of a new generation of 12-, 15- and 18-inch low frequency speakers and matched, tuned enclosures for pro audio and sound reinforcement applications.

Designed as integral systems, the speakers of the new Altec 3000 Series were developed in conjunction with the matching 8000 Series loudspeaker enclosures. Each speaker in the new Altec line is engineered for a specific sound application. The six new woofers include three extended low frequency models: the 12-inch 3124, 15-inch 3154 and the 18-inch 3182; and three high efficiency speakers: the 12-inch 3127, 15-inch 3156 and the 18-inch 3184. The optimally tuned enclosures range from the 1.5 cubic-foot 8127 to the 24 cubic-foot 8182.

The long voice-coil geometry of the 3000 Series reduces distortion by increasing the diaphragm's linear motion, and boosts power handling through increased heat dissipation.

The 12-inch 3127 has an enclosure size of 19-in. x 16-in. x 14¾-in. with a frequency response down to 70 Hz (-3 dB) when coupled with the Altec 8127 enclosure. At the other end of the spectrum, the 18-inch 3182 delivers response down to 23 Hz (-3 dB) when paired with the 24-cubic-foot 8182 enclosure. A high power solution for system requirements falling between low frequency response and compact dimensions is the 3156/8156 combination, delivering high SPLs down to 60 Hz in a mid-size box.

Circle 36 on Reader Service Card

NEW ELECTRONIC CROSSOVER

BGW Systems' Model 5015 PROLINE™ Electronic Crossover is a compact, one unit-high rack mount package of all welded steel construction. It is configured as a two-channel, two-way stereo crossover with fixed subsonic filters. It is easily convertible into three-way mono. All input and output connections are via ¼-in. phone jacks.

The BGW Switchset™ capability provides precise settings for frequency switching at 300, 500, 800, 1000, 1200, 1400, 1700, and 1900 Hz.

The 5015 also has low-noise design to insure the quietest operation possible. Its low impedance output stage will drive loads of 600 ohms or greater. Total Harmonic Distortion is less than 0.05% (typically 0.005%). ***Circle 37 on Reader Service Card***

IBANEZ PARAMETRIC EQUALIZER

The Ibanez PQ9 parametric equalizer contains a wide-ranging (75 Hz to 5.6 kHz) sliding filter along with fixed high and low shelving-type filters. Each filter provides up to 15 dB of boost or cut. An infinite range of settings, from mild tonal changes to extreme frequency modifications, are easily obtainable. The PQ9 also features an LED indicator, a quick-change battery pocket and the Ibanez exclusive Q-1 noiseless electronic switching system. It is housed in a zinc die-cast case and may be powered by a 9-volt battery or an optional AC adapter. ***Circle 38 on Reader Service Card***

DIGITAL DELAY UNIT

KLARK-TEKNIK's new DN700 Digital Delay Unit is the first of a series of products primarily designed for engineered sound systems including theaters, conference centers, and multi-media installations. The DN700 is a single input device with three independently adjustable outputs. All operations are controlled by a microprocessor, and the delay time for each output can be varied from 0 to 435 ms in 26.5 microsecond steps. It has a perpetual memory of all delay settings and features a lock-out system to prevent tampering with front panel controls. In-house designed A/D-D/A converters give a 15 kHz bandwidth at maximum delay, with a dynamic range greater than 86 dB. The DN700 is housed in a compact 1U (1¾ in.) package, and can be supplied with transformer balanced inputs and outputs.

Circle 39 on Reader Service Card

YAMAHA'S MIXER

Yamaha Combo Products' entry into the recording mixer business was confirmed with the introduction of the RM 1608, a mixer designed by Yamaha for recording and recording studio applications.

The RM 1608 has 16 input channels, each with an electronically balanced XLR mic input and an unbalanced RCA jack tape input. Two switch-selectable banks of output jacks are provided for the eight main program mixing buses, numbered 1-8 and 9-16. This enables 16-track recordings to be built up in successive overdubs without re-patching. Separate 2-track tape inputs and outputs are provided for mixdown and monitoring of the stereo master tape.

Some of the convenience features of the RM 1608 are the "Multi-track" mode, in which individual inputs may be switched to tape or mic; a "mixdown" button which selects tape return on all channels and simultaneously assigns these channel outputs to the stereo mixing bus. This allows for instantaneous changeover from overdubbing to mixdown of multi-track tapes. The RM 1608 has built-in phantom power for condenser microphones, including individual switches for each channel. A switchable pad and separate gain trim control enable mic sensitivity to be optimized for levels from -70 to -20 dB, which covers almost all mics and electric instruments as well as many line level sources. The three-band, multi-frequency channel EQ and high-pass filter each have bypass switches, so the direct outputs can be used for one input to one track to record with the fewest line amps. The RM 1608 will be available in April, 1983.

Circle 40 on Reader Service Card

NEW BLANK AUDIO TAPE

Magnetic Tape International (MTI) is marketing its new blank audio tape line in two versions: one a high energy, ferric oxide line and the other, a low noise series in cassette and eight-track. The high energy line is available in C-45, C-60, C-90, and C-120 lengths in cello wrap, blister card and multipack Philips boxed bags. The Philips boxed bags come in two-pack C-60, three-pack C-60, and two-pack C-90. Also available are twelve-pack C-60 and twelve-pack C-90 storage and display boxes.

Included as part of the high energy line is a C-30 blister carded mini cassette and a C-30 blister carded microcassette. The extra low noise audio cassette line consists of C-45, C-60, C-90 and C-120 lengths in cello and blister carded cassettes. Cassettes are bulk-packed in polybags in two-pack C-60, three-pack C-60, two-pack C-90 and three-pack C-90. The low noise product line also includes 45- and 90-minute eight-track cartridges in two-pack poly bags.

Circle 41 on Reader Service Card

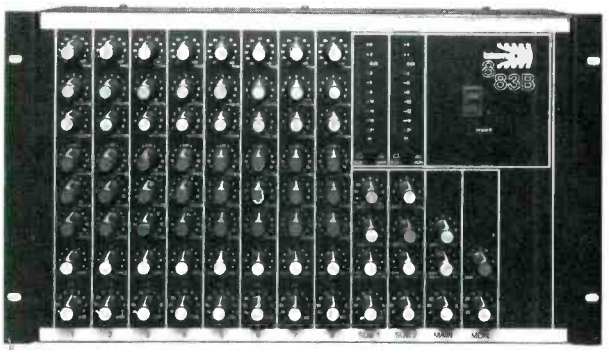
DYNACORD DIGITAL REVERB ECHO UNIT

Dynacord's DRS 78 digital reverb echo unit produces delay and echo effects as well as real sounding reverberation for studio and stage. The unit works fully electronically, pure digital, without mechanical moving parts, and no bucket brigade delay. The incoming signals are converted into 12-bit data words and into a 100,000 bit memory. The signal-to-noise ratio is comparable with studio units. Phase-shifted signals are available at the left and right outputs in order to create a multi-dimensional, special reverberation effect (only with 2-channel systems).

The unit is divided into three sections: an original section with input channel (series connected preamp); an echo delay section with three delay controls adjustable from 7 to 320 msec with 3-digit 7-segment LED display; a reverb section with 4-step delay control for dead time (interval between original and initiation of reverb = 0-25-50-75 msec.), decay switch, reverb duration and reverb return controls.

The universal layout of the inputs and outputs makes it possible to use the unit as a preliminary component, to connect it at effect insertion loops, or to connect as an intermediate or follower unit. Remote control is provided for echo/reverb return, echo/reverb switch-over, and echo delays. ***Circle 42 on Reader Service Card***

EIGHT-CHANNEL BOARD



Biamp Systems has just added an eight-channel version to their 83B Series mixers. The 883B is a compact, low-noise board with some high-tech features. Biamp has developed new system architecture and circuit topology, with discrete transistors in critical areas instead of conventional ICs, resulting in 25 to 50% less noise than most comparable mixers. Total harmonic distortion has been reduced to new low levels, while hum and cross talk have been virtually eliminated by condensed, symmetrical circuit board layout techniques. All components are accessible for servicing. High-density mechanical packaging allows the 883B to be used as a rack mount or consolette without compromising connector placement.

The board also has floating and balanced outputs incorporating Biamp's "Autobalance," metering on all outputs, separate reverb control in the monitor, reverb routing into the subs, three-band equalization, and ten-segment LED output display.

Circle 43 on Reader Service Card

BGW PROLINE POWER AMPLIFIER

BGW's PROLINE™ Model 7000B power amplifier is an improved and updated version of BGW's Model 7000, which was introduced in October, 1981. The Model 7000B features a new chassis design incorporating a separate power supply compartment and improved structural strength. It also has a new electronic short-circuit protection—the same type circuit as used in the BGW 750 professional power amplifier series. A two-speed fan control circuit has also been added to the Model 7000B.

Thermostatic switches are wound into the power transformer to protect the power supply from failure. The 7000B also features DC speaker protection; in case of amplifier failure there will be no damage to loudspeakers.

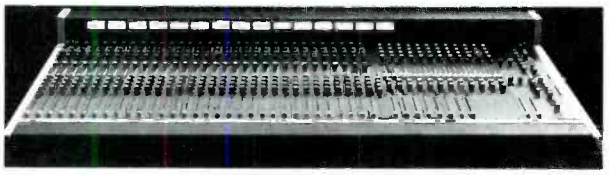
Circle 44 on Reader Service Card

TWO CHANNEL SWITCHING AMPLIFIERS

Marshall's Models 2210 and 2205 amplifiers offer 100 watts and 50 watts respectively. The new units have two different channels. One creates the traditional Marshall raw distortion sound, and the other offers a "clean" sound which is activated by a remote footswitch and enables the performer to step into another mode of intonation. The Marshall boost channel has the following controls: gain, volume, bass, and treble. The Master section is equipped with Master Volume, Presence and Reverb controls. The back panel has an effects send and return loop and a direct line out with level control, which can be used to interface to mixing boards in live playing situations or as a direct line during studio recording.

Circle 45 on Reader Service Card

RECORDING CONSOLES FROM AUDIOARTS



Audioarts Engineering's R-16 and R-24 Series are modular plug-in design consoles intended for 8 and 16 track recording. With the addition of R-24 expander modules, 24 track recording can also be accomplished. The consoles employ separate input and group/output modules. The R-16 and R-24 consoles have four individual channel cue/effects feeds and two cue/effects bus foldback controls to accommodate musicians with varying cue requirements. Standard input module features include three-band fully sweepable equalization, switchable phantom power, phase switching, HPF, left-right and odd-even bus assignment, four effects/cue buses, and exclusive Audioarts Engineering M-104 precision conductive plaster linear faders. Console systems include LED clip overload indicators throughout the signal path, separate effects send and return modules, master left and right output modules, and a special CS-8 control module housing full studio, control room and headphone monitor, talkback, slate, oscillator, and solo functions. Frequency response is from 20 Hz to 50 kHz (±½ dB); THD: 0.005%; Dynamic range: 110 dB.

R-16 and R-24 Series consoles are available in 24, 32, and 40 input mainframe sizes.

Circle 46 on Reader Service Card

samuel graham

Profile:

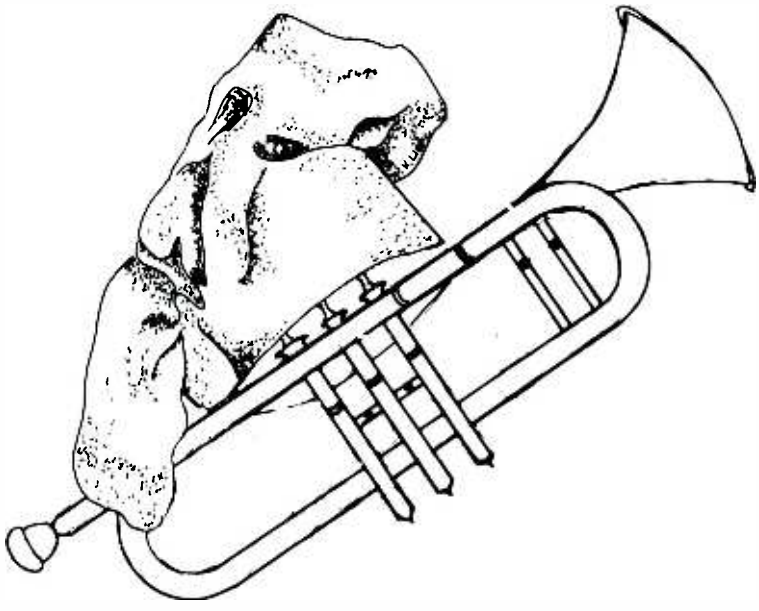
LESTER BOWIE

It wasn't a lengthy performance—less than an hour, in fact—but when trumpeter Lester Bowie and his Root to the Source group played the Kool Jazz Festival in Los Angeles this past November, they covered more musical territory in one set than most musicians cover in a lifetime. Gut-bucket blues, gospel music straight out of the black church, freewheeling modal excursions reminiscent of John Coltrane, even the pop standard "Everything Must Change": Bowie and his troupe of singers (including his ex-wife, Fontella Bass) and instrumentalists did it all, and more. The variety was startling, even a little overwhelming, but those familiar with Bowie's career weren't surprised. They know the music that Lester Bowie cannot or will not play has yet to be written.

Born 41 years ago in Frederick, Maryland, Bowie was raised in St. Louis. His father, a trumpeter and music teacher, introduced him to the trumpet when Lester was just five years old, and his professional career began not very long thereafter. At an age when most kids would be in high school, Bowie was a member of the musicians union, touring and recording with blues and soul legends like Albert King, Little Milton, Jackie Wilson, the Temptations and many others. And by the time he was old enough to vote, Lester Bowie had graduated with honors from the college of musical knowledge.

In the mid '60s Bowie moved to Chicago, where he was to become part of the Association for the Advancement of Creative Musicians (AACM), whose members would include such forward-thinking players and composers as Anthony Braxton and Muhal Richard Abrams. Along with reed and woodwind masters Roscoe Mitchell and Joseph Jarman, bassist Malachi Favors Maghostut and eventually percussionist Don Moye, Bowie put together the Art Ensemble of Chicago, a group whose "spiraling, shifting, sometimes wildly intense, sometimes silent musical melting pot," to quote one description, simply "defies category."

These days, Bowie divides his time between the Art Ensemble (their most recent album is *Urban Bushmen*, on the ECM label), his own projects (his first ECM solo album, released in early '82, is *The Great Pretender)*, tours and recordings with leaders like drummer Jack DeJohnette (DeJohnette's New Directions, with Bowie, also have recorded for ECM) and various other activities, including Root to the Source and the New York Hot Trumpet Repertory Company. Through it all, he displays an unflinching commitment to qualities that are as timeless as they are indispensable—like humor, taste, chops and an utter lack of musical pretension or snobbery.



Modern Recording and Music: The Art Ensemble, and by inference the AACM as a whole, uses the slogan "great black music—ancient to the future." Is this a conscious avoidance of the word "jazz"?

Lester Bowie: That term *is* consciously not used. The slogan "great black music" is meant to emphasize what the music actually is. Jazz is a name that was sort of given to our music, but not by ourselves. Our argument that it's not a good name is nothing new; Duke Ellington didn't like the word jazz, and no one else has. "Jazz" means something derogatory to us, like "shit," and the music isn't that—it's great, and it's black in origin, and it is music. So we consciously had to try to think of a name that signified exactly where the music is coming from and where it's headed.

I used to love the word jazz; I was proud of being a jazz musician. But still, that doesn't take away what jazz actually meant. Being a jazz musician, living that way, you see what it means to be a jazz group, the group that's the lowest paid on the tour and always stays at the worst hotels. When you picture jazz musicians, you conjure up in your mind an image of a broken-down musician using narcotics, with no family and so on. We're trying to get away from that.

MR&M: There's no disputing that the music is black in origin, but at the Kool Festival, groups like the World Saxophone Quartet and Root to the Source seemed to use a lot of European harmonies, too.

LB: Right. We'll use any influence. At times we sound Spanish. The first time [the Art Ensemble] played in Spain, a guy came up to us in tears and said, "You sound just like the south of Spain—have you ever been there?" We hadn't, but the music is universal. We've had to categorize it as "great black music," but in the future we shouldn't have to do that. I wish we could just say "great music," and everyone would accept it as being that; but since we have done the music wrong for so many years, the cleansing is a gradual process.

MR&M: The AACM is a pretty disparate lot of musicians, but you all seem to have certain philosophies in common. Aside from the "great black music" theme, what might they be?

LB: The main thing that we have in common is that we decided to organize to better our condition. There was no outlet for us, so the message is that if there is nothing else available, you have to be able to organize your situation yourself. We're the same bunch of guys who sat around in a room 20 years ago and said, "We're gonna make some sort of impact on this music scene." And through years of hard work and consistent dedication, we've managed to do that.

MR&M: A piece about the AACM recently made a distinction between the so-called "Chicago school" and the "New York school," saying that Chicago players were largely uninfluenced by New York players. Is that a reasonable distinction?

LB: Well, in a certain way, we stood apart from the beginning, because we did not believe that one type of music was *it*—we didn't believe in all outside (music), or we didn't just believe in bebop or Dixieland. We believed in all of this music. That did make us different, in that most of the New York musicians liked the Ornette Coleman or John Coltrane type thing; they were playing one sort of thing, which we liked, but we also liked the contrast. We wanted to be able to be free to refer to all these different points.

MR&M: Your own group, Root to the Source, certainly covers a lot of ground—too much, according to some critics. What's your overall aim with that group?

LB: That group has been working for the last three years; the job the other night [at the Kool Festival] was only our second job in the United States in three years. What I'm trying to do is to show the connection in all of black music. When we say "great black music—ancient to the future," we're not talking about just bebop, or 'Trane, or the African music. This group kind of illustrates the connection.

MR&M: The Kool Jazz Festival was in Los Angeles for five days in a row, and every performer was a "new music" artist, whether it be the Art Ensemble, Blood Ulmer or Laurie Anderson. Are you surprised that an event of this nature could happen in the U.S., and in Los Angeles—as opposed to Europe—with some degree of success?

LB: In a way, it's sort of unbelievable. When they first asked me about this job, I said, "You sure they want me?" But it's something that could have been done years ago, and it will be done more in the future. People really like music. We tend to play down the intelligence level of the audience: "They don't know what's happening, so I've got to tell them." But people like music, man, and they will respond to it if it's there. Now that we have a festival like this, people are responding.

MR&M: Why did it seem that

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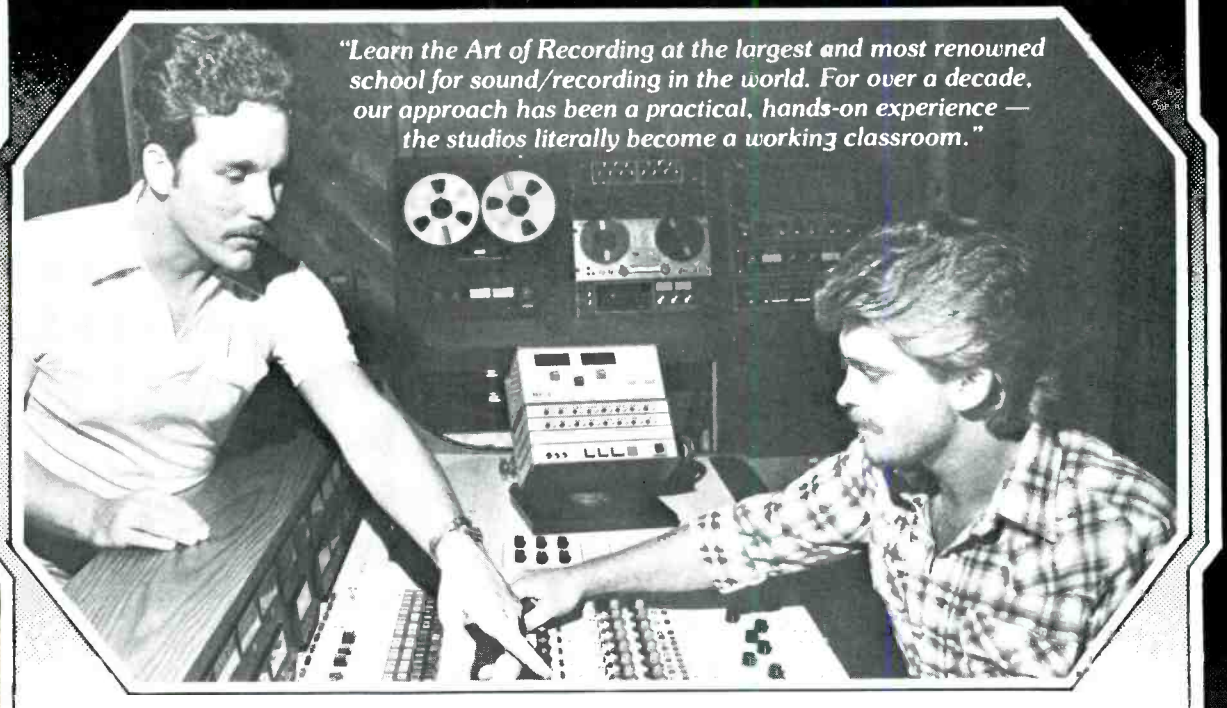

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Europeans were receptive to avant-garde or "new" music so much earlier than people in America, where the music actually originated?

LB: Well, you see, Americans have a lot of hangups that they haven't learned to deal with yet. Europeans don't have any black people. Europeans love salsa, but there are no Puerto Ricans in Europe. There are no blacks in Germany, there are no blacks in Norway, and they don't feel threatened by the presence [of blacks]. There won't be any big cultural event on Mexican music here in Los Angeles, because maybe the Los Angeles people are a little bit afraid—lots of Mexicans up here, so they don't play it up. That's the way it's been in America. When I go to Europe, people have the attitude like, "We're hipper than Americans, and we're more cultured." And I say, "You're not any more cultured—you just don't have any black people."

People learn from culture. I learn from European culture, from African culture, from any culture. In the States, we're gonna have to accept that, because that's how we benefit. We have to accept the art of America as ours.

MR&M: As far as Lester Bowie personally is concerned, I read one thing that described you as "the Cootie Williams of avant-garde," and another thing that said that you and most other modern trumpeters are direct musical descendants of Don Cherry. Are those accurate?

LB: I can see what they mean. As far as being compared to Cootie Williams, a lot of things I've done have been compared to a lot of people, and he's one of them. So is Don Cherry. Don Cherry is what I'd say is the father of the so-called avant-garde trumpet. He was the first guy to really take it beyond Miles Davis. It's like I was the next step after him [Cherry]. We have to pay respect and homage to those guys: Don Cherry, Miles Davis, Cootie Williams... If you listen closely to me, you'll hear all of those cats.

MR&M: Some of the growls and whispers and half-valve techniques you use seem to come from guys like Williams and Cat Anderson.

LB: It has its origin right there, but I usually take those things and extend them a little bit further. Whereas they may have used a growl as an effect on some very normal, regular tempo and regular chords, I can build whole things on the growl itself, and expand on that without the tempo and the chords.

MR&M: What kind of effect has all the blues work you did in your earlier days had on your playing and overall attitude?

LB: For me that was like college. I've always done a lot of blues work, because I've always been a professional, and the blues cats were always working. I spent time with Albert King, Little Milton, Jackie Wilson, Gene Chandler, Joe Tex, the Temptations, the Impressions, Gladys Knight; I just did that whole scene for years. Then my wife had a hit ["Rescue Me"], and I directed shows for her for years. That's when I really learned about stage presentation, about just walking on stage—we walked on stage 25 nights a month—and that's part of the reason I play the way I do now. I feel if I learned all of that, I don't just throw it out the window.

MR&M: Could the blues and R&B experience you had be part of the reason there is so much space in your playing? I mean, you could play like Dizzy Gillespie or Clifford Brown, guys who put such a premium on incredible technique, but it seems that you put less emphasis on chops than on silence, so to speak.

LB: Like I said, other musics before, they were limited. The bebop guys were great, but that's about all you could get those guys to play: bebop. Of course, bebop, because it was so advanced, the musicians had to close themselves off; there was so much abuse heaped on those cats, they had to build up a wall around themselves. But you have to understand that I come from a more professional standpoint; I make my living playing music, so in St. Louis, we had to be able to play everything: bar mitzvahs, polka gigs, country and western gigs, blues gigs. If you couldn't play all of these things, you could maybe be a part-time musician, but you couldn't be a full-time pro. The bebop guys were great musicians, and I love bebop, but I don't feel that we should limit ourselves to just bebop. You know, the bebop cats couldn't handle the modes; the mode guys couldn't handle the "free" business. We liked it all.

MR&M: You also employ a lot more humor in your music than one usually expects from avant-garde players. When did you start adding elements like the doctor's jacket you wear on stage, or tunes like "It's Howdy Doody Time" and "The Great

Pretender"?

LB: Like I say, we started off with the idea that we were free, and we were free to refer to any frame of reference. That's how this whole thing started. The Art Ensemble used to rehearse 12, 14 hours a day, and in those 14 hours, we'd do everything; we'd have an hour when we would just do country and western tunes like "Railroad Bill." (Laughs) We had these big fake books, and we'd just go through things. Once we freed ourselves, we were free to play "Howdy Doody"—why not? We think it does more for us personally, as musicians, and it does more for the audience. It frees everyone.

MR&M: You've recorded for a lot of labels, but lately, both you and the Art Ensemble have been mostly with ECM. How did that association come about?

LB: Well, ECM had been trying to record us for quite a while, and we have found a situation [there] that is an adequate situation. It's not ideal, but we're working with a company that respects our music, and we're free to record anything we want. That makes a difference. And we're paid a little bit better than we normally would get paid.

We don't get to record as much; there are many things that we would like to do, but being a small company, ECM can't quite release the number of albums we would like to have released. They're not quite big enough to do, let's say, the orchestra album we've been wanting to do. So there are some limitations.

MR&M: What's it like working with Manfred Eicher (ECM's founder and principal record producer)?

LB: He's a very good engineer. He doesn't interfere at all with what we're doing; he just wants to know what we want to do. He never even makes a suggestion; he just says, "I'll do my best to make what you want to do come across." He's quite familiar with what we're doing; he really listens close. He was the first guy to come into the studio and listen. Most engineers and producers, they'll sit in the control booth and listen to what you're doing, and adjust it to what they think they should be hearing, rather than listening to it themselves, coming to a rehearsal first, or coming to a concert first, and then coming out front in the studio and listening to what's happening before you go back in the booth. He [Eicher] pays a lot of attention to detail.

MR&M: ECM records a lot of guitarists and piano players, and Eicher gets a very distinctive sound on those instruments. The Art Ensemble doesn't use guitar or piano; what are his particular strengths with this group?

LB: He has his concept of sound, which is trying to get the true sound of the instrument and the true sound of the individual. I've heard other trumpet players on that label, but they all sound completely individual. There may be some similarity in recording techniques, but Kenny Wheeler's sound is his, mine is mine, Enrico Rava's is his, Don Cherry's is his. The Don Cherry on ECM is really nice Don Cherry, you know. So I think he [Eicher] really tries to get each individual approach across, and it's a real clear sound—I guess that's what they call the "ECM sound." Some people don't like it—they say, "It sounds cold to me"—but I like it. It doesn't sound cold to me at all.

MR&M: Is there any significant difference between Eicher's approaches to live and studio recording?

LB: Well, he tries to be just as faithful to his sound at a live gig. Our [the Art Ensemble's] last recording, *Urban Bushmen*, is live; it was done in a place called the Amerika Haus, which is kind of an American cultural center in Munich. He uses the same engineer, and he used very good equipment, which is the same brand [used in the studio]; he tries to make a connection, and he tries to make the live sound just as good [as in the studio].

MR&M: ECM artists seem to work a lot outside of their usual contexts, recording with different musicians on the label. What was it like for you to tour and record with Jack DeJohnette (in a group that also included guitarist John Abercrombie and bassist Eddie Gomez)?

LB: We had a lot of fun with that group. We're gonna try to do that again. I've seen Eddie and Jack, and we're going to try to make another tour together. We had a ball.

MR&M: Do you listen to other players, too, the young hotshots like Wynton Marsalis?

LB: Oh yeah. We've got this group, the New York Hot Trumpet Repertory Company, and Wynton is in it. Wynton is fantastic, man; he's gonna be all right. He's got a lot of facility; he's got some unbelievable facility. Once he figures out what to do with it, he's gonna be terrible! (Laughs) I hope he maintains his equilibrium. See, they push you so fast in this business, and you can get ahead of your actual development, so that what you believe to be may not actually exist. If all of a sudden you're 20 years old and recording for Columbia [as trumpeter Marsalis does], you can get off on the wrong track kind of easily.

MR&M: How much preparation does the Art Ensemble do before you record an album?

LB: Oh, we do a lot. We may have been doing the material for years; it depends. In preparation for an album, we do a lot of rehearsal—*a lot* of rehearsal. We usually take the material and work it out live before recording it.

MR&M: Do you pretty much know how each track will turn out, especially in terms of length, before recording it, or sometimes do you just take off and carry something out to 15 minutes when you thought it was only going to be eight?

LB: It depends on how they go. They can be longer than we anticipated; we have an idea of what we're trying to do, but we don't put any limits on it.

MR&M: Most ECM records seem to be made in the span of two or three days, tops. Do you do much in the way of overdubbing and multiple takes?

LB: Sometimes there'll be a few alternate takes. Most of the time is spent, like I say, in preparation. By the time we get to the studio, everything is pretty well set. We've never been allowed the opportunity to do a lot of research in the studio, you know, like some rock groups go in and take six months to record an album.

I did a solo album recently, a double album, and one album is just solo trumpet—it's the first digital solo trumpet record. I did a few overdubs on that. It should be out sometime this winter.

MR&M: You say that the financial outlook with ECM (which is distributed by Warner Bros.) is pretty good, at least compared to some of the labels you've been with?

LB: Compared to the labels we've been with, yes. But it's not great, man—don't let your readers get confused into thinking that we're getting the big advances, limos and all of that! But it's been much better than Black Saint and most of the small independents that we've had to deal with. I like what we're doing; don't make a lot of money, but we don't have to take any bullshit.

Graham

nina stern

Few groups, with the exception of such giants as the Beatles, the Rolling Stones, the Who, and a handful of others, can legitimately claim to have had such an impact on the course of contemporary music as Crosby, Stills and Nash. Consider: the CSN alliance was formed back in 1968 and the world was jolted the following summer by such acoustic gems as "Suite: Judy Blue Eyes" and "Marrakesh Express." From that time on, there have been various musical projects involving the three originators, and sometime collaborator Neil Young, Crosby/Nash pairings, even solo efforts by the individual members. The group took a breather and put out "CSN" back in 1977 (wasn't that the year punk and New Wave were billed as the Second Coming?), and it immediately shot to the top of the charts. Another five year layoff and "Daylight Again," a smash Top 10 LP featuring two Top Twenty singles: "Wasted on the Way" (Nash) and "Southern Cross" (Stills). How does a group like CSN make that kind of longevity work? Simple, explains group spokesman Graham Nash. A dedication to good music, extraordinary vocal harmonies and a clever blend of acoustic and rock melodies. The music industry takes its cues from them, not the other way around. *Modern Recording* recently caught up with the ever-busy Graham Nash for an inside analysis.

n Nash

Modern Recording & Music: Let's start from the beginning. Were you involved in producing the first Crosby, Stills and Nash LP, "Crosby, Stills & Nash"?

Graham Nash: There are only three people who have ever produced a Crosby, Stills and Nash LP...

MR&M: The three of you?

GN: The three of us, right. Why should I take the time to explain to you what we want, when I can go right to the machine and do it? There's no point. Besides, we have never really known what it was we wanted till the end. We have always gone at it blindly, and we've always ended up with a nice concept. That's been our history; we've always skated through. I've never found anybody who could tell the three of us what to do; I've never known anyone who could control the three of us together.

MR&M: Is one of you more technically oriented than the other?

GN: It's a question of, how much do you want to concentrate on the technical stuff and how much do you have to concentrate on the music? What we need is a great engineer—an engineer that can just do what it is we need. But in terms of choosing songs, making arrangements, the programming, the order, the album cover—we're the only ones who could do any of that. Give us a good engineer, and we can do it.

Halberson helped us a lot with the first album. He did a great job, a wonderful job. It was one of the first albums he ever made...

MR&M: Where was it done?

GN: At Wally Heider's, right here in Hollywood on Selma. I pass by it on my way home every day...and I still think of that little room, and how much of my own personal history is tied up in it.

MR&M: When did Rudy Records open?

GN: God, years ago, I don't know, '78, '79.

MR&M: Is it something that you, or the three of you, worked on?

GN: No, it was purely my idea, my dream. I used to live in San Francisco and had a studio in my basement. I get very upset because I wasn't using it all the time, and I realized that there were some musicians who would give their right arm to have a studio like that at their beck and call. When I'd finished my stint of living in San Francisco, and decided to marry Susan and move down to Los Angeles, I had all that equipment, so I brought it down. At the same time I decided I wanted to take the equipment out of my house in San Francisco, I found this beautiful building down here [LA]. Or at least Mac Holbert found it.

Mac said, "There's a great building over here—come and check this out. It used to be a Spanish restaurant." We went, and it was just fabulous, so we leased it, moved all our stuff in, and there it was: Rudy Records.

MR&M: Is it used primarily for your own projects, or is it...?

GN: No, it's a public studio. I own it, but anyone can call up and hire it, lease it, use it.

MR&M: Do you have any personal equipment preferences?

GN: No, I guess it becomes, generally, what you're used to.

MR&M: Being English, do you like Tannoy?

GN: I'm not crazy about Tannoy. I *am* crazy about Studer. I think they make damned fine machines! They're a little weird to edit on, they're a little weird to punch in on, but I did all my early recordings with the Hollies on a 4-track, 1-inch tape Studer machine. I've got a distinct preference for MCI when they can be maintained. We have Susan Rogers who works at the studio. She's an excellent engineer and takes care of all the equipment. It

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sort of spaces a few musicians that a woman is doing the job, but I can't find a man to do it better. She's just fabulous at it. So, if it's all carefully maintained, I like MCI stuff. It works when I want it to work, I can punch in and out; it's a perfect setup for me. I've got an MCI board, and a couple of MCI 24-tracks, and I'm happy, thank you.

MR&M: Do you have a studio at your home in Hawaii also?

GN: No, I like to *go* to work. I've done that one before. Now, I might get a little 8-track, just to lay some demos down and stuff, but I certainly won't put a full-blown studio there, no.

MR&M: What about the revolution that's taking place now in other areas of technology, say home computers?

GN: I think if I weren't interested in this, I'd be a fool. I, personally, have not had much time to delve into it in the past few years; but I'm going to make the time, because if I don't, I won't be able to talk with my children in five years. Right now, though, my children don't even have a television in Hawaii. But they know how to grow bananas, and they know where avocados come from, and they know how to avoid the ocean when it's really rough. They know all the stuff they've got to know before they even begin to think about computers.

MR&M: I noticed your little boy has a performance credit on *Earth and Sky* (Nash's most recent solo LP effort).

GN: He played harmonica on "Magical Child," for which he got paid double scale. Triple scale, actually, now that I think about it. What happened was that the song was written for him, because Jackson was my only child at that time, and he was down in the studio when I was putting the harmonica solo on, and at the end, I wanted for him to play it. I gave him the "G" harmonica. He could play it—he blew in and out several times.

MR&M: How old was he then?

GN: Two.

MR&M: Can you tell me about the Hollies reunion LP?

GN: It's already happened! It's 95 percent done!

MR&M: How many of the original band members?

GN: All of them. I'm not interested in rehashing a fake. The very fact that Alan Clark and Tony Hicks and Bobby Elliott were still there, making good music, made me decide to get into it. I wanted to do two things: make fine music with people with whom I'd made fine music in the past, and finish some unfinished business with the Hollies (I didn't think we'd pushed ourselves hard enough). I wanted to give history a twist by the tail. *And*, more importantly, I wanted to be at the beginning of something, in the middle of something, and at the end of something all at the same time.

MR&M: Where was the album done?

GN: Rudy Records, right here in Hollywood.

MR&M: The Hollies project is something you produced as well?

GN: It's a strange situation. A lot of it was done the same way the Hollies have always done it: me, Alan and Tony doing it. A lot of the tracks they had done before they brought them over and we put the vocals on, so I did a lot of it and they did a lot of it. In fact, I'd probably admit that they did most of it.

MR&M: How much of it was your writing?

GN: None of it. None of it was any of our writings. These were all somebody's else's tunes.

MR&M: Why?

GN: Because I've always believed that the Hollies were one of the finest interpretive bands around, that we could take a song like "Just One Look" from Doris Troy and turn it into a Hollies record. People think we wrote "Bus Stop," but we didn't. It would have been very easy for me to say, "I'm coming back, and I want six of my tunes on there"—but we're not into that; we never were. We're only into, "Do you want to do this tune? Joe Blow did it, but who cares?"

MR&M: When you're preparing to record an LP, do you generally rehearse ahead of time before going into the studio?

GN: We've tried that, you know. Rehearsal time in your home is a lot cheaper than $150 an hour in the studio. But there are certain times that you've written a song that day and you've got no time to rehearse it. Then you try to work it out in the studio. It all depends; it happens both ways. I've rehearsed a song till I'm sick of it, then gone in and recorded it that way, or I've written a song that morning and gone in and recorded it. It's happened every way. I've made records from the bass drum up, from the vocal down, any way you look at it. I've made 'em in every way, with orchestras, with one or two people; I've made records almost every way you can think of.

MR&M: In various CSN and CSNY projects that have taken place, has there been much consistency in how they've been produced? Have they mostly been a series of tracks laid upon tracks, or have some been more "live" than others?

GN: Yup to all of it. CSN and CSNY have done all that. We've rehearsed and recorded it, and we've had a song that didn't exist an hour before and recorded it. There's been stuff where we laid track upon track; and there's been stuff where everything was live; we've done it every way. It's been twenty years for me now—wow!

MR&M: There seems to be a trend these days—largely because of economics—to just go in and do it in a couple of days, or maybe a week or two, as opposed to the long, extended three and four month projects.

GN: I don't mind how it's done, as long as we get a fine result. The recent CSN album took eighteen months, the Hollies album took three

weeks. I cut my first album with the Hollies in one afternoon! We did our set twice, chose the best, and that was it. Cost us about $40. *Daylight Again* cost $800,000 to do. I've done it any way you want to think about it. There's no way I can say, "Hey, *this* is the way to do it." You can only follow emotion and follow your heart.

MR&M: The question you're probably asked more than any other these days is, to what do you attribute your longevity in this business?

GN: It can only be the music. When you look at the three of us, we're not sex gods, you know.

MR&M: Well, it depends...

GN: We do put out the music we think is our finest effort. We don't care what anybody else thinks about it. No one. We don't care what the record company thinks about it, we only care what *we* think about it. A lot of people think, "Big Deal." But when we're all dead and gone in the next day or next 100 years, I want the music left. That's one of the things I say to all the media people who say, "Crosby's fat and bald and losing his hair..." They miss what we're really there for, which is the music. My reply to them is that that's all I care about. When we're dead and gone, I want people to understand that there were a bunch of guys who tried to make music that would help people deal with the insanity of this world. The songs that we write are written from our hearts, they're usually true, and they're usually about something that's happened to everyone we know. I can only put it down to that fact that the music itself—and there've only been three albums in fourteen years—is as special as we believe it is.

You must realize that I had twenty-one Top Ten records *before* I ever met David and Stephen. It's been a long time for me. The same thing has always applied; I always try to make the best music I can.

MR&M: What have your compatriots in the Hollies been doing during the last decade or so?

GN: Their last three records here were Number One; they have not been without hits. In the last five or six years, they've played nightclubs and venues in Europe to keep the money rolling in and make a living. Fortunately, I've never had to do that. That gives me a great deal of artistic freedom, because when you're forced to go on the road, you start to close up, and freeze up, and it's just dreadful for you. I've been very, very fortunate in this country. What I believed about this country was true: if you're willing to work your ass off, you can get somewhere here.

MR&M: How do you mix career with family? Do you purposely make your tours shorter, and be more selective as to where you go?

GN: No. I have a wife and family who understand that there are occasions when Daddy has to go away and work. They have a great understanding of it; my children aren't the kind who cling to my legs as I try to get out of the door. They say, "Okay, see you in a couple of days, give us a call." They're very rational about it. I seem to have struck a very interesting balance. See, my wife understands that I don't have a "career"; I am *me*. Whatever I do is me. So it's not like, You have a career, and you're a father, and then you're your own individual being. I am everything to my family. My kids enjoy what I do, my wife is very proud of what I do, and so far we've managed to strike a balance between all those things.

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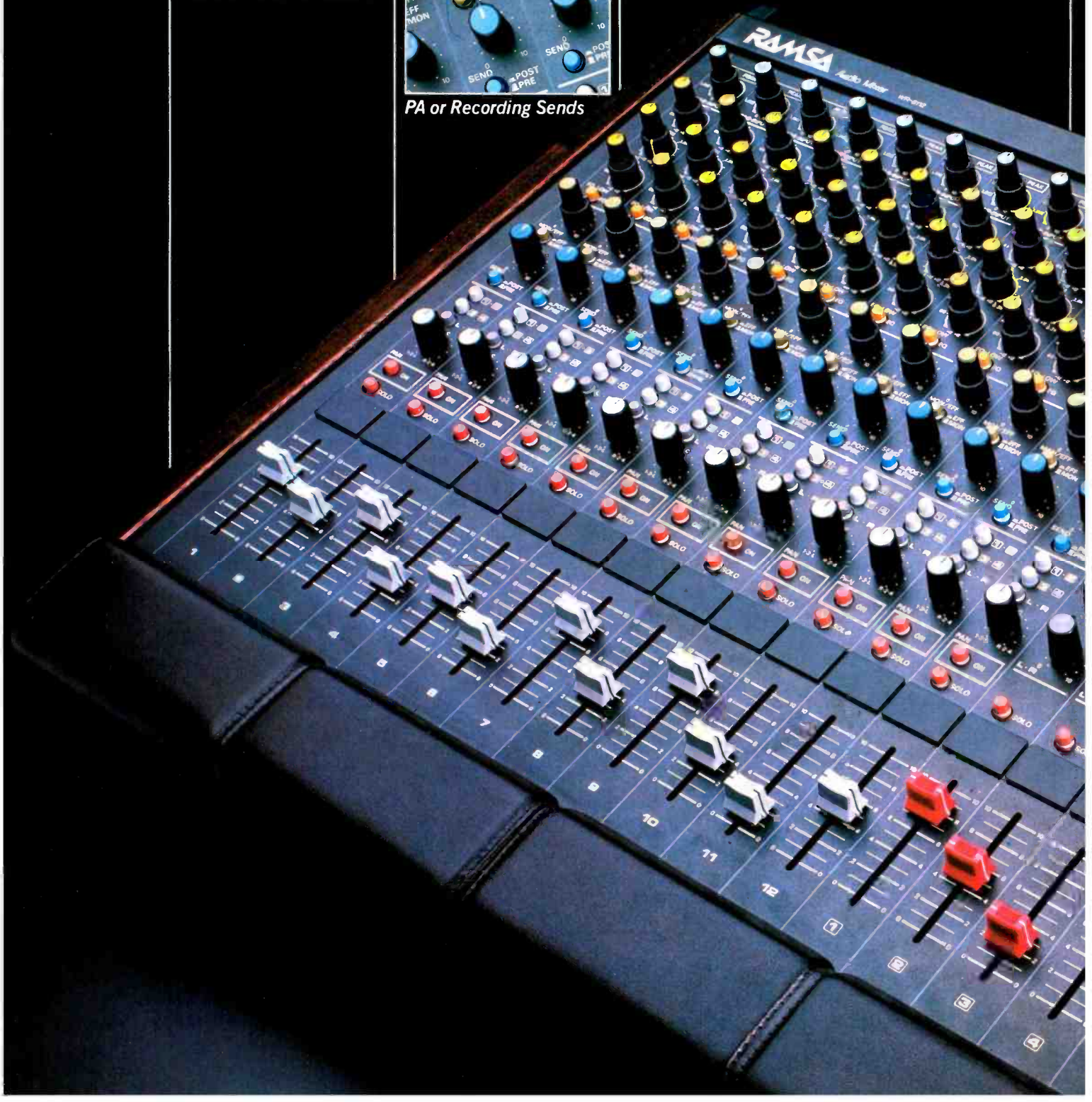

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of switchable turnover frequencies for high and low EQ plus continuously variable frequency for the midrange.

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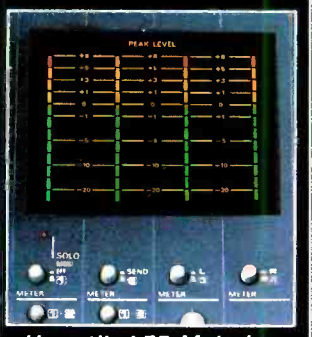

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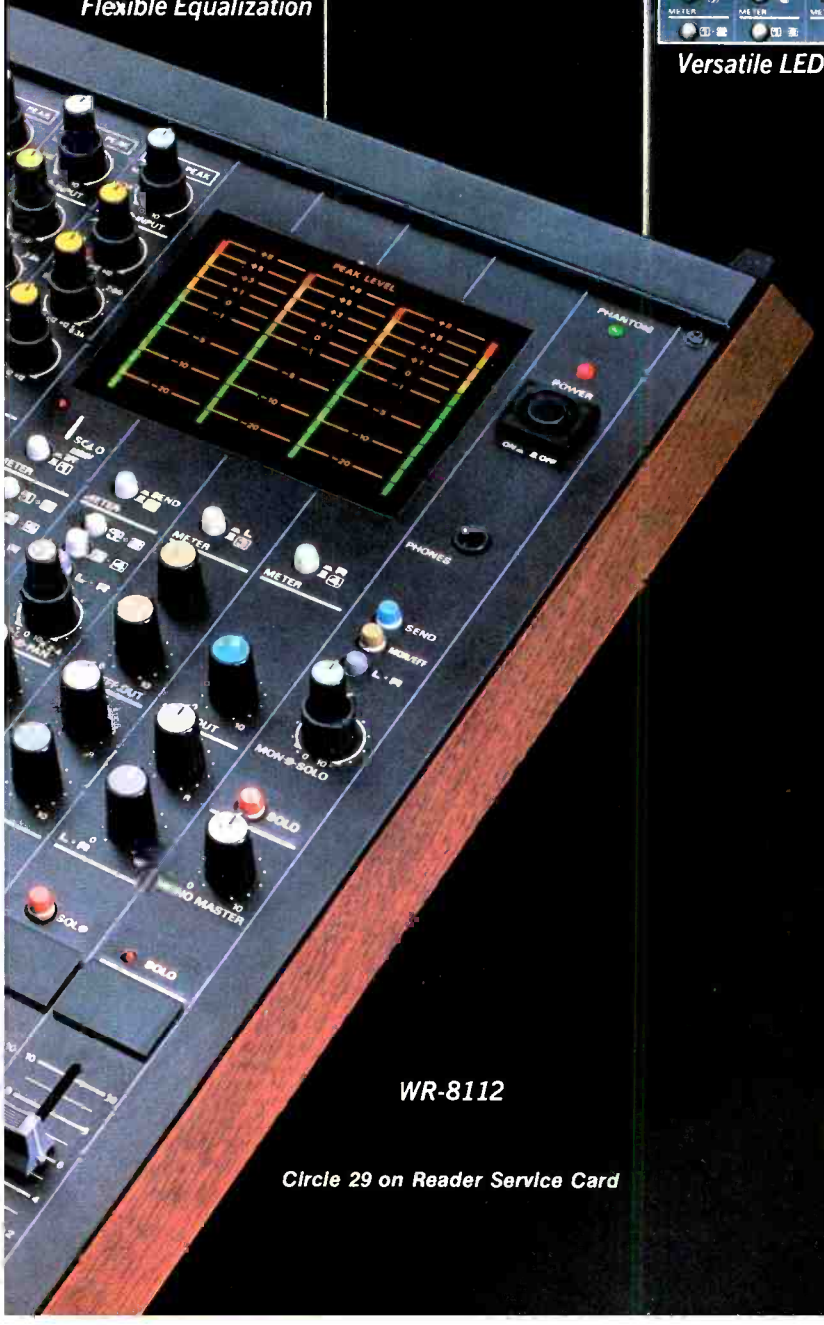

WR-8112

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Panasonic
PROFESSIONAL AUDIO SYSTEMS

MR&M: Getting back to the music, what about your original songs? Take "Cathedral": was the experience true, of your standing on the tombstone and looking down?

GN: Yup, 'fraid so. Slight poetic license—it was 1798, but it didn't rhyme—but I thought I could take that much liberty. Yes, it's a true story. I went to Winchester Cathedral in Salisbury and went through it...It's a true story, but then, all the stuff we write is true! Where the hell else whould we get it from? I spent ten years with the Hollies creating songs out of nothing. (singing)—"Oh, she's holding her right leg over her left knee, and she's twisting her ring, ooh-ooh-ooh-ooh." I did all that. Now I want to write songs that help people, that give an indication of how I feel about things, so that they can say, "Hey, he's full of it," or "Hey, he's got something there," or, "Boy, I went through that last week." There's a link between us all that's undeniable. I think our music helps people to be less lonely, and I think our songs help people to understand that as crazy as the world is, it can be dealt with and, after a careful search, you will find most of the answers you're looking for. Not in our music per se, but generally, you know.

MR&M: When did your songwriting really take off? Was it with CSN?

GN: I think it finally started to expand in the direction I wanted it to during my last year or so with the Hollies, when I started to write things like "Right Between The Eyes" and "Lady Of The Island." That's when I thought it showed a glimpse of where I wanted my songwriting to go.

MR&M: What are some of your own favorite songs that you've done?

GN: I don't have any favorites; I know the ones that seem to be other peoples favorites, but *I* don't have any favorites. I like it when I'm on the edge, like when we were at Carnegie Hall, when David and I were doing a concert. Someone on the side of the stage whispered, "Stephen is here," so I said to David, "As soon as we finish this tune, you go out and deal with Stephen, I'll stay here and keep the audience occupied, and you bring him out and we'll tear the house down." Well, I started to talk, and kept talking and talking, and there was no David or Stephen, so I said to myself "Fuck it," and went to the piano and started banging about on the black notes, and wrote a song called "Black Notes," and it was on the record! That's the kind of stuff I like.

MR&M: There seems to be a strong, continuing interest expressed by you in your music for political causes, from the very beginnings.

GN: That's just a word, you know; we've never thought of ourselves as a "political" group at all. When you chain and bind a man to a chair, that's not politics to me, that's bullshit! When you shoot four students down at Kent State, that's not politics—that has to be spoken, and screamed, *against*! So, we've never seen ourselves as a political group at all; we've seen ourselves as a reflection of humanity, because what happens to us probably happens to

every other person on the planet.

MR&M: Can you differentiate between your work with the group and your solo work? When you record with the group, it's still credited as a Nash, or a Stills, or a Crosby song. But aren't there the kinds of collaborations that other groups have had, where two actually get together and put their heads together to write one song?

GN: Oh sure, there are a couple like that on *Daylight Again*. I wrote "Turn My Back On Love" with Stephen and Michael, and I've written a lot with Crosby, for instance. We can all specifically remember times when I have needed a verse, and Stephen says, "Hey, da da da da dum," and I say, "Thank you," and never give him credit—as I've done for him. If you add two lines to a verse, you don't expect credit for writing it. If you write the chorus and verse, you say, "Okay, let's write this together," and it becomes a dual effort. We've helped ourselves out with one-liners for years.

MR&M: Is your approach to writing fairly structured?

GN: I think most things are that way. I think the universe is that way, I think life itself is that way. It's in a constant state of decay. Most things have a beginning, some kind of middle, and then they finish. What can I say? But I don't have any particular structure. When I was with the Hollies, we could always write a song that was exactly 2 minutes and 51 seconds. That was the ideal time for a single at that point, right before the news. I don't know how we did it! It took me years to get out of that; I think that "Wind On The Water" was my first long song, the first song longer than three minutes.

There are so many levels in songwriting that one has to deal with. A lot of people have criticized my work for being too simple, and I say, "What is *too* simple?" I'm not interested in talking to people who come from MENSA—I'm interested in talking common, simple people's language. I'm not interested in "Lollipop, Lollipop"; I'm only interested in putting you on a trip, because the songs, and my wrenching them out of my soul, put *me* on a trip. When I write a song that affected me like "Cathedral," I want to get it on record, so that when you play it, you can understand what I'm talking about. I'm interested in affecting your soul.

MR&M: You as a group have seemed to manage to escape the pressure from the label to pop your records out, one a year.

GN: No, we haven't. We've had tremendous pressure. We have been under pressure from the record company, but they've been smart enough to realize that there are certain people [and groups] they can't push. We have been one of them. We have had all the contractual obligations that every other recording group has had—we have a deal for six records; we've made three of them. We kept changing our contract; there's nothing they can do about it. They can only be glad when we do it. They have been very forgiving, they have been very understanding. They have had the opportunity to kill us, to sue us for millions for non-delivery of product. But Ahmet Ertegun is

smart! He knew from the very beginning that these were three crazy people that had to be handled slightly differently than any other rock stars.

MR&M: Look at the pay-off, though, in quality.

GN: Ahmet understands that. He was recording Ray Charles in the 40's, for God's sake. He was recording Aretha when Columbia couldn't do anything with her. He's a very smart, musical man, and fortunately he has not applied the kind of pressure that he legally could have. And look what's happened. I wouldn't record a CSN album for anyone else, and I don't think David or Stephen would, either. He has shown faith in us.

Elvis Costello is a case in point of someone putting three albums out in two years, and they were all right. But I've seen it go the other way, too; I've seen people being forced to put records out, and, as you say, the quality just declines. You know why? It's hard to wrench that stuff out of your system if you're a writer.

MR&M: Do you have any favorite CSN or Graham Nash LPs?

GN: Yeah, I do: the next one! Really. When we did "Daylight Again," and wrote all those songs, and rehearsed them, and recorded them, and mixed them and mastered them, we were sick of them! So we're on to the next one.

MR&M: Will there be a next one?

GN: Fairly soon.

MR&M: There seems to be such momentum building up...

GN: Yes, there is. I would love to take advantage of the momentum, but I've long since passed trying to plot a path through all of this. There are certain pressures one can bring to bear that sway you one way or the other, but I've long since passed saying, "Oh yeah, in April there'll be an album." "April of what year?" is what I say now. I personally would like to record in the summer and put a record out by September—*if* it's good enough to come out. And any CSN or CSNY album that has come out has passed the "Us" test first. If it didn't pass us, it wouldn't come out.

MR&M: [It seems that] the public hasn't been fickle towards you, as they have towards other groups, perhaps in some cases unfairly.

GN: You know why? I think the music's good. I think the kids know we are trying our best—I mean the people who are into music, whether they're 80 years old or whatever. In Omaha, Nebraska, I saw a 68 year old woman sitting next to a 15 year old kid. Three rows back—and it's *loud* three rows back. She never moved. She had so much grey hair and wrinkles, had to be over sixty. We had some amazing sights on this tour. It really encouraged us to believe that we were doing something right. You never know; there's no instruction books with rock 'n' roll.

MR&M: In terms of future projects, do you have any plans to do any producing of someone other than yourself?

GN: Can't stand it. There are people I'd love to produce, but I can't stand it.

MR&M: Why?

GN: It's not my music. And if I spend four months producing somebody else's music, it's four months I can't spend on my own. It's that selfish. I love being in the studio, I love being able to create, and for the first several weeks of any project I'm doing, I'm wildly into it. Then I realize that I've got no time to go upstairs when I've got a melody in my head and start putting it down, because I'm in the studio at four. Then I start to dislike the fact that it takes away a great deal of time. And now that I have three children and a beautiful wife, I dislike it even more.

Ambient Sound

By Len Feldman

Beta Hi-Fi: Digital Challenger?

I have just returned from the annual Consumer Electronic Show in Las Vegas. While the show concerns itself primarily with products intended for consumer (rather than audio professional) use, there was at least one long awaited development which may have an impact upon every phase of audio recording and reproduction. That development is known as Beta Hi-Fi, and it comes from Sony Corporation. Joining Sony in this technical innovation are many of the companies that have been licensed to manufacture and sell. Beta-format video recorders, such as Sanyo, Zenith, and Toshiba. In addition, a couple of audio-oriented companies who, until now, have not been involved in the production or sale of video recorders, announced their intention to join the Beta camp. Those companies were Pioneer Electronics and, of all people, Nakamichi Research, Inc., whose work in the field of cassette recorders is known worldwide.

Poor Audio For Video—Up To Now

If you have had any experience at all with video recorders (even with the semi-professional U-matic, ¾-inch tape types), you are painfully aware of how poor the audio quality of those recorders is. That's true, by the way, of conventional VHS machines as well as of Beta or U-Matic VCRs. At the highest tape speed (Beta II, in the case of Beta machines and SP in the case of VHS VCRs), about the best you can expect is response out to perhaps 10 or 11 kHz for the -3 dB roll-off point. Switch to Beta III or the EP-VHS tape speeds for longer tape play, and you are lucky if response holds up to much beyond 4 or 5 kHz.

The poor sound quality of VCRs is not just limited to poor frequency response. Signal-to-noise ratios are severely limited to between 40 and 45 dB for the complete record/playback cycle, unless some form of noise reduction or companding is used. And even if companding is used, the poor overall bandwidth capability of the system makes tracking of such companding systems extremely tricky and subject to large errors. In short, for most conventional VCRs tape hiss is very audible—even when operating at the faster tape speeds. It should be pointed out that even at these speeds, tape motion is *slower* than the tape motion in a standard cassette tape deck!

That being the case, it is no surprise that distortion of the audio track on a VCR is fairly high, too. In my audio lab I've measured harmonic distortion levels typically as high as 3 percent (for maximum recording level). Furthermore, until very recently the audio track on both VHS and Beta machines has been limited to monophonic or single-channel sound. A few VHS machines have been introduced in the past couple of years that do offer two-channel audio, but the audio quality of the two channels is no better than that of the mono machines. In fact, since the narrow, longitudinal audio track assigned to audio in the VHS format has to be split in two to create two separate channels, audio quality actually deteriorates by about 3 dB. Finally, if you have ever listened to the sound of a sustained instrument tone played back from a VCR (such as that of a piano or guitar), I don't have to tell you about wow-and-flutter from the audio track of VCRs.

Enter Beta Hi-Fi

Given that background, it is easy to understand why Sony considers their new Beta Hi-Fi audio recording system to be such an important development. I had heard rumors about it as early as half a year ago. In fact, the system was demonstrated to a few key Sony distributors at the Summer Consumer Electronics Show way back in June, 1982. Its entry into the marketplace was then so tentative that Sony would not allow members of the audio trade press to see or hear it. Now, six months later, the wraps are off and Beta Hi-Fi was introduced with a fair amount of flash. Consider the performance specifications claimed (and aurally confirmed) and you'll see what all the fuss is about.

Beta Hi-Fi offers a total dynamic range (and therefore a maximum signal-to-noise ratio) of 80 dB! That's nearly two whole orders of magnitude better (if we talk audio power) than the best LP discs currently available. It's a whole order of magnitude better than the kind of signal-to-noise ratio you can expect from an open-reel master tape after it's gone through at least one mixdown and through a console. And, it's not that much less than the dynamic range achievable with digital audio program sources as they are presently offered by commercially available PCM digital audio processors or by the about-to-be-released (finally) CD discs played on digital audio disc players.

Other performance specifications of the Beta Hi-Fi system are equally impressive. For example, wow-and-flutter is down to a negligible 0.005 percent! Distortion, even at maximum (0 dB reference) record level, is one-tenth that measured on typical conventional VCRs, or 0.3 percent. And, as you might have guessed, frequency response is just about ruler flat from 20 Hz to 20,000 Hz.

How It Works

In case you haven't guessed, the audio information in the Beta Hi-Fi System is laid down on the magnetic medium using the same fast-spinning heads that are used to record the video signals. In other words, instead of the tape writing speed (for the audio signals) being limited to only a couple of centimeters per second (when a stationary audio record/playback head is used), the effective tape writing speed is now the same as that used for the video signals—typically 6.9 *meters* per second in the case of Beta. Given the wide bandwidth that results, it becomes possible to use what amounts to an RF (radio frequency) carrier or, more correctly, two separate RF carriers, each of which can be frequency modulated by a left or right channel stereo audio program. These two extra carriers were neatly nestled into the available spectrum between the chroma (color) and luminance (brightness) video signals. In the Beta VCR format, the luminance signals are located between 3.5 and 4.8 MHz while the chroma signal is centered at 688 kHz (it is an amplitude-modulated [or AM] signal whose upper sideband overlaps the FM luminance signal spectrum somewhat).

Besides the superb performance already outlined, an interesting side benefit arises from this arrangement. If you operate the fast scan feature of a Beta VCR (say, at twice or three times normal viewing speed), the audio doesn't take on the "chipmunk" quality that is characteristic of conventional audio tape reproduction at higher than normal speeds. If you stop to think about it, actual tape head-to-tape writing speed doesn't really change that much when the longitudinal tape speed is increased by two or three times or, for that matter, when it is decreased for slow-motion viewing. That's because the longitudinal tape speed is a very small part of the total effective tape-to-tape-head writing speed when we talk about the video recording heads.

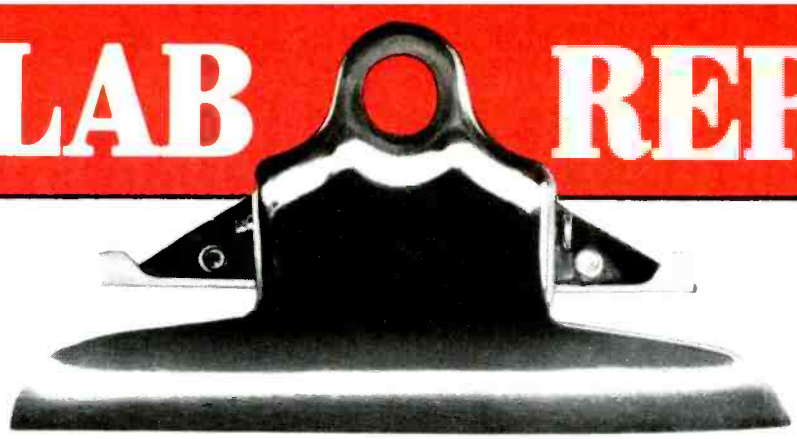
If Beta Does It, Can VHS Be Far Behind?

When rumors of Beta Hi-Fi started circulating last year, they were followed by persistent rumors that the VHS group would not be able to duplicate the audio feat with their system. Those rumors can now be laid to rest, for it is reported that at last fall's Tokyo Audio Fair both JVC (the developer of the VHS VCR format) and sister company Panasonic both showed prototypes of what, for want of any official name, we must call VHS-Hi-Fi. According to all accounts, this system also used a pair of FM carriers for the two stereo audio channels; carriers that are picked up by the spinning video heads rather than by a stationary audio head. Few details about this competing system are available. Rumors persist that fitting in these extra carriers in the VHS format (whose chroma/luminance spectrum distribution differs from that of Beta) will involve some picture degradation, but that remains to be seen.

Beta Hi-Fi versus Digital

Already confusion exists. Even at the introductory press conference of Beta Hi-Fi (attended by supposedly knowledgeable reporters) some of the questions posed by reporters showed that there was a tendency to confuse this new audio recording technique with digital audio. Clearly, it has nothing to do with digital. However, that may be a very big point in its favor with people who still maintain that "digital sound" produces undesirable side-effects attributable to "brick wall" anti-aliasing filters, poor phase response, or, you-name-it.

Given the superb performance of Beta Hi-Fi as a strictly-audio recording technique, could a professional ground swell develop which would favor using this recording system as a mastering system that's better than any present day audio analog recording system and doesn't have the "negatives" sometimes attributed to digital sound? One factor that makes that a possibility is the relatively low cost of Beta Hi Fi video recorders. They are expected to add only about $100.00 or so to the cost of an equivalent conventional VCR. So, even if you totally ignore the fact that these machines can record pictures and use them only for high-quality audio mastering, they still end up cheaper than PCM (digital) audio processors coupled to video tape recorders. Considering the fact that Sony and friends are all pushing the Compact Digital disc and a variety of PCM processors, could Beta Hi-Fi turn out to be so good that its inventors will have inadvertently bitten off their proverbial noses to spite their faces?

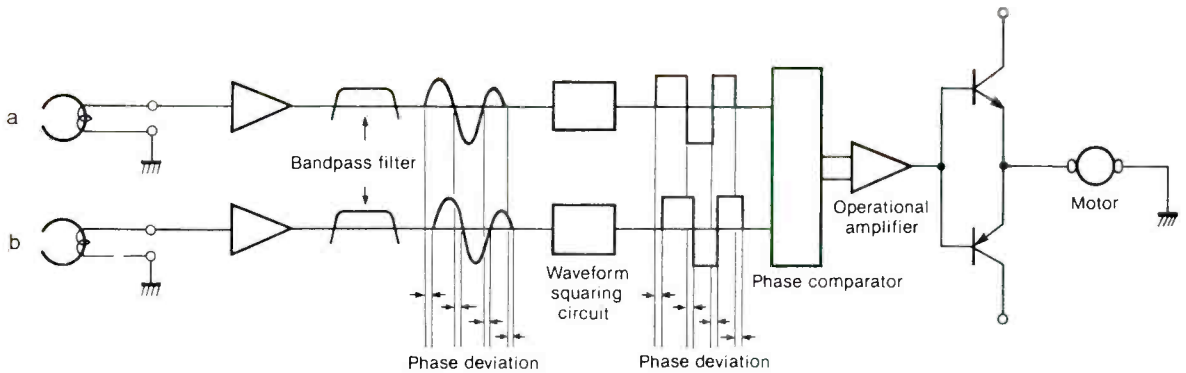


LEN FELDMAN

Nakamichi Dragon Cassette Deck

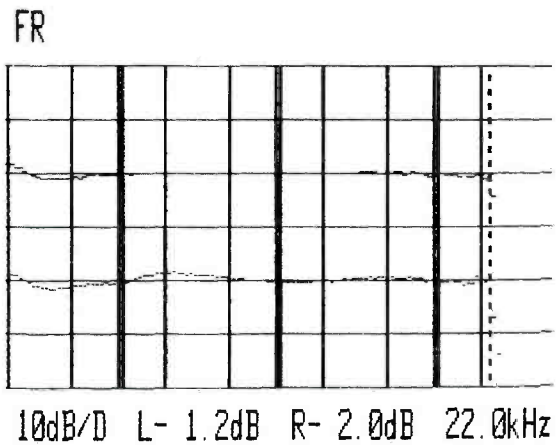
General Description: Just when we had decided to ease up on our coverage of cassette decks (readers have been telling us that we should concentrate more on pro audio or semi-pro audio gear) along comes Nakamichi, that great innovator in the field of cassette recording, with a technological breakthrough in cassette recording that is simply too important to be ignored. The new technology is embodied in a cassette deck named "Dragon"—in itself a departure from Nakamichi's traditional alpha-numeric model-numbering system. The Dragon is Nakamichi's first auto-reverse cassette deck. The company had resisted incorporating an auto-reverse feature in its previous recorders for a very good reason: even if a record head's azimuth is precisely aligned relative to a given cassette package and to a fixed playback head in a specific deck, once you reverse the direction of tape travel there is bound to be enough of a shift in azimuth alignment of the tape itself to degrade reverse playback.

The Dragon deck solves this and more serious problems by a technique called NAAC, an acronym that stands for *N*akamichi *A*uto *A*zimuth *C*orrection. Unlike manual and automatic azimuth correction systems that require special test signals to operate, NAAC determines optimum azimuth *from the program material itself*! Thus it functions with every cassette—whether commercially recorded or home recorded, whether recorded on Nakamichi equipment or on other decks. Given this correct azimuth alignment, every cassette is reproduced with as much treble response as was recorded onto it in the first place. I'll tell you a little more about how NAAC works

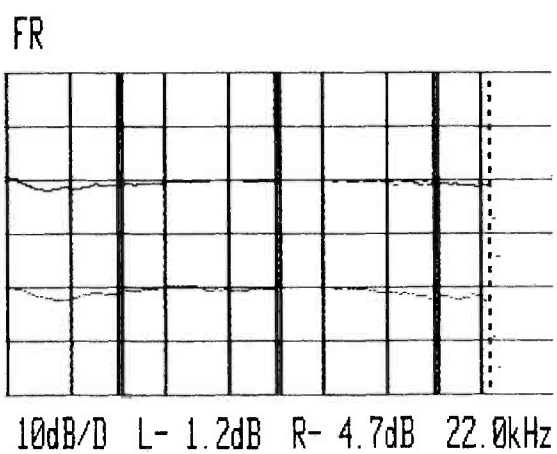


Automatic Playback Head Azimuth Correction System Block Diagram

Fig. 1. Dual-core head construction for the channel used to check azimuth during playback is the key to Nakamichi's new NAAC System.



(A)



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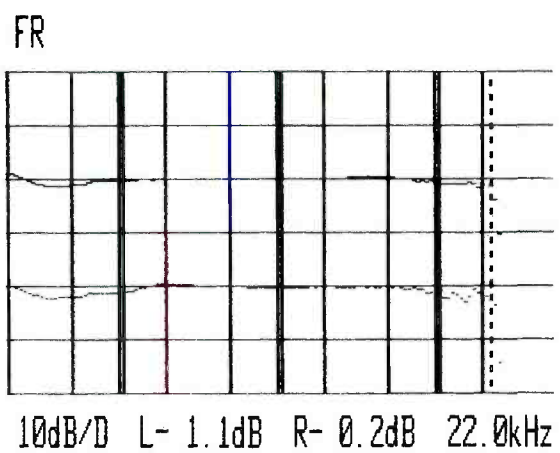

(C)

Fig. 2. Frequency response (record/play) at -20 dB record level, with (lower curve) and without (upper curve) Dolby C noise reduction, using EX tape (A), SX tape (B), and ZX metal tape (C).

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shortly, but first let's take a look at the many other controls and features of the Nakamichi Dragon.

Controls and Features: Power switch, eject button, timer switch and stereo phone jack of the Dragon are all located to the left of the smoothly damped cassette compartment door, above which are illuminated indicator arrows which tell you which way the tape is traveling. Vertically-oriented LED record level meters with a full 50 dB of dynamic range (from −40 dB to +10 dB) are positioned just to the right of the cassette compartment, beneath a four-digit flourescent tape counter. A counter reset button, memory buttons (including a stop/play option after rewind), and auto-reverse buttons are located nearby, followed by the usual light-touch transport buttons (reverse play, stop, forward play, fast rewind, cue, fast forward, record mute, pause, record) and a not-so-usual series of buttons that permit fast or slow up- or down-fades. These professional features are further augmented by the ability to punch-in to the record mode directly from the play mode for editing, overdubbing, etc.

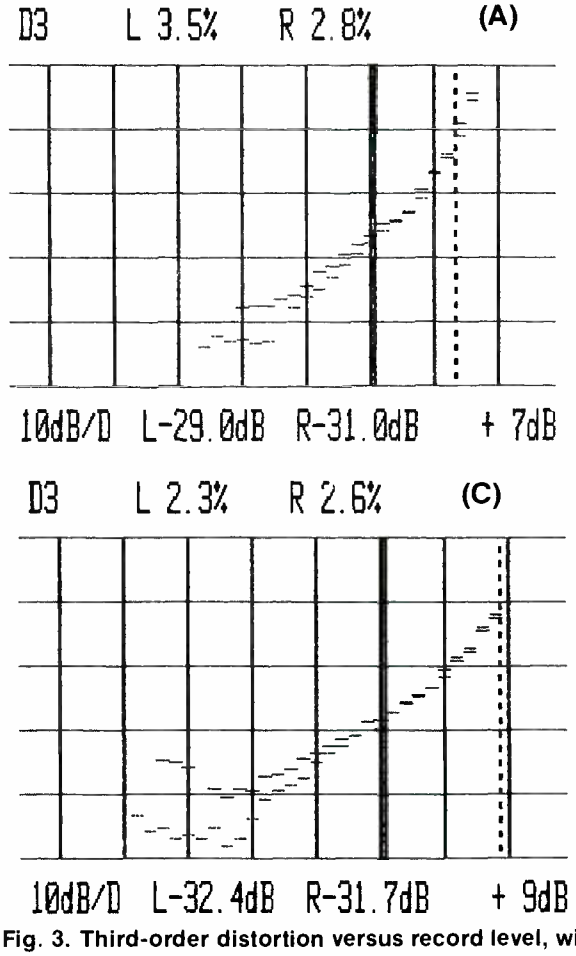
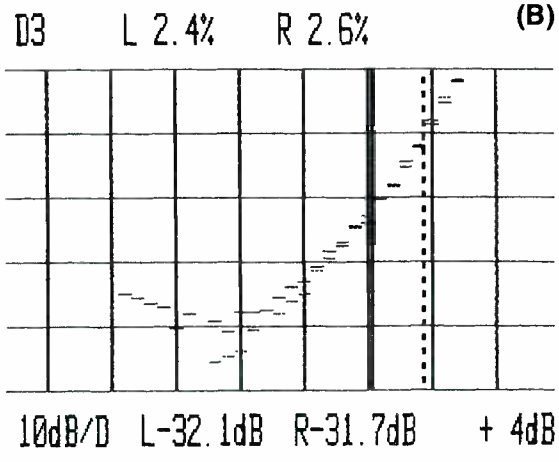


Fig. 3. Third-order distortion versus record level, with and without Dolby C noise reduction.

A major portion of the front panel is dedicated to calibration functions. There are separate level (sensitivity) and bias controls for the three major generic types of cassette tapes (normal, bias, high bias [such as chrome or equivalent], and metal particle). These adjustments are further refined by providing individual controls for each of the two stereo channels when the calibration is performed by the user. Level calibration is accomplished using a 400 Hz built-in test tone, whereas bias optimization is done using a built-in 15 kHz test tone.

Master volume, individual channel input level controls and an output level control are located near the right end of the panel along with a series of tiny two-position switches for such functions as tape/source selection, equalization selection (70 μs or 120 μs), Dolby on/off, Dolby B or C, MPX filter on/off, subsonic filter on/off and auto-record pause on/off. When this last switch is turned on, a pause in the music of more than 30 seconds will automatically throw the transport into the pause mode. A related feature involves auto reverse operation. If you are in the auto reverse mode



and the system senses silence for more than 40 seconds, it assumes that the current side of the tape has no further recorded material and sends the transport into the reverse-play mode. Recordists who are accustomed to not starting a recording near the end of a side of a cassette tape will particularly appreciate this last feature.

How NAAC Works: It's important to appreciate that NAAC corrects playback head azimuth, rather than record head. Thus, even if a cassette is recorded on a duplicator or in a one-to-one real-time recorder whose record head is way off vertical alignment, NAAC will automatically adjust the Dragon's playback head during playback of that tape so that it lines up with the recording for best playback response.

The NAAC system employs a specially-created playback head that derives *two* signals from the same track. A phase comparator determines azimuth misalignment by examining these signals in a specific band of frequencies and adjusts the playback head accordingly by means of an elaborate motorized system. The basic operation of the system is detailed in the block diagram of *Figure 1.* Since NAAC does not require that left and right channels contain similar information, the system doesn't degrade separation in any way. It is capable of correcting azimuth misalignment of as much as 12 minutes (0.2 angular degrees) in either direction. An error that great, if left uncorrected, would result in attenuation of a 10 kHz signal by more than 3 dB; a 15 kHz signal would be attenuated by almost 8 dB with that much azimuth error!

Test Results: Our table of VITAL STATISTICS tells you just about everything you would want to know about the superb measured performance of the Nakamichi Dragon. Frequency response for all the tapes tested (we used Nakamichi-supplied sample tapes in each category) extended to well beyond 20 kHz, both without Dolby and with Dolby C noise reduction applied. Plots of response at -20 dB record level for each type of tape tested are reproduced in *Figures 2A, B* and *C.* We purposely chose to plot response using Dolby C because any mistracking of the noise reduction system would show up to a greater extent with this system. As you can see, there was only negligible mistracking (lower curve for each Figure is taken with Dolby C on).

As can be seen from *Figures 3A, B* and *C* there was little difference in mid-frequency third-order distortion with Dolby C on or off. The dotted-line cursor in each of these figures has been moved to the right to indicate the approximate headroom for 3 percent third-order distortion. For example, at +7 dB (above 200 nWb/meter reference record level), third-order distortion for EX tape was 3.5 percent without Dolby C; 2.8 percent when Dolby C was used. Third-order distortion readings for 0 dB record level are tabulated in the VITAL STATISTICS summary and were all well within the limits specified in Nakamichi's published specifications.

Signal-to-noise readings, while primarily tape dependent, were nevertheless superb when measured on the Dragon. Nakamichi has always designed their decks to get the best out of a given tape, and Dragon is no exception. S/N analyses are depicted in the curves of *Figures 4A, B* and *C,* with dB figures noted at the top of each graph representing the S/N without (the "L" figure) and with (the "R" figure) Dolby C turned on. The spectrum analyses of the noise in *Figures 4A* and *B* were made using CCIR/ARM weighting. In the case of the ZX (metal) tape sample, with Dolby C on, the residual noise was so low when we tried to conduct the analysis with this weighting curve that our test instrument balked (it refused to come up with a dB number). We switched to A-weighting (which generally yields somewhat poorer S/N numbers) to produce the results shown in *Figure 4C.*

Figure 5 represents another run of frequency response, this time with the MPX filter turned on (for the lower response curve shown). Note that the curves are identical up to 15 kHz. Since FM transmissions are limited to an upper cut-off of 15 kHz, here is an MPX filter that will not "bite into" the music of an FM

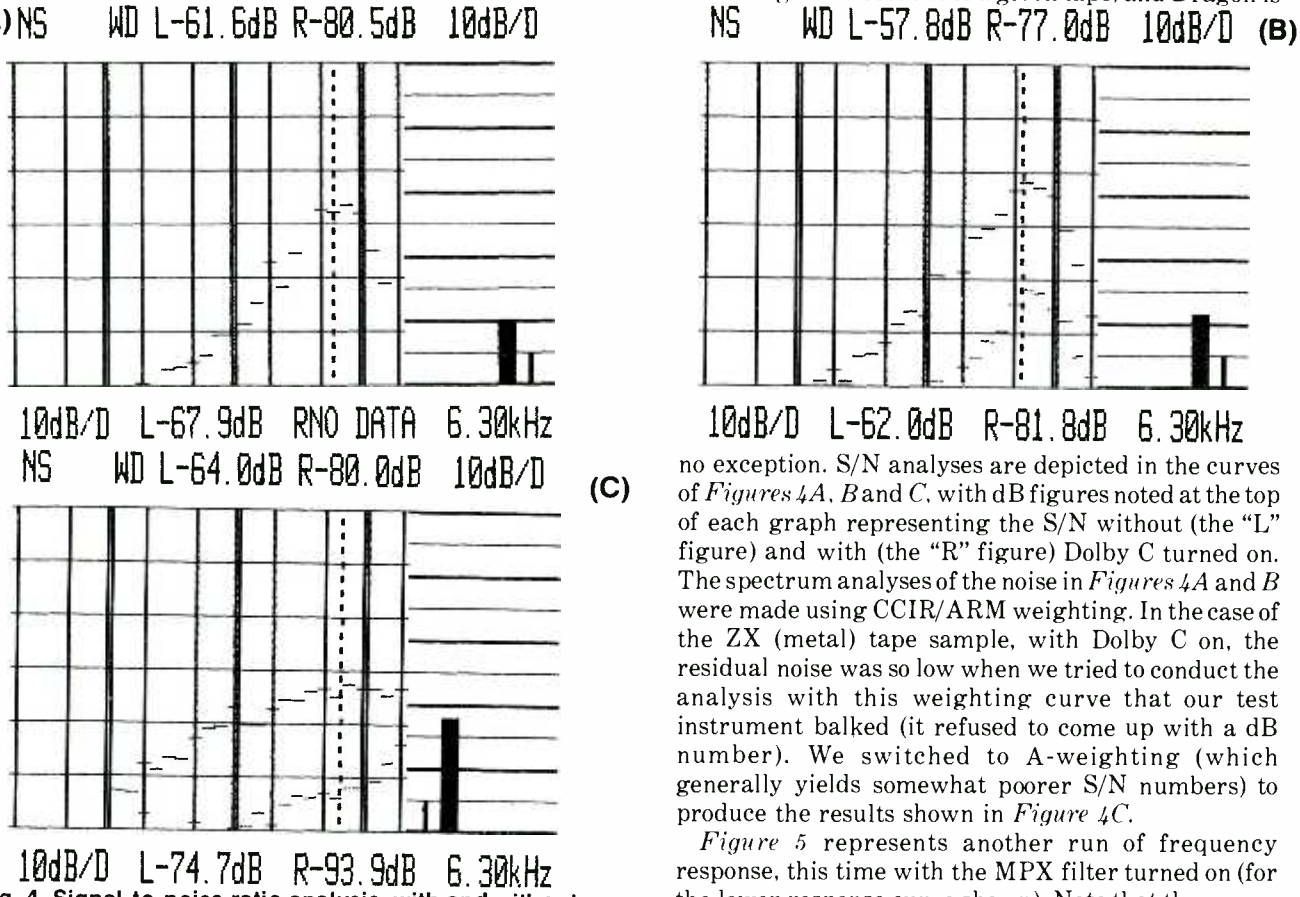


Fig. 4. Signal-to-noise ratio analysis, with and without Dolby C noise reduction. In the case of ZX tape, readings are A-weighted. For other tapes, weighting was CCIR/ARM (see text).

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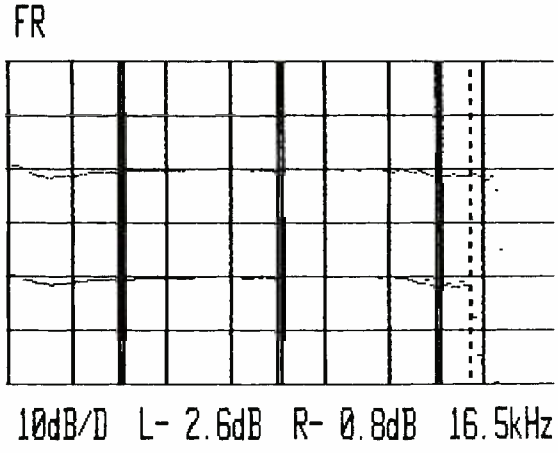

Fig. 5. Frequency response (record/play) at -20 dB level, with (lower curve) and without (upper curve) MPX filter.

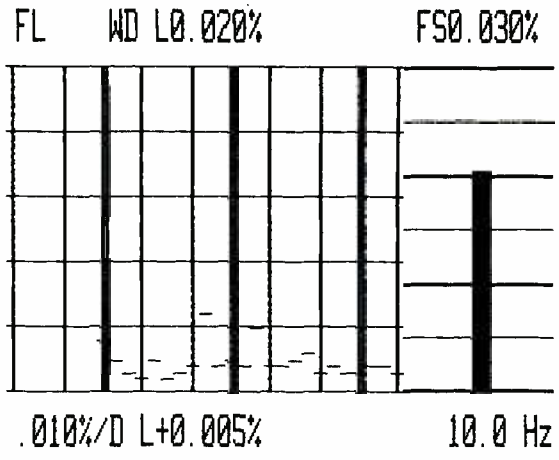

Fig. 6. Wow-and-flutter analysis.

program that you might try to record. Few other MPX filters we have measured on cassette recorders are that well designed.

Figure 6 is a plot of wow-and-flutter components, whose overall value measured 0.020 percent—about as low as we have ever measured for any cassette deck. Since our Sound Technology Tape Tester is equipped with a special azimuth alignment check and we have on hand a laboratory-prepared azimuth test tape for the instrument, we thought it would be a good idea to check out how completely the NAAC system actually corrects playback head azimuth alignment. The azimuth test tape involves four test frequencies, the highest of which is 15.8 kHz. As you can see from *Figure 7*, the azimuth error at that high frequency was a mere 46 degrees. That's 46 degrees of a single cycle of a 15.8 kHz test tone, *not* 46 degrees of azimuth error! Now at 1⅞ ips, a single cycle of a 15,800 Hz tone occupies only 0.00012 inches of longitudinal tape travel. 46 degrees at one cycle of 15,800 Hz occupies only 0.0000153 inches of tape travel. As nearly as we could calculate the angular error, that works out to be no more than 0.025 degrees!

In *Figure 8* we have plotted channel separation versus frequency. Nakamichi claims better than 37 dB at 1 kHz; we measured 43 dB at that frequency.

General Info: Dimensions of the Dragon are 17¾ inches wide; 5⁵⁄₁₆ inches high; 11¹³⁄₁₆ inches deep. Weight is 21 lbs. Price: $1850.00.

Comments: Once again Nakamichi has come up with a useful and important improvement in cassette tape technology; one that is very likely to filter down into lower-priced decks in time and, perhaps, even up to professional and reel-to-reel machines where accuracy of azimuth and interchangeability of tapes is important. Though not a subject for this publication, it is interesting to note that Nakamichi has already applied this same NAAC technology to a mobile (car) stereo cassette deck, where its importance cannot be overstated. A car deck is *always* called upon to play tapes that were not made on it (since car cassettes don't have record capability) and, of course, many car

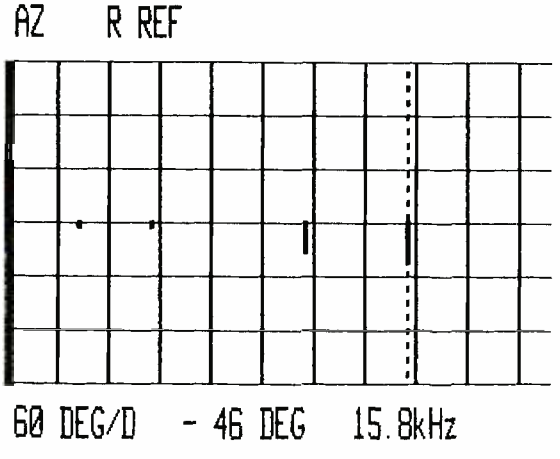

Fig. 7. Azimuth check using pre-recorded azimuth test tape yielded best results ever obtained for any cassette deck.

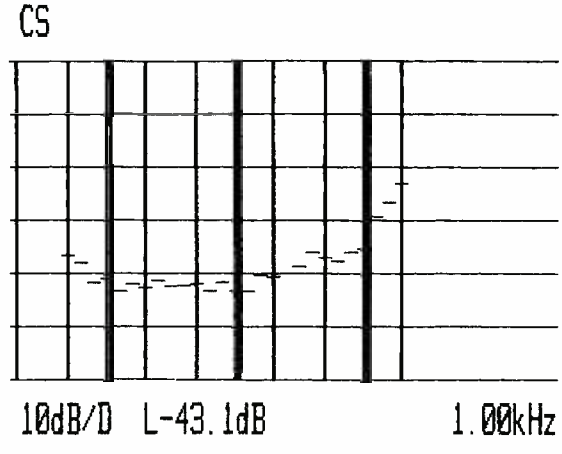

Fig. 8. Stereo channel separation versus frequency. The top line represents 0 dB, and the vertical sensitivity is 10 dB per division. The audio sweep is 20 Hz to 20 kHz.

cassette units do feature forward and reverse play—both good reasons for azimuth aligning the play head and not the record head.

On the practical side, the front panel of the Dragon, with all its controls (however useful they proved to be), is very busy and the designers were forced to cramp some of the most often used controls over to one edge of the panel, one above the other. During my use tests I found that more than once I inadvertently hit the MPX filter switch when I meant to work the Dolby B/C switch. On another occasion, I mistakenly moved the EQ switch when I really wanted to switch from tape monitoring to source. In short, things are a little crowded at one end of the panel and take a bit of getting used to (and careful attention) to avoid making such errors repeatedly.

All of that doesn't detract, however, from the superb performance of the Dragon and the brilliance of the NAAC concept and its execution. As many readers may already know, Mr. Etsuro Nakamichi, founder and chairman of the board of Nakamichi Corporation, passed away at the end of last year. I am told that the name "Dragor" was selected by him for this new product before he died. I knew Mr. Nakamichi well, and counted him not only as a friend, but as a compassionate and sensitive human being whose love of music and its dissemination in its purest form was central to his life and work. I am saddened by his passing; I am pleased that his name and company go forward with the kind of products that he loved.

NAKAMICHI DRAGON CASSETTE DECK: Vital Statistics

SPECIFICATIONS	MANUFACTURER'S CLAIM	*MR&M* MEASURED
Frequency Response, Normal Tape EX Tape (H_r to kH_r, ±3 dB)	20-21	20-22
Frequency Response, Hi-Bias Tape SX (H_r to kH_r, ±3 dB)	20-22	20-22
Frequency Response, Other Tape ZX (H_r-kH_r, ±3 dB)	20-22	20-22
Wow and Flutter, WRMS (%)	0.019	20-23
Speed Accuracy (%)	Absolute	+0.13%
Signal-to-Noise Ratio, No Dolby (re: 3% 3rd Order Distortion Record Level) (dB):		
Standard Tape	N/A	61.5
Hi-Bias Tape	N/A	57.8
Other ZX (Metal)	N/A	66.5 (64.0)
Signal-to-Noise Ratio, w/Dolby B/C (re: 3% 3rd Order Distortion Record Level) (dB):		
Standard Tape	N/A	71.7/80.5
Hi-Bias Tape	N/A	68.0/77.0
Other ZX (Metal)	66/72	73.3/80.0 (A-Weighted)
Record Level for 3% 3rd Order Distortion (0 dB = 200 pWb/m) (dB):		
Standard Tape	N/A	+7
Hi-Bias Tape	N/A	+4
Other ZX (Metal)	N/A	+10
THD @ 0 dB Record Level (%):		
Standard Tape	1.0	0.47
Hi-Bias Tape	1.0	0.65
Other ZX (Metal)	0.8	0.38
Line Output at 0 dB (mV)	1000	1000
Headphone Out Level at 0 dB (mV)	45 mW/8Ω	25 mW/8Ω
Mic Input Sensitivity for 0 dB (mV)	N/A	N/A
Line Input Sensitivity, 0 dB (mV)	50	53
Fast Rewind Time (C-60) (Sec)	N/A	72
Bias Frequency (kHz)	105	Confirmed
No. Motors & Type	4 (See Text)	Confirmed
No. Heads & Type	3	Confirmed
Dimensions	17¾" w. x 5⁵/₁₆" h. x 11¹³/₁₆" d.	Confirmed
Weight	21 lbs.	Confirmed
Power Consumption (Watts)	45 W	41 W
Suggested Price: $1850.00		

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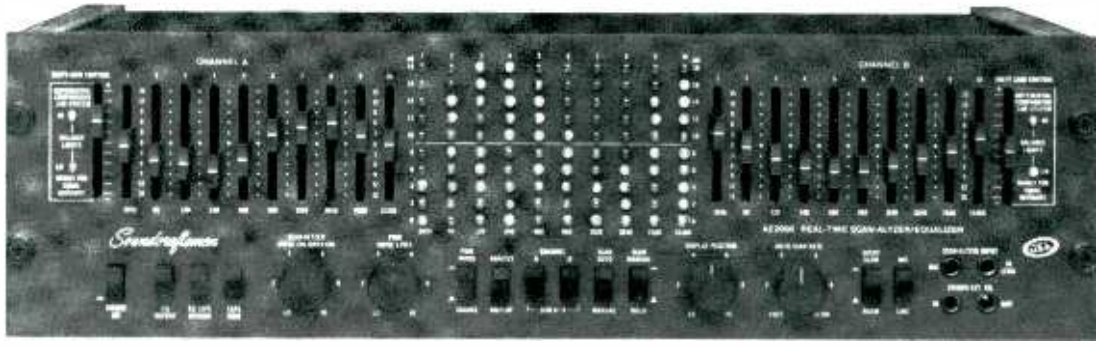
Soundcraftsmen AE2000 Equalizer-Analyzer



General Description: Some months ago, we tested Soundcraftsmen's AS1000, a product known as an Auto-scan-alyzer, which, when used with any external multi-band equalizer, could aid the user in achieving unusually accurate equalization settings. Soundcraftsmen had developed a system known as a "differential comparator" that delivered accuracy of settings of as little as +/-0.1 dB! The new AE2000 tested for this report combines the scan-alyzer action of the earlier unit with a dual-channel 10-octave graphic equalizer. In doing so, several features over and above those contained in either an equalizer or a stand-alone analyzer were added.

An automatic scanning mode, in which octave responses are adjusted one at a time using octave-wide pink noise, greatly simplifies the equalization procedure. The filtered, one-octave pink noise can be fed to the system being equalized automatically, at a fixed rate, switching from octave to octave as you adjust equalizer levers. Alternatively, you can move from octave to octave manually, at your convenience.

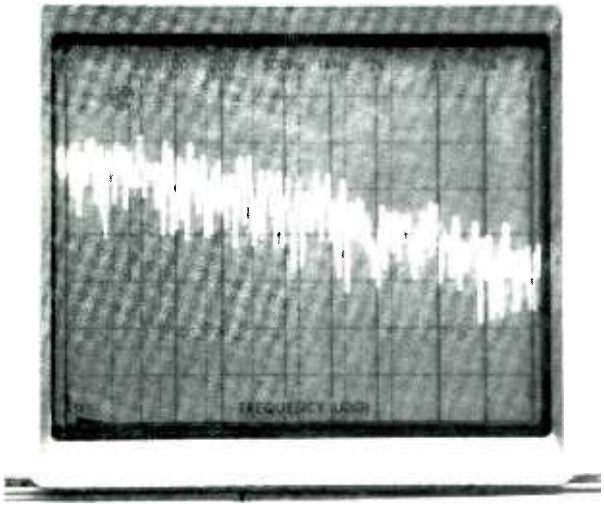


Fig. 1. The Soundcraftsmen AE2000's pink noise output.

Having first carefully adjusted the overall input to output for unity gain using the extremely sensitive patent-pending comparator circuit, each octave-worth of picked up pink-noise is then adjusted for the same accurate level. When all ten octaves worth of noise have been similarly adjusted, you are assured of an accuracy of system equalization far better than that obtainable in the conventional manner. Nevertheless, Soundcraftsmen does supply a grid of 100 LEDs at the center of the elaborately configured front panel of the AE2000. This gives the user an overview of the response of the system as a whole.

No microphone is supplied with the AE2000, but the microphone preamplifier contained in the unit is perfectly flat. All but the least expensive microphones will come with a calibration curve which can then be used to compensate for the particular microphone used. Soundcraftsmen also has available a microphone for use with the AE2000 known as the SAM II.

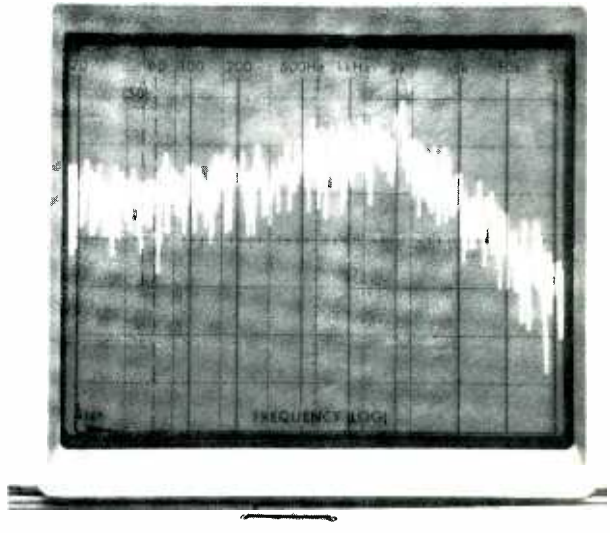


Fig. 2. Filtered pink-noise emphasizes one octave at a time for octave-by-octave analysis and adjustment of equalizer controls.

Control Layout: Aside from the usual ten slider

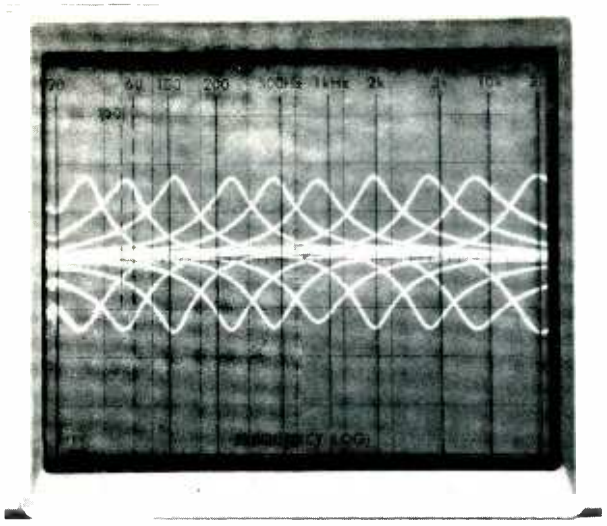


Fig. 3. Overall boost/cut characteristics of equalizer slider controls.

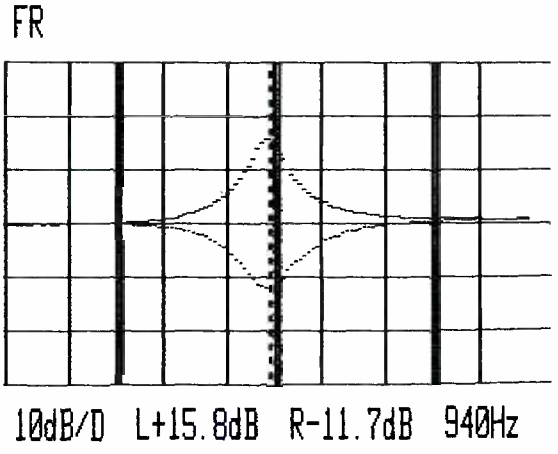


Fig. 4. Detailed view of boost and cut characteristics of 960 Hz octave slider control.

controls per channel and the differential comparator LED lights that enable you to accurately set up unity gain for the entire system or for each octave of test signal, the AE2000 is equipped with many other controls associated with the scan-alyzer functions. An input calibration control and pink noise level control are at the lower left, next to the power on/off, EQ defeat, EQ Tape Record and Tape Monitor switches. Beneath the grid of 100 LEDs are more pushbutton switches for pink noise on/off, analyze/display function, channel display selection (A, B or A + B), auto/manual scan, and manual scan-advance. Further to the right we find display sensitivity and auto-scan rate continuously variable rotary controls, a slow/normal decay rate switch (for the LED display), a mic/line switch and input jacks for mic, high level and external EQ, as well as an output jack for an external equalizer.

On the rear panel are pairs of line in, line out, tape in and tape out phone jacks. All inputs and outputs require the use of ¼-inch standard single-circuit phone plugs. Just in case your other equipment uses hi-fi type phono-tip audio cables, Soundcraftsmen thoughtfully sends along a bag of eight phono-to-phone-plug adaptors.

Test Results: Our table of VITAL STATISTICS details the claimed and measured performance characteristics of both the analyzer and equalizer sections of the AE2000. *Figure 1* is a spectrum analysis display of the pink noise signal source available from the unit. As usual, it is a random noise source having a downward slope of 3 dB per octave over the audio range from 20 Hz to 20 kHz. (Sensitivity of this display and of that in *Figures 2* and *3* is 10 dB per vertical division.)

Figure 2 shows what happens to the pink noise source when it is filtered on an octave-by-octave basis during the automatic or manual scan-alyzer procedure unique to this instrument. Notice that the noise

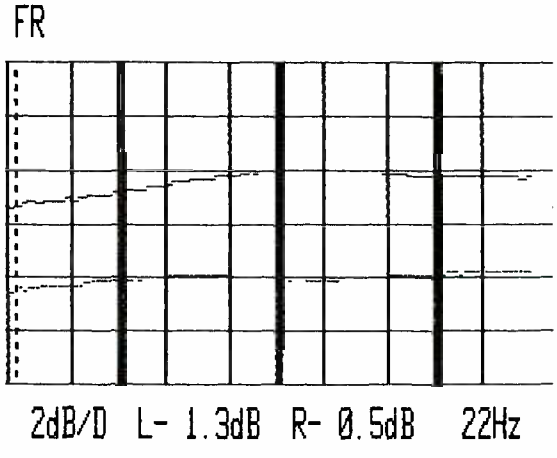


Fig. 5. Frequency response of left (upper trace) and right channels of equalizer section. Note: Expanded vertical sensitivity of display is 2 dB per division.

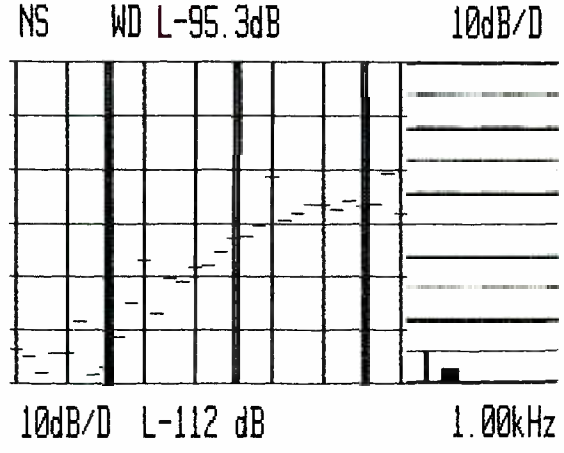


Fig. 6. Signal-to-noise analysis of equalizer section. Overall S/N of 95.3 dB is referenced to 1 volt in and out.

now exhibits a peak centered at the center frequency of the particular octave being adjusted (in this case 1.92 kHz).

In *Figure 3* we have superimposed multiple plots of the boost and cut characteristics of each slide-control of the equalizer section in order to show the extremely accurate and uniform amplitude and frequency spacing of each of the ten octave controls of the equalizer portion of this instrument. Using our Sound Technology 1500A tester for a more precise display, we have reproduced in *Figure 4* the boost and cut characteristics of a single control—the one whose center frequency is at 960 Hz. (The cursor in the display has been positioned to 940 Hz simply because it is the closest fixed step to the ISO center frequency of 960 used by the AE2000). That particular slider offered a maximum boost of 15.8 dB and a maximum cut of 11.7 dB at 940 Hz.

Figure 5 is a plot of the frequency response of the left and right channels of the equalizer section of the AE2000. The response measurements were made with all slider controls set to their mid or detented positions. While there seems to be some roll-off in response at the low end for the left channel, this is really of no great concern since it is easily compensated for by a very slight upward movement of the 30 Hz and 60 Hz sliders for that channel. Note that the sensitivity used in this display is 2 dB per vertical division, rather than the usual 10 dB per division which we normally employ.

Figure 6 is a graphic analysis and measurement of the signal-to-noise ratio of the AE2000's equalizer section. The A-weighted S/N (shown at the top of the display) measured 95.3 dB relative to an input of 1 volt. This differs from Soundcraftsmen's figure of 114 dB, but it should be noted that Soundcraftsmen is referencing their S/N figure to "maximum output." Since maximum output is not defined in their printed specifications, we elected to use an arbitrary 1 volt (around +2 dBm) for our S/N evaluation. The cursor has been set to mid-band (1 kHz) at which third-octave noise is a full 112 dB below reference level. We should point out, too, that in order to see any of the noise spectrum on our display, it was necessary to raise the noise calibration of the display so that the top line represents -80 dB below reference level, (1.0 volt and each successively lower line represents an additional 10 dB of S/N.)

Comments: Whether your job involves room equalization, sound reinforcement, system analysis or even electronic component response analysis, the Soundcraftsmen AE2000 is one of the finest instruments for any of these tasks that I have had the pleasure of using. Everything about it has been designed with the user in mind and with the idea of making the EQ task as simple and speedy as possible. I am not at all sure that an accuracy of 0.1 dB in equalization work is that important, but that really isn't the point of this remarkable combination instrument.

I do agree with Soundcraftsmen that it is extremely important that an equalized system have the same overall gain as the same system without equalization applied. And for that, nothing I have run across provides as accurate a means of achieving identical gains as does Soundcraftsmen's unique Differential Comparator technique. Nor do I know of any comparable equalizer/analyzer that offers such precision and quality for the same reasonable price as the AE2000. Soundcraftsmen has taken the very best of two of their products and combined them into a single instrument that benefits synergistically from the union.

SOUNDCRAFTSMEN AE2000 ANALYZER EQUALIZER: Vital Statistics

SPECIFICATION	MANUFACTURER'S CLAIM	*MR&M* MEASURED
Comparator Minimum Input	75 millivolts	70 millivolts
Differential Meas. Accuracy	+/-0.1 dB	+/-0.1 dB
Hi Level Input Impedance	47K ohms	Confirmed
Hi Level Gain	30 dB (Adjustable)	30 dB (Adjustable)
Hi Level Freq. Response	20 Hz to 20 kHz, +/-0.1 dB	See Fig. 5
Mic Input Impedance	2000 ohms	Confirmed
Mic Preamp Gain	80 dB max.	82 dB max.
Filter Center Frequencies	30, 60, 120, 240, 480 960 Hz, 1.92. 3. 84, 7.68, 15.365 kHz	Confirmed
Harmonic Distortion (EQ Section)	Less than 0.01% @ 2.0 V	0.007% @ 2.0 V
SMPTE-IM Distortion (EQ Section)	Less than 0.01% @ 2.0 V	0.009% @ 2.0 V
Boost/Cut Range, per control		
(All others at max.)	+/-22 dB	+/-22.5 dB
(All others at center)	+/-15 dB	+15.8/-11.7 (typ.) (See Fig. 5)
Unity Gain Control Range	18 db	20 dB
S/N Ratio	114 dB @ max. out	95.3 dB re: 1 V in/out (See Fig. 6)
Dimensions	19" w. x 5¼" h. x 11¼" d.	Confirmed
Weight	28 lbs.	Confirmed
Suggested Price: $699.00		

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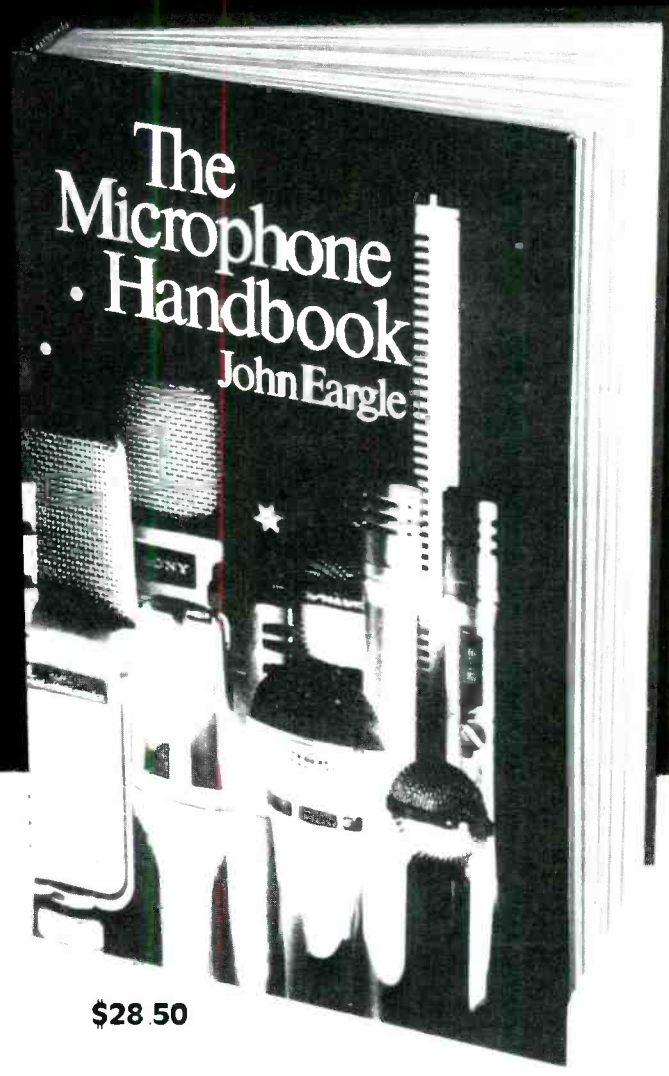

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MILLIE JACKSON: *Hard Times.* [Brad Shapiro and Millie Jackson, producers; Ernie Winfrey, Mike Bradley, engineers; recorded at The Sound Shop, Nashville.] Spring SP-1-6737.

Performance: **R-rated, B-graded**
Recording: **Solid**

Millie Jackson is fighting a couple of artistic battles at this point. An immediate problem has to be overcoming any misconceptions stemming from last year's *Just A 'Lil Bit Country*, which might have been construed as an Urban Cowboy bandwagon attempt. It wasn't a half-bad disc, actually, but that was one packaging job that never should have made it out of the barn.

A more long-range hurdle for Jackson has to be beating a bad rap, literally. Ever since *Caught Up* caught us by surprise with its funky, sordid soap and satire—and a ribald "rap" vocal style—Jackson has been working that bad girl side of the street. At first, Millie's sassy frankness was provocative, funny, and maybe even progressive in a way. Even without massive airplay, this lady established herself as one of the gutsiest, funkiest singers of the '70s.

Raw, earthy energy comes naturally to Millie Jackson, and that will always be the strength of the music she makes. It could not be otherwise. But with so much passion intrinsic to the Millie Jackson style, there is really no need to push it. Better to develop other areas and merely harness that natural power.

Millie Jackson

Hard Times almost recognizes that need by presenting a fairly straightforward collection of songs recorded in Nashville (but without the C&W tongue in R&B cheek, thank you). The title track and "Blufunkes" are churning funk numbers that turn topics of economic woes into an excuse to dance. For contrast, *Hard Times* diversifies into straight, big city blues ("The Blues Don't Get Tired Of Me") and a ballad ("Special Occasion") to good effect. Strings and horns are classy, and Brad Shapiro helps keep fairly good tabs on the overall production.

Unfortunately, there are new digressions into sensationalistic lingo (and cheap laughs) on "Mess On Your Hands" and its companion piece.

"Finger Rap." While an otherwise prim and proper background choir sings the repeated line "shit on your fingers" with perfect enunciation, Millie gets into one of her blue short stories about the wife confronting the mistress, and it's R-rated ho-hum time for those of us who have heard this stuff too many times before.

What *Hard Times* lacks more than anything else is an editorial guiding hand, perhaps some outside observer to decide when enough's enough. In the hands of a Quincy Jones, for instance, Millie Jackson could become a veritable Eliza Doolittle. But for now, it looks like we're being made to suffer through the bad material to get to the better cuts like "I Don't Want To Cry." And, with times being as hard as they are, that doesn't make for a very good record value. R.H.

ROBBY KRIEGER: *Versions.* [Robby Krieger, producer; Mark Avnet, engineer; recorded and remixed at Mad Dog Studios, Venice, California; mastered at Precision Lacquer by Stephen Marcussen.] Passport PB 6017.

Performance: **Guitar playing from a rocking chair**
Recording: **And just as quiet**

First the facts: Robby Krieger was a founding member of the Doors, is an excellent guitar player and has released a solo album entitled *Versions*. Now the fiction: This is a landmark album exploding with energy, innovative structures and extraordinary recording techniques.

Truth be told, *Versions* is simply a mild album, chock full of interpretive covers that hardly leave the impression that Krieger sweated while laying down his tracks. As an all-instrumental record, Krieger's fingerwork is naturally a substitute for a fronting vocal. And, as producer, he did the obvious in pushing his axe out front. Yet, while each string pull, pluck and slide sing out like a voice in a mic, the soft production and bluesy swagger more often than not work against the moods Krieger is trying to establish through his labors.

Without words, Krieger's songs are left to take off based on how they make a listener *feel*. He's only on the mark with that chore 50 percent of the time. His best stuff are his originals, especially "Her Majesty" and "Underwater Fall," which create a nighttime beach atmosphere. The former is a curious number, for Ray Manzarek's keyboards come out like the **Jackie Gleason Show** theme, while the Hawaiian guitar paints a picture of a romantic sand-in-between-your-toes-romp. I don't quite get the feel of "her majesty," unless the artist was talking about an Island princess. "Underwater Fall"'s guitar is relaxing enough to once again conjure up visions of paradise in your mind—or at least Fort Lauderdale as it is seen in New Yorkers' winter fantasies. The guitar, again, is high pitched, yet decidedly soothing. (Trivia note: Krieger appropriated the song title from an incompleted Jim Morrison tune.)

When Krieger offers something like Eric Gale's "East End, West End," his style works into the skin like osmosis—slightly less than annoying at its most progressive; simply pretty with its most liquid licks. But when this man is bland—check out "Street Fighting Man"—one has to question the validity of this vinyl effort, especially when the rhythms of these songs match and sometimes surpass the caliber of Krieger's playing.

Robby Krieger

However, Krieger does, on occasion, show promise as a producer. Cases in point: Greg Romeo's percussion blended with John Densmore's drums and Manzarek's melodica turn the Door's "Crystal Ship" out into Jamaican waters. And, Motown gets ryddim (sic) when "Reach Out And I'll Be There" cuts to Bruce Gary's tribal beats that seem only slightly less forced than Krieger's off-line guitar prancing. With Gary on skins and Frank Zappa alumnus Arthur Barrow plucking bass, there's an interesting shift from reggae back beats to rock and roll structure on the bottom of "East End, West End," and it is Densmore's light cymbal taps that contribute the final breeze to "Her Majesty."

Versions also delivers a sprinkling of psychedelia ("Gavin Leggit") and New York-styled dissonance ("I'm Gonna Tell On You"), but the braiding of sunbelt riffs and West Indian rhythm are the only original successes on this platter. E.Z.G.

PETER GABRIEL: *Security.* [David Lord and Peter Gabriel, producers; David Lord and Neil Perry, engineers; recorded at Gabriel's home by Mobile One and mixed at Crescent Studios, Bath, England.] Geffen GHS 2011.

Performance: **Awesome**
Recording: **Awesome**

Phil Collins would appear to be the resident genius of Genesis these days. He's the "voice" of a band still growing in popularity and artistic integrity. He's also a damned good solo artist, producer, and all-around man about town with Brand X, Robert Plant, and many others.

But albums like *Security* leave little doubt as to who was the original driving force behind Genesis. Since vacating his lead vocalist spot in the late '70s, Peter Gabriel has steadily prodded at pop music's fattened ribs, tickling our fancy with the cleverness and wit he brings to rock music—and sometimes jabbing harder lest we again grow complacent. Like the similarly independent Jon Anderson (formerly of Yes), Gabriel is capable of redefining the lyrical rule book of contemporary music, practically inventing his own lexicon as needed. But in Gabriel's case, the boldness extends beyond intense, esoteric verbiage into the domain of explicitly original instrumental concepts as well.

"The Family And The Fishing Net" is just such a challenge on both the word and music level. It opens with eerie Ethiopian pipes, builds on a percussive effect created by scraping an automobile exhaust pipe, and swells with electronic instrumentation including Moog bass (Larry Fast), Stick (Tony Levin), treated

saxophone (Roberto Laneri), and other basic rock instrumentation. The half spoken/half sung poetic imagery is broken, dark, and extremely successful at conveying a mysterious swirl of sex and suffering. No, not S&M—a deeper kind of psychological statement about gut level emotions, guilt, the unknown.

Adding impetus to the remarkable synthesizer conceptions (and programming of same by Gabriel, Fast, Stephen Paine, and David Lord) is Gabriel's extraordinary use of wide and varied percussion. On the opening "The Rhythm Of The Heat," for instance, Ghanaian drums are contributed by the Ekome Dance Company, Surdo drums are dubbed in by Gabriel and Jerry Marotta, with trap drums (here and throughout) by Marotta as well. Elsewhere, Gabriel can be found banging on marimba, blown drainpipe, paving stone, glass, and so forth. Whether the beat is funky and intense, as on "Shock The Monkey," or light and tinkling ("San Jacinto"), this album would be fascinating for its progressive percussion alone.

Peter Gabriel

Getting down to specifics, there are many reasons why this album is a technical masterpiece as well: digital mixing on a Sony PCM 1610, Fairlight CMI recording, Quiex II pressing, the engineering prowess of David Lord and many others. But conceptually, almost every cut on this album is a killer, the kind of meaty musical fare that true artists can really dig into. "Lay Your Hands On Me," "I Have The Touch," and a new classic called "Wallflower" will not disappoint Peter Gabriel's current fans, while the other five cuts will amaze them even further. R.H.

FAY RAY: ***Contact You.*** [Nigel Gray, producer; Pete Buhlmann, engineer; recoded at Surrey Sound Studios, Leatherhead, Surrey, England.] Elektra EI-60098.

Performance: **Message received...**
Recording: **...but not always loud & clear**

The last time you heard a vocalist out of England named McCartney, he was headed for the top of the charts. Well, there's a *Macartney* singing lead in this new band, but her name is spelled differently and there's no comparison on the notoriety level.

Fay Ray and Sheila Macartney almost slipped by unnoticed in '82, despite an album title as intentionally inviting as *Contact You*. Several hot modern cuts make this LP worth checking out, and there's a depth to much of Fay Ray's material that could keep them around awhile.

The disc starts off with "Different Morning," a tense and dramatic scene setter that is full—up to here—with 20th Century cold (and hot) war. Next up is "Heatwave," with a beat similar to Loverboy's "Waiting For The Weekend"; but Fay Ray isn't waiting for Friday's fun and games, their heatwave is a nuclear holocaust. Sheila sings with pride, "I didn't hate/I didn't kill," then Jeff Taylor launches into an impassioned sax solo. Unusually strong topics for the checkered shoes set.

The balance of side one is motivated, but more along girl-boy lines with "Love Is Strange," "Modern Lovers," and "Contact You." Guitarist John Loverling is the band's clever writer, and "Modern Lovers" is an example of the subtle, but simple, arranging he does. It's got a new wavish, speeding rockabilly pace that suddenly cuts to a raunchy—in the spirit of Duane Eddy—*accordion* solo...Huh?

Side two is loaded with memorable material as well, sometimes hinting of Pretenders balladry ("Cold As Steel") or Blondie entrancement ("Clean Lines"), but always from a strong Fay Ray perspective. "Family Affairs" and "Wargames" again demonstrate Loverling's concern for contemporary political issues, while Macartney and the boys deliver each song with melodic flair and a no-nonsense kind of Sixties social consciousness.

If there's a problem with the album it could be in the recording levels. *Contact You* needs to be turned up a bit louder than most albums. However, that's a minor problem that might be solved by simply twisting the knob on your stereo tuner. Then again, small technical factors have been known to influence a program director or two. Still, don't be discouraged from picking up an album that represents one of the most natural unions of New Wave's "old" sound with an old-fashioned concern for tomorrow's issues. Confused? Well, the music on *Contact You* will clear heads with its direct attack, strong writing, and deceptive energies. R.H.

Performance: **Trite**
Recording: **Dripped out of the speakers**

While it is no longer common practice to condemn mainstream jazz players who have channeled their energies into the more commercial rhythm and blues-funk-disco recordings, there is still a growing number of such individuals who demand confrontation if only because once they make the switch, they no longer produce anything of import—indeed, many are manufacturing conformist product geared to radio programming requirements worth nary the vinyl it is pressed on.

Tenor saxophonist Stanley Turrentine is one such convert. A recording headliner for Blue Note Records in the late sixties and later with Creed Taylor's slick-as-ice CTI label, Turrentine's vision foretold his present pop inclinations as early as the Blue Note days. While the early records featured large ensemble collaborations with the likes of

JAZZ

STANLEY TURRENTINE: *Home Again.* [Produced by Chuck Jackson and Turrentine; Engineered by Paul Ring and Gary Jaye; Recorded at Golden Sound Recording, Los Angeles, CA]. Elektra Records 60201-1.

Stanley Turrentine

McCoy Tyner, Bob Cranshaw, Pepper Adams and other luminaries, Turrentine's most recent endeavors, especially this one, find him surrendering much of his role as instrumental leader, but concurrently assuming a self-appointed visionary stance as producer, talent scout and overseer a la Quincy Jones. But while Jones is a jazz arranger and bandleader turned pioneering pop producer, Turrentine's similar attempts have left him faceless.

From a technical perspective, *Home Again* is admittedly seamless. An army of keyboardists, percussionists, bassists and guitarists have been gathered and recorded to velvety effect. The problem is, the sound montage is *so* polished and slick that no track here provides any hook provocative enough to get excited about. All personality has been cast aside here in favor of a computer-like generation of "accessible" music which, while trying to cover enough material to please nearly everybody, sounds like nothing in particular.

All the instrumentals are pop-jazz readings, meaning that the melodic lines are painfully simple; Turrentine's solos, riding the tides of the rhythmic foundation, are so dreadfully anemic that his ability to play with any semblance of fire must certainly be questioned. Production and arranging references to Grover Washington, Jeff Lorber and Jay Graydon are obvious. "You Can't Take My Love," featuring vocalist Irene Cara, and "I Knew It Couldn't Happen," featuring vocalist Derald Conway, must both be pegged by Elektra Records as potential hit singles, but in light of recent successes by other artists, neither is more snappy than a form letter.

Recordings like this do have one asset, no matter how obscured or ironically underhanded: they effectively serve as introduction to an entire set of sensibilities necessary for accepting and enjoying the more conceptually honest forms of similar music such as jazz, blues, and progressive (in this culture) dance music like reggae and harmolodics. However, there are better records than this for even *that* purpose. *Home Again* is a blatant emulation of much that has recently proven successful for other artists and producers and, as such, precludes itself from any list of recent, similarly conceived worthwhile records. MF

Nonpareil Jazz Singers: Sarah and the Long Neglected Boswells

By Nat Hentoff

On the face of it, the combination did not appear especially enlivening, let alone full of surprises. A symphony orchestra (the Los Angeles Philharmonic conducted by Michael Tilson Thomas); an all-Gershwin program (not again!), and a jazz singer. Even though the jazz singer was Sarah Vaughan, the odds were heavily against her being able to soar above all those strings and the predictability of the repertory.

In joyful actuality, however, *Gershwin Live!* (CBS) is one of the most satisfying performances in the Sarah Vaughan canon. Conductor Thomas wisely keeps his orchestral forces in the background, thereby providing touches of appropriate color without bumping into the spontaneity of the singer. And Sarah approaches these Gershwin standards as if they were all new to her. The result is continually venturesome, graceful, and often witty improvisation—from sizzling scat singing to middle-of-the-night soliloquies of memory and desire.

Along with the Los Angeles Philharmonic, Sarah's own trio is crisply present—pianist George Gaffney, bassist Andy Simpkins, and drummer Harold Jones. This set, along with her recent Pablo albums, make clear that Sarah's powers, far from waning as the years go on, have never been more compellingly resourceful. And that includes her time. Sassy swings harder these nights than any of her peers.

The recorded sound could be called festive—very live, very clear, very open to the jubilation of these combined forces.

Unaccountably, nearly all histories of jazz ignore one of the most original and influential of jazz singing groups—the Boswell Sisters. Born in New Orleans, Martha, Connee and Helvetia made their most intriguing recordings in New York from 1932 to 1935 with such hotly swinging sidemen as Bunny Berigan, Dick McDonough, Eddie Lang, the Dorsey Brothers, etc. Because of the sisters' consistently imaginative harmonies (Connee was the arranger), supple rhythms, sensuous solos, and cool wit, these recordings are as fascinating now as when first released. More so, in fact, because there are no jazz singing groups currently in this league.

There are now two volumes of hitherto very rare and invaluable performances: *The Boswell Sisters 1932-34* and *The Boswell Sisters Vol. Two/"It Don't Mean A Thing If It Ain't Got That Swing."* The label is Biograph (P.O. Box 109, Canaan, N.Y. 12029).

As jazz historian Michael Brooks says in the notes for the first set, The Boswell Sisters "revolutionized close-harmony singing, taking it out of the barbershop." And, "for the first time, they employed the human voice as a section of the orchestra and not as the means to force musicians into the secondary role of accompanists."

If you've never heard the Boswells, what they do to songs like "42nd Street" and "Sophisticated Lady" will be a revelation. Obviously, these are not high-fidelity recordings, but the sound quality is more than sufficient for enjoyment and constant surprise.

SARAH VAUGHAN AND MICHAEL TILSON THOMAS: *Gershwin Live!* [Steven Epstein, producer; Bud Graham, engineer.] CBS FM 37277.

THE BOSWELL SISTERS: *Vols. 1 and 2.* [Arnold Caplan, producer; no information on the engineer.] Biograph BLP-C-3, BLP-C-16.

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