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MODERN RECORDING

SERVING TODAY'S MUSIC/RECORDING-CONSCIOUS SOCIETY

VOL. 2 NO. 11
NOVEMBER 1977

A Session with
Brass Construction



Weather Report
—An interview
with Joe Zawinul
and engineer
Brian Risner

Lab Reports
New Products

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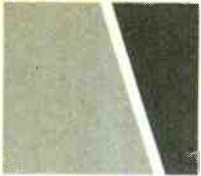
ments that allow you to specifically boost or diminish the tonality of any part of your performance. Its frequency range (31.2 Hz—16KHz) is sufficient to allow the widest range of application, including musical instruments such as keyboard and drums as well as PA mains and/or monitor equalization. The MXR Ten-band Graphic Equalizer is AC powered, can handle both low and high impedance signals and is extremely quiet.

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MODERN RECORDING

NOVEMBER 1977

VOL. 2 NO. 11

SERVING TODAY'S MUSIC/RECORDING-CONSCIOUS SOCIETY

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A SESSION WITH BRASS CONSTRUCTION

By Stu Gale

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If you've been wondering how to have fun while you're recording and still keep the "gold" (records, that is) on the wall, take a look at Brass Construction. Brass Construction has become one of the most important groups in music by being consistent, but with a flair.

OUTFITTING A MOBILE STUDIO

By Jim Ford and Brian Roth

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Our "Hands-On" writers are at it again. Recently called upon to outfit a studio on wheels, Brian and Jim pulled the task off in their usual "grade-A" fashion. From patch bays to tape decks, and from TV monitors to plexi-glass windows, the authors guide us through what could have been a nightmare for many audio consultants and prospective owners.

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Advertising Representative

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Advertising Director

VINCENT P. TESTA
Publisher

Editorial and Executive Offices
Modern Recording,
14 Vanderverter Ave.
Port Washington, N.Y. 11050
516-883-5705

COWAN PUBLISHING CORP.
Chairman of the Board Sanford R. Cowan
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LETTERS TO THE EDITOR

Some Info on Techniques

I was recently present at a studio with a friend of mine who was recording a demo. It was a small 8-track studio built for the purpose of recording demos, for which it was fine. But on one of the tracks, the guitar (which was highly distorted and rich in harmonics) sat in the middle on the master track even though it was split between two channels. I was annoyed at this problem so I tried to find an answer to this problem using a stereo mixer. The best way, I found, to "fill up" the sound with the guitar was to place three mics in different locations—closely in phase, but not quite. In this fashion the sound can be spread from left to right as well as centered. This results in a fuller sound while enabling the guitarist (or any musician) to play his best licks and riffs without overdubbing. My personal taste is to pan the mics between one quarter to one half the way left and right with the middle drawn back a little from the other two.

This may be information that a lot of engineers know, but in case anyone has missed it, I pass my findings on to you.

—R. Keith Smith
Scarborough, Ontario, Canada

Not knowing the studio you're working in, we'll refrain from making any specific comments on your techniques or suggestions on how you can better it. You might be taking the longest route to your desired end, but we'll leave that up to any engineers who might read this. We're sure that for every person who might learn something from your techniques, there is one who will have a suggestion on how you might make it easier on yourself.

Binaural Basics

You people seem to know all there is to know about recording, so could you tell me briefly what binaural recording is? I understand that some artists are currently recording binaural albums. How are they different from stereo? Can they be played on stereo equipment? Any information that you could share would be greatly appreciated.

—Jeffrey Meyer
Boston, Ma.

Yours is not the only letter we received concerning binaural recording, and binaural recording isn't as new a concept as you might think. For some basic information on what binaural recording is, see Len Feldman's Ambient Sound column in the Feb/Mar 1977 issue on page 62. Also refer to the May 1977 Talkback column where one of the questions ("Rundgren's Ra," page 20) touches on some of the problems with listening to a binaural recording. Also, look up the Talkback question in this issue entitled, "A Simple Explanation of Binaural Recording." It will give you just that!

Tips for a Sweeter Sound

I have a semi-pro studio in my basement (concrete walls and floor). At present, I have a TEAC A3340-S/Tascam 5 board, a Marantz Quad receiver, and Fisher 3-way speakers.

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SEE US IN ROOM 10E AT THE AES CONVENTION.

I am set up for a Fender-Rhodes piano, Fender bass and a Roland synthesizer unit and I have plans to buy a synthesizer (i.e. a Micromoog) in the near future.

My problem lies in the vocal tracks. Having a voice that doesn't waver much above middle 'C,' my vocals are practically monotones. Having read about equalizers, Digital Delay, the Eventide harmonizer, etc., I was wondering which would be best for "sweetening" vocal tracks.

I have been hesitant to purchase a PA/reverb system since I think it would only make my vocals louder (not necessarily more enchanting). I have two Electro-Voice 1776 mics which seem to have adequate frequency response. They pick up my slurred words and out of breath phrases very well.

Seriously, would a reverb unit such as the Orban/Parasound model be a wise investment or would a few lessons in vocal harmony and theory be a more rational choice?

—John Asbury
Nashua, N.H.

In a case such as the one you describe, we would have to go with the voice lessons. Outboard equipment and electronic "gadgets" (regardless of their price tag) cannot improve a poor performance, but simply enhance a good one. We suggest you find a good voice teacher in your area and concentrate on technique before investing in any "sweeteners."

A Learning Experience

In the April, 1977 issue of *MR*, in the Talkback section, John Boyle gave a list of books and magazines in his response that us future recording engineers might learn from (see "Your Own Studio," page 13). His list appears quite complete except for one minor detail—the price. What I am mostly interested in is the rates for *Studio Sound* magazine and surface and air mail rates.

Thank you for your cooperation.

— Peter Lurowist
Berwick, Pa.

The best we can do is supply you with their address and advise you to write to them directly for their subscription rates. You can reach them at Studio Sound, Link House, Dingwall Avenue, Croyden, England CR9 2TA. As for mailing rates, as a point of reference, air mail rates for Modern Recording from the U.S. overseas is \$2.50 per

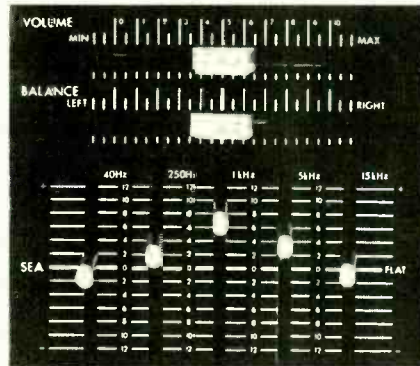
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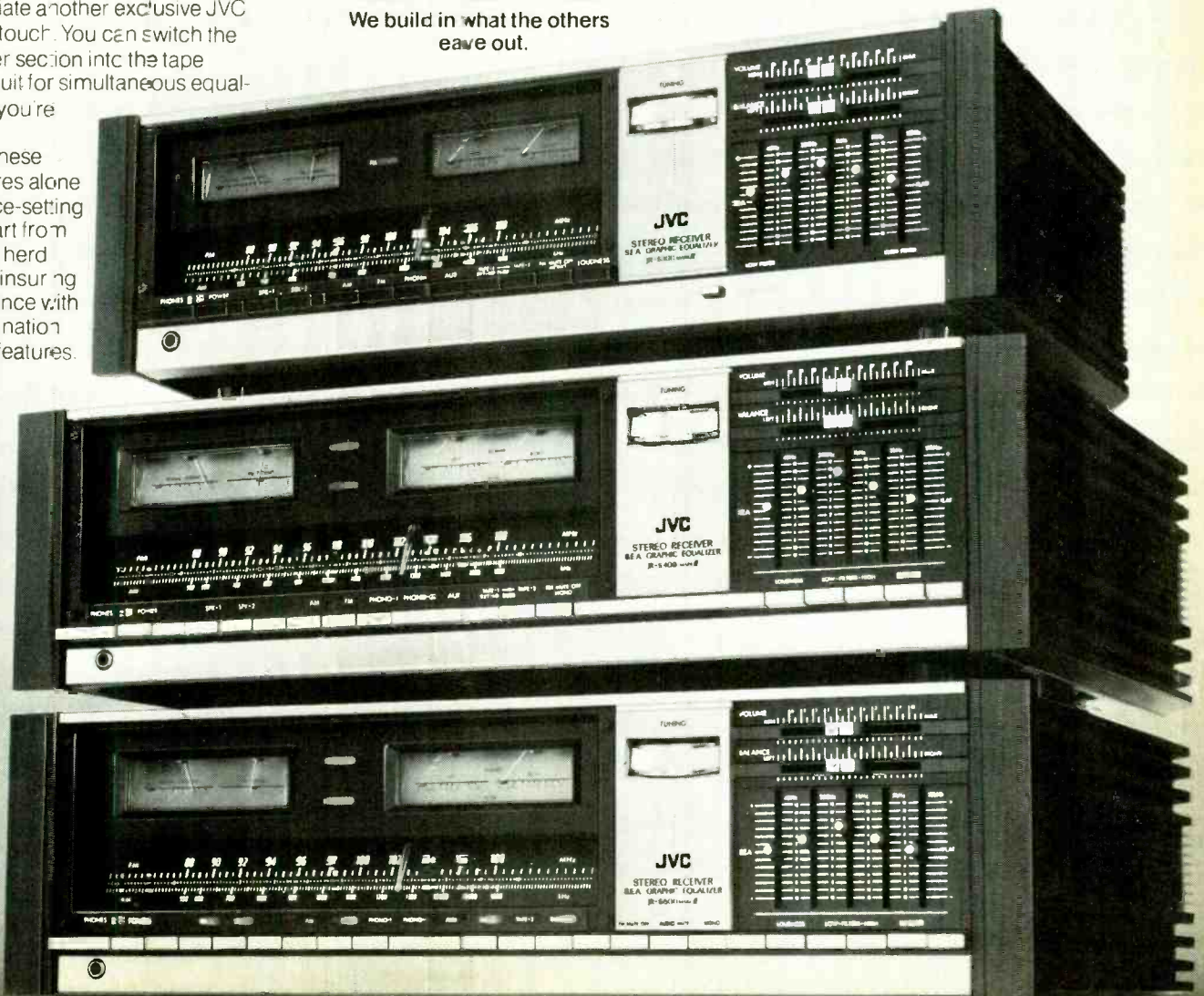
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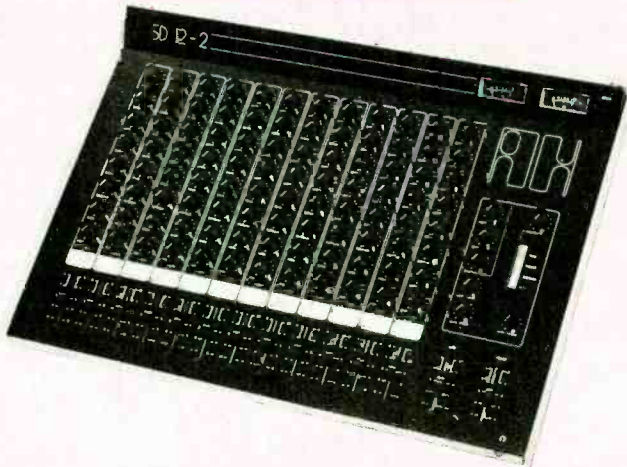
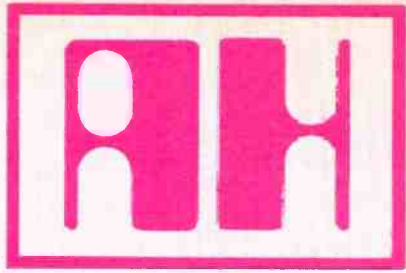
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More From Our Regulars

I would like to compliment you on your incredible magazine. As a subscriber and enthusiast from the start, I've gained a lot of insight and knowledge into the recording and pro-sound field from the articles you have printed.

My purpose in writing is to first request that you continue with articles along the same lines as "P.A. Primer" (by Jim Ford and Brian Roth, June/July, Aug/Sept and Oct/Nov 1976) but on a regular basis, partly for selfish reasons (for I am an audio engineer working mostly in "live" sound reinforcement) and partly for the benefit of those who are involved in different, but associated areas of recording who will be able to broaden their knowledge if such articles are available.

My second request is that Len Feldman pursue the subject of his September, 1977 Ambient Sound—impedance, (page 54) by elaborating and detailing the many areas of impedance that he barely touched upon in the article (matching, etc.). I can't think of any subject that is more confusing or harder to gain knowledge of, but is more important to understand. Despite the article's lack of detail, I enjoyed it and thank you and Mr. Feldman for its existence.

—T. Young
Waterbury, Ct.

Jim Ford and Brian Roth are regular contributors to Modern Recording with their monthly Hands-On Report; but on the feature side, catch their article, "Building A Mobile Recording Studio" in this issue. As for the second part of your letter, due to the limited amount of space allotted, it was impossible for Len Feldman to explore the subject of impedance in any greater detail. But he will be back to pursue the ins and outs of impedance further in an upcoming issue so be sure to watch for it.

A Discussion of Digital Delay

In reference to Dave Moyssiadis' article in the September issue ("From Tape to Disc, Disc Mastering, Part II," pg. 45), I would first like to point out that I found it to be most interesting and, in my opinion, a very realistic presentation of disc mastering in general. However, I must point out that he is a bit out of date in regards to digital delay systems.

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—Marcus I. Holzer
President
Holzer Audio Engineering Corp.
Van Nuys, Ca.

One of the problems in the recording field these days is the incredible proliferation of products constantly scamp-ering through the market. It seems that each day sees a hundred new micro-phones blossom forth, a dozen new 2

kilowatt amplifiers thump on, and fifty new equalizers clatter across the pages of the trades. Obviously no one can keep up with every new product as it is virtually impossible to get one's hands on even a fraction of them all. One of the consequences of this manufacturers' blizzard is that if there is a good piece of equipment out there no one will be able to find it, which unfortunately tends to backfire on the manufacturers.

With respect to the VP-1000, neither I nor any associate nor any company with which I am acquainted have any first-hand knowledge of the merits of your particular system. Thus, to make mention—favorable or unfavorable—of the VP-1000 would not be fair to the readers or to you. To make a judgement on published specifications alone, is, as we all know, folly. (A lot of people would turn in their \$5000 Ampex, Scully and 3M professional decks for Sonys, TEACs, and Dokorders. Can you imagine dumping a Studer in favor of a "Magniwunder 4" on the basis of a spec sheet alone?)

With your letter you sent your brochure describing the VP-1000 but even in that four-page folder you only devote *one* small paragraph to the delay

line and that contains few concrete specs. I should think that, in view of the fact that Scully, Neumann and Capps have had "ordinary" computer Variable Pitch systems out for some years now, the big breakthrough in disc technology would be the delay line.

In answer to the cost part, I said it would be expensive to get a delay line capable of up to 1800 ms at acceptable quality. Your delay line is only 300 ms and that was achieved many years ago.

—Dave Moysiadis
Frankford-Wayne Mastering Labs
Philadelphia, Pa.

Useful Methods

I enjoy your magazine very much, and was interested in Craig Bransfield's letter regarding multi-track recording ("Reader Offers Another Solution," Letters to the Editor, August, 1977, page 6).

As most of my work is demos, and can be monaural, I would have done it a bit differently. I would have put four onto *one* track, and added another while doing so. This gives you five on one track with three open for further recording.

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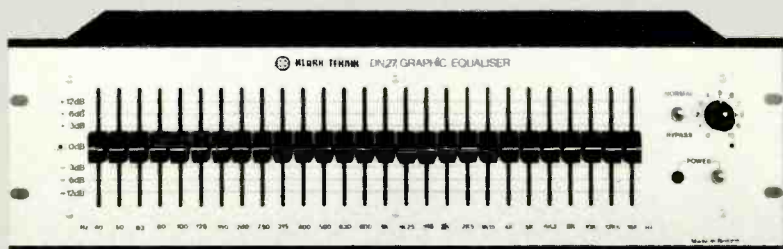
After all, if you're using yesterday's equipment, will you be ready for tomorrow?

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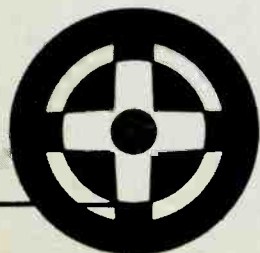
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CIRCLE 32 ON READER SERVICE CARD

Sometimes I use another, somewhat specialized method, if I have a lot of tracks coming up. Using a Rhythm King electric drum, a Fender-Rhodes piano bass and an electric piano, I can put them all on one track, at one shot. I mix them through a Shure musical instrument mixer.

I really prefer to leave the bass until I can find an open track for it alone so that I can control it better on the final 'mix. It takes a lot of practice and "feel" to get the precise amount of bass by starting out with it.

Another device proves useful under certain circumstances. If my "fills" are to be organ, melodica and guitar, say, I try to space them out so that they can all go on one track. A few beats between does it very nicely, and sometimes my wife or a neighbor can drop in and push a few buttons for me.

My machines are the TEAC 3340-S and the A-7300. The latter's pitch changing ability solves obvious problems when playing the dub back on the first recorder.

Keep up the good work, and hope I haven't bored you. Peace.

—Gordon H. Jenkins
Malibu, Ca.

A Commendation

Modern Recording is the first magazine directed toward the semi-pro recordist—and as you have found there exists a fair number of us who have been waiting for such a publication. I subscribe to *Recording Engineer/Producer* whose major interest is in the large studio operations, not the smaller pro or semi-pro operation. The true honesty in your publication is noteworthy, and sets your publication far above both *db* and *RE/P*. The proof of the pudding for anyone was in your April, 1977 issue in a response to a reader question asking where more reading was available (see "Your Own Studio," Talkback, page 16). The names of a number of fine books plus your own competition, *db* and *RE/P*, were mentioned in the response! This is very rare in the publishing game and should be commended.

Overall, *Modern Recording* is a fine, enjoyable magazine. I was especially pleased when you went monthly. Keep up the fine work as we all know full well you at *MR* will.

—Larry A. Brechner
Lab Recording Studio
Neophon Productions
Highland, In.



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CIRCLE 81 ON READER SERVICE CARD

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TALK BACK

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

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

Designing A Mic Splitter

I understand that when doing a "live" recording utilizing the same mics that are used for P.A. applications, mic splitters are needed to send the same signal to two different inputs without altering the signal in any way. My questions regarding this are as follows: What does a mic splitter consist of? How expensive are they? How much loss can be expected using them? Would it be cheaper to

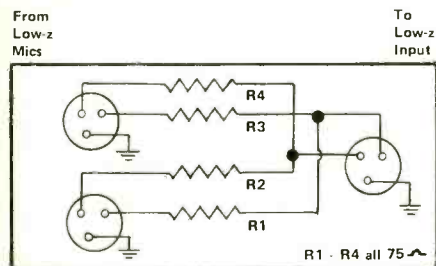


Fig. 1

build your own? And, if so, would the following work? (See Fig. 1.)

—Robin Netzel
Mt. Prospect, Il.

Mic splitters consist of several resistors, mic connectors, and, of course, some type of box (a Bud box or an equivalent). I do not know the cost of buying one already made, but I am sure that you

could save at least half the cost if you were to make it yourself. I estimate the total cost would be about \$12.00, buying all the parts new, but you could cut down on this cost by using parts out of your junk box and save.

As for the design of a mic splitter, the schematic you sent will work if you modify it along the lines of the changes that I made. Also, if you use 33K resistors in place of the 75 ohm, the splitter can be used for high-Z mics and inputs. (See Fig. 2.)

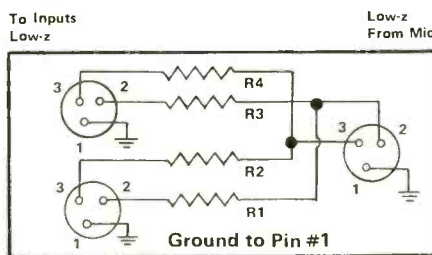


Fig. 2

The question of loss is variable, but I can safely say that you need only expect a small amount of loss—say, 1 or 2 dB.

—Roger Branch
Engineer
Reflection Sound Studios
Charlotte, N.C.

Best Mics for The Guitar

I'm interested in recording the acoustic guitar. Are different mics necessary for recording a nylon string classical guitar as opposed to the steel string folk guitar? If different mics are indicated, could you specify which are best for each type of guitar and briefly describe the best set-up for each? I'll be recording on a TEAC 3340-S.

—Steve Caputo
New Hyde Park, N.Y.

There really isn't a "best mic" or a "best setup" for any recording situation. It all depends on the situation you

are in or what your tastes are. Therefore, I will describe a few different techniques for you to try. You should have one of each of the three basic types of mics: dynamic, condenser and ribbon. A dynamic mic will tend to be bassy sounding while the condenser will give you a wide range sound, i.e. bass and treble will be very present whereas the ribbon mic offers a warm sound. Some examples of dynamic mics are the Shure SM57 and the E-V RE15. Some good condenser mics are the AKG C451E and the Synchron S-10. Some ribbon mics are the Beyer M160 and M260.

Mic placement will affect the sound you get. If the mic is closer than 12 inches or so from the guitar you will be subject to the radiation pattern of the guitar itself. You will find lows coming from the sound hole, mids from the body and highs from the strings. Last, but not least, acoustics will affect your guitar sound. You should have both a reflective and absorptive room to record in. Different mic placements in a reflective room will determine the ratio of direct vs. reflected sound, allowing you to create a wide variety of perspectives.

I gather that you will be overdubbing your guitar on the TEAC machine. I suggest that you find a different sound for each new part you add so that your final mix will have a full sound.

—Richard Robinson
Chief Engineer
Troed Nossel Recording Studios
Wallingford, Ct.

Dealing With Acoustical Nightmares

As an amateur soundman, working strictly in a club circuit, I have a problem that you can probably solve, or at least help me to understand a little bit better.

It appears to be a fact of life that very,

very few "live" music clubs have had any treatment or design for proper acoustics. I accept that. The question that I am most often asked, and even ask myself, is why, when the P.A. and/or band sounds so bad, does the house playback system (be it disco, FM radio or even muzak) sound so good or at least much better? I'm aware that pre-recorded music is treated and mixed in a controlled atmosphere (i.e. a studio) but, nonetheless, it is being played back in the same poor atmosphere as the "live" music. Yet, it doesn't suffer nearly as much from extreme reverberation, reflection and every other harmful acoustic flaw.

Perhaps by understanding why it happens, I can do a better job of compensating and correcting these acoustical nightmares.

—Paul Lazarro
Waterbury, Ct.

In this situation, I think that the musicians on stage are to blame for the rotten P.A. sound, and not the "acoustical nightmares" of the club. Let me explain by setting up a situation that I deal with on a weekly basis: the recording (or broadcasting) of a name recording group performing in a less-than-great-sounding small club.

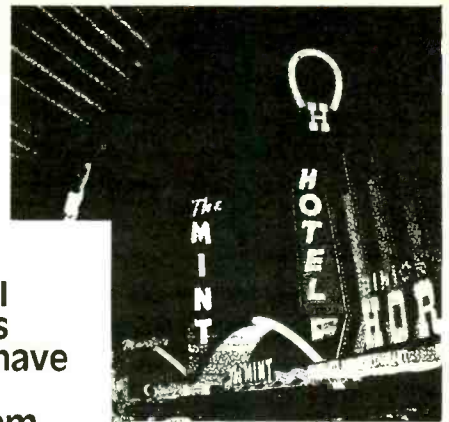
Before the "live" act comes on stage the background music (whether it be FM or cassette) played through the complete P.A. system (console-signal processors-amps-speakers-room) sounds really good, but as soon as the band starts playing the audio quality turns to less than quality audio. Well, obviously, since the only change in the system is the signal source, either:

- (1) The band is rotten.
- (2) The microphones are lousy.
- (3) Poor miking technique was used.
- (4) Too much of the ambient club sound leaked into the mics.
- (5) All of the above.
- (6) None of the above.

And the answer of course is—none of the above, because I'm out in the recording van and it sounds great. Well, it's now obvious that I'm a fantastic mixer and the sound person in the club just doesn't have it together. So let's take the output of *my* console and feed *my* great mix into the house. Sound great? WRONG! It still sounds rotten.

Well, this is getting us nowhere, so we send the band home and feed my tape through the house system. Hold everything! It sounds great!

The recording was not compressed,



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and the tape is dbx'd so it's as dynamic as the "live" sound source, and it's the exact mix we fed into the house before.

So what's the problem:

- (1) The house system is incapable of reproducing any sound source above the level of a loud band.
- (2) The house system is incapable of reinforcing the "live" band if even one of the instruments is overly loud.
- (3) The house system is incapable of eliminating a screeching guitar or booming bass that is reverberating around the room.

The problem is all of the above, and more, but the solution is simple. "Live" performers must learn to play to the room. They do have two choices, though. They can play extremely low and allow the sound system to work as a reproduction system by feeding it a complete mix that can be played above the level of the band; or they can play at their ultimate volume and allow the system to reinforce them, by feeding the system only the elements that need reinforcement, such as the vocals and acoustic instruments. The key is the room, the system *and* the band must work together to produce a good "live" sound.

—Michael "Tapes" Colchamiro
President
Sound Workwhop Professional
Audio Products, Inc.
Roslyn, N. Y.

Tuning Basics

Could you give me some information on tuning? I know it is a large area to cover, but it is a prerequisite for a good recording. These are the questions that I need answered: (A) What do you mean by stretching octaves on a piano? and (B) How do you tune drums to fit the rest of the group?

I hope this isn't too large a request for I feel many musicians can use greater insights into this. My belief is that the best recording equipment in the world is useless if the musicians are out of tune. Tuning is a source of good sound reproduction.

—E. Matthews
San Bernadino, Ca.

Piano wire is stretched with 175 to 190 pounds of tension to achieve proper pitch. Due to the high tension level, piano wire exhibits a unique phenomenon called the inharmonicity characteristic. When a piano's A above middle C is 440 Hz, its first harmonic is slightly

higher than the expected 880 Hz, usually around 880½ to 881 Hz. When the A in the second octave above middle C is tuned to a zero beat condition with the A440, it is actually being tuned to the first harmonic of 440 Hz, which on a piano is 880½ to 881 Hz. This means that A in the second octave above middle C will have a fundamental frequency of 880½ to 881 Hz and a first harmonic of 1761 to 1762 Hz. This upward frequency shift of harmonics continues at a slightly accelerated rate through the upper octaves on a piano. The reverse is true down from A440. Octave stretching or tempering exists whenever all the octaves on a piano are tuned to a zero or near zero beat condition. The result is a gradual rise in pitch above A440 and a gradual lowering below. Other stringed instruments, such as guitars, harpsichords, etc., do not exhibit this characteristic because of their lower string tensions.

As for drums, it is important to achieve uniform tension on each tuning key whether the drums have one or two heads each. This will achieve a ring-off relatively free of dissonant harmonics. With the exception of this rule, there are about as many tuning techniques as there are drummers. On occasion, I have tuned the tom-toms with a strobe tuner to be in the chord structure of the song being performed. This does not work on every song, but sometimes makes a nice effect. Remember, a drum kit does not sound the same in the control room as it does in the drum booth, especially if you are using close miking techniques. Therefore, tuning and padding should be done with the mics open so that you can keep a running track on the sound you are really getting.

—William P. Mueller
Chief Engineer
Sheffield Recordings, Ltd., Inc.
Timonium, Md.

Keeping Signal Strength Strong

My problem is probably due to some minor thing I'm doing wrong, but even a phone call to a TEAC man in California didn't help me.

I cannot mix four very good sounding channels from a TEAC 3340S to stereo on a 3300S 4-track without a bad hiss buildup and poor quality duplication. Every audio consultant has told me that a good four-channel recording should actually transfer a bit hotter, but my signal loses all its strength. I use a TEAC Model 2 audio

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mixer between the two decks but the results are the same with or without it.

On to my actual question—I have an old Sony TC-252 stereo recorder with a built-in amp on which I can make great copies from the 3340S, much hotter than the originals and nearly noiseless. Could this imply that I need some sort of amp between the two TEACs and, if so, could you suggest an appropriate one?

Also, no matter how strong the signal coming in, my 3300S input has to be turned nearly all the way up to get a 0 VU reading and on output, the vol-

ume on the 3300S and my Pioneer SX-838 receiver have to be turned up to the point of amplifier hiss. I have had all units checked and rechecked, cleaned and demagnetized with no woes found. I have interchanged the TEAC cords and reconnected everything many times. I also use the best Maxell tape and high tape speed as well.

—Joey Quinn
No address

If your equipment is all working correctly, there should be no problem with

either excessive hiss or insufficient levels. From the description of your difficulties in achieving 0 VU on the 3300S and having to turn the receiver up to the point of amplifier hiss, I would say that either one of the two TEACs is mis-calibrated, or, you are, in some manner, using the equipment incorrectly.

No additional amp is needed between the two TEAC's. The specified output level of the 3340S (0 dBm) is higher than the specified input level of the 3300S (-8 dBm). So without any amp between the units, 0 VU can be achieved, even when using a passive mixer such as our AX-20. If you have a Model 2 mixer, which in essence is a line amp, there should be no problems in driving the needles into the red on the 3300S. Just make sure the output controls on the 3340S are between 2 and 3 o'clock and the fader controls on the Model 2 are high enough. An MB-20 meter bridge, used in conjunction with the Model 2, will help give a better picture of proper signal strengths.

As far as excessive hiss is concerned, if you are not recording at a high enough level, tape hiss will definitely become objectionable. If the bias is off on the 3300S, this could also cause a problem.

I would like to talk with you on the telephone about this, so I can get further information about your units. Please contact me at (213) 726-0303.

—Tom Spurney
Technical Correspondent
TEAC Corp. of America
Montebello, Ca.

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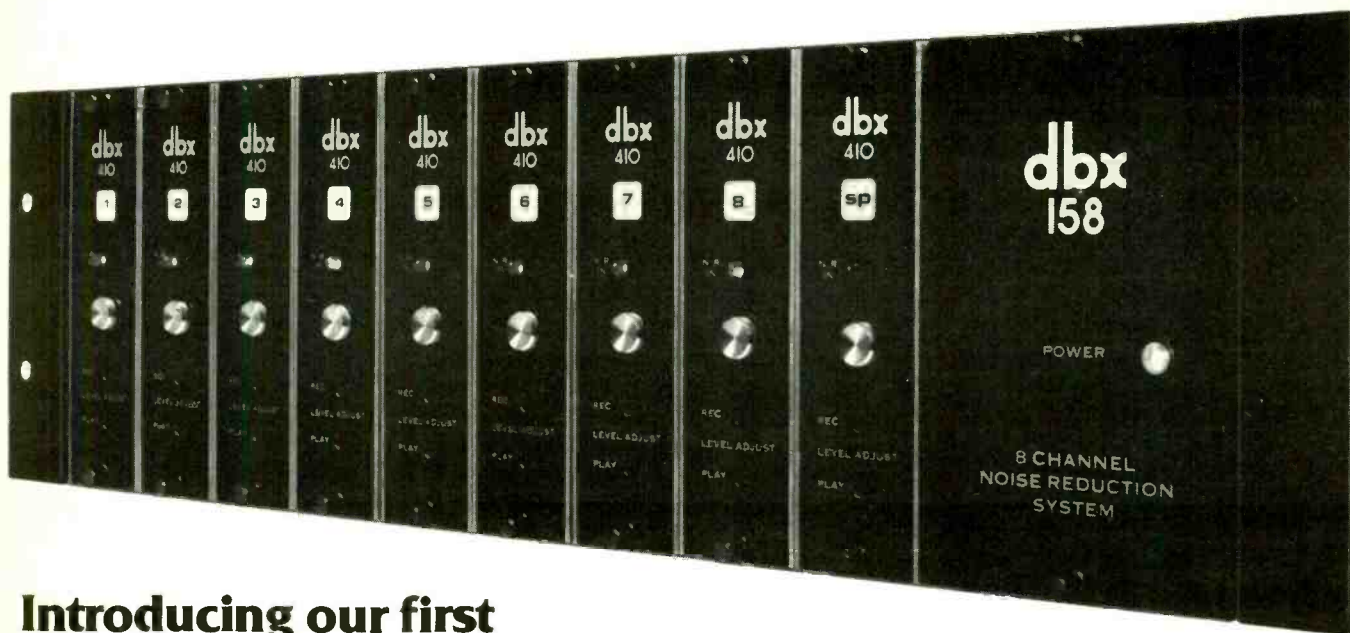

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Enlivening Your Recordings

I have the opportunity to do some work now and then in a small 16-track recording studio. The studio is very well isolated and extremely "flat" which makes getting a clean sound down on tape relatively easy. The studio is very "dead," however, which makes our clean recording sound rather dry and lifeless. I would really like to get some pointers on ambience enhancement techniques. There is a great deal of technical information available on signal processing equipment—delay lines, echo units, and the like—but almost nothing on their actual applications. It would seem that the "trade secrets" are just that. What do the "pros" use in their mix-downs to make their recordings sound more "live?"

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of graphic equalizers, compressors, digital delay, analog delay lines, flanger, and, of course, an AKG reverb unit. Isolated in the middle of Iowa as we are, there aren't many other studios that we can go to for new ideas. We get most of our effects by experimentation, and it's always nice to hear someone else's techniques to get a different perspective.

—Al Weltha
Ames, Ia.

Let me open by saying that the "fix it in the mix" approach to ambience enhancement is a poor substitute for good "live" recording, particularly on instruments such as strings.

We learned very early in the game that you cannot record a string section on a carpeted floor in a "dead" room and make it come alive in the mixdown with any amount of echo. Similarly, you cannot get a good stereo mix from multi-track mono.

You might try some minor carpentry in the studio if you have the time to experiment. A hardwood floor can brighten and add life to some instruments. Carpet can always be thrown over it when a dead sound is required.

Some irregular hard surfaces placed in the room, perhaps hinged to the walls with an opposite side padded, would provide variable degrees of brightness in the initial recording. The control room glass and its relationship to the instruments and microphones can also be used to advantage.

The following may prove useful to the mixdown of lifeless tracks should the studio owner fail to appreciate your willingness to put the saw and hammer to work on his studio.

First, there is nothing particularly new about delays per se. Sam Philips used this technique to great advantage in the mid-fifties and the sound he got on Elvis Presley, Jerry Lee Lewis, Carl Perkins, et al is even copied today. The digital units accomplish the same thing today only without tape. A sophisticated delay unit such as the Eventide models can enhance the sound further by pitch-changing more closely approximating real life doubling.

The flanger you mentioned can add a certain amount of depth to a mix. In stereo you might try the normal signal to one side with the processed sound to the other side. As the signal goes in and out of phase, the instrument (cym-

bals are a good example) will appear to move to center and split apart.

With regard to the AKG reverb, this is a very good unit, but it is a spring. The inherent obnoxious points such as transient "boing" have been successfully minimized by the manufacturer. However, spring reverb has limited dimension. By nature the sound moves back and forth in a line. Also, while the unit is two-channel, it is not stereo. Stereo involves more than just being two-channel. For instance, the old vocal on the right, band on the left records are two-track but not stereo. Operated with inputs combined, the AKG unit can provide an approximation of stereo reverberation. The units made by Mic Mix are single input, stereo output but have their own set of peculiarities.

It is an expensive proposition (\$6,000. +), but to get the sound you seek electronically, an EMT plate will more naturally recreate the ambience of a "live" performance. The unit is stereo in the true sense with the input mixed to a single driver which excites the large (approximately 4' X 8') steel plate. The reverberated sound is picked up at two different points on the plate having random phase and time relationships. The

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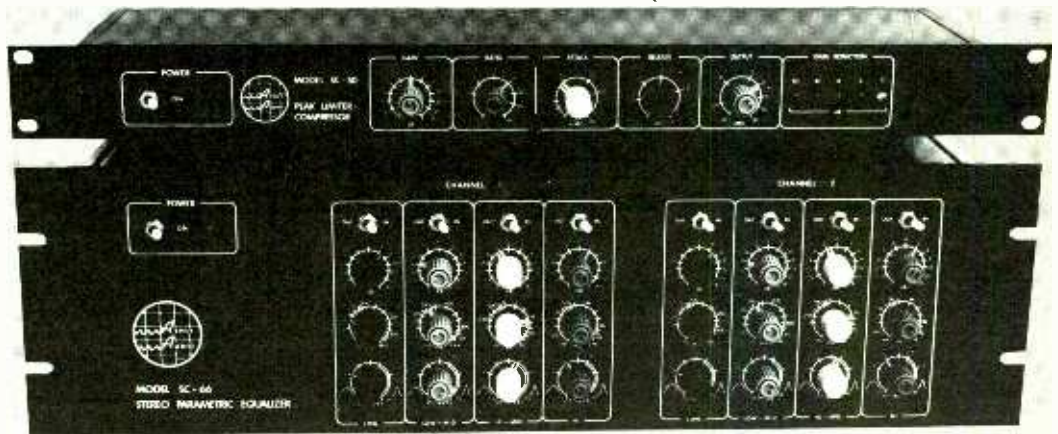
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plate is a two dimensional unit, unlike the spring, and the sound not only travels back and forth, but side to side and at all angles. This can be likened to the travel of balls on a pool table (with no pockets).

You may have an advantage in Iowa with space being more available at lower cost than in crowded metropolitan areas. It may, therefore, be economical to consider a "live" chamber. This would allow three dimensional reflections and sound most natural.

No matter whether you use an AKG, EMT or other unit, the signal should be delayed, in most cases, before it is sent to the chamber. This can be accomplished by a tape recorder or other delay line. Widely spaced record play heads may necessitate a 30 ips speed while closely spaced heads, as on the Ampex 351, sound good at 15 ips. The delay theory is based upon the real life performance echo of a concert hall where reverb does not start until the sound hits the back wall. Changing the delay time by tape speed or head spacing is, in effect, varying the length of the room being simulated. You should also experiment with equalization on both send and return.

Use of multiple echo chambers can do as much as anything to distinguish a "pro-mix." We have found it effective to use long decay and delay times on strings with shorter values on horns and vocals. Also, dumping all echo sends into one EMT tends to create mud which is eliminated by separate chambers.

Dual mono chambers such as the AKG or a mono plate can be panned with reverb opposite the program to have the echo pull across the stereo mix. A chamber such as the Orban/Parasound with a built-in limiter will do a good job for the reverb sound often used on guitar, with the transient problems eliminated.

If the chambers are limited in number, recording echo on-the-track will often work. This can do anything from color the sound of a snare to providing deep echo on a wood block only, when it must be recorded along with other percussion instruments on one track. In one mix we even stopped the tape to double the delay and decay times on two measures of voice for effect and spliced the segment.

Two items not mentioned in your list of "usual devices," but which are helpful are the UREI Cooper Time Cube

which is an acoustic delay line and the Orban/Parasound stereo synthesizer. The cooper can be heard with different effect on records from Rufus to the Stylistics. The Orban unit provides a pleasing spacial effect on tracks recorded mono, out of necessity, but that do not sound right in point source presentation. A good example is the single track piano that you would have done stereo were extra tracks available!

Perhaps one day consoles will have not only level panning but delay panning as well. That is, center information would be delayed equally to left and right; left information delayed to right by twice the time as if centered with proportional delay times to left and right varying with the stereo positioning. When arrival time is considered electronically along with level panning, you may be able to artificially create ambience and true stereo perspective. Until that time, you should concentrate on putting as much natural life in the original tracks as possible.

—Nick Colleran
President
Alpha Audio
Richmond, Va.



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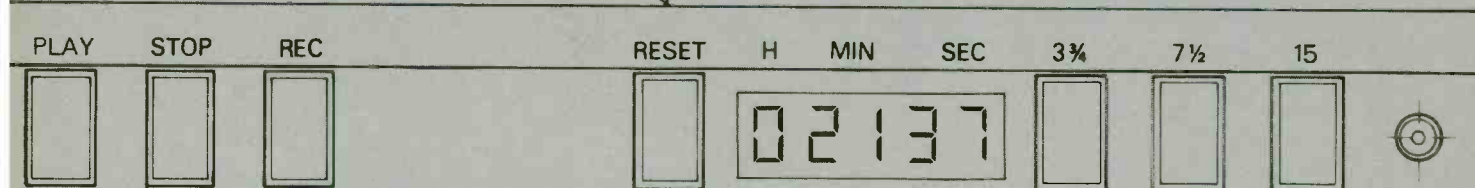
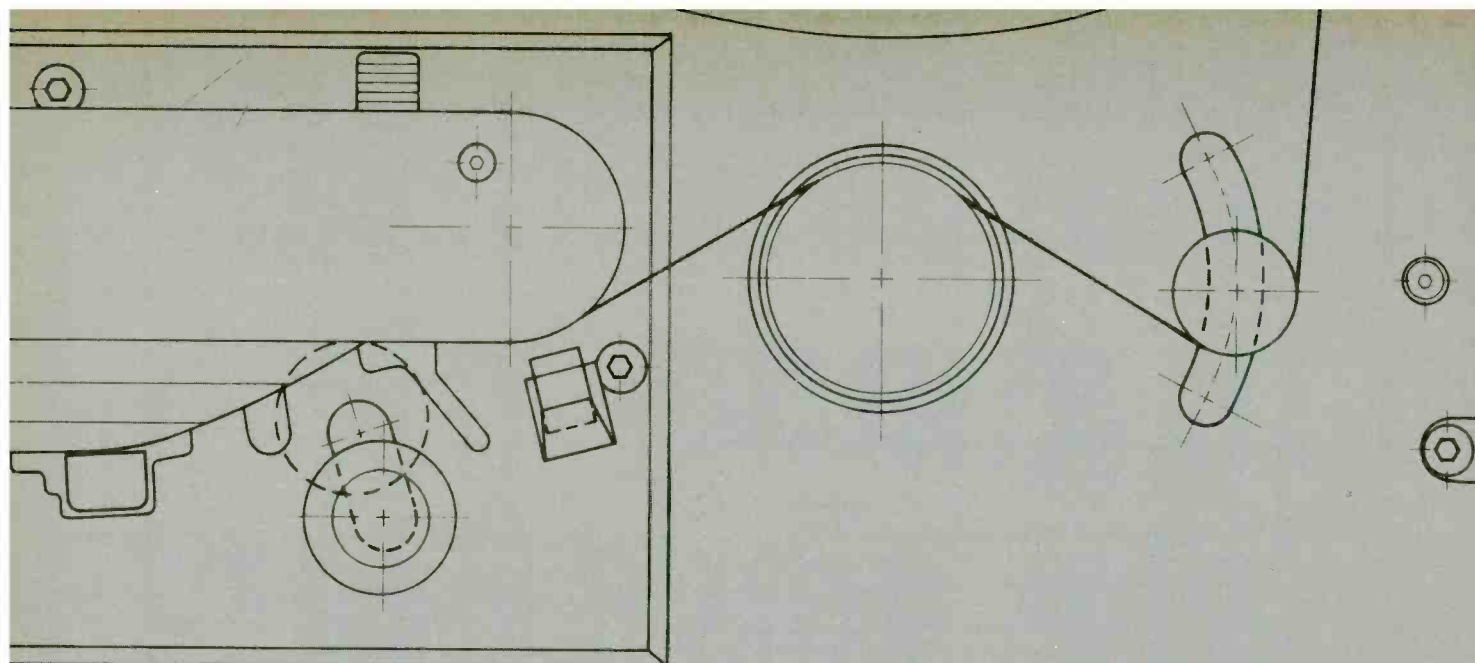
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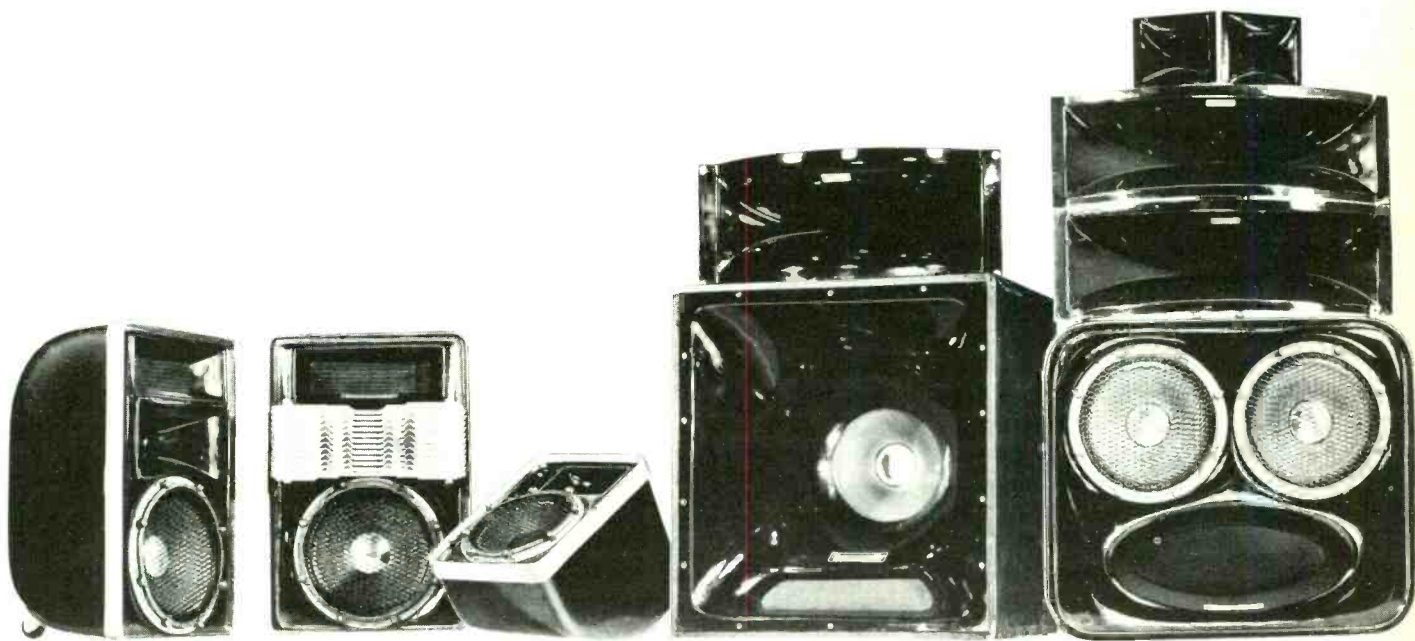
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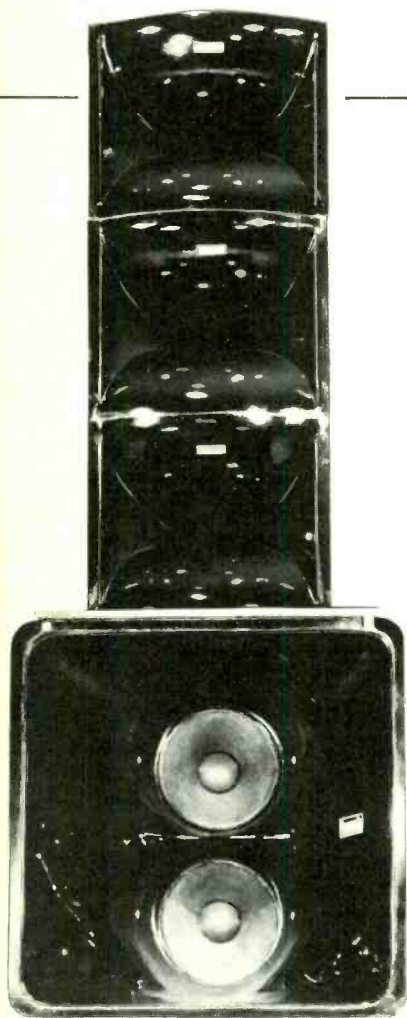
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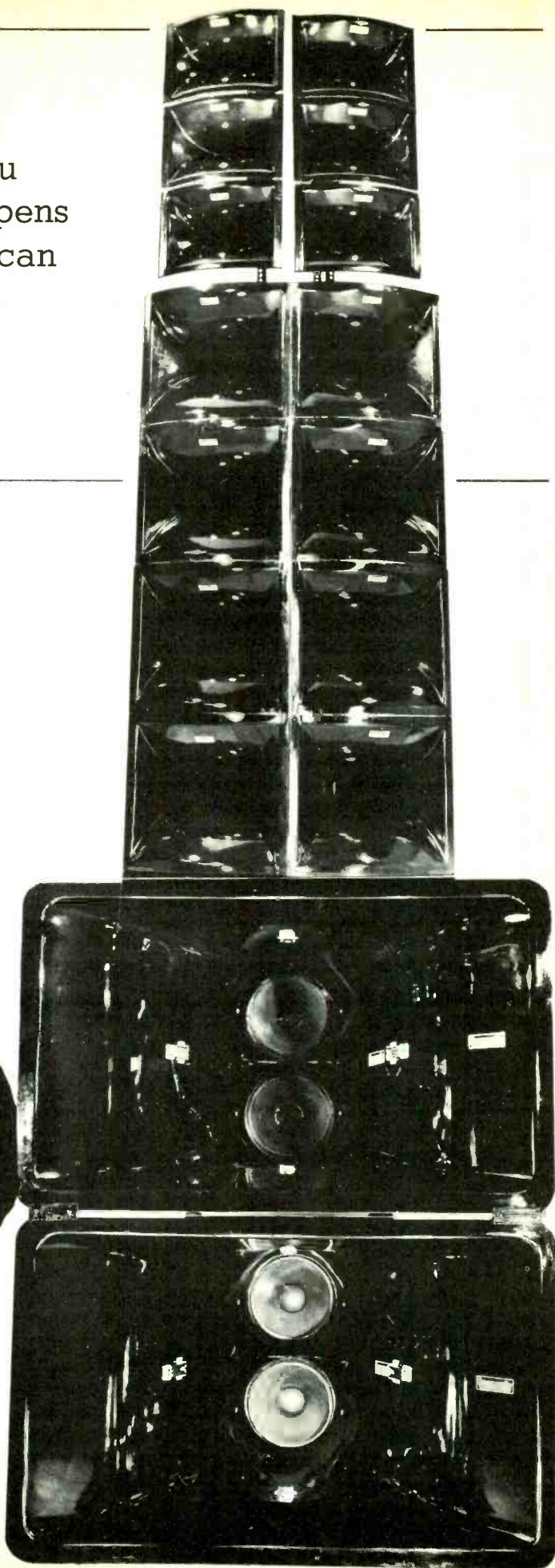
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THE **PRODUCT** SCENE

By Norman Eisenberg

MICROPHONE DISTRIBUTION AMPLIFIERS

Ramko Research, Inc., based in Rancho Cordova, California, has announced a series of microphone distribution amplifiers (the MDA series) that enable the user to amplify a microphone to line level and



then feed the signal simultaneously to up to twelve locations. Three versions are available: a table-top or a 3½-inch rack package, each with one common level control, and a 3½-inch rack unit with six individual output level controls. Prices range from \$197 to \$225. All models share the following features: balanced 150/250-ohm mic input that accepts levels from -60 dBm to -30 dBm; maximum output level of +21 dBm that will feed six balanced or twelve unbalanced 600-ohm outputs; frequency response within +0, -1 dB from 10 Hz to 15 kHz; maximum distortion of 0.03%.

CIRCLE 3 ON READER SERVICE CARD

STUDIO LEVEL INDICATOR

From Studio Maintenance Service of North Hollywood, California comes word of a studio level indicator known as the Ledmeter System and manufactured in England by Trident Audio Developments Ltd. Using modules, each of which contains for one channel a series of LEDs (ten green for normal levels, and four red for overloads), the system can be built up to contain sixteen such columns for mounting in a 5.25-inch high rack. Dynamic range covers about 40 dB, and each meter section is switchable between Bell spec-VU and BBC PPM characteristics. Each section also is individually adjustable for sensitivity.

CIRCLE 20 ON READER SERVICE CARD

TEAC ADDS 4-TRACK TASCAM

Recently introduced in the TEAC Tascam series is the model 40-4, a quarter-inch four-track recorder/reproducer which features the same transport and chassis used in the eight-track version, the 80-8. Fitted with three heads, the 40-4 uses full integrated-circuit logic with motion sensing and a memory stop function. The 40-4 has a combination record/reproduce head, erase head and monitor head. Three motors are used. Speeds are 15 and 7½ ips; reel size is up to 10½ inches. Features include function and output-select buttons; LED overload indicators; accessible calibration controls; and a flip-up head cover. Options include four-channel dbx (the DX-4); remote control (RC-170); and a mic-preamp module (MA-4). Among the important specs are wow and flutter at 0.05% (NAB wtd) at 15 ips, and 0.07% at 7½ ips; response of 50 Hz to 20 kHz at 15 ips, and 50 Hz to 15 kHz at 7½ ips; S/N ratio of 65 dB weighted; and distortion of 1% at 1 kHz.



CIRCLE 11 ON READER SERVICE CARD

SANSUI UPGRADES SPECS

Sansui has announced upgraded specifications for some of its separate components available for rack-mounting. The model AU-717 integrated amplifier is rated for power output, minimum RMS, both channels driven into 8 ohm loads of 85 watts per



channel from 10 Hz to 20 kHz with less than 0.025% THD. RIAA equalization is listed as accurate to within ± 0.2 dB from 20 Hz to 20 kHz. Phono input S/N is given as 78 dB with a 350 mV overload point and a dynamic range of 120 dB. From the main-in, the amplifier has a rated response of +0, -3 dB from zero Hz (DC) to 200 kHz which makes it, according to Sansui, the widest-range DC integrated amplifier on the market today. Rise time is listed as 1.4 microseconds, and slew rate as 36.9 V/microsecond which improve tone quality and "dramatically minimize" phase shifts. Tone controls have click-stop positions and feature dual turnover frequencies. Two-deck reciprocal dubbing provisions are included. Advertised price is \$450.

CIRCLE 16 ON READER SERVICE CARD

FIRST PCM TAPE RECORDER

Mitsubishi has announced what it characterizes as the country's first pulse code modulation tape recorder, describing it as an ultra-high fidelity deck employing a stationary head and a multi-channel system. Using 1/4-inch tape at a speed of 15 inches-per-second, the deck can record for one hour on a 10-inch reel. Response is listed as within ± 0.5 dB from DC to 20 kHz, and distortion at full scale has been measured as only 0.01%. According to a company spokesman, the deck has no tape-speed variation, no crosstalk and no wow or flutter. Emphasized by Mitsubishi is the unit's very simple and quiet-running mechanism, its wide dynamic range, provisions for editing and monitoring and no signal deterioration in duplicating work. The two-channel deck weighs 313.5 pounds. It is 59.5 inches high, 29 inches wide and 20.5 inches deep.

WOW AND FLUTTER METER

For wow and flutter measurements, a new meter—the Meguro Model MK-667-C—has been announced by Sabor Corporation of Hawthorne, California. The instrument features two frequencies (3 kHz and 3.15 kHz) to allow measurements to be made to ANSI, CCIR, DIN, IEC, NAB and JIS standards. Unweighted measurements also can be made. Input voltage range is given as 5 mV to 30 V (RMS) and the flutter range covers values from 0.003% to 10% in six steps. Since the Model 667-C will function at the 5 mV level, it permits measuring wow and flutter on tape decks before electronics are added. In most cases this means that only the reproducer (playback) head is required. Tape speed drift can be measured at either of the test frequencies. Announced price is \$875.



CIRCLE 1 ON READER SERVICE CARD

TASCAM EXPANDER

Designed specifically for use with the TEAC Tascam series Model 5 mixer is an extension unit—the model 5EX—which can increase the inputs from eight up to twenty. The 5EX has eight 201 input modules; an additional four inputs are available as an optional package. According to TEAC, the self-powered 5EX, when connected to the model 5 mixer, retains all the functions of the model 5, including its own four line output buses, cue output bus, echo output bus and solo output.

Price is scheduled to be "less than \$1,300."



CIRCLE 5 ON READER SERVICE CARD

PARAMETRIC EQUALIZER

Studio Maintenance Service of North Hollywood, California is offering the British-made Trident type CB 9066 parametric equalizer/filter for studio use, mixdown rooms, dubbing, tape-to-disc transfer, high-quality PA systems, and other applications. The device features continuously variable control of frequency, amplitude, and Q over low, middle and high frequency ranges. The low-F parametric handles the range from 60 Hz to 700 Hz with boost and cut of up ± 16 dB. A bandwidth control provides continuously variable slope adjustment from 2 dB/octave to 18 dB/octave. The mid-F parametric adjusts from 600 Hz to 7 kHz, and the high-F parametric handles the range from 3.5 kHz to 14 kHz—both with the same amount of boost and cut and bandwidth control as in the low-F section. High and low filters also are included. The device may be rack-mounted and is only 1 $\frac{3}{4}$ inches high. Output impedance—less than 5 ohms—is designed to drive 600-ohm loads. Maximum output level into 600 ohms is +24 dBm.

CIRCLE 4 ON READER SERVICE CARD

PORTABLE MIXING CONSOLE

Dynacord, Inc. of Philadelphia has announced a new Stramp Model MPS-24C, a professional portable mixing console for studio or stage use. Features include a 9-band EQ capability per channel, LEDs and meters, overload control per channel, independent routing to submasters and masters, large faders with 100-mm fading away and extremely low noise level, rated as better than 127 dB down.



Additional options enable the user to tailor the unit to suit particular purposes, including multi-track recording up to 24 tracks. The MPS-24C is housed in a rugged metal case.

CIRCLE 7 ON READER SERVICE CARD

AUDIO RACK IN COLOR

Bright colors, and a unique locking/leveling arrangement in the base, are highlights of a new Lab Rack from Vero Electronics, Inc. of Hauppauge, N.Y. When Vero introduced this new line to its regular industrial customers, acceptance was "mild" and apparently those buyers could think only in terms of the traditional "battleship gray." However, enthusiasm for the new racks has been running high among audio dealers. Made to mount



19-inch wide audio equipment, the Vero rack stands 73 inches tall and has 63 inches of panel mounting space. Width at the base is 25 inches. The rack can support a total of 440 pounds of equipment, and the wide base makes it very stable. Available with it are additional options, including chassis support angles, blank panels, etc.

CIRCLE 19 ON READER SERVICE CARD

AMPEX TAPE AND ACCESSORIES

Described as "extra low noise/high output" are Ampex's Plus Series of recording tapes in cassette, cartridge and open-reel formats, while for "super-critical" recording requirements, Ampex is offering its "20/20+" line also available in the three formats, with the open-reel versions including 3600-foot lengths on 10½-inch metal (professional NAB) reels. New Ampex accessories include a demagnetizer and cleaner "tape" in cassette and in cartridge formats, and a plastic rack for storing cassettes. Each rack holds six cassettes, and racks interlock for stacking.

CIRCLE 8 ON READER SERVICE CARD

FACE THE MUSIC (BUT DON'T DANCE)

The idea of a wireless headphone, one that you could wear and monitor with, but sans the "umbilical cord" of a cable trailing back to the equipment, has long intrigued audio enthusiasts. Well, Beyer, the German manufacturer, has introduced just such a device in the form of its Infra-phone which consists of a stereo headset and a small transmitter. The latter unit is patched into a signal-out point in the sound system and sends a signal which the headphones receive.

The headset as such (Beyer model DT 444) is a 13-ounce dynamic type that uses the open-back construction. They do not completely enclose the ears. Each earcup is plainly marked for left and right sides and they must be worn correctly so that the sensing element in each is oriented toward the transmitter across the room. Neatly built into the right earcup is a mono/stereo mode switch, an off/on switch combined with the right-channel volume control and a special little socket for recharging a built-in battery. The left earcup has a volume control for that channel.

The sending unit, designated as IS-76, is about 8 inches wide, 3½ inches deep and 1¾ inches high. It has two rear-panel connectors, one for the battery-charging operation (which is not required in normal listening use), and the other to make the signal hookup to some "high-level" take-off point in the stereo system. One such suggested point is the tape-monitor jack; another is simply any preamp-out jack. The only snag here is the need to make your own adaptation of the DIN connector supplied with the device for use with two shielded cables of your own. Someone familiar with the five-pin DIN

arrangement can do this, but the chore isn't helped by the very small pin markings which are in slightly raised black against—you guessed it—an equally black background. (The cable, properly terminated, for battery charging is supplied complete, however.) Price of the system is \$205.90.

With the transmitter correctly patched into the system, and the headset (look Ma, no wires!) on my head, I backed away from the rig and listened. The thing really works as long as you orient yourself so that the little sensing elements on the earcups re-



main in a line-of-sight with respect to the sending unit. It is, in other words, a fairly directional system from the standpoint of transmitting/receiving, and so if you chance to turn your head, goodbye signal. In a straight line, however, reception remained quite good up to about 10 feet. So whether this setup—minus connecting cord but demanding a fairly restricted orientation on the wearer's part—beats the conventional headphone which requires a connecting cord but does not penalize you for turning your head while listening is a nice matter for debate.

The sound itself, within the imposed physical orientation limits, was first-rate and not surprisingly since Beyer has been making really good headphones for many years. They now have shown that it is at least possible to do away with the connecting cord. What would really be great would be a less critically-angled reception system so that you could waltz around a room to music that only you (and your partner) are hearing, or at least permit you to turn your head without losing the music.



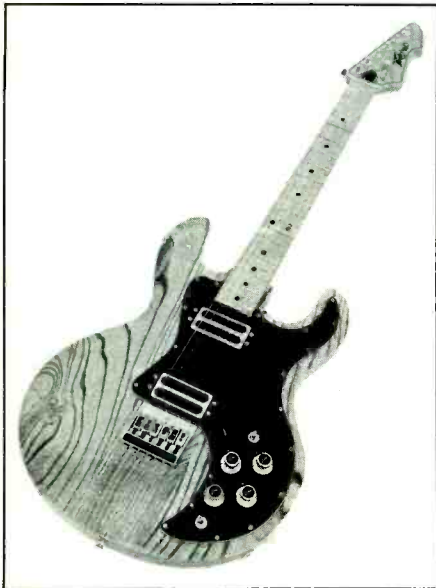
CIRCLE 18 ON READER SERVICE CARD

MUSICAL

NEWSIGALS

—MUSICAL INSTRUMENTS—

New among the ranks of guitar manufacturers but certainly a familiar name is Peavey (P.O. Box 2898, Meridian, Miss. 39301). In Atlanta, Peavey was showing their new model T-60, a double-cutaway, solid-body electric guitar. The T-60

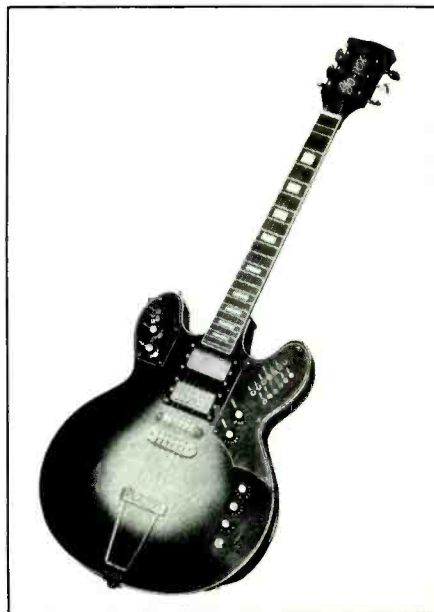


has a laminated ash-wood body and laminated rock maple neck and fingerboard. The neck is reinforced with a stainless steel truss rod and boasts a die-cast plate and a neck tilt adjustment at the neck/body joint. Other features include sealed 12:1 tuning machines, wide nickel-silver frets, a die-cast nut, and a fully adjustable die-cast bridge assembly. Electronically the new Peavey guitar has two humbucking pickups with ferrite magnets and center-tapped coils which allow the choice of humbucking or single-coil operation at the flip of a switch. The fully shielded electronics pocket contains new, wide-range tone control circuits that Peavey has applied for a patent on as well as individual volume controls for each pickup. The new tone circuits also have the effect of

allowing volume changes at the guitar without changing the tone of the output. In addition to the single-coil/humbucking switch is another switch for in phase/out of phase connection of the two pickups. The Peavey T-60 comes complete with guitar strap and a plush-lined, molded, high-impact plastic road case.

CIRCLE 14 ON READER SERVICE CARD

In 1958, a man named James Borrell invented a hybrid accordion/organ combination. He sold the design and the instrument subsequently appeared on the market as the Accorgan and the Cordovox. In the '60s he invented a guitar/organ hybrid which may have been the instrument marketed as the Gitorgan a few years ago. Now Borrell has formed a company to manufacture and market his perfected guitar/organ, now called the G.O.Vox (GOVOX, Inc., 1318 W. Oak St., Kissimmee, Fla. 32741). The G.O.Vox combines an electric guitar with a three-voice electronic organ which is controlled by electrically sensing which string or strings are being played and at which fret they are being



fingered. The three voices are for organ, bass and percussion and may be used simultaneously. Each voice has its own volume control and a variety of effects controls and switches mounted in the guitar itself for complete fingertip control of the sound.

CIRCLE 9 ON READER SERVICE CARD

The Atlanta show marked the debut of a new hollow-body, electric jazz guitar designed in consultation with George Benson by Ibanez (P.O. Box 469,



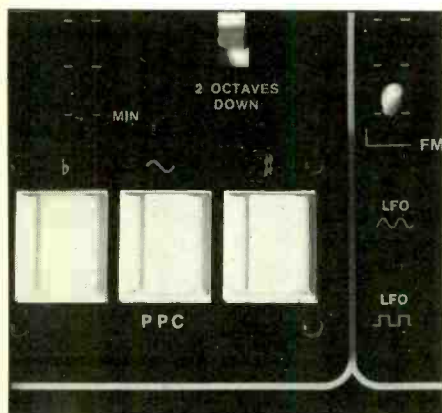
Cornwells Heights, Pa. 11020). The George Benson Model GB-10 differs from most typical jazz guitars in the dimensions of its body, which is much the same size as popular solid-body models at 14½" wide x 19" long. The feel and the sound of the GB-10, though, are very much like those of a jazz guitar and compare favorably with bulkier, traditional jazz models. The slim, 2-3/8" deep hollow body is made from a spruce top with maple rims and back. The neck is rock maple with an ebony fingerboard and joins the body at the 15th fret rather than the typical 14th fret for better

access to all twenty-two frets especially with its extra-deep cut-away. A new tail-piece design was used in the GB-10 which has separate bridge tension adjustments for the bass and treble sides to give control over the balance between bass and treble strings. The compensating bridge is ebony and the frets are high and wide as on other jazz guitars, but the nut is an exclusive "half and half" (half brass, half bone) design which is said to give better clarity and sustain as well as consistency between fretted and open strings. The package is rounded out with double worm gear tuning machines, two humbucking pickups in special "floating" mountings to allow free vibration of the guitar's top without picking up and amplifying body resonances, and distinctive inlays and trim.

CIRCLE 12 ON READER SERVICE CARD

—SYNTHESIZERS—

In addition to the Avatar, ARP showed their ARP Omni orchestral synthesizer and new versions of their popular Axse and Odyssey synthesizers using a new type of touch sensitive control element. The new controller is called PPC, which stands for "Proportional Pitch Control." Both the Axse and Odyssey use three PPC pads, one for upward pitch bending, one for downward pitch bending and the third for vibrato. The intensity of



Proportional Pitch Control



Touch Sensitive Controller

each of these effects is controlled by the amount of finger pressure exerted on the PPC pad; this is said to provide a much more natural playing feel than the previously-used thumbwheels. Prices of the Axse and Odyssey with PPC remain unchanged at \$995 and \$1695 respec-



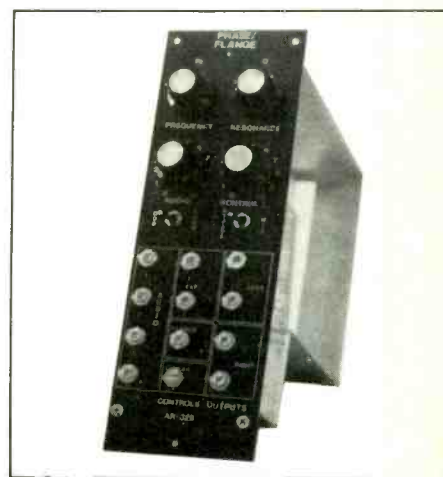
tively, and PPC will also be available as a retro-fit for older Odyssey units. The ARP Omni is a polyphonic electronic keyboard which combines the features of a string synthesizer with some of those of a regular synthesizer for improved sound quality and greatly increased versatility. Most string machines lack a truly realistic string sound because the tones used to generate the string sounds are too closely related in phase; the Omni uses a new technique called "asynchronous phase modulation" to introduce the kind of randomness that exists in the sound of a real string section and thus produce a much more realistic simulation of strings. An ADSR envelope generator multiplies the variety of brass sounds available in the Omni, and a VCF improves the realism and variety of piano and harpsichord effects possible. The Omni also has provision for using the various voices simultaneously in several different ways. Sounds may be simply mixed together, or the keyboard may be split to produce different sounds on each half of the keyboard; in addition, more sophisticated settings of the controls make possible such combinations as brass sounds in staccato passages and strings sounds on slower passages by manipulating the envelope generators, VCAs and VCFs.

CIRCLE 15 ON READER SERVICE CARD

Aries Music (P.O. Box 3065, Salem, Ma. 01970) showed several new modules and accessories for their series of modular synthesizers. The AR-332 module is a dual sawtooth/pulse VCO housed in a single-size module. Both pulse and sawtooth waveforms are available from each oscillator. The two VCOs are nor-

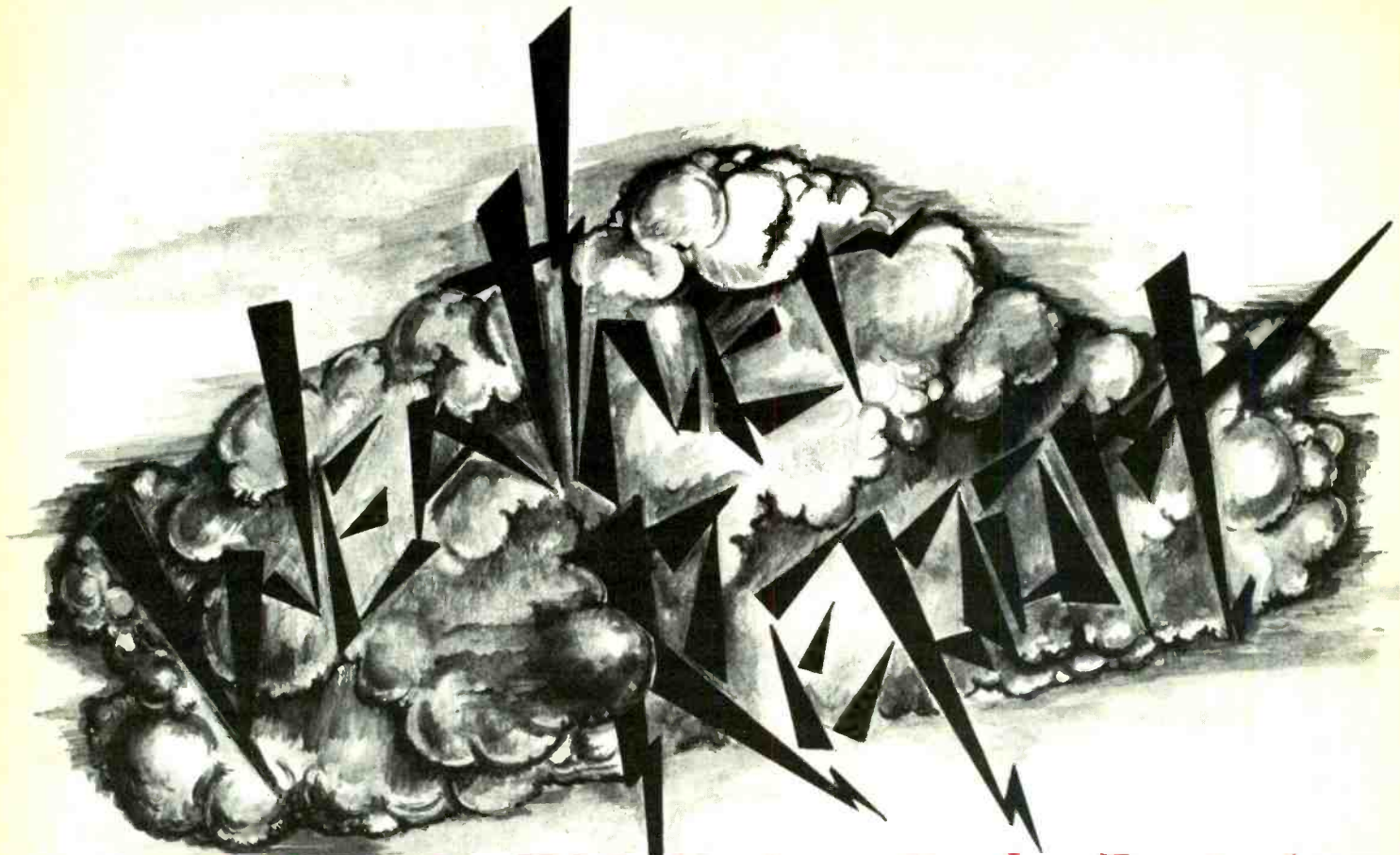
mally synced to one another, but individual sync inputs are provided. Frequency modulation and 0 to 100% pulse width modulation (manual or voltage controlled) are independent. Price is \$179 in kit form or \$295 assembled and tested. The AR-328 is a

stereo reverb and output module in a single-module package. Features include stereo panning of the direct signal, panning of reverb source signal, independent control of reverb amount in each output channel, plus all the features of the AR-326 Power and Output Module. Price is \$159 for the kit, \$259 assembled. The AR-329 Stereo Phase/Flange Module produces phasing, flanging and vibrato effects with a signal-to-noise ratio of 70 dB, and continuously variable resonance, or "Q." The unit produces a stereo image from a single input, and has both linear and exponential inputs. Price for the AR-329 is \$159 in the kit or \$245 assembled. Also available are two new mainframe cabinets. One is the AR-330 (\$350) which is



CIRCLE 17 ON READER SERVICE CARD

their largest model, accommodating fourteen standard size modules and 5-octave keyboard in a single case, and the other is the AR-340 Mini-cabinet (\$65 kit, \$79 assembled) which accommodates seven modules only.



An Interview With Keyboardist Joe Zawinul & Engineer Brian Risner

By Gil Podolinsky

This interview, done in two stages, deals with both the music and recording approach of Weather Report. The first half was done with Joe Zawinul, who discussed his musical beliefs, the concept behind the inception of Weather Report and his thirty-five years of recording experience.

As we began to get more involved with the mechanics of Weather Report's recording process, Joe interrupted by say-

ing, "If you want to talk about things like that, man, you'd better talk to Brian (Risner) 'cos I don't know anything about it. I'm one of the most unknowledgeable people in the world when it comes to technology." Therefore, the second half was done with Brian Risner, engineer for Weather Report both in the studio and on the road, and dealt with recording specifics.

MR: Joe, when did you first start recording?

JZ: In 1942 this lady violinist and singer in Vienna, who was a friend of the family, wanted to make a record for her boyfriend who was on the Russian front. So, we went to this studio and made an LP! With eight tunes on it! It was a very thin record, but also the biggest record you've ever seen, bigger than the V disc. It was a direct recording, and I still have it. I was eleven years old when I did that. I started recording regularly around 1950 when I started doing radio and session work, all in Europe; the work

lasted about ten years. Then in 1959 I left to come to America.

MR: When you arrived in New York, did you immediately look for recording studio session work?

JZ: No. I left session work behind when I left Europe. I've been a jazz musician from the day I arrived until now. You can only do so much, for session work leads nowhere; that's a fact. It's important for young musicians to learn through session work how to read fast, to interpret other people's music very quickly, knowing how the music's supposed to sound just by looking at it on paper. I came to Amer-

ica so I wouldn't ever again in my life have to play in symphony orchestras.

MR: When did you make your first record in America?

JZ: I made my first record in 1959. I wrote a tune for a Yusef Lateef record. Then I made a record with Maynard Ferguson, on *Roulette* I think. I worked with Dinah Washington for several years and made some records with her. Then in early 1961 I joined Cannonball Adderly and stayed for nine or ten years, but during that time I also made records with Miles Davis, James Moody, J.J. Johnson. I purposely made very few on my own. I



Weather Report: (Left to right) Joe Zawinul, keyboards; Jaco Pastorius, bass; Acuna, drums; Badrena, percussion; Wayne Shorter, reeds.

didn't want to expose myself too much, too soon, just what was necessary.

MR: Did you play in a reserved fashion, then?

JZ: I was a sideman, so I played like a sideman.

MR: When did you decide to become a leader and form your own band?

JZ: The leadership aspect never occurred in my head. Cannonball gave me plenty of opportunity to write, but it's not the same thing as writing for yourself. So, no matter how great the band was, there still was a great difference between the way they did it and how I would have expressed it. The same thing was true when I started writing for Miles which I did from 1968 on. I wrote seven or eight tunes for him, two or three of which I think still are in the can, but I did "Bitches Brew," "In A Silent Way," "Live Evil." Then in 1971 I formed Weather Report with Wayne Shorter, Miroslav Vitous, Alphonse Mouzon and Airto.

MR: You've been in recording studios since 1942, doesn't it get to be old hat?

JZ: The studio is *always* strange.

MR: You co-produce your albums, don't you?

JZ: No, I am *the* producer, though on this last one (*Heavy Weather*) Jaco Pastorius co-produced it with me.

MR: Well, what I was getting at was whether or not you're involved in the engineering aspect.

JZ: I'm involved in the mixing, but I'm getting more into the engineering 'cos you've got to keep moving along.

MR: Do you normally use the same studio and engineer?

JZ: We have made three albums at Devonshire studios in North Hollywood, using Ron Malo as the engineer. *Mysterious Traveller*, *Black Market* and *Heavy Weather* were all made there.

MR: Do you rehearse before you record?

JZ: We have to because the music is difficult. It might take us five months to do an album, but only three weeks of it will be spent in the studio. We'll record for a day and then take it home and listen to it for two weeks to see what we've got, then work on it again for approximately three or four days.

MR: Do you record "live" or track by track?

JZ: We do both, depending on the tune. It's not that we couldn't get it on the get-go, it's just that certain things are easier to do soundwise, etc., with

overdubs. You get greater separation when you overdub, so why not use the studio for what it is? But without overdubbing, the actual tracking is done in a week easy.

MR: Do you go for first takes whenever possible?

JZ: Yes. We usually have good success recording early in the morning, like 11 a.m. We'll play two or three hours of strong music then forget about it.

MR: Do you take your keyboards direct?

JZ: Absolutely, except for the acoustic piano.

MR: Do you use different keyboards in the studio from what you use "live?"

JZ: No, I use the same as the stage set up: Oberheim Polyphonic, two ARP 2600s, a Fender Rhodes and a Yamaha Acoustic.

MR: Can you pick out which of your records pleased you most?

JZ: I like all the records, but I like *Mysterious Traveller* and *Heavy Weather* the best, then *Black Market* and the very first one, *Weather Report*. Hell, they're all great man. I mean, we worked so hard to get them there so we gotta be pleased.

MR: How about records you made as

a sideman?

JZ: I liked *In A Silent Way*.

MR: Were there records you made that didn't happen?

JZ: Oh yeah. When you play with someone as a sideman, you don't give a shit, actually. If you play with someone in that capacity, as a sideman, you accept what they do. I'm a professional, so I do my job, but there were a lot of things I did with Cannonball that I never would have done on my own. One of the reasons I got Weather Report together was that I got tired of having to play from that perspective, as a sideman, but it's part of the learning process. It's also because of having gone through that stage that Wayne and I are completely different as band leaders from everybody else I've ever worked with. We encourage everybody to contribute. We want to have people show who they are as musicians. If it's your music, you have to get from people, have to inspire, make them work for the music.

MR: How do you do that?

JZ: You can't talk about it. Just like music itself, it just happens. It's an approach you can't talk about. It's like "What do you hear?" It can never be "You do this."

MR: Doesn't this statement contradict your earlier ones regarding your tunes being written out, people not playing them the way you would if it were your band, etc.? How are both statements equally valid?

JZ: They can never be equally valid, it changes from tune to tune, bar to bar. My tunes are all improvisations which have been written down. They're already pure inspiration, not something that has been gotten together in time. I play it at home, put it on tape, then write it down without changing a note.

MR: Do you improvise on that or play it as written?

JZ: It's already an improvisation so you interpret it in the studio.

MR: How long does it take you to compose?

JZ: No time, it's really nothing to think about. If I never wrote another thing, I could release records for the next ten years—or I could record every day, if I wanted.

MR: You've changed personnel from album to album, why?

JZ: Changes evolve because change is necessary, because things are not the way you or others want. Miroslav was good, but unfortunately did not evolve into total greatness as I had

hoped. He was great in terms of free jazz. Al Johnson was great in a high level of funk, but Jaco Pastorius has reached that level of greatness because he can do it all. That's *total* greatness. It was the natural development that we should run into each other. You can't go looking for greatness, or a great musician—you never find things if you look. Whenever we come out with a band it's always gonna be happening and always gonna be different.

II

(At this juncture Joe excused himself and soundman Brian Risner entered and we discussed some of the more intricate details involved in the Weather Report sound.)

MR: How long have you been associated with Weather Report?

BR: About five years now, I started somewhere late '72, early '73. I've been involved with their studio projects since *Sweetnighter*.

MR: What's been your role in the studio?

BR: Primarily interfacing the equipment with the studio . . . mixing, also, though I'm not responsible for getting it on tape per se.

MR: Joe mentioned that all his keyboards go direct with the exception of the Yamaha acoustic piano. How do you mic it?

BR: Devonshire has a Yamaha Concert Grand, as opposed to the Yamaha Baby Grand that we use on tour. In the studio we use an Electro-Voice CS 15 placed at the nose (at the far end), six inches above the bass strings and pointing inside with the lid propped up. The top of the piano is covered with packing blankets. We don't use a pick-up in the studio as we do "live."

MR: How do you amplify it "live?"

BR: I use two AKG C-451Es suspended on goosenecks. One I place over the soundhole and the other underneath over the bass strings, plus a Helpinstill pick-up. I go with the mics on solos with just a little bit of Helpinstill for body warmth on the low end. Otherwise, throughout the set I use Helpinstill because there's too much ambient noise going on to be able to use the mics effectively. I find the pick-up to be so dry and mechanical. I've had better luck with the Helpinstill than the Countryman—the Countryman is more involved to set up just because it's active electronics as well as coming off the circuit boxes.

MR: When overdubbing the grand piano in the studio, do you do anything

different?

BR: We pull off the packing blankets to get a fuller sound and more resonance. The only other thing I can think of that we've done differently was the "live" recording of either *Mysterious Traveller* or *Black Market* where we miked the piano up by the hammers. We just wanted to get a little different sound, so with just a little EQ change and a different mic placement we succeeded in getting a different sound, a more percussive sound.

MR: Is the bass taken direct in the studio?

BR: Recording the bass is interesting because with Jaco we do both—mic it "live" as well as take it direct, just off the guitar before the amp. It's such a unique sound and so much of it is derived from the actual Acoustic 360 Bass Cabinet; Jaco has developed such a sound through it that you'd swear it's not an Acoustic amp. That particular amp was one of the first one or two hundred made. In the studio we use an Electro-Voice DS 35 and on stage an Electro-Voice RE 20. On stage I go more with the mic than the DI because of the volume situation and the DI is too much work and not accurate alone.

MR: The RE 20 has the characteristic of picking up other signals in close proximity. Have you had leakage problems?

BR: No, I just cram that sucker right up against the cabinet and pack it tight. Depending on how you EQ it, you might get a little cymbal way in the distance due to proximity. All that stuff is off-axis and you never really notice it. I mean, if you put it on pre-fold and put on a set of cans you might hear something, but it's all negligible.

MR: Do you bring your own mics when you go on tour?

BR: Weather Report doesn't own its own mics so when we rent a system I specify what mics I want. As soon as we get a couple of grand, we'll sink it into microphones, which [the money] should go really fast.

MR: Do you basically use the same type of mics "live" as in the studio?

BR: No, we use a DS 35 on Jaco in the studio and an RE 20 "live." It's the reverse for Shorter. In the studio we'll use one RE 20 whereas "live" I'll use a DS 35 and a Beyer 500 ribbon. We use a lot of Electro-Voice stuff at Devonshire. They're pretty accurate, but also that's primarily what Devonshire has to offer in terms of recording studio microphones.

MR: Does the limited selection pose a problem?

BR: No, because the others [brands] are *available*, but the mic selection is the choice of the house engineer, Ron Malo. There's not that much need for the others, actually. We're pleased with the E-V sound, it's smooth with no coloration from the mic.

MR: Will Weather Report continue to use Devonshire in the future?

BR: We will probably continue to use Devonshire because of the close proximity to everyone's house. There's no Hollywood scene going on there, no saunas, bar, etc. Dave Mancini owns the place and it's a very comfortable place to record. It's not a Caribou or resort-type comfortable, but we're pretty much left to ourselves. *And* it's only fifteen minutes from Zawinul's house! [He laughs] There's a "live" echo chamber at Devonshire, just a tiled room, that has lots of ambience. It's just fantastic. It's gotta be one of the best reverb chambers in the country, as well as being part of the secret of the Weather Report recorded sound.

MR: Is there much experimentation with the recording equipment on Weather Report sessions?

BR: Not a lot. There's no fancy phasing or toying around, we just go for accuracy. The ideal behind the approach is to bring out the realism of the instrument. There isn't too much synthesis of sound, basically being all very acoustical, including the synthesizer. I don't know any other synthesizer player [Joe Zawinul] who can get such an acoustical sound out of the instrument. You can just visualize the instrument he's reproducing. We really get the idea soundwise the first day of recording. We've never done anything off the wall *except* having Wayne Shorter (reeds) play into and off of the soundboard of the piano in conjunction with holding certain chords open on the piano with the sustain pedal. We did that on *Mysterious Traveller* and the first album, before I joined, *Weather Report*.

MR: On the average, how long does it take to prepare for the actual recording of a Weather Report album?

BR: That's hard to say because the band has changed from album to album, so it's different for each project. *Heavy Weather* took about two weeks of rehearsing, but everyone on their own takes the initiative to do the things necessary in preparation. The first day or two is spent in getting adjusted and finding the groove. The

first two weeks are spent bringing the music out into the open to see where it's gonna go. So, there's ten days to two weeks of actual tracking then four or five months of fine tuning.

MR: Joe mentioned that after a day of recording you (band personnel) take it home to see what you've got.

BR: Right, every bit of 16 track is put on cassette and everybody goes home and does their homework. It's a constant evolution in the studio where a tune three months later will have the basic root but the rest has changed. "Teen Town" [a track on the *Heavy Weather* LP] is a good example. We lived with that tune for a month, and nobody was really pleased with it; then one afternoon we went in, brought the tempo up and changed it all around. Sometimes you just wait for something to affect someone's life so that he'll see the tune differently and then it happens.

MR: Joe also mentioned that if he never wrote another tune, he'd have enough material to make records for the next ten years. Is there a lot of stuff still waiting in the can?

BR: Not so much, three tunes or so. I'd say that about 95% of what is recorded is used on that particular project, but everybody does have a lot of material ready to contribute.

MR: How do you mic the percussion instruments?

BR: It's much simpler in the studio than "live." Ron doesn't tight mic the percussion, but will go with just three overhead mics—an RE 20 just pointing down, a DS 35 over the congas and a CS 15 over the rack. You have enough ambience with these mics, they're accurate enough and you don't have to tight mic. That's the reason why there's so much "air" in Weather Report recordings, because they're not tight miked. There's no need for tight miking with that echo booth supplying with all that ambience and spatial feel. The studio is very different from the "live" show where you must tight mic because of the volume and in order to get the separations. "Live" I'll use SM 57s on the congas, which really works out nice what with the proximity plus boosting it up 3 and 5 K. You get the pop plus you still have the bottom thing happening. I'll use AKG 224s on the overhead for the timbales and roto toms. That whole area, with the cymbals, ends up being nice and flat as a result. I use an SM 58 on what few vocals are done "live." I also use an 224 on the chimes, plus there's a water

drum made out of car parts and shit that I use a Barcus Berry Hot Dog pick-up on. I use an SM 58 on that big marching drum used on "Teen Town."

MR: What about on the regular kit?

BR: Well, in the studio everything is assigned two tracks plus the snare and kick. We tight mic the floor tom and snare, and use an old, cigar-shaped E-V on the kick. It gives it that really warm sound. We use a pair of CS 15s for the overheads.

MR: Do you mic high or low on the snare and hi-hat?

BR: High on both, although we have gone under and on the beater side on the kick, I won't tell you on which tune, just to get a different sound. "Live," Weather Report's sound is different because the band plays differently "live." The volume and energy level is different. It's tighter sounding "live" because the ambience is different when you don't have the reverb chamber to deal with. Drums and percussion are tight miked. The stuff is happening on record because we have 16 tracks to bring up and you have that ambience, but "live," pow! The audience is right in front of you so it's different. "Live" I use an AKG D 12 on the kick; an SM 57 on the snare; overhead and hi-hat are AKG 451s, which are really nice, crisp and airy. I use very little EQ, just a bit to warm up the hi-hat.

MR: What type of mixing boards are you using "live?"

BR: We use an Electrasound System which we rent. They have offices in Hollywood, Boston and London. We use one of their custom boards for the house sound, and I use a modified Soundcraft which offers eight discrete mixes (monitor) of which I use six and one for a tape mix, utilizing a Nakamichi 550. I got some really good stuff from last year's tour. I used to do the house sound until the monitor mix became more complex and essential.

MR: In closing, is there a "live" album in the works?

BR: Eventually, there may be one, like in the next year and a half. I hesitate to say "will do" because it isn't as though it's expected, but I know people certainly do look forward to a "live" album. Weather Report has a "live" album called *Weather Report Live in Tokyo*, which was released only in Japan. Part of that concert was on the third album, *I Sing The Body Electric*, so American's aren't really missing much of anything.

*In this studio,
you don't get a second take.*



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Brass Construction is a tight, together group that cares very much about its sound and the manner in which that sound is presented to their audience. Their audience is quite large, proof of that hangs on the walls of the group members, their producer Jeff Lane and engineer John Bradley. I'm talking about their albums *Brass Construction I* and *II* which achieved gold record status (with *Brass Construction I* becoming platinum), two singles that sold over 500,000, plus many, many awards. To mention a few, they received awards from NATRA, Cashbox, Billboard and Record World, plus a Grammy nomination for best new R&B group—the list goes on, and all of this accomplished within a year.

They recorded both of these albums at Ultra-Sonic recording studios in Hempstead, New York, where they are currently recording *Brass Construction III*. Part of their new album was done on the road while they were touring, and now, in between gigs, they are finishing recording and are determined to mix it all at Ultra-Sonic.

The members of Brass Construction really enjoy recording and treat the studio like a home, and for the approximately 200 hours they are in the studio, it is just that. They have been very busy lately, though, and have only been able to record a little at a time. As a matter of fact, two days after this session they will be leaving for a gig in Detroit, and then on to a festival in Baltimore.

The day begins at 10:30 a.m. when three members of "Brass"—Randy Muller (the leader of Brass), Larry Payton (drums) and Sandy Billups (congas)—arrive at the studio, tired and with a lot of work ahead of them. They relax in the control room over some coffee and talk and joke awhile until they are awake, in good spirits and ready to lay down some tracks.

John starts setting up for some vocal overdubbing on "Happy People," a cut for their new album, while Randy, Larry and Sandy start warming up on their harmony parts. The mic John uses on Randy is a Neumann U87, on Larry he uses a Neumann U67 and Sandy has a Sony ECM-22. The U87 is a solid-state microphone, the 67 is a tube mic. Both are padded -10 dB and rolled off. (The roll-off on a Neumann compensates to make the response flatter when close-miking.) Sandy's ECM-22, which has an "M" and "V" for Music and Vocal, was put

on M (which is flatter when compared to V, which is rolled off). All the mics have pop filters.

Randy says that he wants it "in the cans," so John sends it through one of the tracking systems to his headphones. Ultra-Sonic has two separate tracking systems to enable an artist to have two different headphone mixes. Randy asks for "more organ" while Sandy asks for "more foot." By now they're really into it—getting new ideas, discussing them and figuring out exactly what they want. They keep a very relaxed atmosphere in the studio, some fooling around and dancing along as they sing, but when the tape machine is in the record mode, they get down to serious recording. Brass' producer Jeff Lane is due in at 12:00-12:30,

so they have time to experiment with different effects before he arrives.

Experimenting

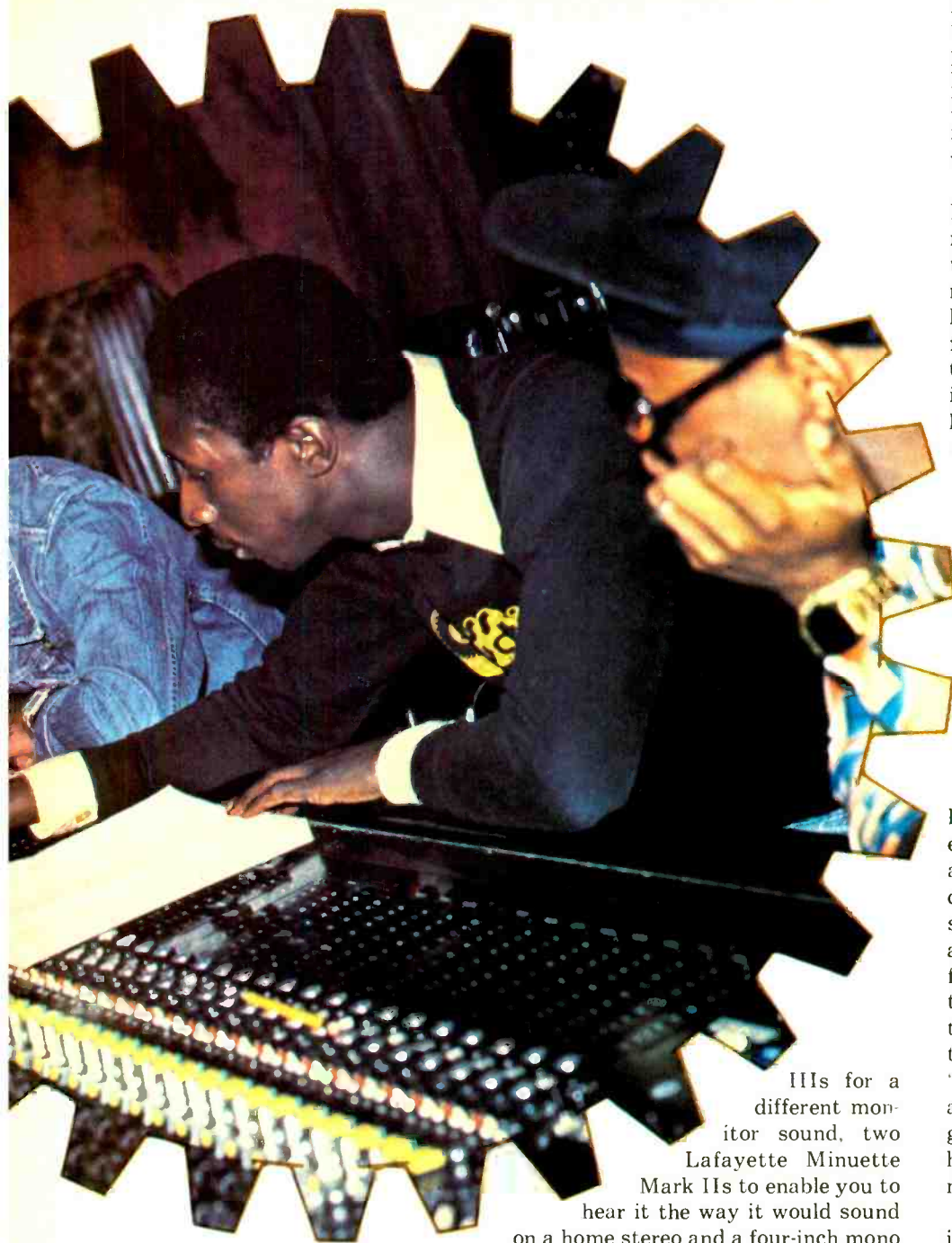
They lay down a rough background vocal just to see if it's the sound they want. Then Randy comes into the control room, followed by Sandy and Larry, to listen over the control room's monitor system. Ultra-Sonic's monitor system consists of a multitude of speakers so that an artist or producer can choose a monitor he feels comfortable with. There are four Altec A-7s acousta-voiced for the control room, two Rectilinear



A
Session
With



Construction



III's for a different monitor sound, two Lafayette Minuette Mark II's to enable you to hear it the way it would sound on a home stereo and a four-inch mono radio speaker.

Randy has an idea to try some phasing on the vocals, but he and John decide to leave that for the mix. (Once anything is recorded with phase or any effect, you have to go with it or re-record it without the effect. It's safer to put it on in the mix when you still have a choice.)

Jeff Lane has not arrived yet, so they decide to put down a reference vocal with phasing as an experiment. The studio has an Eventide instant flanger and a Marshall time modulator, which they decide to use. Randy feels that a delay alone will give them the sound they really want, so John

puts a 40-millisecond delay on the vocals and they go with that. John explains, "A state-of-the-art analog delay would be better than a digital delay, because it is more 'natural' sounding and would come out as pure as it went in, with only the delay added."

It's now 12:20 and producer Jeff Lane arrives on the scene. With the music flowing, it doesn't take Jeff long to get into it. He tells John to erase the reference vocals so they can begin to lay down the vocals they will keep. A few takes pass by while Jeff analyzes the playback for details such as phrasing, diction and tightness. He then listens to Randy, Larry and Sandy *a cappella* and likes what he hears. Jeff seems quite relaxed, even tired, but it doesn't affect his producing in the least. He's just as alert and on top of everything that's going on as anybody could be. Jeff and Randy work hard together to get exactly what they want and the magic between them is incredible. They have worked together for many years and have had a great many hits.

Research & Philosophy

A lot of research is done by them on life, people's feelings, moods and the economy. Then they proceed to write and choose the songs they feel their audience can relate to. Feedback and the success of previous albums also have an important role in picking material for their upcoming one. And while they're working on album III, thoughts are already gathering for their fourth. They want to touch that "nerve" in the listener, whether it be an emotional or physical one, that will get you up and dancing. And the heavy, complex, rhythms in their music will get *anybody* movin'.

A main characteristic of Brass is the interplay of rhythms. The basic rhythms, bass line and rhythm overdubs are all pre-planned. Randy comes in prepared with the musical scores and a basic outline of how the song will be. He gives a simple analysis that in a song the bass will usually remain the same, while in every cycle of 4 to 6, or an odd 6 to 7, he varies the rhythm.

The members of Brass usually learn the music in the studio. Being on the road so much, they rarely get the chance to go over *beforehand*. The ability to interpret the music on the spot is a necessity. Randy, having the whole song charted out completely, knowing exactly how it should go and leaving room for all group members'

BRASS
Station

By Stu Gale

styles and ideas, is pretty accurate with the end producing sounding like it was planned to. Of course, if a better way is discovered they will build toward it, but every step is given careful thought and experimentation by Randy, so the material and chart work are pretty close to everything they could be.

Randy feels a song should "sound like a hit" from day one. Each part should be able to stand alone. "We grow with every album," he states, and feels this new album to be different from I and II, "a change for the better." He explains, "A group will introduce a new sound everyone loves, and become a success. If their next album is the same, their audience gets tired of it; and if it is completely different, then they're not the same anymore, so a happy medium needs to be reached." Randy feels *Brass III* is "in the pocket" and hopes their audience agrees.

John and Jeff also have worked together for years and are very good friends. John can anticipate pretty much what Jeff wants and has it ready, many times before Jeff even asks. Together their experience makes for a great team, and an impressive track record of hits.

Jeff takes on a very serious air when he is working, but he does joke around every once in a while to keep the atmosphere light. Many takes bite the dust in their effort to perfect everything, down to the minute details of pronouncing a word such as "happy" (happē or happā). Whatever they feel would best complement a particular part of the song they are working on is discussed and planned out.

Satisfied with the background vocal they've just put down, they proceed to double it. Jeff jokingly lets us in on a secret(?). "To double a track properly, put down a good one, then, double it!" (Jeff's humor isn't usually this bad.) When doubling or tripling, John uses a different delay time for each vocal put down, with a degree of variance from 5-10 milliseconds. This creates a denser vocal quality. That done, everyone breaks for some Moo Su pork.

Moo Su Magic

Over lunch, Jeff, Randy, and John all discuss what's ahead for the tracks.

Lunch did it! Whether it was the break, or the magic of Moo Su pork, the studio glows with creativity and



inventiveness. It is such a magic that the mood of everyone, no matter how good before, is fantastic. Jeff is even singing his instructions through the talkback mic to the group in the studio. The energy is flowing, and joking about the pork serves as a tension relieving vehicle to get them through the tedious hardships that perfecting the tracks might bring.

After completing the doubling, Randy comes into the control room and on the console adjusts a rough monitor mix to suit his taste. The console, custom-built by Herman Bear's Audio and Electronic Consulting Services, is a full sixteen-track board, 26 inputs with spring and EMT echo units. It has compression on every input and is a very flexible studio board having the capability to do "live" radio concerts. A complete line of Scully 280s cover the back wall of the control room—mono, 2-track, 4-track, 8-track and 16-track with Dolby A noise reduction available for all.

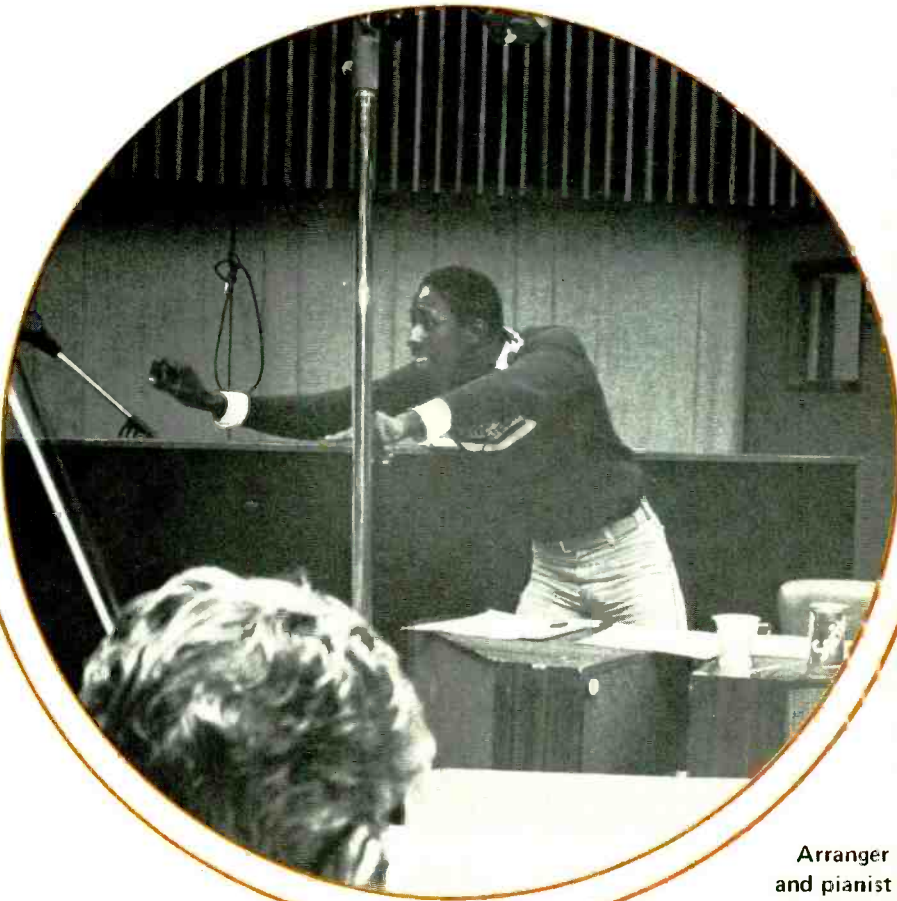
Satisfied with his mix, Randy decides to triple the background vocals and heads for the studio, while Jeff sings some parts to himself to make sure they match his expectations. Randy, Larry and Sandy then complete the tripling.

Randy now feels he's into laying down the lead vocal for "Happy People" so John prepares for that. He uses the same mic and set-up on Randy as he did when Randy worked on the background vocals, with the two exceptions of transferring to another track and changing the delay. Randy doesn't leave everything to John when he records. The knowledge he has acquired in "live" performances helps him to use the mic to its best advantage. He strategically places himself in different positions around the microphone to make the most of his recorded performance. At the conclusion of the vocal lead in "Happy People," Randy does an "artist's manual fade" by falling back from the mic as he attenuates the level of his voice.

The basic tracks for *Brass III* were done on the road, so I will explain the technical aspects of Brass' sessions with a normal Brass set-up at Ultra-Sonic combining Brass I, II and III. Of course it depends on the project, song and sound needed, but John usually uses an E-V 666 on the bass drum. It has very little if any proximity effect. Generally some sort of bottom end EQ between 80-200 cycles is put on with some compression. On the



Producer Jeff Lane (left) and engineer John Bradley.



Arranger and pianist Randy Muller.

snare, John's "old favorite" is the 546 Shure with subtle low-end EQ around 100 cycles and a touch at 6 K on top. Larry's (Brass' drummer) playing is usually concentrated around the foot, snare and high-hat. He sometimes also uses one small tom and floor tom when he records. John uses a pair of condenser mics, placed to mic the toms and adjacent cymbals at the same time. Usually they are the Neumann U67s or U87s. He sets the pattern on the mics to suit.

Wade Williamston's bass is usually taken direct with an effect such as a Dr. Q [an envelope follower foot pedal manufactured by Electro-Harmonix which creates wah-wah effects] on one

self on the road. Any electric piano that might be needed goes direct. The grand piano, miked with the U87 for a bright sound or an RE-55 for a deeper sound, depending on what is preferred, would go on one track. Either a U87 or ECM-22 would be used to mic the conga. John uses a little limiting on the bass drum and bass guitar. He also limits anything with an effect, such as a Dr. Q, fuzz, etc., which may give outrageous peaks, in order to keep control and prevent distortion. The studio has UREI limiters. For the horns (Morris, Wayne, Michael and Jesse), he uses the U87 or 67 on trumpets, a Neumann M-49 on sax and the EV-666 on an occasional trombone.

tight miking situation.

John tries not to impose the technical aspects of recording (as much as possible) on any group. It might hinder their performance. He only asks them to choreograph their distance from the mics for vocals, horns, etc., as much as they can. He gives them a good balance in the cans, makes sure they're comfortable, and lets them go. John tries to capture their spontaneous performance in the studio and let them get everything possible out of it. He feels that recording should be as much fun as you can make it because spontaneity and fun go together.

John finds it easy to work with Brass; he has a feel for Jeff who relies



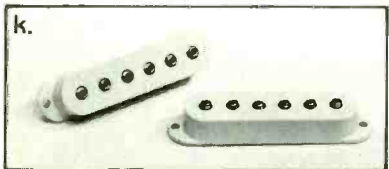
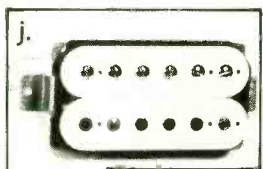
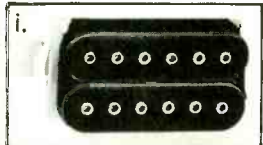
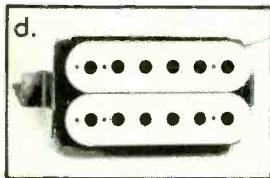
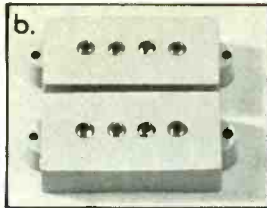
Brass "Brass" (left to right) : Michael Grudge, Jesse Ward, Wayne Paris and Morris Price.

channel, and straight bass on another. Joe Wong's guitar is also taken direct, although sometimes he might go through an amp which is miked with an Electro-Voice RE-55. Any effect he might use would be hooked up either way he was taken. Most effects used are what the group members use them-

The essence of Brass' sound is a tight, crisp rhythm track, so John needs to get as good a separation as possible. Yet, feel is also important so he has to keep the members as visually together as possible, so anything set up for sound isolation must allow for eye contact. It usually winds up in a

on instinct and intuition, and Randy who is very much a perfectionist. They both will spend time to get what they desire, so John just keeps the ball rolling, keeps everyone happy (which sometimes takes diplomacy), and does what's right for today, because tomorrow may be different.





1 How many of these musicians can you identify?

2 What kind of pickups are these?

3 What do they both have in common?

ANSWERS

1 a. - Roy Buchanan, c. - Rick Derringer, f. - Paul Stanley (Kiss), h. - Al DiMeola, l. - Ted Nugent, n. - Gary Rossington (Lynyrd Skynyrd), o. - Martin Barre (Jethro Tull), p. - Laurie Wisefield (Wishbone Ash).

2 b. - P-Bass Precision, d. - Super Distortion, e. - Far Strat, g. - Pre-BS Tele, i. - Super II, j. - PAF, k. - SDS-1 Strat, m. - Piano Transducer & Acoustic Pickups.

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Outfitting a **MOBILE STUDIO**



By Jim Ford

THE SOUND BUSINESS

Of course the "sound business" is exciting! Everybody knows that! However, there are parts of the business that might be *too* exciting, especially if you are a sound man and your job is to do a "live" mobile recording or sound system mix.

Recently, we had the opportunity to design and build a low-cost mobile recording trailer. The majority of the equipment would be considered semi-pro, however, when it is installed and operated correctly, the results are very professional.

Now, the purpose of this article is to describe the design and construction of a mobile recording trailer, but first, the problems of recording a "live" show must be reviewed. A better knowledge of the difficulties encountered in a "live" show will help in the design of the recording system.

A "live" show is one that is being broadcast, recorded and/or reinforced as it actually happens in time. There is no stopping, editing of mistakes, backing up and trying it again, overdubbing, fixing it in the mix, etc. The sound man has one and only one chance to make the show sound perfect. Mistakes cannot be retrieved and the sound man must "live forever" with the outcome and the opinions of all the people that heard the show. This type of situation generates such a great amount of mental and physical pressure that many good sound men have been reduced to "babbling nervous wrecks" by the time the show has been completed.

In today's sound industry the majority of all shows are pre-recorded and edited. However, a small percentage is "live" and there will always be "live" entertainment that needs to be recorded and broadcast. Some examples of the "live" situation are: concert sound reinforcement; television; radio; and mobile recording.

In all cases the actual broadcasting or recording of the show is just a small part of the trouble that must be endured and the work that must be done. Precision planning and preparation is mandatory in order to avoid a disaster during the show. Anticipating potential problem areas and being ready with a solution is the mark of a good sound man. Every piece of equipment must be accounted for and checked out prior to loading on the trucks. For safety, backup equipment should be taken in case certain critical

pieces of the sound system should fail, e.g., power supply for the mixing console, extra power amplifiers, extra speakers and horn diaphragms, miles of microphone cable, etc. (Remember the first Carter/Ford presidential debate on national television when the sound went dead for more than 20 minutes!)

Lost or forgotten equipment can mean added time, expense and embarrassment at the job. After the trucks are loaded and on the road the question is: Will they arrive at their destination safely? At the job site there are a great number of things that can go wrong. For example:

- (a) The stage is set up all wrong.
- (b) The building does not have adequate electrical A.C. power.
- (c) The light man got there first and set up in the sound booth.
- (d) The promoter told you to bring a sound system for 3,000 people, but he sold 10,000 tickets.
- (e) The contract asks for sixteen mics but the band decides it needs twenty-four.
- (f) After the sound check (if there is one) the band changes its mind and decides to do a different set of songs.
- (g) Right before the show begins, someone walks up and says, "Oh, by the way, we need a mono mix for a radio and TV feed."

Well, the list goes on and on. The good sound man is prepared for the worst and carries a giant suitcase filled with every type of electronic gadget to help get him out of trouble in a hurry. Our hats are off to the sound men who make their living doing "live" shows.

THE TRAILER

The owner of this particular mobile recording van is George Bingham of Tulsa, Oklahoma. After consulting with several sound engineers, George purchased a trailer and did all the interior work himself.

The trailer is a fifth-wheel type manufactured by the Hanover Company. It is two axle and costs approximately \$6,000 new. George bought the trailer used from a company that was using it as a portable showroom. It is 28 feet long, 8 feet wide and 8 feet high. One Duotherm air conditioner was added to the roof. On the left side of the trailer a 3 foot by 7 foot 1/2-inch, bronze plexiglass window was installed. Also, on the same side, a large motor-home-type awning was at-

RADIO



& Brian Roth

tached, and it extends out to cover the window. This window is used in conjunction with a permanent studio that George owns. When the trailer is not out on the road, it is parked next to the permanent studio and used as the con-

main Model 5 and expander provide 20 inputs (the full complement available with the Model 5 system) for "live" microphone sources and final mix-down. The 20 microphone inputs are fed from the microphone patch bay.



trol room. A large window in the studio that matches the window in the trailer is used so that the engineer and the musicians can see each other. A 3/4-ton club cab pickup with a short wide bed is used to pull the trailer.

The floor of the trailer is carpeted, the walls are wood paneled and the ceiling is made up of styrofoam acoustical tiles. Near the doorway (which is at the rear of the trailer) are several storage cabinets and a couch which can be converted into two bunk beds. Located at the front end of the trailer (which extends over the bed of the pickup) are three 19-inch equipment racks which hold the patch bays, tape recorders, limiters, the reverb and sub-mixers. Also in this area are the entrances for the three incoming snake cables and A.C. electrical cables. In the middle of the trailer is the mixing console, which runs the length of the trailer. The sound engineer and producer sit behind the console and view straight ahead through the large window. The monitor speakers are located on either side of the window. The cost of remodeling the trailer was approximately \$2,000 (wood, carpet, etc.).

The Mixing Console

Rather than using a typical unitized recording console, the mobile studio's console consists of several separate units combined to form a complete system.

The heart of the console is a pair of Tascam Model 5 mixers with their optional expander mainframes. These are divided into two distinct functions and will be referred to here as the "main" mixer and the "monitor" mixer. The

Since all of the mixer bus outputs and direct outputs are routed through a patch bay, virtually any combination of direct or bus signals can be routed to any tape track.

By using normalizing type jacks in the patch bay, the first mixer and expander are normally connected to the 8-channel recorder's inputs by using the mixer's four mixing buses to drive the first four tape tracks, and direct feeds from modules 5 through 8 feed tape tracks of like numbers. Obviously, other combinations are possible by re-patching.

In most situations the direct feeds are used extensively because of the fact that many tracks consist of only a single instrument or microphone. It was necessary to have some method of monitoring the 20 direct outputs, consequently, five Tascam MB-20 meter bridges were used, which gave a total of 20 VU meters. The MB-20s were wired "in line" with the direct outputs.

Additionally, sixteen of the direct outputs are routed through a pair of Tascam Model 1 mixers, giving a 16 into stereo submix for a stereo reverb send during mixdown. The Model 1s, like the meter units, are connected "in line." The echo send bus included with the Model 5 mixer can be used for an effects send for slapback, etc.

The second Model 5 mixer and expander is used for a comprehensive monitor and cue mix. This unit is used during the actual "building" of the tracks. A total of sixteen line inputs (only eight are currently used) are normally connected to the output of the multi-track tape recorder although other combinations are possible by re-patching at the patch bay.

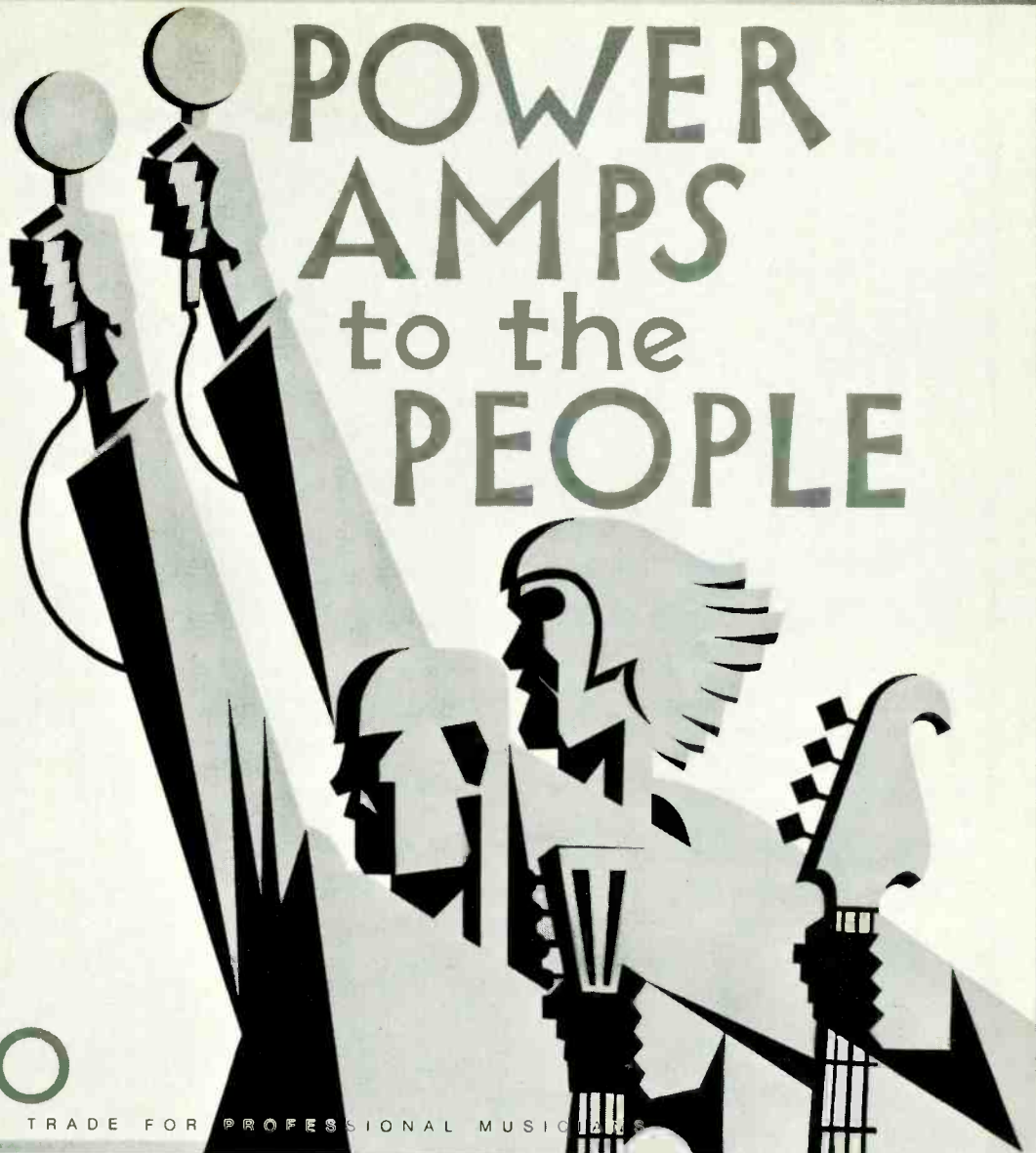
The four mixing bus outputs from the monitor console are used to drive the monitor amplifier, a Crown D-150A, which in turn drives a pair of JBL 4311 loudspeakers. The outputs are available in the patch bay for other uses such as generating a "live" stereo recording on the two-track tape recorder while simultaneously recording a multi-track master.

To allow overdubbing of tracks, a rather elaborate cue system was devised. Three separate headphone cue mixes are available. The first mono mix is taken from the cue bus output on the main Model 5 mixer. This mix will generally be of the "live" microphones and will be used during the recording of the basic tracks, although it can also be used during overdubbing by switching some of the inputs to line as would be done during mixdown.

The second mono mix is derived from the cue bus output on the Model 5 mixer that is used for the monitor system. The output from the multi-track tape recorder is used to generate this second cue mix.

The third cue mix is stereo. To accomplish this, another pair of Tascam Model 1 mixers were included. These mixers are wired "in line" with the output of the multi-track recorder after the patch bay connection. Thus, the same signal that appears at the line inputs of the monitor mixer also appears at the inputs of the Model 1s. This arrangement is practically the same as having a separate cue mix (in stereo)





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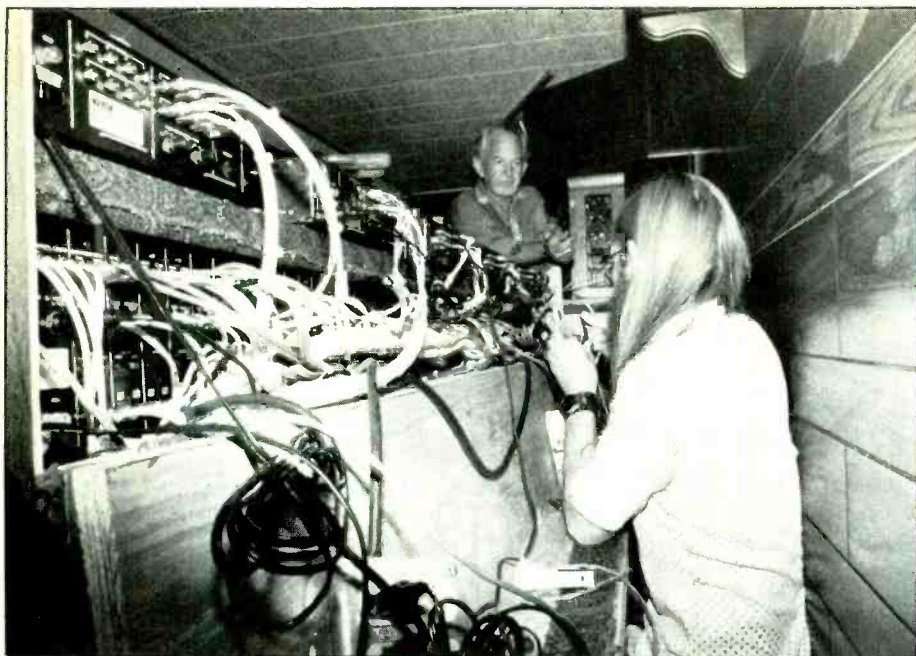
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on the monitor mixer in addition to the mono cue facility built into the monitor mixer.

To facilitate intercommunication between the engineer and musicians, a slight modification was made to the talkback module in the main Model 5 mixer. This modification allows the engineer to talk into all three cue mixes when he presses the appropriate button on the talkback module.

It can be seen that very extensive monitoring facilities are available for both the loudspeakers in the trailer and for headphone cue for the musicians recording.

The numerous separate monitor and cue mixes will allow a very elaborate recording situation to be handled easily, even when the sixteen-track recorder is added to the system.

The Tape Recorders

The multi-track mastering recorder chosen was a Tascam 80-8 with the 8-track dbx accessory. This particular deck provides all necessary 8-track recording facilities at a very reasonable price. Additionally, the 80-8 has a good monitor switching circuit that allows easy punch-ins.

The two-track mixdown recorder was a Tascam 25-2. The wide variety of functions, such as variable speed and editing modes, will prove to be useful during the mixing process.

Both of these recorders have remote control units located at the console.

Finally, a Roberts combination video tape recorder and stereo quarter-track machine that was already on

hand was installed. This machine was added mainly for video usage, which will be described later.

Auxiliary Equipment

Presently in use are four UREI LA-4A limiter/compressors and one AKG BX-10E stereo reverb chamber.

The Patch Bay

The patch bay can basically be divided into two groups: microphone patching and line level patching.

The line level patch bay consists of four jack frames of fifty-two jacks each (twenty-six jacks per row) giving a total of 208 line level patch points. Most of the line level bay uses normalizing type jacks so that the use of dozens of patch cords is not necessary. The normalizing jacks are configured to allow a signal flow for recording or mixdown, but this can easily be changed by using patch cords to defeat the normalized signal routing.

The line level patch bay gives access to all of the line outputs on both Model 5 mixers, line inputs on both mixers, all auxiliary sends (such as cue and echo) and echo returns into both mixers. Additionally, all of the accessory send and returns of the main Model 5 mixer are routed through the patch bay to allow insertion of limiters, equalizers and other outboard equipment into the signal path of the main mixer's inputs.

The inputs and outputs of the tape recorders, all outboard accessory equipment (reverb, limiters, etc.), the Model 1 outboard mixers and even the power amplifier inputs are accessible at the patch bay. Nine jacks are available for sending signals to the remotely located stage equipment rack that houses the cue amplifiers. Practically every signal in the system passes through the patch bay, thus greatly reducing the possibility of having to inform the producer that—"We can't do that," when some unusual



The twenty-four lines that ultimately connect to the stage microphone snakes are connected into the top row of jacks of the microphone bay. The bottom row of jacks are wired to the microphone inputs of the main Model 5 mixer and expander. Consequently, it is possible to route any microphone into any input.

signal routing is necessary. The use of normalizing type jacks makes this highly flexible system manageable.

While on the subject, we should mention that only the input jacks are the normalizing type. Since it is possible to have one output signal drive several inputs, we chose to use regular jacks for all output accesses. Consequently,

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plugging a patch cord into one of the equipment output jacks will not disconnect the normalized connection. Only when a plug is inserted into an input jack is the normal signal flow interrupted. This arrangement allows one output source to be sent to multiple inputs while eliminating the possibility of having two output signal lines tied together, which is not desirable.

The Multi-Conductor "Snakes"

Three different snakes form the link between the trailer and the musicians. The first two, one 15 pair, and one 9

the trailer's electronics. This rack is part of the musician's cue system. Two Crown D-60 amplifiers provide ample output for the two mono cue mixes and the stereo mix.

A multi-pin connector on the amp rack allows easy connection of the multi-pair cable. Also, multi-pin connectors are used to plug in the headphone boxes. These headphone boxes are a very strong cast box (they are "picker proof") with two phone jacks for the headphones, a volume control and a three position switch to allow selection of any one of the three cue mixes described earlier in the record-



pair, are used for connection to a pair of microphone input stage boxes. It was decided to split the microphone snake into two smaller cables rather than use one large one. This will allow the stage boxes to be placed at the most convenient location. Generally, the 9-line snake and stage box will be placed toward the front of the stage for the vocal microphones and the 15-line snake will be located by the instruments and amplifiers. This procedure reduces the rat's nest of microphone cords that would be present if only a single microphone stage box were utilized. (The stage boxes themselves are made of heavy gauge steel and include a multi-pin military grade connector for connection to the multi-pair cable.)

The third snake, another 9-pair cable, ties the stage amplifier rack to

ing console discussion.

At the trailer, a steel plate was installed on the outside wall to hold three multi-pin connectors for the other end of each snake. Since everything uses these connectors, set-up is only a matter of plugging in the multi-pair cables into the trailer and into the stage microphone boxes or the stage amplifier rack.

The Video System

To accommodate the common situation when the control room trailer is located at a distance from the recording area, closed circuit television was a necessity. Included in this system is a Sony television camera with tripod, a small video monitor and the Roberts Video/Audio Recorder mentioned earlier in the article.

The AC Power System

Since the AC power connections available at a remote location tend to vary, careful consideration of this aspect of the system was made.

The final configuration uses three separate power lines into the trailer. The first is for the audio equipment, the second is for the air conditioner, and the last line is for lights and miscellaneous power.

The reason that three lines were used was so that if only wall receptacles were available for power at the site, the load of the trailer could be split into different circuits. This would eliminate overloading of a typical outlet's circuit. Also, having the air conditioner isolated on its own circuit will prevent line voltage fluctuations and electrical noise (caused by the compressor in the air conditioner) from affecting the audio.

A voltage regulator transformer was wired into the audio equipment power line to insure "clean juice" at all times.

The power cables are a heavy rubber-jacketed type "SO" cable that plug into connectors on the outside of the trailer.

A multitude of power outlets are located at the console area and in the equipment rack in the trailer.

The interior lights are on a dimmer. To eliminate electrical noise generated by typical electronic dimmers, a variable transformer type of dimmer was installed.

CONCLUSION

Construction time totaled approximately four weeks, with the biggest problem being the wiring of the snakes and patch bays. Although the trailer is presently operating with an 8-track recorder, it was designed and built for 16-track operation.

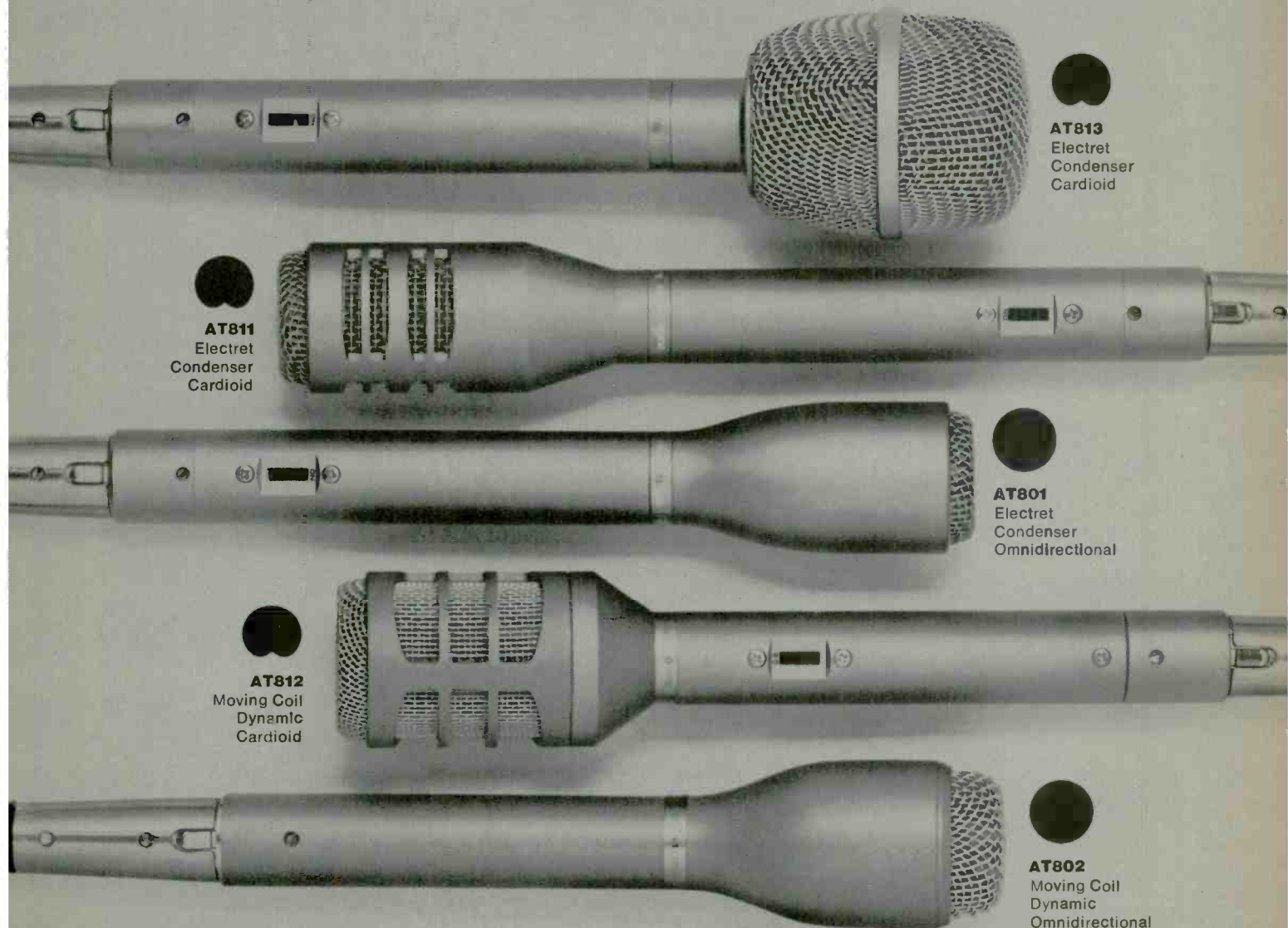
Total cost for the entire trailer and all equipment was about \$40,000. The unit has already been out on the road, and has completed one of its first successful recording sessions—a concert by the group Asleep at the Wheel.

Finally, if a mobile unit is going to be built, remember these things:

- (a) Make it rugged.
- (b) Make it flexible.
- (c) Use dependable professional equipment.
- (d) Take along back-up equipment.
- (e) Do not lose your suitcase full of gadgets; you may need it!



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Ambient Sound

BY LEN FELDMAN

Echo, Reverberation and Time Delay

Now that audio time delay can be accomplished by purely electronic means, more and more recording engineers, as well as serious recording hobbyists, are equipping their recording facilities with such time-delay units. Obviously, the user of a time-delay unit (be it an older, magnetic-loop type or one of the newer digital-delay or bucket brigade IC types) is free to use his or her new acquisition however they please, and a great variety of acoustic tricks and effects have been appearing on recently released discs. But it might be a good idea to take a look at some definitions at this juncture, if you want to apply the new time-delay units to the creation of *realistic* audio programming.

The original purpose of any artificial reverberation device is to impart to the recorded program the illusion that the performance took place in a room other than the one in which it was actually recorded. First, let's define reverberation, or, more precisely, "reverberation period." It is the time required for a sound in an enclosure to die away to one millionth of its original intensity—a decrease in intensity of 60 dB. Reverberation itself is the persistence of sound within an enclosure after the sound has stopped. Reverberation may also be considered to be a series of multiple echoes, decreasing in intensity and so closely spaced in time that they combine or blend into a single continuous sound which is eventually absorbed by the absorptive qualities of the walls, ceiling and floor of the particular enclosure.

Reverberation, or the reverberation time of a given enclosure has a great effect on the intelligibility of speech. If there is too long a reverberation time, a listener who is close to the speaker will have no great difficulty in understanding what is said. But if the listener is located a greater distance from the speaker, each syllable will be prolonged and will run into succeeding syllables, resulting in confusion and loss of intelligibility. Acoustical engineers have calculated the "optimum" reverberation times for different types of

program material in a variety of room sizes. As an example, consider an auditorium having a cubic volume of 100,000 cubic feet. (That's not as huge as it seems at first. A hall measuring 100 feet in depth, 50 feet in width and having a 20-foot high ceiling adds up to that much cubic volume.) If the hall were to be used strictly for organ music (as, for example, in a church), optimum reverberation time would be around 1.7 seconds. Symphony or opera music would be best reproduced in such a hall if its reverberation time were around 1.4 seconds, while speech would best be heard if the reverberation time were reduced to just a bit over 1.0 seconds.

A broadcasting studio, or, for that matter, a recording studio, is usually a good deal smaller than a concert hall. In a recording studio having a cubic volume of only 10,000 cubic feet (say, 25 feet wide, by 40 feet long, with a 10-foot ceiling), the optimum reverberation time has been calculated as around 0.8 seconds. Obviously, the two situations are incompatible with each other and, if an organ or orchestra were recorded in such a studio, they would sound flat to a listener in the studio and when it is played back at home unless some form of artificial reverberation is added—either mechanically or electronically.

Artificial reverberation can be achieved in several ways. Earliest reverb systems employed electromechanical devices, such as coiled springs, which were activated by transducers at one end, causing the spring to vibrate "down the line" with vibrations picked up by a corresponding transducer at the other end of the spring and re-amplified by either the main amplifying equipment or a separate amplifier. Early on in the history of recording and broadcasting, actual echo chambers were used. That term is really a misnomer, as we will soon point out, and they should probably been called reverberation chambers. These chambers were highly reverberant rooms having long and narrow dimensions and hard, reflecting wall surfaces. A loudspeaker was placed at one end of the room and a microphone was placed at the other. Sound is sent into the loudspeaker, picked up by the microphone,

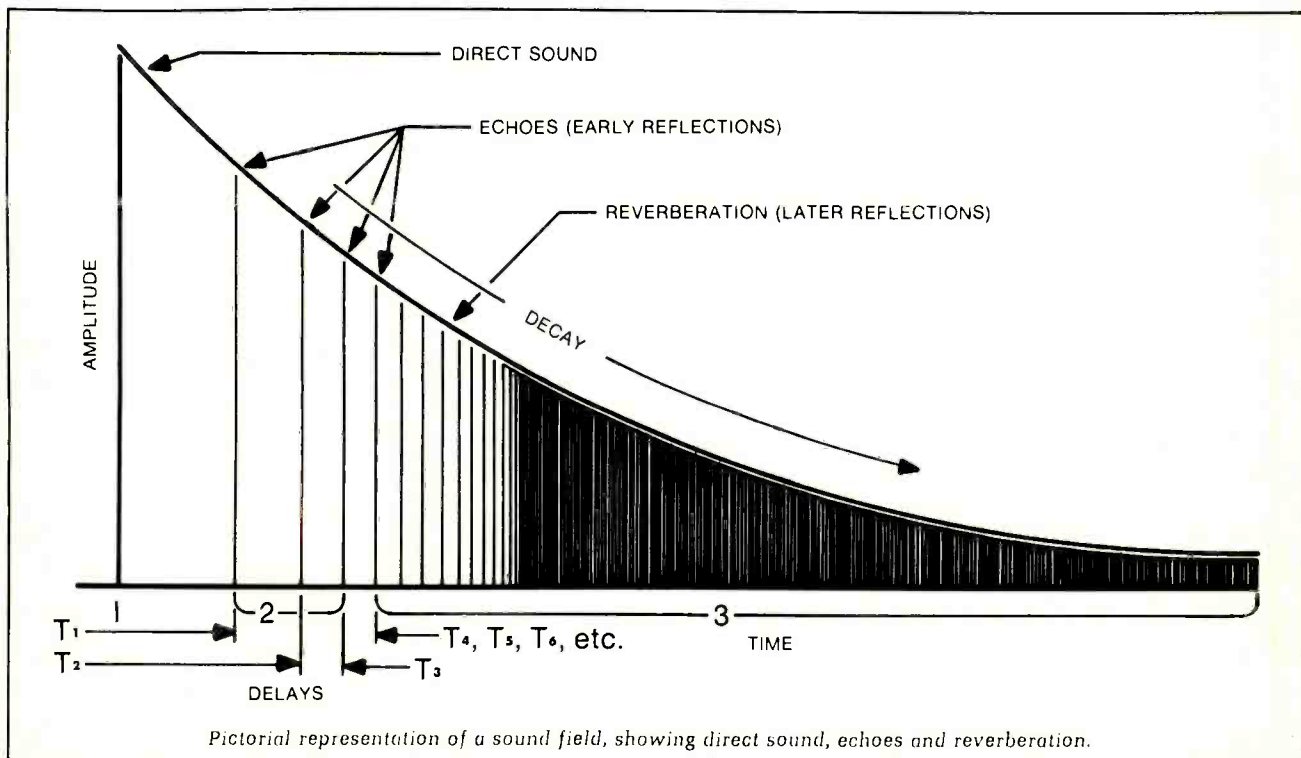
amplified, equalized and mixed with the original program material. Because of the hard wall, multiple reflections are produced.

The third system developed for creating artificial reverberation (and one still very much in use in modern recording studios) employs magnetic recording techniques. The signal is recorded on an endless tape loop, and signals from several playback heads located at various distances from the recording head are mixed together and added to the original program signals.

All-electronic time delay or reverberation producing systems are a relatively recent development. Thanks to the development of micro-circuits for both analog and digital electronic applications, totally electronic time delays have come down considerably in price compared to what they cost when they were first introduced. One system of electronic time delay involves the conversion of the primary signals into pulse or digital form. In that form, the digital pulses representing the audio signal can be stored and delayed by variable amounts—even up to hundreds of milliseconds, reconverted into analog or continuous

own definition. Like all forms of reverberation, an echo is the repetition of a sound caused by reflection from a surface. To be an echo, however, the reflected sound must be heard 1/20th of a second or longer after the original sound. If it is heard after a shorter duration than that, our minds combine the direct and reflected sound into one continuous sound. Room echoes are discrete, separately heard sounds or reflections occurring too late to provide beneficial reinforcement to the direct or primary sound. 1/20th of a second converts to 50 milliseconds. Beneficial early reflections arrive within about 20 milliseconds of direct sound arrival. A concentrated echo arriving more than 50 milliseconds after the primary sound is a serious acoustical defect, as far as acoustical design engineers are concerned, but may be useful in creating special effects in certain kinds of recordings where intelligibility of spoken words is not a prime requisite.

In a real listening situation, the reverberant sounds we hear reflected from the various surfaces of a hall do not contain as much high-frequency material as does the directly heard sound. For one thing, the "highs"



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waveform audio signals and remixed into the program or reproduced separately. Such circuits, despite their sophistication, have become so inexpensive that various versions are now offered for home use as well as for professional studio applications.

Echoes

Although most people tend to use the words echo and reverberation almost interchangeably, an echo is a special case of reverberation and, as such, requires its

are partially absorbed by the reflecting surfaces so that the reflected sounds contain much less high frequency content. Furthermore, the shape of our outer ear (known as the pinna of the ear) is such that high frequencies reaching us from behind the ear do not impinge upon our eardrums and inner ear structure with the same intensity as mid- and low-frequency sounds. For this reason, electronic time-delay units usually attenuate the highs before re-mixing with the original program content. This is rather fortunate in the case of digital and bucket-brigade circuit time-delay units

which would have to be considerably higher priced if they were required to reproduce delayed sounds all the way from 20 Hz to 20,000 Hz.

Another desirable characteristic of audio time-delay units (especially if they are used to drive auxiliary loudspeakers located other than at the front of the listening room) is that the delayed sounds they produce be "non-coherent." That is, the listener should be unable to detect or pin-point the source of these reflected sounds. Rather, one should sense a feeling of ambience or a general "enlargement" of the listening space without being able to say that additional sounds are coming from a given point in space. Multiple delays which are uniformly spaced and at intervals greater than 30 to 50 milliseconds will generate audible "flutter echo." A flutter echo is a rapid, usually regular succession of reflected pulses that is heard as a sort of "boing-boing" quality when reproducing sharp musical transients. For lifelike reproduction, multiple reflections should be closely and irregularly spaced. Modern electronic time-delay units are now capable of providing such blends, which result in a very realistic ambience, as opposed to older delay units in which later delays were whole number multiples of the early delays. Of course, we have been discussing the use of time-delay units for reproducing reverberation and echo effects as they occur in the "real world." As we pointed out earlier, the availability of modern electronic time-delay units at low cost opens up a whole

new field of experimentation for the imaginative recording engineer who may well want to lay down complexes of sounds that cannot be readily duplicated in the real, physical and dimensional world.

Not too long ago, I visited the AR Corporation, up in Massachusetts. They had developed an experimental 16-channel digital time-delay system by means of which they were able to "program" in the acoustics of various concert halls of known dimensions and acoustic absorption qualities. After listening to a variety of "halls" (sixteen speakers were positioned around the rather small listening room, each representing a given segment or cubic portion of the artificially created "halls"), just for fun, the operator introduced a set of parameters to the program that could not have been physically realizable in an actual concert hall. Music was then played over the multi-channel system and those of us who listened could immediately tell that "something was not right." Our ears had never been subjected to that kind of a listening experience simply because it could not exist in the real world. That did not, however, make it any less interesting or exciting. By the same token, engineers are now using this new audio-delay tool to create new sounds in recordings—sounds that might never have been achieved in any other way. And, unless you are a dyed-in-the-wool audio purist, you cannot help but admire this wave of experimentation and the new sounds it produces.

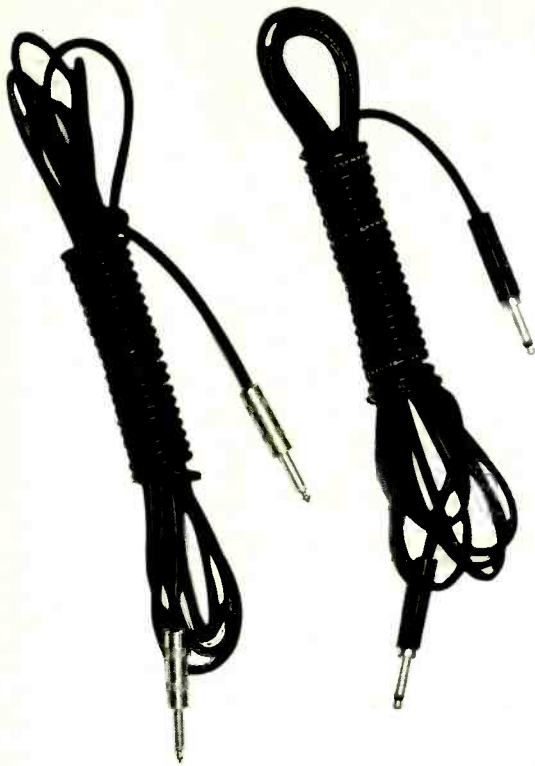


Sound Workshop will introduce its new 16 Track Recording Console at the Audio Engineering Society Convention in New York City on November 4th, 5th, 6th, and 7th. We suggest you check it out.

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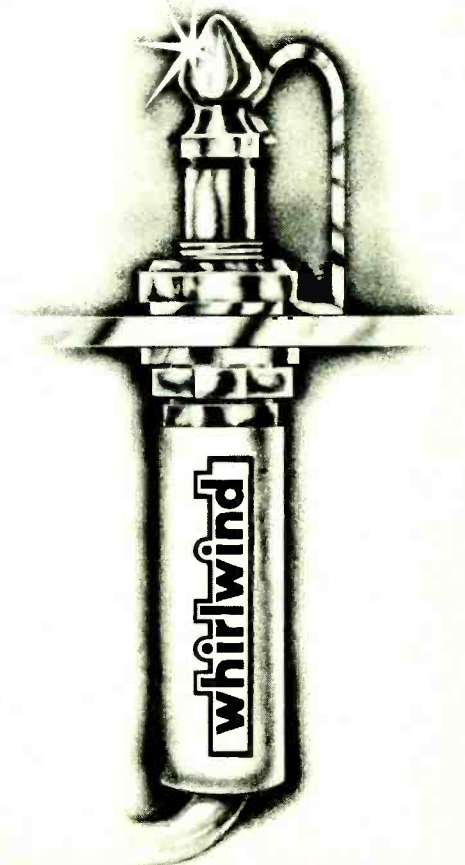
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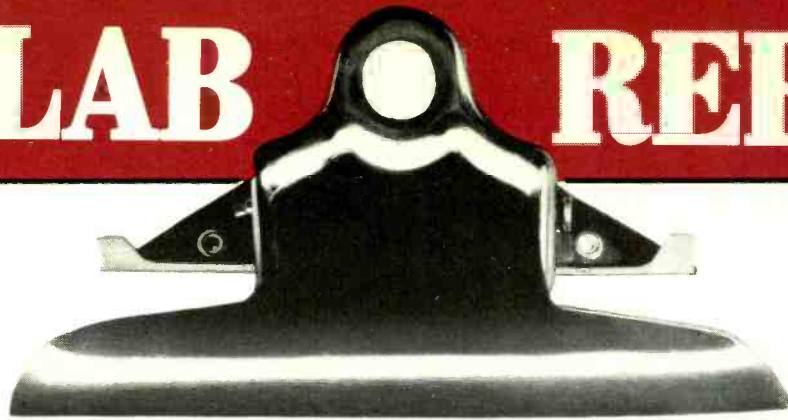
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NORMAN EISENBERG AND LEN FELDMAN

Sony TC-766-2 Tape Recorder



General Description: The Sony TC-766-2 is essentially a half-track machine, but in addition to its three half-track heads (erase, record and play) it has a quarter-track play head for reproducing quarter-track tapes too. A closed-loop, dual-capstan drive system is employed. The transport uses three motors, the capstan-drive being AC servo-controlled. Transport function buttons are "logic controlled" for fast-buttoning. Tape speeds are 15 and 7½ inches-per-

second, and the deck accepts reels up to the NAB hub-size (10½-inch reels).

Transport functions and controls occupy the larger upper chassis plate while meters and electronic controls are arranged on a separate section below. The tape threads past tension arms and shut-off switches, guides, and so on, with the two capstans and their pinch-rollers located symmetrically below the head assembly. The cover of the head assembly is hinged for

lifting to gain access to the heads for cleaning, degaussing, etc., as needed. The 2 track/4 track play head selector is on the cover. "Tape searching" is possible during rewind or fast-forward by depressing the pause button and gently pushing the pinch-rollers against the heads.

Below the heads at the extreme left is the machine's power off/on switch. Next come three controls for reel-size, tape-speed and use of an optional timer, respectively. Transport function buttons are grouped toward the right and include record, rewind, stop, forward, fast-forward and pause. Above the last two buttons is the four-digit tape index counter and its reset button.

A pair of VU meters dominate the right-hand portion of the electronic panel. They are illuminated when power is turned on and they may be switched (via a monitor switch) to read either recording or playback levels. Calibration is from -20 to +3 on each meter, with zero VU (on playback) corresponding to a signal level of 0.435 volt. To the right of the meters are two dual-concentric control knobs for recording level; the first handling microphone and the second, line signals. In each, the outer knob governs the left channel; the inner knob, the right channel. Input mixing of mic and line signals is possible, and the recommended procedure (using headphones and the VU meters to monitor) is explained in the owner's manual. To the right of these controls is the tape/source monitor button.

At the extreme lower left of the panel is a low-impedance stereo headphone output jack. Next to it are two low-Z mic jacks (left and right channels), and an associated mic attenuator switch with three positions (zero, which provides no attenuation, and -15 and -30 dB).

Tape selection (for recording) is handled by two individual switches for bias and EQ. Each switch has three positions, so that a total of nine possible combinations is afforded. The owner's manual lists recommended settings for several well-known brands and types of recording tape. Adjacent to the tape selector switches are two recording-mode buttons, one per channel; above each is a small lamp that glows on and off when its button is activated. The playback level controls, at the extreme lower right are a dual-concentric pair with the outer knob handling the left channel and the inner knob, the right channel. The knobs adjust output level for both line and headphone jacks simultaneously.

At the rear are the line in and line out jacks, standard "hi fi" pin-jack connectors. Also here are the socket for a remote-control unit, the recorder's AC line cord and a convenience outlet (unswitched). The loca-

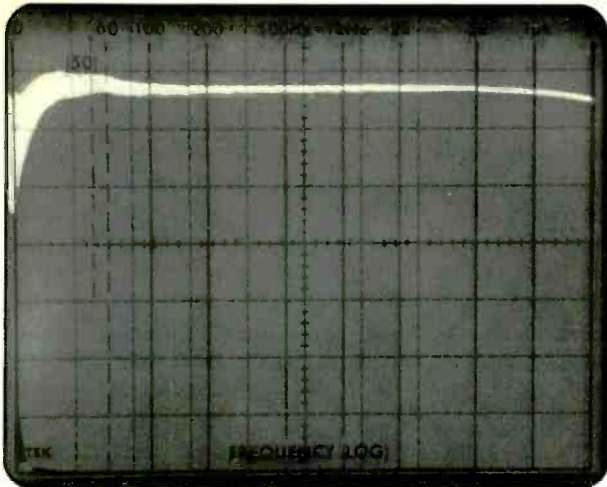
tion of these connections and the lack of any "bumpers" or "feet" on this side of the machine suggest that the TC-766-2 be installed vertically.

Supplied with the recorder is the RM-30 remote control accessory which duplicates all transport functions and adds one more, that of "record muting" which may be used to deactivate the recording head without stopping tape motion, useful in eliminating unwanted material from off-the-air recordings, and so on. Also supplied with the machine are two 10½-inch reels, one loaded with 3600 feet of Sony SLH-180-36 tape and accompanied with a little plastic add-on strip called an "easy threader." Sony also supplies two pairs of signal cables and a length of head-cleaning ribbon.



Sony TC-766-2: Frontal view.

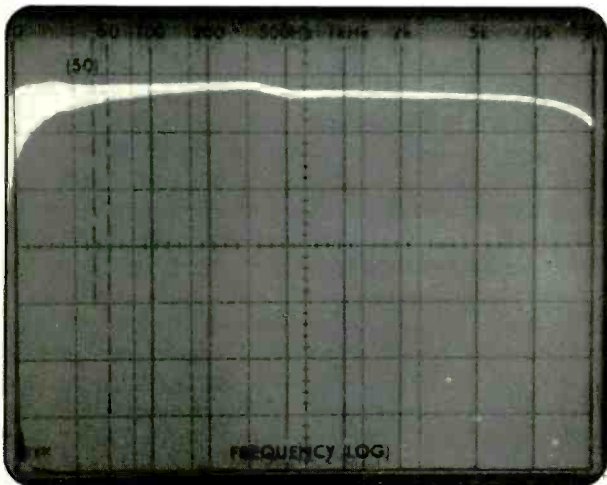
The owner's manual is comprehensive and well-presented; it includes details on normal recording and playback operations plus instructions for timer-activated record and playback; record-muting; mic-and-line mixing; sound-on-sound recording; echo recording; editing (by duplication and by cueing and splicing); and a few maintenance hints. Styling of the Sony TC-766-2 tape recorder is straightforward and functional, with the deck framed between two nicely finished wooden side pieces and resting on sturdy "feet" in the vertical attitude.



Sony TC-766-2: Record/play response using Sony SLH tape at 15 ips.

Test Results: MR tested the Sony TC-766-2 with the Sony SLH tape supplied. MR notes that for such popular tapes as Scotch 211, 212 and 213 and Ampex 406 and 407, the EQ switch should be set to what Sony calls its Fe-Cr (ferrichrome) EQ setting, even though none of these tapes is actually a ferrichrome formulation. In any event, MR feels that of the nine available EQ and bias combinations, one is sure to provide a good compromise between distortion and frequency response for just about any high quality tape currently available.

Except for a few minor differences, the TC-766-2 either met or exceeded its published specifications. The "differences" have to do with frequency response.

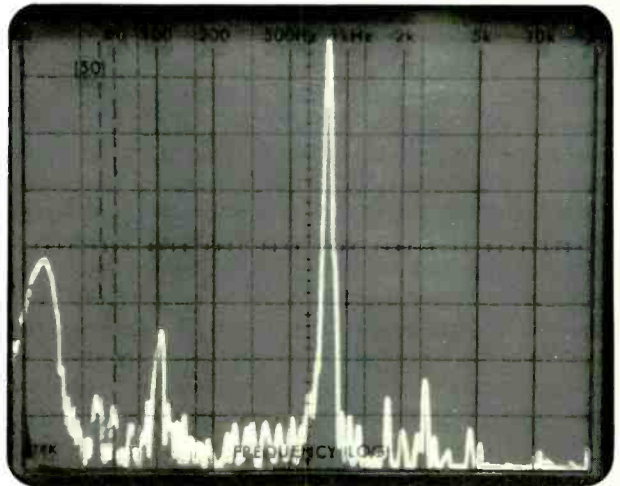


Sony TC-766-2: Record/play response using Sony SLH tape at 7 1/2 ips.

The accompanying 'scope displays show response at both speeds. At the higher speed, response was down 3 dB at 28 kHz. Sony claims response within ± 3 dB from 30 Hz to 30 kHz for this tape at 15 ips. The small

discrepancy between our results and this claim, while not terribly important, probably arose from the "plus and minus" notation rather than from anything amiss in the recorder. That is to say, if we shifted our reference points so that the truly "flat" portion of the curve was nominally at ± 3 dB (arbitrary reference), the -3 dB point would actually occur a bit beyond 30 kHz. This, of course, would be a bit of "spec manipulation" and we prefer, as always, to quote the -3 dB point with reference to a 1-kHz test signal which is considered to be our "zero dB reference."

In the case of the 7 1/2-ips record/play response, however, the difference between our results and the claimed response is too great to be excused by the above reasoning, although even here we could "stretch the point" and report that the response did extend to 20 kHz, using the "plus or minus" 3 dB approach instead of the -3 dB referred-to-1 kHz approach. In all



Sony TC-766-2: Spectrum analysis of 1 kHz playback signal recorded at "0" dB.

events, the ultimate significance of a dB or two at the upper limit of hearing, or beyond that, may well be something the individual prospective buyer has to judge for himself.

More certain are the excellent results obtained in other performance areas, including lower wow and flutter than spec'd; lower distortion; and an ample signal headroom of +10 dB before hitting the 3% THD mark. At this impressive level, signal-to-noise ratio was excellent at 63 dB. For zero-dB recording level, our analyzer read THD of 0.38% at mid-frequencies; as we have often stated, "single readings" of THD on a tape deck can be misleading since wide-band noise often elevates such readings. We analyzed the distortion components produced during playback of a 1-kHz signal (recorded at zero dB at 15 ips). Results are shown in the 'scope photo of the spectrum analysis, with the 1-kHz signal displayed at the center of the sweep, and the second and third harmonic components seen to the right of the fundamental. The dominant third harmonic contribution was down some 60 dB,

thus amounting to no more than 0.1% distortion.

The mechanical transport system—with its three motors and dual-capstan arrangement—operated beautifully and smoothly, and with very low wow and flutter. Precision “rocking” afforded by the solenoid-operated fast-forward and rewind buttons are commendable. The only thing here that bothered us somewhat was the relatively long time (three minutes) to rewind the full 3600-foot reel.

General Info: Dimensions are 20½ inches high; 17½ inches wide; 9¼ inches deep including projecting parts and controls. Weight is 58 lbs., 7 oz. Suggested retail price: \$1079.95.

Joint Comment by L.F. and N.E.: The Sony TC-766-2 represents yet another example of how close a non-professional deck can come to a true studio machine. Its half-track format makes it very usable for final mix-downs, and with somewhat better S/N capability than would be likely in a 4-track format. Of course, as a fillip to those who already own 4-track tapes, the added quarter-track play head is provided. Among the “pro” touches on the TC-766-2 we especially liked are the individual track “record-ready” buttons (and their flashing lights), the ability to “punch-

in” and to edit or re-record during playback at precisely cued points on a tape, and—to be sure—the remote-control accessory which, for a welcome change, is supplied with the machine initially instead of being offered at added cost. The “record edit” option on this accessory is a handy feature (why wasn’t it included also on the main deck?). All told, at its advertised price, the TC-766-2 strikes us as an extremely good buy, one that merits consideration by serious recording enthusiasts and possibly too as a backup unit for a small studio.

SONY TC-766-2 TAPE RECORDER: Vital Statistics

PERFORMANCE CHARACTERISTIC	LAB MEASUREMENT
Record/playback frequency response	
15 ips	± 3 dB, 24 Hz to 28 kHz
7½ ips	± 3 dB, 21 Hz to 17 kHz
Harmonic distortion, 15 ips	0.38% at 0 VU 0.58% at +3 VU
Recording level for max 3% THD	+10 dB
Best S/N ratio	63 dB (SLH tape, re: +10 dB)
Input sensitivity, line	50 mV
mic	0.2 mV
Output level, line	0.70 V (controls at “10”)
headphone	65 mV (8 ohms)
Bias frequency	160 kHz
Erase ratio	86 dB
Wow and flutter, 15 ips	0.010% WRMS; 0.025% unweighted
7½ ips	0.030% WRMS; 0.045% unweighted
Rewind time	180 seconds, 3600-ft reel

CIRCLE 10 ON READER SERVICE CARD

Spectro Acoustics Model 101B Preamp/Equalizer



General Description: The model 101B from Spectro Acoustics Inc. is a stereo system preamp-control unit that combines a five-band equalizer with a versatile pushbutton function-selector. The equalization is evenly spaced in five bands across the spectrum by means of five sliders each of which covers a nominal range of plus or minus 15 dB from the indicated flat (zero) position. The bands extend within the frequency groupings delineated by the front-panel markings: 20 Hz, 80 Hz, 320 Hz, 1250 Hz, 5 kHz and 20 kHz. They thus are 2-octave segments, and are labeled low bass, mid-bass, midrange, mid-treble and high treble. Each slider handles both stereo channels simultaneously.

Two more sliders are used for adjusting left and right channel levels independently; they serve as both overall volume controls and channel balance controls.

The function selector consists of a row of ten push-buttons. First is a mode switch (in for mono; out for stereo). The next two are for equalizer in or out, and for tape or line. They thus can insert or remove the EQ from the circuit, and also insert the EQ into the main outputs or the tape-feed outputs. The next two buttons are for monitor of tape 1 or tape 2; the next two buttons are for recording, including a copy option; the final three buttons select input source material (phono, tuner, auxiliary). The phono input is a standard RIAA-

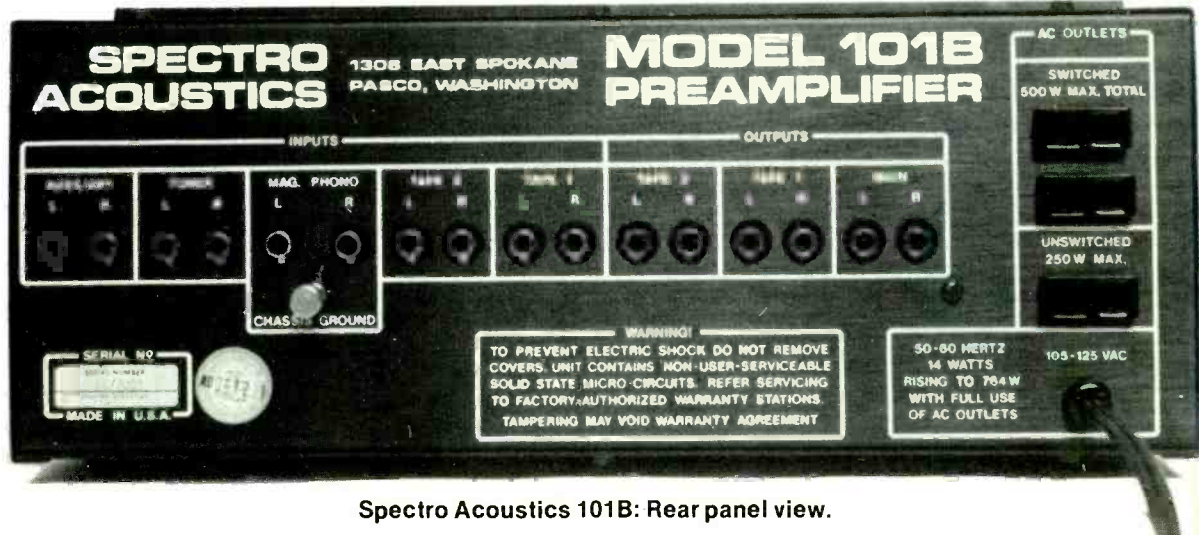
equalized circuit suitable for magnetic pickups. The instructions furnished for using this function selector are quite detailed and include valuable hints on recording and monitoring.

The front panel also contains the device's power off/on switch, and a headphone jack for use with "sensitive high impedance phones" and which turns off the main outputs when in use.

The rear of the 101B contains stereo pairs of input jacks for signal sources designated as aux, tuner,

cutoff filters if desired to eliminate rumble and hiss respectively.

Test Results: In MR's tests, most of the published specs for the 101B were confirmed or bettered, and the unit was judged to perform very much "as advertised." Our tests of the equalizer sliders did not produce an exact match of the idealized pattern shown in the accompanying instruction manual (see attached



Spectro Acoustics 101B: Rear panel view.

magnetic phono, tape 2 and tape 1. Stereo output pairs are provided for tape 2, tape 1 and main. At the rear there also are a grounding post, the AC power cord, one switched outlet and two unswitched outlets.

Internally, the 101B incorporates glass epoxy plug-together circuit boards. The outputs are claimed to be fully buffered low-impedance drive-points capable of driving up to a dozen typical power amps or tape machines simultaneously if necessary with no increase in distortion or loss of low-end response. Inputs are high impedance direct-coupled lines for compatibility with all of today's stereo devices. The equalizer section itself is said to be based on Spectro Acoustics gyrator synthesis techniques similar to those used in their model 210 graphic equalizer (see report in MR, August 1977) and designed to completely eliminate hum and distortion from the EQ circuitry. Maximum flexibility from the five-band design is claimed to result from the filter response parameters and center frequencies. The phono stage design uses operational amplifiers and accurate, stable RIAA EQ components with total isolation between the feedback loop and the cartridge-loading components, preventing interaction and non-linear loading for accurate pickup response and increased definition of high frequencies.

Turn-on and turn-off are silent and thump-free, and there is a brief warmup period on initial turn-on.

The end bands (low bass and high treble) are "shelved" instead of being peaked like the three center bands. This design permits using the end sliders as

'scope photo) but the action was deemed close enough to the ± 15 dB limits and certainly useful for the device's intended applications.

Noise was well down at -73 dB on phono input, and -94 dB on the high-level inputs. Distortion was consistently lower than the 0.05% claimed. RIAA equalization was accurate to within plus or minus 0.5 dB across the band. Overall high-level frequency response was very linear, being within plus or minus 0.1 dB from 10 Hz to 60 kHz. Our test sample clipped at an output of 10.5 volts (better than the 9 volts claimed). For normal operation within specs, the rated output of 2 volts was confirmed as being correct.

Although the EQ sliders operate over a continuous travel with no defined or detented center position other than the zero markings, the user can "eyeball" the sliders and come up with a genuinely flat response if desired.

Internal examination of the 101B indicated an extremely high order of workmanship, with precision circuit-board layouts and a minimum of intercomponent wiring. The power transformer is about as far from the sensitive phono circuits as it could be and still remain on the chassis, and this painstaking design approach proved its value in both measurements and listening tests in terms of extremely quiet, hum-free performance.

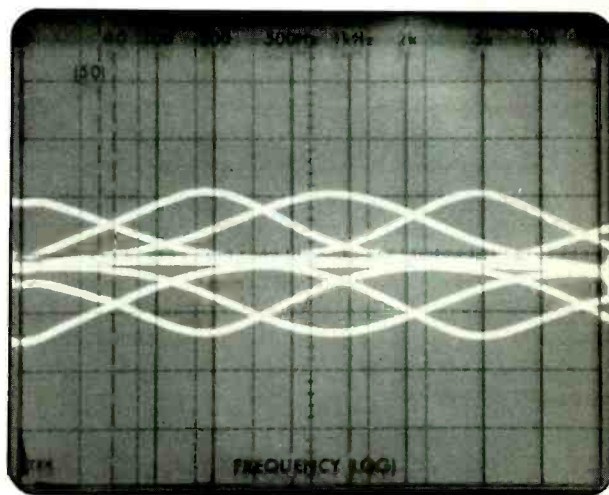
All told, MR feels that at its price, the 101B offers above-average versatility and performance as a stereo preamp-control-equalizer.

General Info: Front panel dimensions are 15 by 6 inches. Depth behind front panel, about 5¼ inches (less connectors). Overall depth, about 5½ inches. Height, less panel, 5½ inches; with panel, 6 inches. Weight, 10 pounds. Suggested retail price: \$335.

Individual Comment by N.E.: In terms of product styling and user handling, the 101B seems to occupy a place somewhere between the typical home or consumer hi-fi type of preamp and the more advanced, complex professional type of gear. Its general appearance is somewhat "plain Jane" and it looks like no conventional preamp-control I know of. Be that as it may, it is an unimpeachable performer, an audio device that gives you a feeling of confidence in that pressing its buttons or moving its sliders will accomplish the audio results you expect. Obviously, the manufacturer has gone after high performance and versatility, and has virtually ignored conventional cosmetics. For instance, with the 101B you can, if you wish, equalize the output of the preamp at the record-feed (out) terminals in contrast to most consumer preamps which invariably bring out the tape-feed signal before tonal compensation. And the end EQ bands can double-in-brass as low and high filters if desired. Of course, five EQ

bass, and midrange bands use gyrator inductors; coils are found only for the upper two bands where they will not cause saturation or any significant pickup of hum or noise.

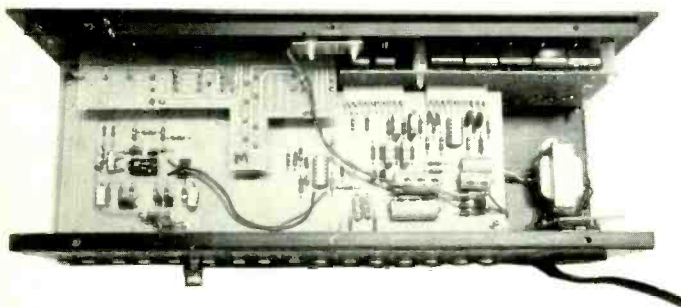
While the 101B is hardly a cosmetic coup, its front



Spectro Acoustics 101B: 'Scope photo showing range of control of each equalization "slider."

panel does have a very sensible layout, designed to accomplish a great deal of switching and control flexibility at minimum cost. For instance, the dual sliders used for gain control can be moved up or down with one finger to establish overall output level, or you can treat them as individual controls which eliminate the need for a separate channel balance control.

Technically speaking, in any event, the inside of the 101B is a "thing of beauty" in terms of the parts employed and the manner in which they are laid out and assembled. In all, while the 101B may not qualify as fully professional gear, I can see it as being of interest to a good many home-recording enthusiasts—advanced hobbyists or "semi pros"—who want a low-cost, reliable unit to augment their recording efforts and also to provide a control center for a first-rate listening setup.



Spectro Acoustics 101B: Internal view.

bands across the full audio spectrum, and operating on both channels simultaneously instead of separately represents some kind of compromise—but at its price of \$335 my guess is that a lot of sound buffs will accept that compromise. Those demanding more will have to spend more to get it.

Individual Comment by L.F.: Call it an "ugly duckling" if you must, and surmise that perhaps Spectro Acoustics ought to enlist the help of an industrial designer to restyle that rather stark-looking black-and-white front panel, but regardless of what anyone thinks about its exterior, the 101B is a real winner as far as performance and features are concerned. Of course you cannot do as precise a job of graphic equalizing with a five-band device as you can do with an octave-by-octave model or one that is even more segmented than that, but keep in mind that the 101B's relatively low cost gets you a combination preamp and equalizer. Noteworthy too is the fact that the low, mid-

SPECTRO ACOUSTICS 101B PREAMP-EQUALIZER: Vital Statistics

PERFORMANCE CHARACTERISTIC	LAB MEASUREMENT
Input sensitivity, phono	4.6 mV
Input sensitivity, aux, tuner, or tape	460 mV
Phono overload	100 mV
Hum and noise, phono	-73 dB 9 (re: 10 mV)
Hum and noise, aux, tuner, tape	-94 dB (re: 2 V out)
THD at rated output (2 V)	0.01% at 1 kHz 0.03% at 20 Hz and 20 kHz
IM at rated output (2V)	0.0037%
Rated output	2V confirmed
RIAA accuracy	± 0.5 dB
High-level frequency response	± 0.1 dB, 10 Hz to 60 kHz
Max output at clipping	10.5 V (10 K ohm load)
High and low filter action	See text and illustration

CIRCLE 6 ON READER SERVICE CARD

Orban/Parasound Model 111B Reverberation Unit



General Description: Orban/Parasound's model 111B is a dual (stereo) reverberation device using a spring system and suitable for use with or without mixing consoles having an echo send/echo return system. In the former application, the main outputs of the 111B, which carry the reverberated signal only, are used. However, the device also has auxiliary outputs that carry the input signal plus the reverb signal, and these outputs may be used to insert the 111B in a program line to add controlled amounts of reverberation.

Dimensioned for rack-mounting, the unit's front panel contains identical arrays of controls for left and right channels. At left, for each channel, is a limiting threshold switch to select "fixed" or "floating" with an LED indicator above it to show peaks when in the "floating" position. This is the recommended setting for an optimum combination of low noise and protection from the effects of "spring twang" as explained in the instruction manual. In the "fixed" position of the switch, the floating threshold is defeated but the limiter still serves to protect the spring from distortion due to excessive input drive.

Next there is a dual-concentric attenuator control, marked from 0 to 10, with the outer knob and the inner knob regulating output and input signals respectively. A bass EQ knob is next and is marked from -12

ing to an indicated broader band. Also on the front panel are the unit's power off/on switch and associated pilot lamp. Styling of the reverberation unit is in subdued blue with white markings.

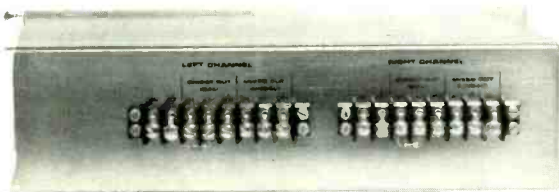
The rear of the 111B contains all the signal inputs and outputs. These are arranged as screws on two terminal boards, one for each channel. Input screws are marked for "in" and ground. The direct-out (balanced output) is arranged on three screws: hot, system ground, chassis ground. The mixed output (unbalanced) also has three such screw markings. The rear also contains the unit's AC line cord (fitted with a three-prong or grounding plug), and a fuse holder.

The 111B is intended to provide early reflections and reverberation only, via its internal spring elements which are driven by the direct sound provided by an external program source.

The 111B can be wired to operate on 105-125 volts or on 210-250 volts AC, 50-60 Hz.

Test Results: Except for a 6-dB discrepancy in S/N ratio (MR measured 70 dB as compared to the spec'd 76 dB), our lab tests confirmed or bettered published specifications for the model 111B reverb device. On S/N, by the way, MR notes that Orban suggests measuring signal-to-noise ratio by using a 400-Hz high-pass filter with an 18-dB/octave rolloff, and a similar low-pass filter that lops off everything above 20 kHz. MR has no quarrel with the latter of these filter recommendations, but takes exception to the use of the high-pass filter with a 400-Hz cutoff because "of hum and low-frequency microphonics (to which the ear is relatively insensitive)." What Orban is really trying to say, in our view, is that spring reverb units just can't deliver the kind of S/N and hum ratios that tape units or fully electronic units can deliver. In any event, so as not to be comparing "apples and pears," MR followed these recommendations but could not reach the 76-dB S/N claimed.

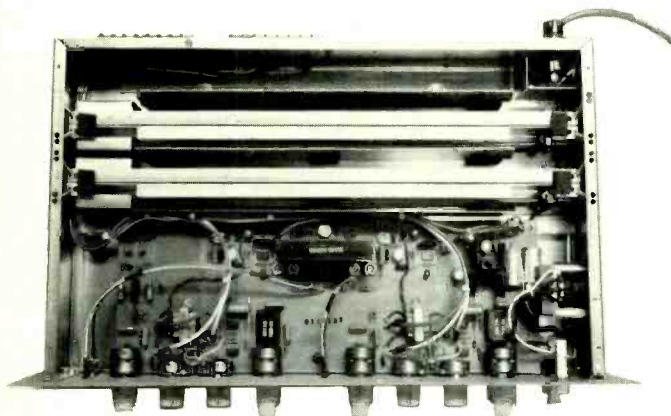
However, on all other performance counts, the device performed very much as claimed, and impressed MR as being capable of doing its intended job very satisfactorily, and apparently with having solved



Orban/Parasound 111B: Partial rear panel view.

through 0 to +12 in increments of 2 (dB). The third knob is similarly designed for midrange EQ, while the fourth dual-concentric pair handle tuning (outer knob) and bandwidth (inner knob) over the midrange. Indicated tuning frequencies are 1.6, 2, 2.5, 3.2, 4, and 5 kHz. Bandwidth markings range from 0 to 10, with the zero marking corresponding to an indicated narrow band, almost a spike, and the 10 marking correspond-

many of the problems normally associated with spring-reverb systems. For one thing, the usual "spring twang" effect has been minimized by what appears to be almost "brute force" techniques. Four springs are used for each of the two channels, and since no two springs are tuned to exactly the same self-resonant frequency, this "averaging effect" tends to offset the usual unpleasant coloration normally encountered with such units. In addition, the 111B has a sophisticated "floating threshold" limiter which, of course, should be used correctly, and that means careful setting of both the input and the output controls. The limiter circuit (evidently a complex one) is encapsulated as a module on the circuit board just in front of the suspended springs. The floating threshold feature can be defeated, but even in the "fixed" mode we found that the limiter still protects against overdriving of the springs and so protects against the creation of unnatural sound effects. The bass and midrange EQ controls and their associated circuits enable the user to come up with an enormous variety of reverb effects, some of which will seem more "natural sounding" than others. For this reason, a fair amount of experimentation with these controls is probably a good idea for the user of the device, and it may also be helpful to keep a log of control settings for various effects that one



Orban/Parasound 111B: Multiple springs (four per channel) mounted at rear of chassis. Limiter module appears just below, in sealed block.

might want to repeat later.

In terms of functional flexibility, it is to the device's credit that it does provide a mixed output (direct feed-through of primary signals as well as the spring-reverbered signals). It also is possible to vary indirectly the proportions in the mix by careful balancing between input and output level controls (assuming of course there is ample gain elsewhere in the system to get overall sound output up to desired levels).

General Info: Dimensions: 19 inches wide (rack-mount); 3½ inches high; 12 inches deep. Weight is 11.5 pounds. Suggested retail price: \$695. Owner's manual: complete; obviously aimed at the professional or advanced audio-hobbyist.

Individual Comment by L.F.: Ordinarily I am turned off by spring-reverb units. These days, with highly effective tape-loop techniques, and even fully-electronic time-delay units coming down in price, it seems a bit archaic to resort to springs to produce what is at best a somewhat uncontrolled kind of reverberation field to augment "dry" recording channels. While the 111B we tested has not changed my basic opinion on this subject, I must admit that Orban/Parasound Associates have managed to solve many of the problems normally associated with such devices. The spring-twang effect has been greatly reduced; the floating threshold and fixed threshold options work as intended; the EQ controls afford a great deal of versatility.

I recognize that if all of the secondary functions of this device (equalization, the special limiter, the circuitry needed to attenuate the unnatural decay time caused by the spring's favoring frequencies around 300 Hz, etc.) were excluded, and only the spring-driver amplifiers and pickup amplifiers had been included, Orban could have produced a far less costly unit. All of these special tailoring and compensating circuits are built into the 111B so that a good deal of electronics has been added to what starts out as essentially a mechanical reverb device. The aim, obviously, is to make the resultant reverb sound "as good" as that which might have been obtained using tape loops or fully electronic delay techniques.

Individual Comment by N.E.: I have mixed feelings about the 111B since, like my colleague, I am not especially enamored of spring-reverb systems. However, it must be conceded that the 111B represents a very high level of refinement (via electronics to be sure) of the spring system. The device does work well and appears to be carefully built. It is very hard to generalize these days about prices, but the price of the 111B may not be out of line vis-a-vis what you might have to pay for equally good reverb devices employing alternate systems. This price position, however, may not hold for long if the all-electronic reverb and time-delay units continue to make the big strides they have been making recently.

ORBAN/PARASOUND MODEL 111B REVERBERATION UNIT: Vital Statistics

PERFORMANCE CHARACTERISTIC	LAB MEASUREMENT
Number of channels	2
Reverberation element	4 springs per channel
Delay time, first reflection	25 to 35 millisecond (frequency dependent)
Input level range	-30 to +6 dBm
Input impedance	10 K ohms, unbalanced
Maximum output level	+22 dBm
Output impedance 2	600 ohms, transformer
Bass EQ turnover and range	500 Hz; ± 12 dB
Midrange peak frequency	1.3 to 6.0 kHz
Midrange EQ range	+10, -13 dB
Bandwidth Q range	0.5 to 5.0
S/N (weighted)	70 dB
Power requirements	8 watts

CIRCLE 2 ON READER SERVICE CARD



Gallen-Krueger 1000-1S and 1000-1SB Power Amplifiers

By Jim Ford and Brian Roth

General Description: Most power amplifiers were originally designed for the relatively easy task of home music reproduction. However, in recent years, several manufacturers have been producing power amps specifically for sound reinforcement applications. The Gallien-Krueger Models 1000-1S and 1000-1SB fit into this latter category.

Both amplifiers are basically the same unit with the exception of the inclusion of an active (electronic) crossover in the 1000-1SB. We had both units available for testing.

The power rating of the amplifiers is 200 watts RMS per channel with a 4-ohm load and 125 watts RMS per channel with an 8-ohm load.

The front panel, identical on both models, contains a pair of meters marked with a VU-type scale, a pair of input volume controls, a pair of "clipping" indicator LEDs, a pair of "overload" indicators and the usual power switch and power lamp.

The "clipping" lamps will illuminate when the amplifier is overdriven by an excessive input signal, while the "overload" lamps will flash if an excessively low impedance speaker load (or a short circuit) is connected to the amplifier's output.

Loudspeaker protection is handled by a "crowbar" type circuit that trips the circuit breaker if excessive DC (direct current) due to a malfunction appears at the output.

The side panels of both models are cast aluminum and they serve as the heat sinks for the power trans-



sistors. Also, the side panels extend to the front of the unit where they form a pair of heavy-duty carrying handles.

The rear panel provides the necessary input/output connections. Here is where the two models differ physically.



The model 1000-1S uses both a 3-pin "cannon" type audio connector and a quarter-inch phone jack for the input on each channel. "5 way" binding posts are used for the output connectors on each channel.

The model 1000-1SB (with integral electronic crossover) uses quarter-inch phone jacks for all input and output terminations. Each channel provides an input phone jack and a pair of output phone jacks for loudspeakers.

An additional phone jack applies the input signal to the active crossover circuit. The high and low frequency crossover output signals are automatically routed to channels 1 and 2 if no plugs are inserted into the channel input jacks.

A three-pin "cannon" type connector is wired to both outputs of the amplifier to allow a single cable hook-up in bi-amped systems.

Also, another pair of phone jacks provides direct access to the bass and treble outputs of the crossover to allow the crossover to drive additional amplifiers. A rocker switch selects 800 or 1200 Hz for the crossover point.

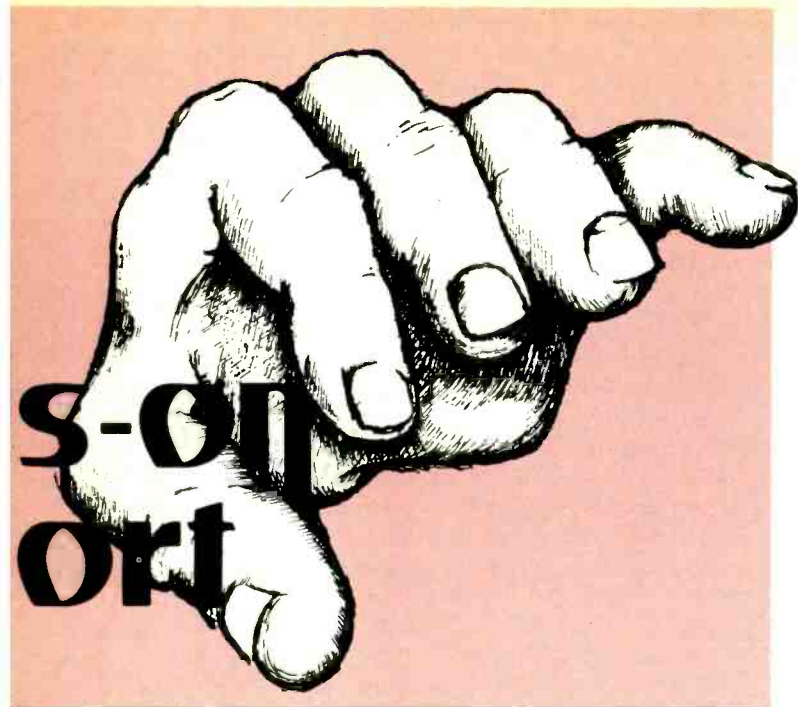
Both amplifiers include a convenience AC power outlet on the rear panel. A push-to-reset circuit breaker is also located on the rear.

Internally, the dominate feature is the large power transformer mounted on a metal strut that extends from the front to the rear panel. Also on this strut is a pair of 10,000 mfd filter capacitors and other power supply components.

Each channel's circuitry is on a large printed circuit board that is bolted to the heat sink assembly.

The manual supplied with the 1000-1S (none was supplied with the 1000-1SB model) is intended to cover both the basic amplifier and the electronic crossover model.

The information in the manual was quite vague and



sketchy. An experienced soundman would not need thorough information, but the novice would probably require more than the manual provided. A schematic diagram was included, but there were not any circuit board parts location diagrams, nor were the printed circuit boards themselves marked with component designations.

We will state that the amplifier should be easy to service. Removal of the top and bottom cover plates will allow the serviceman to have total access to all parts of the unit.

Field Test: Our first check was with the 1000-1S connected to JBL 4315 and 4343 studio monitors. The amplifier had a pretty good sound characteristic. We detected some dulling of attack transients on drums and piano. In a direct A-B comparison with three other highly respected amplifiers of similar power rating, this "dulling" was apparent. Also, the 1000-1S bass response seemed to be somewhat "mushier" or less "tight" than the other units. (This commentary is beginning to sound like one of those "golden ear" audio magazines!) Program sources with strong high-frequency content didn't sound as "airy" with the Gallien-Krueger amplifier; instead, under these circumstances the sound character became a bit projected in the high midrange region. Lest we be accused of writing nit-picking reviews like those audio "underground" quarterlies, we hasten to point out that these differences were subtle. Generally, the sound of the amplifier with full-range program was good.

The meters of the amplifier were not very helpful. Program levels that registered as low as -10 on the meter scale would cause the clipping indicators to flash. Consequently to avoid overdriving the amplifier, the input signal would have to be reduced to the point

where the meters barely moved. The owner's manual states that the meters will read "0" at clipping. Unfortunately, the calibration point of the meters is fixed and cannot be adjusted without changing the amplifier's circuit components.

We feel that every power amplifier should have a clipping indicator and Gallien-Krueger was quite wise by including this feature. We wish that the action of their indicator was more positive since short duration clipping would cause only a short, barely visible flash of the LED. A better arrangement would have been to include some type of "memory" circuit so that once the light had been tripped on by clipping it would remain illuminated for a reasonable duration.

We noticed that the two VU meters didn't track each other with identical input/output signals; one indicated a higher level than the other.

We connected the unit with a nominal 4 ohms per channel load (a double pair of JBL 4315 monitors). Under this condition, the "overload" lamp would flash, indicating that the protection circuitry was being activated. Fortunately, the protection circuitry did not produce any cracking or popping noises that many other amps produce when they are set into the protection mode.

The 4-ohm load really heated up the unit. After extended operation, the carrying handles became uncomfortably warm. This might be a hazard after a hard night's work; we can see some poor soundman emitting a yelp of pain, and the amplifier being unceremoniously dumped on the floor. We feel that a fan would be in order to keep things cool.

The fact that the amplifier became very warm plus the activation of the protection circuits with the 4-ohm load raises some philosophical questions for us. The manufacturer rates the amplifier for 4-ohm operation (in fact, the power ratings on the front and rear panels are for 4-ohm operation). Since a nominal 4-ohm load can have an actual impedance less than 4 ohms at certain frequencies, we feel that the protection circuit "trip" point should be at a lower impedance point to accommodate "real life" 4-ohm loads. Also, the heat sinking could be better, although a fan will keep the temperature under control.

In a P.A. system test of the unit, it performed quite well. Its clipping characteristic when driving woofers was very smooth. The high-end performance with horn-type transducers was close to the performance of other brands of amplifiers in our P.A. system. Since our amplifier racks have exhaust fans, heat was not a problem even at four-ohm loads, although the Gallien-Krueger unit did seem to run a bit warmer than other amplifiers in the rack. When its power rating is considered, the model 1000-1S performed very well in the P.A. system.

Lab Test: Back on the bench, both amplifiers performed well. The charts give the measured performance results. We will point out that we run all power output tests with a line voltage of 115 volts AC ($\pm 1\%$). We feel that this line voltage is more representative of

Continuous Sine Wave Power at clipping, 1 kHz

Load Impedance	1 Channel Driven	Both Channels Driven
4 ohms	200 watts RMS	185 watts RMS
8 ohms	120 watts RMS	115 watts RMS
16 ohms	68 watts RMS	64 watts RMS

Total Harmonic Distortion at various power levels and frequencies, 8 ohm loads, both channels driven

Power Output	Frequencies		
	20 Hz	1000 Hz	20 kHz
110 watts	.1%	.005%	.035%
30 watts	.03%	.006%	.02%
7.5 watts	.04%*	.008%	.018%
2 watts	.045%*	.01%	.02%

*Mainly hum pick-up

Intermodulation Distortion SMPTE method (60 Hz and 7000 Hz mixed 4:1) 8 ohm loads, both channels driven

Power Output	Intermodulation Distortion
110 watts	.009%
11 watts	.008%
1 watt	.009%

Output noise (dB levels are below 120 watts)

Test Condition	Output Noise 20 Hz - 20 kHz Unweighted
Ch. 1 Vol. Max.	950 microvolts or .11 microwatts (-90 dB)
Ch. 1 Vol. Min.	100 microvolts or .001 microwatts (-110 dB)
Ch. 2 Vol. Max.	150 microvolts or .0028 microwatts (-106 dB)
Ch. 2 Vol. Min.	160 microvolts or .0032 microwatts (-105 dB)

Crosstalk

ch. 1 driven, ch. 2 under measurement

Frequency	ch. 2 vol. min.	ch. 2 vol. max.
20 Hz	-101 dB	-103 dB
1 kHz	Below noise level	-100 dB
20 kHz	-101 dB	-90 dB

ch. 2 driven, ch. 1 under measurement

Frequency	ch. 1 vol. min.	ch. 1 vol. max.
20 Hz	-100 dB	all below
1 kHz	-106 dB	noise level
20 kHz	-104 dB	

actual conditions in the field as compared to the 120 volt (or higher) level commonly used.

We were able to really heat either amplifier with 4-ohm loads at 1/3 power (per FTC measurement method). While waiting to see if the amplifier would thermally shut down, we noticed that the schematic diagram showed no thermal sensors. We discontinued our testing and re-examined the interior of the unit to try and locate any thermal sensors. We could find none! This is not a very good situation. Although the user will never have to worry about the unit "thermaling off" under hard usage, it seems possible that the amp could overheat. Clearly, the addition of sensors on the heat sinks is necessary.

Harmonic and intermodulation distortion figures are very respectable. The figures apply to either model of the amplifier. Noise and crosstalk levels were also excellent.

The electronic crossover section of the 1000-1SB version performed extremely well. The crossover frequen-

cies were very accurate as were the 18 dB-per-octave slopes.

We were unable to confirm the published frequency response (-1 dB at 200 kHz) of the amplifiers. The response was 1 dB down at about 60 kHz with the volume control wide open. Lower settings of the volume control reduced the 1 dB down point to lower frequencies. The low frequency cut-off point was -1 dB at 4 Hz, better than spec.

Square-wave response was excellent, even with a capacitive load (2 mfd in parallel with an 8-ohm resistor). One very strange fact was noted during square-wave testing. After the amplifiers had warmed up a bit, a square-wave signal within a couple of dB of maximum output (with a 4-ohm-per-channel load) would cause the circuit breaker to trip. This would happen with any test frequency, although high-frequency square-waves would cause quicker shut-down. The amplifiers wouldn't trip off with a sine-wave signal.

On the subject of the circuit breakers, we found that the breakers couldn't be reset immediately after turning off; a two minute wait was required before the breakers' push buttons would stay "in" and reapply power. This could be a bit of a nuisance at a "live" show, particularly if the crossover outputs of a 1000-1SB were being used to drive other amplifiers. If the breaker tripped on the main amplifier (with the crossover) the entire audio chain would cease to operate until the breaker could be reset.

The meters on the 1000-1S definitely had a tracking error. There was a 1½ dB difference in the level indicated when both outputs were producing the same output level. This problem did not exist on the 1000-1SB unit.

Also, the dB indications were not correct on either unit's meters. A 10 dB drop in output level only registered as a 6 to 7 dB drop on the meters.

We generated an asymmetrical waveform to check the clipping lights and found that they would not respond to negative-going clipping. They would illuminate only on clipping on the positive portion of a waveform.

Overall, the Model 1000-1S and 1000-1SB were very respectable performers in terms of measured performance. This correlated well with the listening tests.

Conclusions: It appears that Gallien-Krueger has taken pains to create a sonically accurate amplifier. Either unit compared well with other brands, even those with a higher price per watt. The test results demonstrate that the design is basically sound.

It is therefore unfortunate that certain areas of the design did not match the sonic performance, mainly the lack of thermal sensors and the odd operation of the circuit breakers.

If care is taken to ensure plenty of air flow around the heat sinks, the performance of the unit should be satisfactory. Perhaps future production runs of the amplifiers will eliminate the problem areas and make the total performance of the units more nearly equal to their sound quality.

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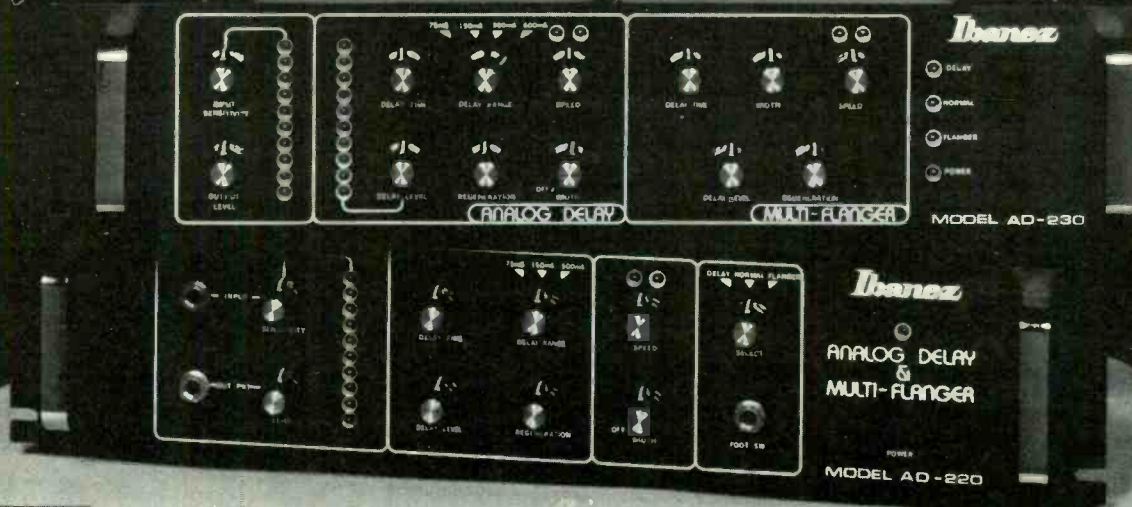
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CIRCLE 85 ON READER SERVICE CARD



GROOVE VIEWS

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

POPULAR

THE JACK BRUCE BAND: *How's Tricks*. [Bill Halverson, producer; no engineer credited; recorded at Manor Studios, England.] RSO RS 1-3021.

Performance: **Vintage Bruce**
Recording: **Everything present and accounted for**

Since the demise of Cream (which, incidentally, is reportedly reforming), Jack Bruce has done various solo albums,

formed what could have been an interesting musical relationship with Carla Bley and Mick Taylor had not his personality intervened, and more or less dropped out of sight. The Jack Bruce Band is the first group effort since the Bley/Taylor falling out. Musically the material is good, consistent and with more feeling than Bruce has exhibited in a long time. Many a Cream overtone can be heard flowing in the various tracks. If one doesn't mind his odd voice, this may be the best thing he's done since Cream.

Drums get the full treatment on this record, being deep and consistently panned when rolled, which tends to give

the impression to the listener that either the drummer or the engineer, or both, are limited in interpretation. The acoustic piano, which is also regularly featured, is quite up front in the mix and naturally reproduced, adding an interesting base from which Bruce can launch his biting vocals. What's really lacking here is some hot guitar, which may be intentional after playing with Clapton and then Taylor, for what little there is here is pretty much buried. And, as one might expect if a bassist is involved in the mixing of his own album, the bass is slightly more present than need be throughout the course of the album. The main point of the album is his vocal, which I, personally, find grating for an entire album, but is the reason we've all been assembled here today. As one would expect, everything flanks the vocal track with guitar right, drums panned, bass and keyboards fairly centered, as are all solos, producing a nice, tight stereo effect overall. *How's tricks?* Apparently, judging by this LP anyway, not bad. G.P.

JERRY JEFF WALKER: *A Man Must Carry On*. [Michael Brovsky, producer; engineer unnamed; recorded at the dance hall, Luckenbach, Texas; Pecan Street Studios, Austin, Texas; Harvest Studios, Dallas, Texas; "On The General Store Front Porch," Luckenbach, Texas; Performing Arts Center, New Orleans, Louisiana; The Music Hall, Houston, Texas; McFarland Auditorium, Dallas Texas.] MCA 2-6003.

Performance: **Boring**
Recording: **Clinical**



THE JACK BRUCE BAND: Maybe the best since Cream

A definitive encyclopedia of honky-tonk seems to have been the goal of this record, yet due to its overgeneralized, hackneyed approaches, boredom frequently surfaces.

On various tracks, we are led through the usual Texas dance hall clichés: trite



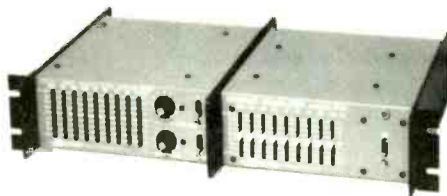
JERRY JEFF WALKER: Down the same old trail

verbiage about rodeo cowboys, hoboes, lonely ladies and trains. Not that anything is inherently wrong with such material; Dave Gilstrap's "Rodeo Cowboy" and Jerry Jeff's "Leavin' Texas" are sad laments perfect for that fourth pitcher of Lone Star Beer in some dusty tavern. Yet even though those songs are performed convincingly, with just the right amount of mix between the various country instruments of Walker's Lost Gonzo Band, an undeniably clinical feeling prevails.

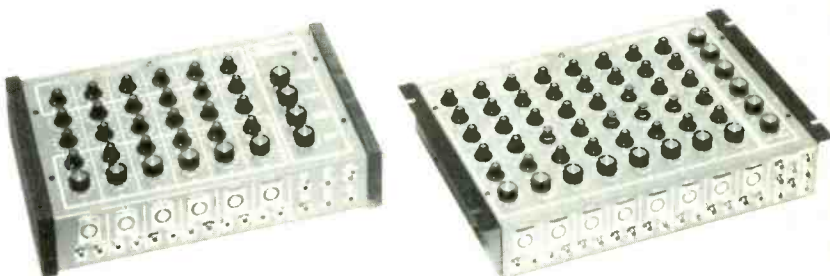
Face it folks, although Jerry Jeff has written several good songs ("Mr. Bojangles" and "That Old Time Feeling") he's just not a very prolific, or varied bard. So rather than cram four sides with his own works, he's taken to doing the compositions of his many friends. Unfortunately, most of these exude the same hackneyed references which diminish Walker's original work.

As if that weren't enough, the central direction here is occluded via the inclusion of several spoken poems, all seemingly dedicated to the memory of one Hondo Crouch, a departed buddy of Walker's. As a matter of fact, side three resembles a poetry reading with the verses read mainly by another Walker crony, hack poet Charles Quatro. Side four, recorded live at several sites

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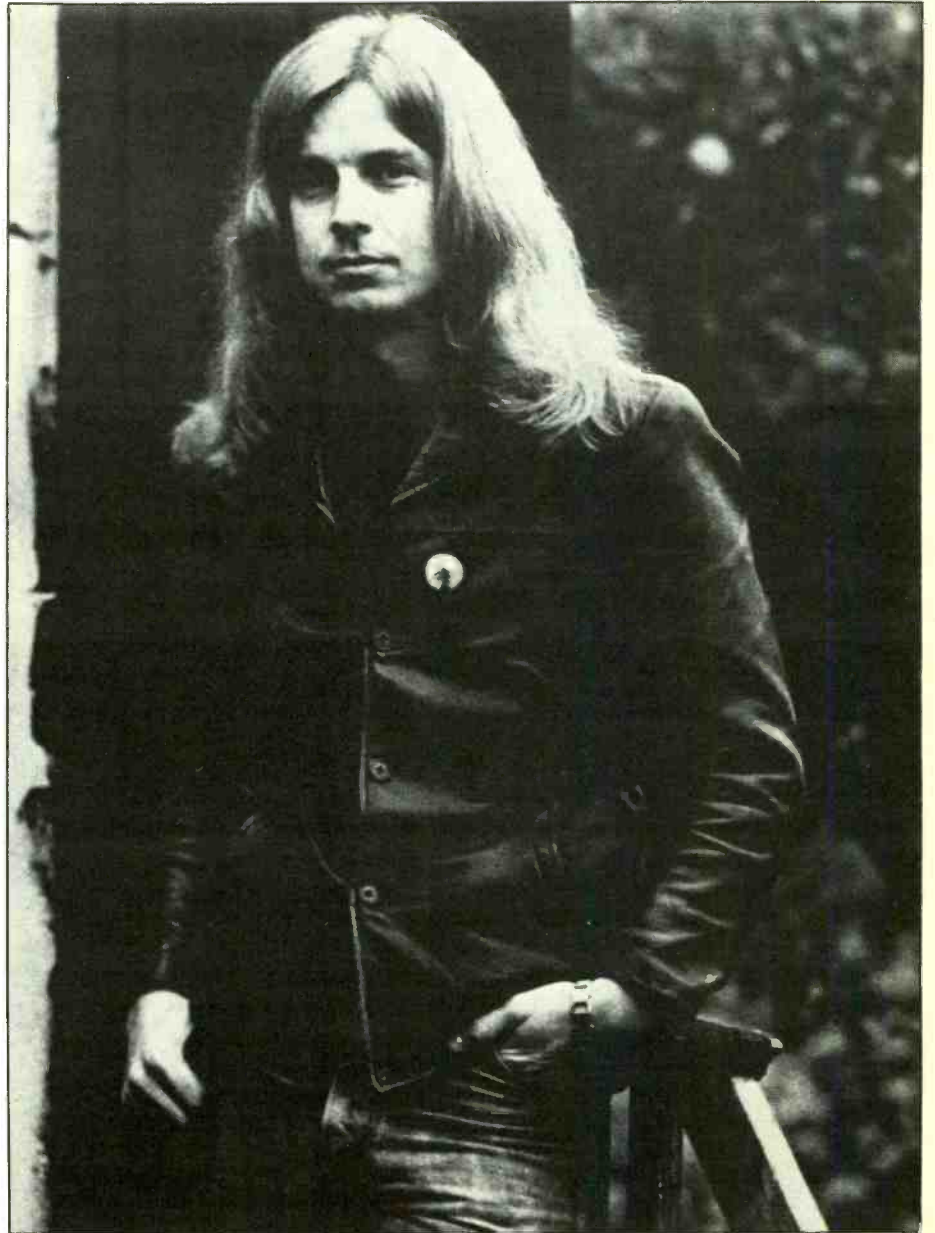
boasts the familiar "Bojangles," plus tunes by Dylan, Guy Clark and Ray Wylie Hubbard. While clinically excellent, these sides fail to convey any excitement; the recording seems to have been done right off the board, and crowd noises are muffled to the point of both brevity and inaudibility. The mix, however, is perfect, and Jerry Jeff's characteristic slurs are well-captured.

Basically though, this strikes me as an album that is quite unnecessary. Off-heard barroom laments, triple entendre

JANNE SCHAFFER: *Katharsis*. [Janne Schaffer and Lasse Samuelson, producers; Leif Mases and Leif Allansson, engineers; recorded at Marcus Studio, Europa Film Studio, Sweden.] Columbia PC 34499.

Performance: **The boy can play**
Recording: **Quite clean**

For decades American jazz critics have sneered at the ability of Europeans, or more accurately, non-Americans, to



JANNE SCHAFFER: Head and shoulders above the rest

poetic allegories worthy of eleventh-grade English classes, and restrained, time-clock "live" performances are quite effective in neutering any technological strong points which might have proved this album's saving grace. R.S.

play jazz. No American jazz musician would touch an electronic instrument until Miles Davis shoved a Fender Rhodes in front of Chick Corea. The possibilities of the combination of jazz and electronics have put the Europeans and

Scandinavians in the forefront of contemporary jazz. Known to a select few through two import solo albums, or as guitarist for Sweden's ABBA, Janne Schaffer is a wealth of talent. The fact that he's the first electric guitarist capable of changing tone considerably and in mid-run not only puts him head and shoulders above the rest, but that fact in itself should suffice as a review. Liner notes compare him to Jeff Beck, which I feel does Janne an injustice. Whereas Beck's approach to jazz is nothing more than the elimination of vocals and reliance upon the likes of Max Middleton or Jan Hammer, Janne has the emotion, interpretive ability, originality and technique lacking among most electric guitarists.

My only complaint is with the packaging, for credit is not given as to the identities of the drummer, bassist, alto horn, pianist, violinist or flutist who appear on Schaffer's first American release. This is a very clean recording. Janne's guitar is not only the center mix, but he has the entire album on his strings, for the other instruments (except for the piano on "Atlanta Inn" or the flute on "Ramsa," where they replace the guitar in the center of the mix) serve simply as background embellishments. The Rhodes is the left of the mix with the bass and drums center behind the guitar. No toying-for-toying's-sake is done on this recording, with Schaffer only overdubbing some wah-wah accompaniment on the right of the mix on "The Blue Gate" or doubling himself, left and right, on "Dimbaa Jullow." In conclusion, Janne Schaffer demonstrates through *Katharsis* his ability to stand alone as a guitarist's guitarist. G.P.

MAX WEBSTER: *High Class In Borrowed Shoes*. [Max Webster and Terry Brown, producers; engineer unlisted; recorded at Toronto Sound, Toronto, Canada.] Mercury SRM 1-1160.

Performance: **Interesting**
Recording: **Very creative**

The second album from this Canadian quartet features several twists and turns not present on their rather commonplace first effort. Little snippets of highly individualistic musical consciousness abound; so much so as to deserve both plaudits and predictions of future stardom.

The title track represents a marshalling of energy into disciplined parameters reminiscent of the best rock. The vio-

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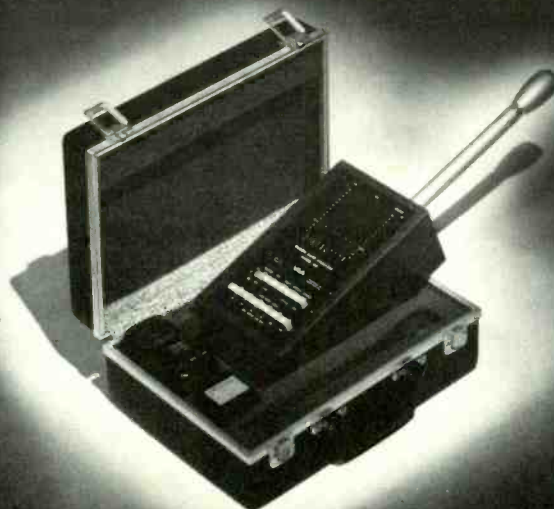
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MAX WEBSTER: Individualistic musical consciousness abounds

lent guitar aggressions of Kim Mitchell are perfectly matched by some appropriate cymbal bashing on the part of Gary McCracken, and the other two players, bassist Mike Tilka and keyboardist Terry Watkinson, respond with fancy filigrees of their own.

Conversely, the group also has their mellow side. Distinctively captured, the sparkling synthesizer and counterpoint harmonies during "Diamonds, Diamonds," speak of an almost onomatopoeic ambience, as does "Gravity," replete with Kraftwerk-type keyboard sounds.

Plaudits must go to the studio, Toronto Sound, for managing to ride herd with the many shifts present throughout this LP. The louder, more raucous tracks are captured in a raw, savage mold, and the intricate, more melodic designs have that air of spaciness about them. What more could one ask for? R.S.

FATBACK BAND: NYCNYUSA. [The Fatback Band, Gerry Thomas, producers; Anthony Bongiovi, Mike Barbiero, Liz Saron, Ramona Janquito, engineers; recorded at Mediasound Studios, N.Y.] Spring Records SP 1-6714.

Performance: **Average**
Recording: **Clean**

Another one of your non-descript, let's-boogie-down-and-disco albums, this, by the Fatback Band, offers nothing new to the listener. An eleven-piece group that includes two female backup singers and a three-piece horn sec-

tion, this conglomerate puts forth a sound not uncommon to the manufactured studio concept of disco at its heyday. Lyrics run from predictable to stupid ("Come on and do the Duke Walk"). Instrumental gimmickery is apparent,

with the tasteless use of synthesizer used to underscore an unimportant, redundant single line. However, the recording is pleasant with all instruments and vocals crisp and clear. There's a slight use of echo on the horns and vocals which adds depth to the overall track.

One of the better horn-recorded albums I've heard in many a release, the solid sound produced is one of the few highlights on this otherwise routine album. The drums add a nice counterbalance to the treble-frequenced horns, guitar and vocals, being present in a second-thoughtish way without the clashing brilliance normally bestowed upon the snare, high hat and cymbals. The vocals are perfectly centered with the rest of the mix solidly surrounding the focal point. Too bad the lyrical content also make it the weakest point. Kudos go to the four engineers who gave life to a rather dying sound. G.P.

THE TUBES: Now. [John Anthony, producer; Don Wood, Jim Sintetus, David Raeder, John Henning, Mike Beiriger, W.S. Richardson, engineers; recorded at His Masters Wheels and Funky Features,



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CIRCLE 46 ON READER SERVICE CARD

the revolutionaries have become classic

By Nat Hentoff

Ornette Coleman told me once that a band leader he worked for in the late 40's paid him *not* to play. The Texan's sounds had nothing to do with "music." And during a New York session in the 40's, Jo Jones, on hearing the first bars of a Cecil Taylor solo, threw his cymbal across the room in resounding disgust. But now Ornette, Cecil and their colleagues through the embattled years have become the acknowledged present masters. And their music, extended and personalized by younger players, is the foundation from which, as emulation turns to rebellion, yet another cadre of revolutionaries will emerge.

So it is that in this period we are getting, from time to time, recordings that so brilliantly distill the reigning jazz Zeitgeist as to be the classics of the 70's. In *You Can't Name Your Own Tune* (Muse), for instance, Barry Altschul, who has helped create a veritable spectrum of new percussive forms and colors, leads a combo as historic in its way as Louis Armstrong's Hot Five. Muhal Richard Abrams, a founder of the Association for the Advancement of Creative Music in Chicago, is on piano. Sam Rivers, long in the avant-garde wilderness and now a key figure on the New York loft scene, plays tenor, soprano, and flute. The bassist is the still awesome Dave Holland whose *Conference of the Birds* is an earlier classic. And representing the farther future is trombonist George Lewis who had barely learned to walk when Ornette Coleman traumatized the New York jazz community at the Five Spot in 1959.

Collectively the five are so at home with each other that the record is a paradigm of post-modern ensemble interplay of a most intricate, intriguing, and diversely emotional order. The solos are wholly authoritative, as befits a classic; and the sound quality is also a model of how engineers have changed in twenty years in terms of being able to make swiftly changing dynamics as

natural on record as they are in the air.

The second classic achievement is Black Saint's *Old and New Dreams*. Participating are four Ornette Coleman alumni—Don Cherry (pocket trumpet), Dewey Redman (tenor and musette), Charlie Haden (bass), and Eddie Blackwell (drums and gong). While much takes place that is strikingly original (Charlie Haden's lyrically insinuating *Chairman Mao*, for instance), the spirit of Ornette is leapingly evident. In a way, then, this album is a tribute to his unyielding determination through the years to prevail over the mockers among both musicians and critics.

Yet how easily assimilable this music is now, how right-sounding. Sure, there's still some mystery, as there was in Duke and Pres and Louis Armstrong. That quality—a sudden twist of texture or accent generating wholly unexpected feelings—has always been integral to jazz. But what most characterizes these performances, which are also engineered with a musician's ear, is the triumph in them. Like jazz musicians all the way back, these players have overcome seemingly impenetrable misunderstanding and mishearing. When they play now, it is for listeners who hear their own time, their own rhythms, in the music. Cherry and the others can relax some now—these progeny of Ornette and other hard travelers. And their music shows that relaxation, without there being any lessening of the urge to keep surprising themselves.

BARRY ALTSCHUL: *You Can't Name Your Own Tune*. [Michael Cuscuna and Barry Altschul, producers; Richard Alderson, engineer.] Muse MR 5124.

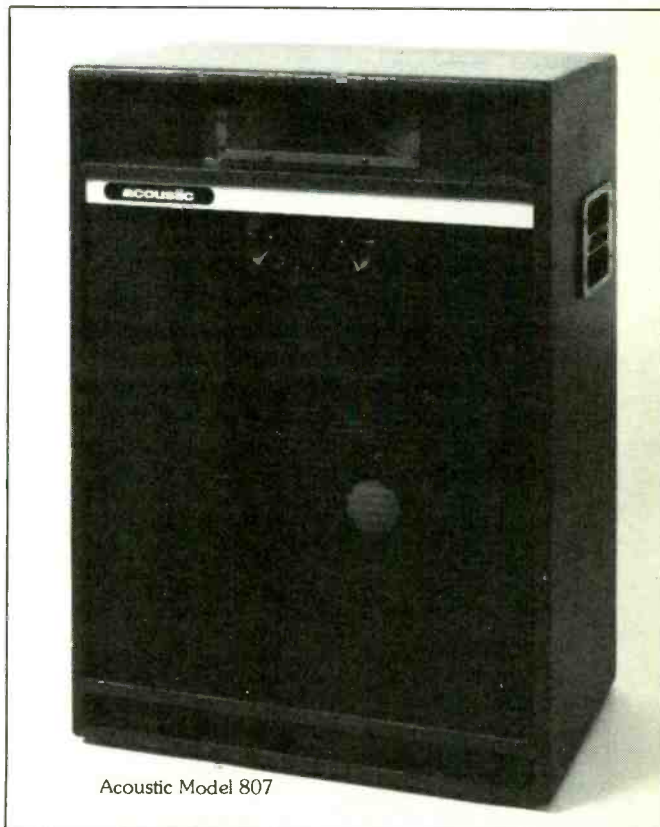
DON CHERRY, DEWEY REDMAN, CHARLIE HADEN, EDDIE BLACKWELL: *Old and New Dreams*. [Giacomo Pellicciotti and Timothy Marquand, producers; Tony May, engineer.] Black Saint BSR 0013.

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Performance: **Original**
Recording: **Cohesive**

With a change in producers from Ken Scott to John Anthony and the addition of Mingo Lewis on percussion, The Tubes roll on. Easily America's most original band since Steely Dan, The Tubes have come a long way since they were called The Nazz when they originated in Phoenix (the name later changed to The Beans when they ran across another group with Todd Rundgren called The Nazz, and finally moved to San Francisco). In comparing *Now* to its predecessor, *Young And Rich*, one can see a different approach to recording has been undertaken. While the band continues to keep its prolific lyrical stance intact, and hence their image, they have continued to broaden their horizons. This can be heard on Lewis' "God-Bird-Change," which is similar in style to things he did with Al DiMeola and succeeds in allowing the band to show some of its well-kept musicianship.

Young And Rich was recorded with the primary intent of achieving total separation between instruments. This was done by first recording the basic drum and bass tracks, with the bass taken direct. Guitars were then overdubbed with keyboards taken direct

whenever possible. The results were some of the widest and most apparent separations I have ever heard on record. The reason for this success was due in large part to the material itself, for it very easily lent itself to the track-by-track approach since the songs tended to be very spacey. In contrast, *Now* is an album of much busier material. Whereas *Young And Rich* was recorded in one studio, *Now* was completed in four with no discernible damage suffered as a result. It also was done without the extremity of separations, which gives it a livelier, more present and spontaneous sound.

The instruments, especially the guitar, tended to be more in the background on *Young And Rich*, which is not the case here. Although echoed vocals seem to have always been a standard for them, on *Now*, Fee Waybill's vocal interpretations are beginning to sound too reminiscent of David Bowie's "Young American" period. I still find their use of synthesizer very tactful, with no leaning towards the purposeless building of tracks. One interesting tune on the new album is "This Town," a social story about Hollywood. It begins with an acoustic clavinet, or harpsichord, switches to an acoustic piano which eventually gives way to a string synthesized wall of sound that's kept in the background, but is very effective. The tune is made un-ordinary in the end as only The Tubes can by having a tinny brass sec-

tion play/murder Herb Alpert's "The Lonely Bull." It's double the pun when you realize that the "A" in A&M (their label) stands for Alpert. I can't wait to see what they do next. G.P.

THE GREGG ALLMAN BAND: *Playin' Up A Storm*. [Lenny Waronker and Russ Titelman, producers; Lee Herschberg and Lloyd Clifft, engineers; recorded, mixed and mastered at Warner Bros. Studios, North Hollywood, Ca.] Capricorn CP 0181.

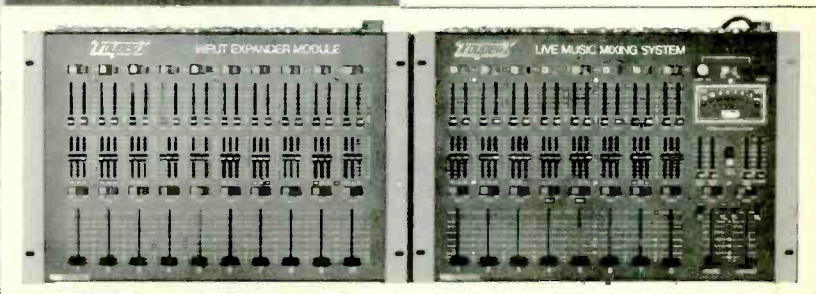
Performance: **Classy true-blues**
Recording: **Labor of love**

Because it's unabashed, soulfully honest, and extremely well-played music, and because it's a technically near-perfect recording, *Playin' Up A Storm* makes the "A" list for American music. Allman may be white, but he *knows* the blues and its many forms quite well, and the blues seasons his soul as he grows older. Likewise his band, each in his own way—bassist Willie Weeks, drummer Bill Stewart, Gregg's keyboard partner, Neil Larsen, and guitarists Ricky Hirsch, Steve Beckmeier, and John Leslie Hug. Other contributors to this well-titled album are Mac (Dr. John) Rebennack, Milt Holland, Victor Feldman, Steve Madaio, Pat Rizzo, Dave Luell, Fred Beckmeier, Bill Payne, and George "Red" Callender. All of them soak the

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GREGG ALLMAN: The blues have seasoned his soul

tracks with their own blues knowledge (considerable), as well as taking part in Allman's diverse stylizations.

The production team's talent is well-matched to the high-quality musicians and the fine songs and arrangements. Little, if anything, is missed. The use of echo and other effects is tasteful and economic. Allman's vocals are perfectly present, well-suited for recording with Neumann M249B mics. The mix has great presence and near-perfect balance, honestly representing the musicians' contributions to the moods commanded by the songs.

The album's theme is one of lost love, sometimes with hope of reconciliation, sometimes not. Each song was carefully chosen to represent a different side of Allman's soul. It's one of the blues' little ironies that pain and turmoil lead to beautiful expressions of honesty. S.P.

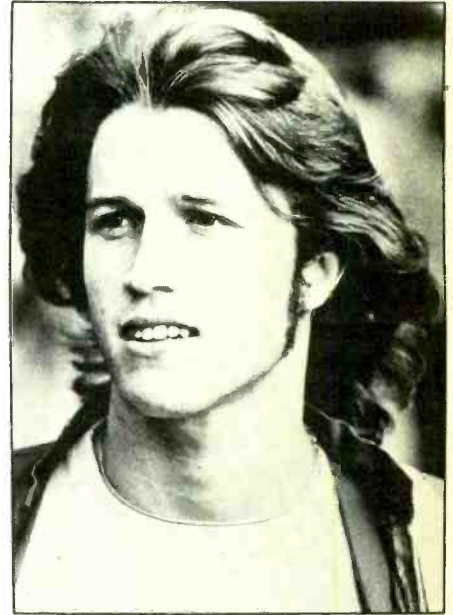
ANDY GIBB: *Flowing Rivers*. [Barry Gibb, Alby Galutin, Karl Richardson, producers; Karl Richardson, engineer; recorded at Criteria Studios, Miami, Florida.] RSO RS 1-3019.

Performance: **Adorably adept**
Recording: **Pop essence**

Andy Gibb doesn't write any Jackson Brownish paens to depth of spirit, nor does his writing reflect the increasingly rhythmic ambience of his main affiliation, the Bee Gees. Andy, the youngest of the talented Gibb clan, constructs his designs to more of a pop sensibility, managing to avoid cliches and compose memorable little tunes in the finest 45 rpm tradition.

The folk ballad Bee Gees approach which bode them so well in the late six-

ties has been buried by their producer Arif Martin, but in brother Andy, Barry keeps alive the legacy of highly choral, plaintive approaches. Accordingly, the arranging and instrumentation are purposely sparse at times; the solo guitar accompaniment which ushers in "Words and Music" reminds the auditor of Leonard Cohen. When the strings are brought in, they are not added as a



ANDY GIBB: Keeping the legacy alive

counterfeit embellishing agent, but as accentuator of a heartfelt mood.

There is within these parameters a good deal of variety as well. While the pensive, alluring "Starlight" speaks of emotive commitment, several cuts on the second side are quite country in flavor. "Flowing Rivers," through the employment of twin lead guitar lines, recalls southern rock, and the steel gui-

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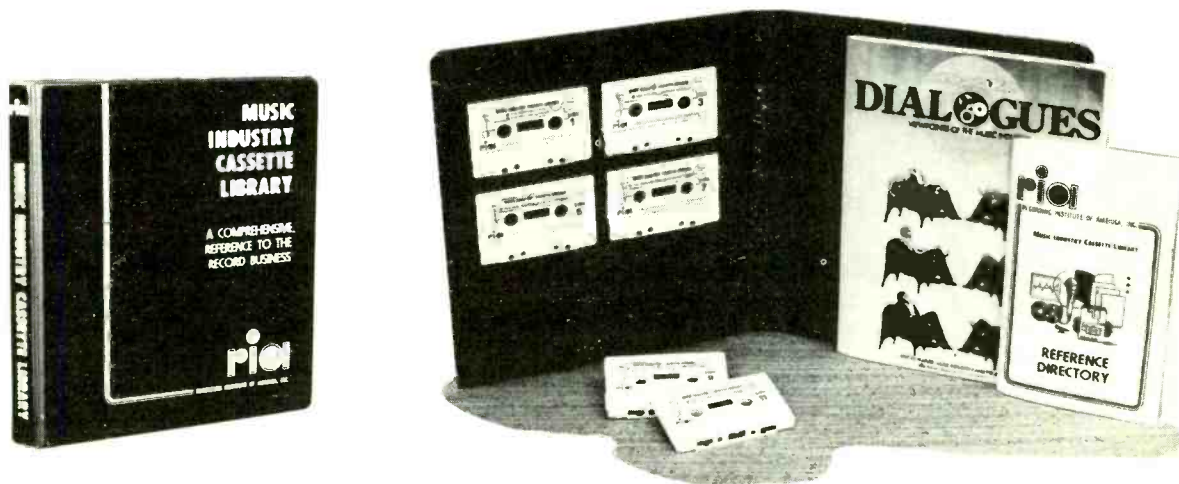
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tar of Don Buzzard on "Come Home For The Winter" would make this, if not for Gibb's telltale Australian-English accent, a legitimate candidate for the barroom jukebox.

Everything is all so perfect—not reflecting a dry predictability, but a fresh, nonchanted attitude towards production. The strings, piano, wooden guitar, drums, are all brought in at the right time, seemingly reflecting a mandate. Some call it taste, others deem it professionalism. Either adjective fits; if the parent group gave up some of their hackneyed disco funk lines and took a

lesson from little bro', they would be better off for it. R.S.

GRAHAM PARKER: *Howlin' Wind*. [Dave Robinson and Nick Lowe, producers; Michael Gardener, engineer; recorded at Eden Studios, London, U.K. and Hope and Anchor Recording Studios, London, U.K.] Mercury SRM 1-1093.

GRAHAM PARKER: *Heat Treatment*. [Robert John Lange and Nick Lowe, producers; Robert John Lange and Pete Kelsey, engineers; recorded at Rock-

field Studios, Monmouth South Wales.] Mercury SRM 1-1117

Performance: **Stunning**
Recording: **Captivatingly sparse**

These albums are not new—reams of type have been devoted to their praises.



GRAHAM PARKER: Effective subtlety

Yet to these ears, the plaudits have not been complete.

The mail for last week alone has brought nigh thirty rock albums, all seemingly clones of each other. The vocals have been delivered with banshee-like conviction, each guitarist seems to want to play faster than the one before him. In a word: noise. Yet once in a while, a record or a singer will come along that understands subtlety; realizing that the shouted statement is often not as effective as one delivered with a snicker, with a sense of theatre and pacing rather than with a decrepitly tiresome boogie ambience.

Graham Parker is such a vocalist. *Howlin' Wind*, his first LP, is full of passionate, literary masterpieces, delivered sparsely by an excellent band. Via production techniques which should be more common, many of these tunes stand "naked." On "Nothing's Gonna Pull Us Apart," the guitar is delivered with an economical stance, chord blocks being substituted for counterfeit bragadocio. The same effect is brought out on the title cut, "Howlin' Wind" with an organ, simply yet evocatively imitating the wind. Rick Wakeman should learn some lessons in taste from Graham's backup band, Rumour, and especially his Hammond-minder, the fantastic Bob Andrews.

Heat Treatment, the more recent of these two issues, does indeed reflect a

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more sophisticated production attitude, but is just as good a record. The brass backing on the title track is one of the better utilizations of horns on a rock record in recent memory. On this album, Parker's sense as a lyricist shows developing sophistication—the Springsteenish allegories of "That's What They All Say" strike the mind.

In borrowing from several time periods, Parker has shown fealty to the essence of rock. The quivering guitar of "Pour-in' It All Out" is vintage Eddie Cochran; the "wah-ooo" choruses of "Back Door Love" are a hybrid mixture of fifties' acapella and rockabilly.

Seldom has a recording artist excited so many so soon. Can't wait for the next album. R.S.



WARREN VACHE: *First Time Out.*
[Bill Borden and Bucky Pizzarelli, producers; Fred Christie, engineer; recorded

November 22 and December 6, 1976 at Mediasound, New York City, New York.]
Monmouth Evergreen MES 7081.

Performance: **Versatility and taste but is it a commitment?**
Recording: **Honest, clean and unspectacular**

When I first heard cornetist Warren Vache, he had been hired by the New York Jazz Repertory Company to imitate Bix Beiderbecke. He did the job well but left me wishing I could have heard what Warren Vache sounds like. Since then, I've heard him with Benny Goodman and with his own group and, now, on this recording, with Kenny Davern on soprano sax, Bucky Pizzarelli and Wayne Wright on guitars, Mike Moore on bass and Connie Kay on drums. The album shows that Warren Vache can play ballads like "I Didn't Know What Time It Was," Ellingtonia like "Black Butterfly," Dixieland standards like "Oh, Baby," and bop pieces like "Joy Spring." That's quite a range of material and it's all capably done. However, it leaves me wondering where Warren Vache's commitment is. The



WARREN VACHE: Still looking for his musical direction

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music is so emotionally played that there must be a commitment somewhere. Perhaps it's a commitment to versatility.

There's not much to say about the recording. It's honest, undoctored, unsweetened and unspectacular. The only gimmickry involved is that when the artist and producers were unable to decide which of two takes of "Once In A While" came off better, they used them both uncut.

In my opinion, Warren Vache is still looking for his musical direction. I think he's hit on something good in the two-

part inventions he plays with Pizzarelli on "Once In A While" and with Davern on "All Of Me." And yet, if he were to seize on this for a trademark, it might become predictable and boring. Maybe the second time out we'll find out what the real Warren Vache style is—or maybe he's just trying to tell us that the real Warren Vache is versatile enough to play everything from Dixie to Bop and pigeonholes be damned. J.K.

TERUO NAKAMURA: *Sun Rising*.
[Teruo Nakamura, producer; Don Hahn,

engineer; recorded at A & R Recording Studios, New York, N. Y.] Polydor PD 1 6097.

Performance: **CTI rerun**
Recording: **By the numbers**

What's there to say? If this had been the first, rather than just one of a long line of laid back, catchy, "play-it-for-the-sales" jazz albums with funk overtones, it would have set a precedent. It's okay for what it is, only we've heard so much of the same that it's become trite through sheer repetition. As a bassist,



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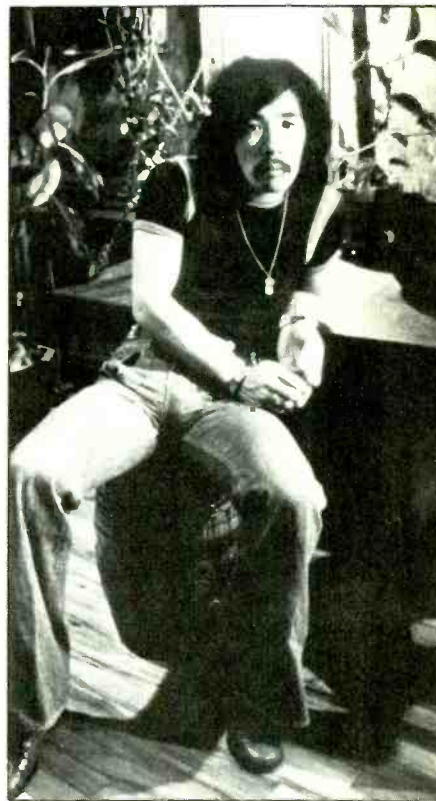
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TEURO NAKAMURA: "Optional illusion."

Nakamura doesn't rate a review. In fact, why does he have a solo album anyway? He's mixed so muddy and so far removed from what calculated action there is on this album that if his name weren't on the cover he'd easily be overlooked. As a writer/producer we get tracks that sound like out-takes from Chick Corea, Quincy Jones or Grover Washington projects. Overall, it really has that "small - label - trying - to - sound - like - the-primal-movers" feel.

Recording wise, the separations are enjoyably clean, the Rhodes under control, and the sax is given enough elbow room to move with a slight echo which steals center stage. The synthesized strings are buried way in the back-

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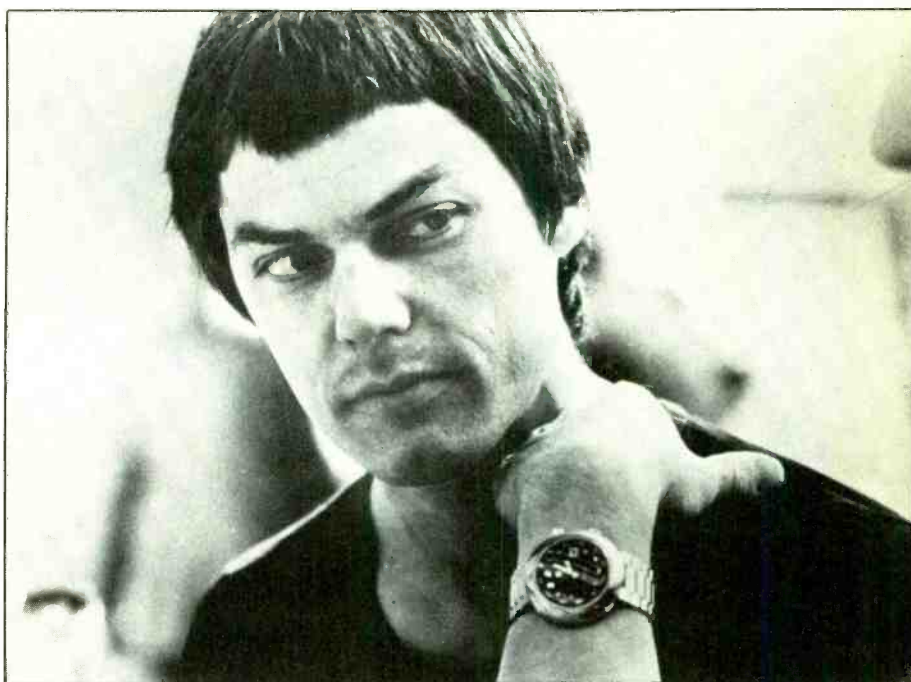
CIRCLE 48 ON READER SERVICE CARD

ground in an effort to hide the fact that they do absolutely nothing for the recording. Somebody must really envy Rudy Van Gelder. At best, this record couldn't serve as a bad demo for saxophonist Steve Grossman, or as Archie Bunker might comment, "This record is an optional illusion." G.P.

JAN GARBAREK: *D/S*. [Manfred Eicher, producer; Jan Erik Kongshaug, engineer; recorded at Talent Studios, Oslo, Norway.] ECM 1-1093.

Performance: **Rare**
Recording: **Exemplary**

A fascinating recording idea makes this



JAN GARBAREK: Tweaking your curiosity

album a must for all serious engineering enthusiasts. Already an interesting duet album when you have the talents of saxophonist Jan Garbarek and that of guitarist Ralph Towner, add a unique instrument whose playability is dependant upon the quirks of nature and it's bound to tweak your curiosity.

The instrument in question is a windharp built by a native Norwegian, the strings of which are designed to vibrate in the wind creating tones and overtones, which, in turn, are enhanced by the resonant body of the instrument. The concept used in construction was to make an instrument reacting directly to the air stream and thus creating a sound image of the wind. Engineer Kongshaug decided to record the instrument on the

coast of Southern Norway due to the unending gusts of wind coming in from the North Sea. Half of the material on the album utilizes this interesting instrument, making for some very haunting music and enabling the other two instruments, especially the horn, that rare effect of breathless effort. The continuity is held throughout the non-windharp material by the use of natural ambience of the room when recording the sax, which, I would guess, was achieved through the omission of tight miking technique. The separations are quite exact, which isn't difficult with only two instruments, although the change of volume of the windharp for effect is successful. Although personally I prefer my jazz slightly more defined, it's difficult

not to appreciate such an album of originality and uniqueness both in front of and behind the mic. G.P.

SONNY STITT: *Sonny Stitt With Strings, A Tribute to Duke Ellington*. [Pat Britt, producer; Bill Finegan, arranger; Thorne Nogar, engineer; recorded at Annex Recording Studios, Hollywood, Ca.] Catalyst CAT 7620

Performance: **Exquisite, the kind of musicianship Duke Ellington's music deserves**
Recording: **Lush and rich**

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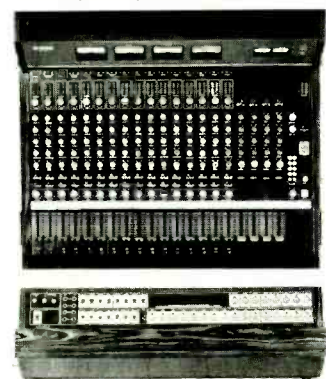


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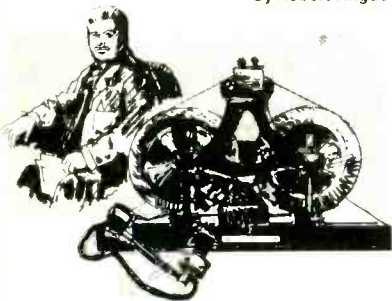
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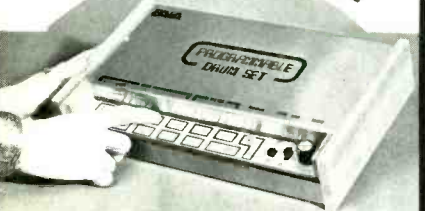
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section and then back it up with lots of strings. I do know that after Charlie Parker did his Bird with Strings sessions everybody was turned on to the concept and every saxophonist around just had to do a string session. Usually the string



SONNY STITT: Never sounded better

sections just sound as though they'd been grafted onto the soloist like window dressing. This is the first album of sax with strings that has sounded like it's had more than a moment's forethought since the Stan Getz/Eddie Sauter sessions that produced the *Focus* album. It's an interesting sidelight that the string writing for this album was done by Sauter's one time partner in a big band venture, Bill Finegan. Bill's decision to use cello and violas exclusively (no violins) was a wise one as was the decision of whoever dug up Gildo Mahones for the piano chair. This former Lester Young, Lambert, Hendricks and Ross pianist has been far too long in eclipse.

Stitt has the amazing facility to be a consummate player on both alto and tenor sax. Other players double both horns but few are so capable on both. The idea of having a jazz musician do an album of Duke Ellington music is not novel. This must be at least the 500th tribute to Duke since his death in May of 1971. Sonny Stitt has chosen some unusual vehicles such as "It Don't Mean A Thing" and "Jeep's Blues" in addition to the, by now, well-worn "Take The A Train" and "Prelude To A Kiss." I've never heard better writing

than Bill Finegan uses to set up the strings for Sonny's entrance on "It Don't Mean A Thing." And I've never heard better playing from Sonny Stitt than he gives throughout this album. Even the recording engineers, realizing that it was an album heavy on low register scoring, have given it a lush, warm sound that fits perfectly with the quality of the music. J.K.

CLASSICAL

DVORAK: Piano Quintet in A, Op. 81; Bagatelles, Op. 47. Juilliard String Quartet; Rudolph Firkusny, piano and harmonium. [Steven Epstein, producer; Stan Tonkel, Milt Cherin, Frank Abbey, engineers; recorded at Columbia Recording Studios, New York, N.Y.] Columbia M 34515.

DVORAK: Piano Quintet in A, Op. 81. The Cleveland Quartet; Emanuel Ax, piano. [Peter Dellheim, producer; Edwin Begley, engineer.] RCA ARL 1-2240.

Performances: **Juilliard, streamlined; Cleveland, romantic**
Recordings: **Excellent**

It seems odd that the two American majors should collide with new recordings of this delectable quintet. With per-



EMANUEL AX: Overtly romantic

formances as good as these, however, who could complain? The young artists on the RCA disc take an overtly romantic approach, with heavy *ritardandos* at



THE CLEVELAND QUARTET: Missing that pastoral simplicity

cadences and expressive rubato. The Juilliard/Firkusny team on Columbia is more straightforward and lithe, stressing purity of line and structural cohesion. This is not to say that the Columbia performance lacks expressivity, however, for the playing is always sensitive and idiomatic (no doubt helped by Firkusny's spring-like pianism). The darker, more serious RCA performance, in contrast, misses some of Dvorak's customary open, pastoral simplicity; adding to the gravity of the opening movement

twelve minutes.

Both recordings are first-rate, with excellent piano/string balance. It is especially gratifying to note the high quality of the Columbia sound, however, for chamber music has not been well-served on this label in recent years. I had assumed that the harsh, ice-cube sound was due to Columbia's 30th Street studio acoustics as well as to claustrophobic miking, but producer Steven Epstein and his engineers have achieved commendable results with a



RUDOLF FIRKUSNY AND THE JUILLIARD STRING QUARTET: Straightforward and lithe

is the exposition repeat, which the Columbia team eschews. The clincher in favor of the Columbia disc, however, is the inclusion of Dvorak's delightful *Bagatelles* for two violins, cello and harmonium. Side two the the RCA disc, with no filler, times out to just over

microphone set-up that allows warmth, perspective and depth without sacrificing clarity of detail. It's all to the benefit of Dvorak, the artists and the listener.

S.C.


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