Musicians! "NOTES" Is Here!

MODERN RECORDING & MUSIC

ICD 08560
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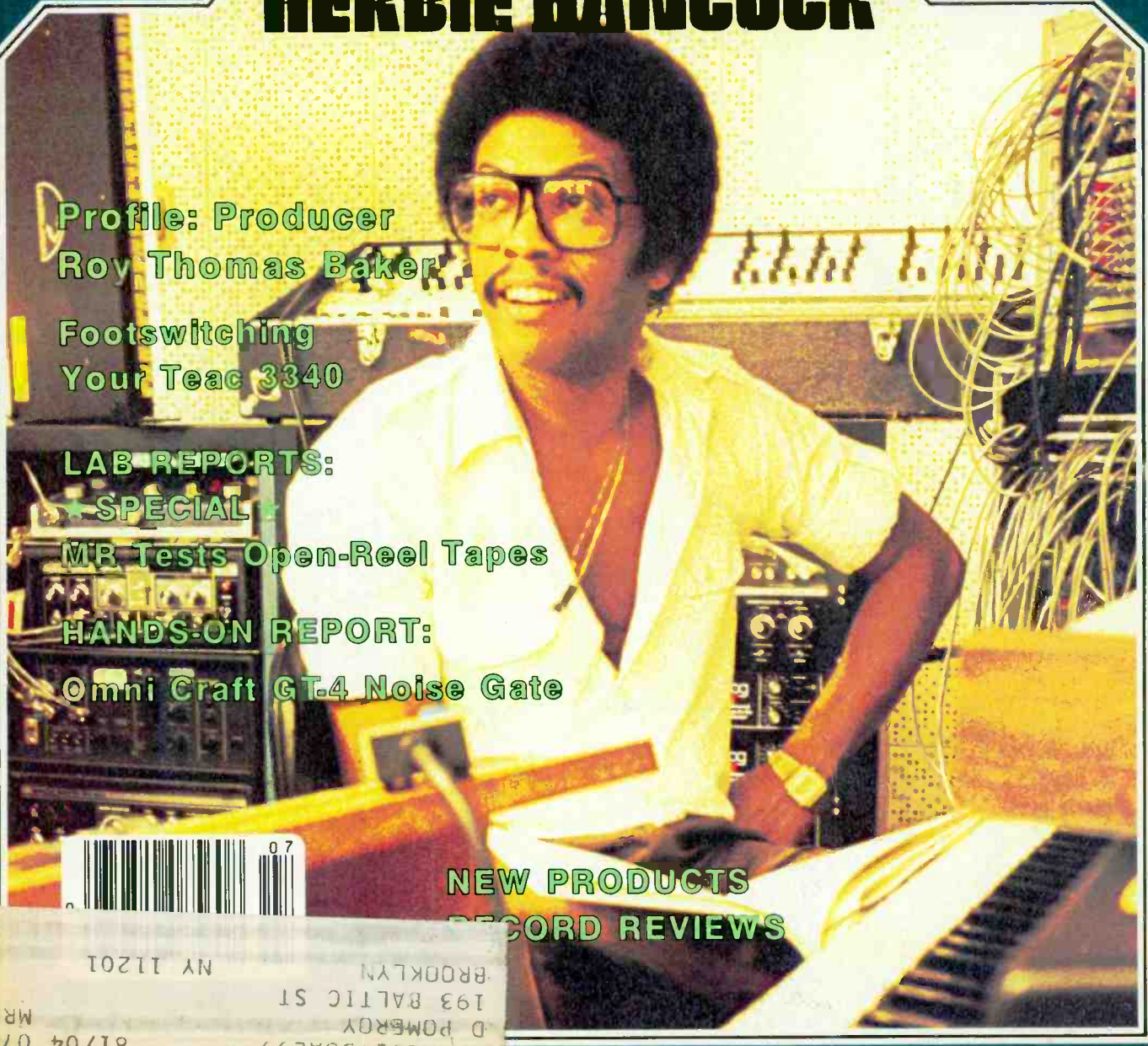
VOL. 5 NO. 10
JULY 1980

a session with HERBIE HANCOCK



Profile: Producer Roy Thomas Baker

Footswitching Your Teac 3340

LAB REPORTS:
SPECIAL
MR Tests Open-Reel Tapes

HANDS-ON REPORT:
Omni Craft GT-4 Noise Gate

NEW PRODUCTS
RECORD REVIEWS

Expression through time delay.

Time delay has become increasingly important to musicians and engineers as a way to color musical sounds and create spatial illusions. MXR's Flanger/Doubler and Digital Delay have proven to be effective tools for the musically creative professional who requires a wide range of performance possibilities from a precise and cost effective time delay unit.

Both the MXR Flanger/Doubler and Digital Delay offer a flexible system of controls which provide ultimate freedom for creative expression. They feature frequency sweep and width controls, a mix control (between the dry and the delayed signals), a regeneration control for additional intensity and multiple repeats on doubling and echoes, and a delay bypass jack which enables the user to employ a footswitch to bypass the unit entirely for instantaneous cut-offs of time delay effects. Both units represent an expandable system, and can be easily ganged together or interfaced with other instruments and recording gear.

The MXR Flanger/Doubler provides a manual control over delay time, and rear panel connections offering full remote delay time adjustments and a VCA output suitable for stereo ganging of two units. The MXR Flanger/Doubler can switch easily between flanging and doubling modes, and two LED indicators are provided for easy visual monitoring of sweep speed and range.

The Flanger/Doubler is capable of producing infinite varieties of flanging, hard reverberation, vibrato, and numerous doubling effects including subtle chorus sounds. It offers a time delay range of .25 to 5 milliseconds in the flanging mode and 17.5 to 70 milliseconds in the doubling mode.

The MXR Digital Delay offers a continuous range of delay times from .08 to 320 milliseconds. This range of delay times is expandable with three optional memory cards, in 320 millisecond increments to 1280 milliseconds, with full bandwidth (20Hz to 20kHz) capability to 160 milliseconds. The Digital Delay features push button controls for varying delay ranges. A level control regulates the input signal to prevent overloading of the unit's circuitry, and LEDs monitor the input level and indicate whether the effect is in or out.

At fixed delay times the Digital Delay is perfectly suited for "traditional" delay applications such as "slap echo," discrete echoes, and synchronization of speakers in PA applications. By adjusting sweep frequency, mix, regeneration, and level controls, the Digital Delay offers additional effects which include doubling flanging, pitch alteration (vibrato, pitch bending), frequency modulating, and infinite (non-deteriorating) repeat hold.

The MXR Flanger/Doubler and Digital Delay are designed for use in the studio and on stage, with line or instrument levels. They're reliable, delivering a clean signal consistently, with a dynamic range exceeding 80 dB. And as with all MXR Pro Group products, optional road cases are available. For the serious artist, the MXR Flanger/Doubler and Digital Delay are the versatile tools which provide the key that will unlock his creative musical imagination.

Expression through equalization.

The MXR Dual-Fifteen Band and Thirty-One Band equalizers are cost effective electronic signal processors designed to meet the most exacting equalization requirements in a wide range of professional applications.

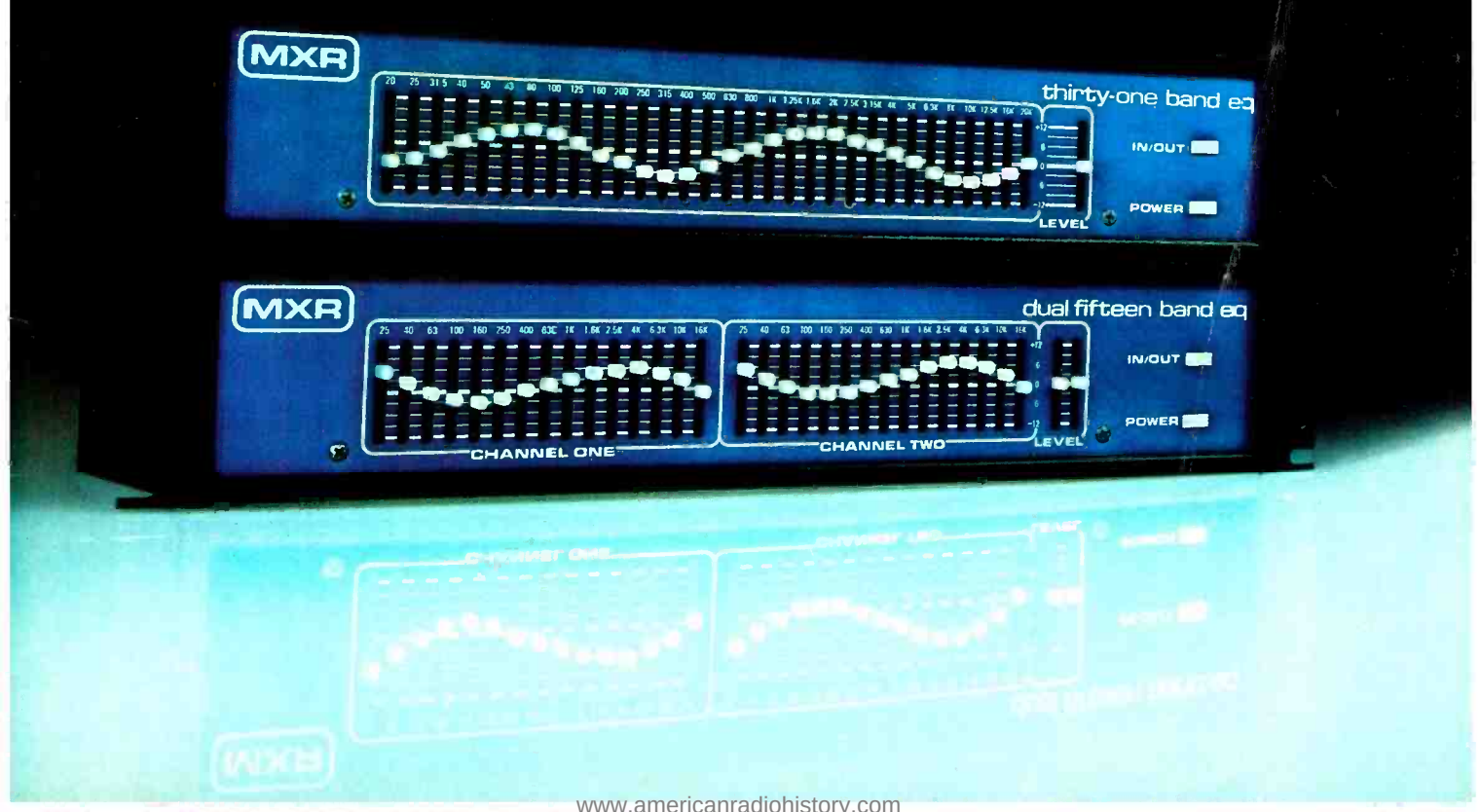
The MXR Dual-Fifteen Band equalizer can be used to tailor the frequency response of two sides of a stereo system, or it can act as two separate mono equalizers. In performance one channel can equalize the house system, while the other is used independently in the stage monitor line adjusting frequency response and minimizing the possibility of feedback. In the studio the Dual-Fifteen Band equalizer can be used to compensate for control room acoustics.

The MXR Thirty-One Band equalizer provides maximum detail in the most demanding equalization applications. It can be used in pairs for ultimate stereo control, or in live performance interfaced with PA systems and other instruments. The Thirty-One Band equalizer is also the perfect tool for conditioning film or video sound tracks, and in mastering applications.

The spacing of frequency bands on ISO centers (2/3 octave in the Dual-Fifteen Band; 1/3 octave in the Thirty-One Band) and a flexible system of controls offer superior accuracy in frequency equalization. Each band can be boosted or cut over a range of ±12 dB. Clear, readable markings alongside each level control allow for quick and accurate checks of equalization settings, and aid in resetting the sliders to predetermined positions. The tight mechanical action of the sliders prevents slips during indelicate handling.

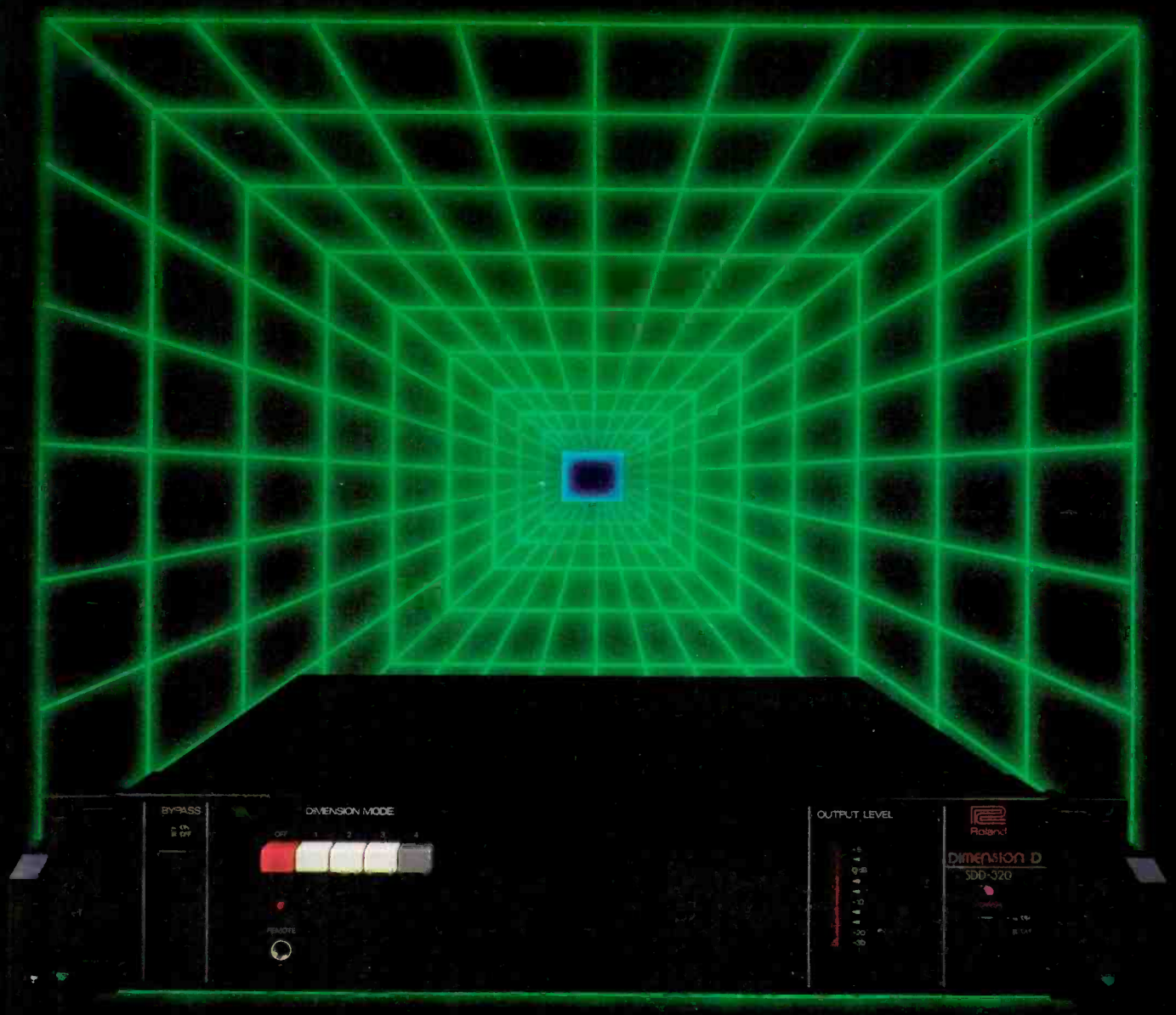
The MXR Pro Group equalizers afford maximum control of frequencies while maintaining the highest level of sonic integrity. The Dual-Fifteen and Thirty-One Band equalizers both have a dynamic range exceeding 110 dB and, as all MXR Pro Group products, will drive low impedance lines. Audio signal, including transients, is reproduced faithfully due to a high slew rate and a wide bandwidth.

The MXR Dual-Fifteen and Thirty-One Band equalizers are designed to withstand the demands of a professional road and studio schedule. Their superior design and superb craftmanship reflect MXR's continuing commitment to the manufacture of the highest quality electronic signal processors for today's creative artists.



THE history of music has forever been a search for new and expanded means of expression in sound. In every age, composers, performers, and instrument builders have sought out new ways to broaden their creative range. By leading in the development of new musical technology, MXR is carrying on this progressive tradition and pushing it to its limits.

We currently produce some of the most sophisticated electronic signal processors in the history of the art. Our graphic equalizers, time delays, and our new Pitch Transposer are just a few of the products we're developing to give the contemporary artist the control and freedom he needs to create what he hears.



The Dimension D

The problem with many special effects is that they have a tendency to become specialized effects. Rather than being integral to a performance. They become simply the frosting on the cake, used only occasionally because their very nature makes constant use tiresome.

But what if the fundamental sound itself is lacking? What if you want to give it some life without having to put it through a wringer for improvement? For you Roland offers Dimension D—the Uneffect.

The Dimension D changes the life of your sound without changing the sound itself. Electric and electronic musical instruments are enriched with a depth and liveness that they never had before...fundamentally the same, but deeper and richer. Likewise, acoustic instruments and vocals are richened and thickened when you amplify or record them. They're given back the brilliance they had live.

The Dimension D is not a device that will be relegated to sitting in a bank of equipment, rarely used. On the contrary, the Dimension D is likely to become as integral to the creation of sound as any other element. Once you turn it on, you won't turn it off.

The Dimension D can work on either a mono or a stereo signal, and also has the capability to generate a stereo field. And if you don't want to turn the Dimension D off, you won't have to, because its signal-to-noise ratio is better than 90 db.

The Dimension D is not an effect, it's really an experience. It won't blow you away—it isn't supposed to. That's because some effects are not measured by their intensity, but by their subtlety.

Enclose $1.00 for a copy of the Roland Rack catalog.

RolandCorp US
2401 Saybrook Ave.
Los Angeles, CA 90040
(213) 685-5141

Roland
We Design the Future

CIRCLE 144 ON READER SERVICE CARD

New realms of expression from MXR.

The Pitch Transposer is MXR's newest addition to our professional line. It is one of our most innovative products, and possibly the most revolutionary signal processor in the music industry today. It is a unique, high-quality unit which provides a cost effective and flexible package for today's creative artists.

The Pitch Transposer extends your musical boundaries by creating live instrumental and vocal harmonies. It has 4 presets which allow the artist to predetermine the intervals to be processed. Transposed intervals can be preset anywhere from an octave below to an octave above the original pitch. The chosen interval is activated by means of touch controls or a rugged footswitch. LED indicators display which of the four presets has been selected.

A mix control is provided, enabling the unit to be used in one input of a mixing console, or with musical instrument amplifiers. A regeneration control provides for the recirculation of processed signals, creating more and more notes, depending upon the selected interval. This results in multitudes of voices or instrumental chords. An entire new range of sound effects and musical textures, unattainable with any other type of signal processor, is suddenly at your fingertips.

With many other pitch transposition devices a splicing noise, or glitch, is present. The MXR Pitch Transposer renders these often offensive noises into a subtle vibrato which blends with the music, and is, in some cases, virtually inaudible. The result is a processed signal which is musical and usable.

We have been able to maintain a high level of sonic integrity in this most versatile signal processor. The frequency response of the processed signal is beyond 10 kHz, with a dynamic range exceeding 80 dB.

A micro computer based display option allows the user to read the created harmonic interval in terms of a pitch ratio, or as a musical interval (in half steps). This unique feature allows the pitch to be expressed in a language meaningful to both musicians and engineers.

We designed our Pitch Transposer as a practical musical tool for those actively involved in creative audio. It reflects our commitment to provide the highest quality signal processors with the features and performance that will satisfy the creative demands of today's musical artist. See your MXR dealer.

MXR Innovations, Inc., 740 Driving Park Ave., Rochester, New York 14613, (716) 254-2910

MXR Professional Products Group

JULY 1980
VOL. 5 NO. 10

MODERN RECORDING & MUSIC

THE FEATURES

COMING NEXT ISSUE!
A Session with the Brothers Johnson
Profile: Joan Armatrading
. . . and lots more!

Cover Photo: Ashiki Taylor
Hancock Photos: Ashiki Taylor
Roy Thomas Baker Photos: Lynn McAfee

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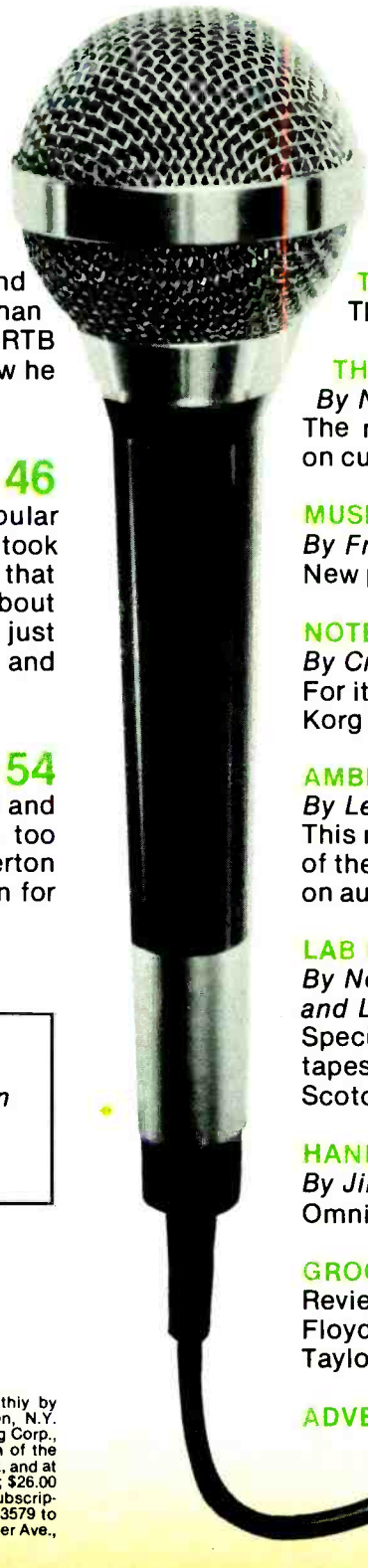

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Editorial contributions should be addressed to The Editor, Modern Recording & Music, 14 Vanderventer Ave., Port Washington, N.Y. 11050. Unsolicited manuscripts will be treated with care and must be accompanied by return postage.

The Publisher's Track

Regular observant readers probably noticed a somewhat different cover logo this month. We have incorporated the word "Music" into our original title of *Modern Recording*, while deleting our tag line: "Serving Today's Music/Recording-Conscious Society." (I'll wait here while you scurry to find a past issue . . . see, the line was there; why would I lie?)

That tag line was originally used to describe a "society" that when *MR* began five years ago was merely embryonic. It was *emerging*. *Modern Recording* believed in that market, and consequently became a major force in shaping it. Now, five years later, the addition of the word "Music" is necessary because you, the reader (*and* the music and recording industry's technological developments—hail to digital technology!), have become so sophisticated as to require it.

No longer do the great divisions between musician and recordist exist. Musicians are now recordists; recordists are musicians. Audiophiles want the best in music; musicians want the best in audio equipment. The "ivory tower" types have gone much the way of the pterodactyl and the thirty-cent gallon of gas. Today's musician very rarely states: "Don't talk to me about technical matters—I'm an *artiste*." Nor do recordists and "live" sound mixers frown upon musicians because of superior technical expertise. The groups have come together, because in 1980 to have a complete lack of musical *or* technical knowledge is to be doomed to failure.

The movement all of us became involved in several years ago has now come of age. And we at *Modern Recording & Music* feel happy and proud that we were there in the beginning.

There will be no great changes in our editorial format. But you will see added coverage for the musician who is serious about knowing all he or she can regarding the latest in electronic musical equipment: guitars, pickups, amplifiers, electronic keyboards and special effects units. The initial proof of this coverage is this month's debut of "Notes," our new review column for the musician. Read it carefully; "Notes" gives you a perfect example of the added dimension.

More and more musicians have been subscribing to and reading *MR* because of its unique approach: it provides a *working* insight not found anywhere else. It doesn't just introduce them to the new "toys," it also tells how to use those toys . . . properly. Musicians consider us an inside path to greater musical perception and expanded creativity.

The staff of *Modern Recording & Music* is very excited about the future of recording, music and "live" sound, and you can be sure that we will continue to be your best source of information on that future.

Stay in tune,

H.G. La Torre
Editor/Publisher

Studiomaster is Expanding

We have never been ones to sit around and watch others progress. Instead, we prefer to be the leaders. And in our field, that is how many regard us. So we apply our energy to expansion . . . growth in every phase of the development of our products.

Our mixers are expandable. *Studiomaster* was first with the add-on module concept in affordable professional grade mixers. Whether you select our 12X2b or 16X4 units, neither will ever limit your group or studio to its original capacity. By our four-channel-at-a-time expander modules, a 12X2 can become a 24X2 in minutes. A 16X4 will change into a 20X4 almost immediately, and without the hassle of dangling cables that can cause shorting or transporting difficulty.

Our features are expanding. As pioneers in the more-feature-per-dollar area, *Studiomaster* was the first to offer 5 way equalization on an affordable mixer. We still are. Our 16X4 mixer was the first studio quality desk that allowed the operator to have a separate stage (or studio) mix for the performers while still sending an independant, unaffected mix to the tape recorder. No competition yet. And now, our mixers come with direct in/out channel patching as standard equipment, just one example of our expanded features.

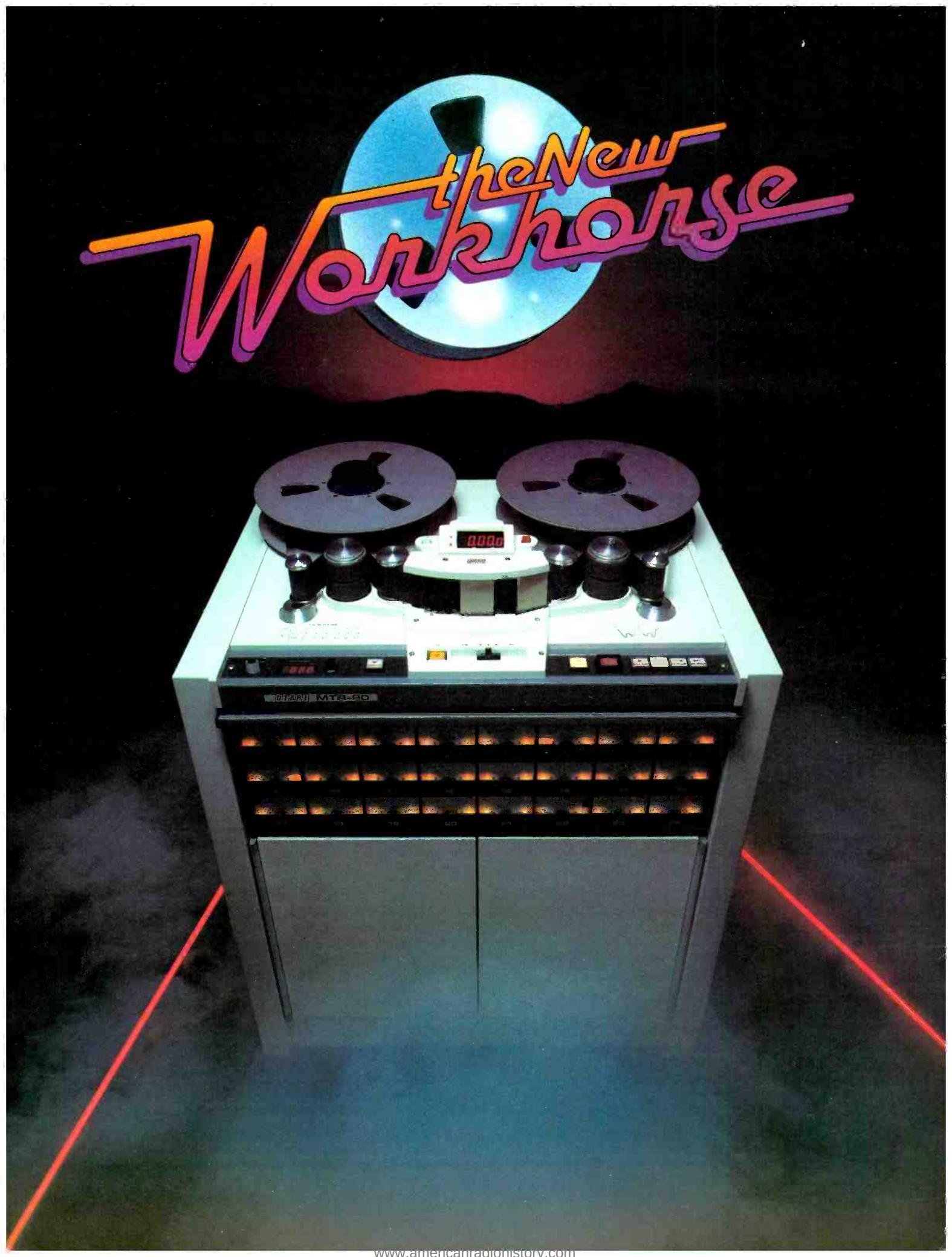
Our product line is expanding. *Studiomaster* now has a 16X8 mixing console designed for 8 track studios and live performance. We offer the professional touring band the most affordable 20X8 monitor mixer available. And we now manufacture three and five way stereo crossovers which solve the complex speaker system problems of large concert arenas. We even make the coolest running, smoothest sounding 225 watt/channel amplifier around, too. Did we say we're expanding?

The only thing that really hasn't kept pace with our other phases of expansion is our price tag. It has escalated only a fraction in two years . . . and that only to justify the extras we offer. So we are still the most affordable 16X4 mixer that money can buy in our performance category.

Maybe you should consider expanding your studio's or group's ability to create. Give us a call at (800) 854-6219 nationally or (714) 528-3360 in California. We will give you the name of the *Studiomaster* dealer closest to you. If you visit him this month for a *Studiomaster* demonstration, you can receive a *Studiomaster* T-shirt free from us. Visit him soon to see the continually expanding possibilities of *Studiomaster* products.

For more information about Studiomaster products, please write to Craig Bullington, National Sales Manager, Studiomaster, Box 55, Atwood, California, 92601.

CIRCLE 83 ON READER SERVICE CARD



MTR-90: The Machine You Helped Design.

After extensive consultation with you, the people who depend on professional audio machinery for their livelihood, we found that a new generation of two-inch master recorder was required to meet your demands. You wanted better tape handling, increased performance, greater creative flexibility; you needed adaptation to multi-machine interlock, compact design, better serviceability and the number one priority—greater reliability. You felt that contemporary technology could be incorporated into an affordable machine. We felt the same way.

Here is the result of a collective vision—our engineering and your current and future needs—THE OTARI MTR-90.

The OTARI Optimal Tape Guidance System

Research has proven that impeccable tape handling can be achieved by a servo-controlled, symmetrical, and uniformly distributed constant tension tape path utilizing a wide diameter (60 mm) pinch-rollerless capstan. This elegantly simple method of controlling tape movement eliminates the problems of stretch and wear, which are generic to many conventionally designed 2″ pinch-roller type transports. With the MTR-90 the only tape drive contact is on the tougher tape backing, thus allowing for the first time, virtually unlimited safe passes with your valuable 2″ master tape.

The OTARI Unitized Transport

The integrity of the entire tape machine is dependent on the long-term stability of the top plate, its supporting frame and the integration of its head assembly. OTARI engineers felt it essential to mate a super-rugged, precision top plate directly to a unitized, welded steel chassis to make it strong enough to withstand the most rigorous studio or remote work.

Electronics

By engineering single card circuitry, OTARI has refined "state-of-the-art" electronics by reducing the complexity and expense of multiple card assemblies. Active mixing of audio and bias in the record circuitry and proper utilization of high slew rate integrated op-amps and discrete components at critical stages are your best assurance of aural success.

The modular approach of the MTR-90's digitally controlled transport logic achieves a higher level of reliability along with the "real world" considerations for rapid diagnosis and serviceability.

The Man/Machine Interface

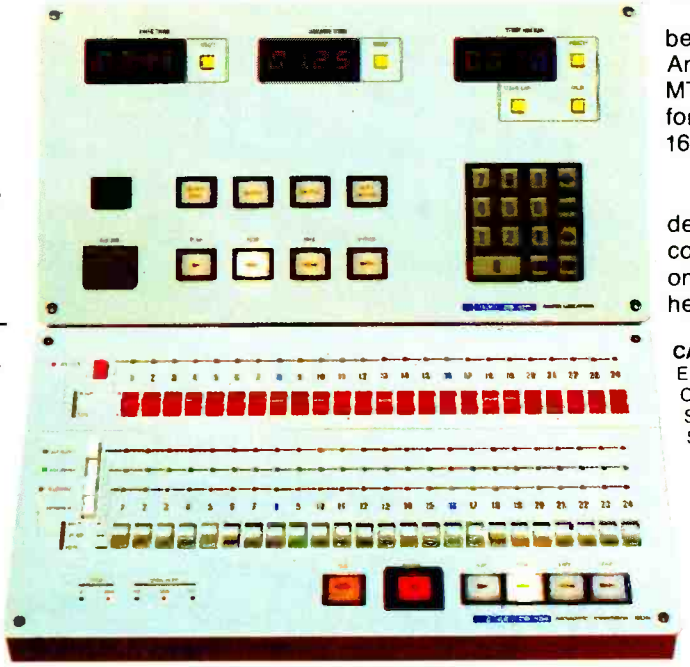
Included with every MTR-90 is the CB-104 Remote Session Controller. Offering total flexibility while providing immediate understanding on your first session, the CB-104 accomplishes mode selection faster than any other remote available. There's "positive feel" switching—important under session pressure; flexible standby mode monitoring, master switching, single control simulated punch in/outs and more.

The optional CB-107 Memory Locator, which physically mates with the CB-104 Session Controller maximizes your efficiency and creativity with your clients' time. It features ten keyboard assignable memories, shuttle function, and independent, built-in stopwatch.

Factory support through a large domestic parts inventory, thorough documentation and communicative personnel versed in all aspects of studio equipment, are integral parts of the MTR-90's presentation to the professional. A network of the finest and most experienced audio dealerships is the final link in your assurance of OTARI's comprehensive approach to the professional recording community.

The OTARI machine has become *The New Workhorse*. And now, the advanced MTR-90: *The New Workhorse* for two-inch, multi-track 16/24 channel audio production.

Contact your nearest dealer for a demo and detailed color brochure. Get your ears on the tape machine *you* helped design!



The CB-107 Memory Locator and the CB-104 Remote Session Controller.

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The continuing story of TDK sound achievement.

Part One.

Music has gone through many transitions. Its rhythms, tones and forms have changed dramatically. As have the means of reproducing it. From the first wax cylinder to today's music machine: the TDK cassette.

TDK pioneering in ferrite technology began over forty years ago. This led TDK engineers to develop microscopic particles which, through their long shape and uniform size,

could translate magnetic energy into flawless sound. By 1968 TDK had created TDK SD. The world's first high fidelity cassette. In 1975, TDK created a revolution. Super Avilyn. Ultra-refined gamma-ferric oxide particles were bombarded with cobalt in a proprietary ion-adsorption process. The resulting TDK SA cassette had higher signal to noise. Higher coercivity. Low noise. A maximum output level superior to anything heard before. Overnight, TDK SA became the high bias reference.

TDK has a philosophy of sound. A belief that total performance is the outcome of a perfect interplay between the parts. It all begins with *Part One*, the TDK tape. Magnetic powder is first converted into TDK magnetic material in the form of a coating paint or binder. On a giant rotary press and in a dust-free atmosphere, jumbo rolls of tensilized polyester are coated evenly with TDK binder. The tape rolls are edited and leader is inserted at precise intervals. Surgically sharp knives then cut the tape into predetermined widths. The edges perfectly straight. All along the way, TDK tape undergoes thousands of checks. It's polished to micron smoothness to give better head contact, increase sensitivity and maintain stable output. TDK binder, recently improved, packs more particles on the tape surface. And the whole process is done automatically. Controlled by a central computer brain. From the very first, TDK tape runs true. And so does the sound.

The TDK story will unfold in future chapters. You'll learn about other key parts and their sound synergy in a TDK cassette. And you'll draw only one conclusion. Music is the sum of its parts.

TDK

The machine for your machine

CIRCLE 67 ON READER SERVICE CARD

Letters to the Editor

Solving the Noise Problem

Re: April, 1980 issue "Talkback" letter from Mark Simmons of Brunswick, N.Y.

I am a secondary level public school music/music theory and composition instructor who also has an avid interest in multi-channel recording. During the last few years, I have recorded many hours of demo tapes in my small home studio, which includes much of the same equipment as Mr. Simmons' proposed system. The 4-track deck is a Teac 2340, the mixer a Teac 2A. Reverb is via a Fisher K-10 unit. The 2340 feeds a Pioneer MA-62 mixer whose dual stereo outputs serve for both mixdown and for cue feed. Sub and final mixes are done on a Ferrograph Super 7 or on a Sony 640B. Mics are Sony ECM-19s, 270s and Audio-Technica 801s. As with Mr. Simmons' gear, the majority of mine could be considered rather technically outdated. However, I've found that it is not how "current" one's equipment is that really matters; it's how well one understands the interface between the music and one's own personal hardware that counts. Really fine demos can be made on Mr. Simmons' pre-logic 2340. I prefer this old lever-actuated Teac series to the time delay logic series. Nothing can be more infuriating during an 8 hour session than having continuously to *wait* for the logic to allow a mode change...

Mr. Simmons' noise problem might be solved by inserting a Phase Linear Autocorrelator in the submix/final mix chain. I've used a Series 1 unit for some time, and although it does have a few faults, its single-ended nature allows it to remove the *vast* majority of noise from all mixes. Very usable 4th and 5th generation submixes are not entirely out of the question.

I have enjoyed my small studio immensely, and am constantly trying to refine my techniques. *Modern Recording* magazine is invaluable. I wish Mr. Simmons the best of luck in his endeavors—and complete freedom from Murphy's Law.

—Bill Stine
Mt. Joy, Pa.

Reverb Spring Assemblies

Do you know the full address of a company called Accutronics in Geneva, Ill.? I'm trying to obtain an application note from them concerning their reverberation devices. Also, do you know of any other companies that make reverb spring assemblies?

By the way, thanks for a great mag. I read every one cover-to-cover. I do wish, though, that you would have more articles on P.A. systems and miking techniques for sound reinforcement.

—Joe H. Babb
Knoxville, Tenn.

You can write Accutronics at 628 North St., Geneva, Ill. 60134 or phone the company at (312) 232-2600. Stateside, they seem to be the largest producer of such assemblies.

Getting Decked

In your publication Vol. 5, No. 7 (April 1980) there is an article written by Len Feldman: "Ambient Sound," in which he talks about a computer-programmable cassette deck by Eumig: the Eumig FL 1000 cassette deck.

Unfortunately the price of that deck was not mentioned. I would like to know more about it, especially where I can get more information about that cassette deck.

—Renald Dumay
Dorchester, Mass.

The cost of the Eumig deck is $1550, and you can write or call Eumig USA, Inc., at Lake Success Business Park, 225 Community Drive, Great Neck, NY 11020, (516) 466-6533.

Delay Manual Lost

Do you think that I could get some assistance? Being a faithful reader of your publication and seeing the aid that you have given to us readers, it has come time for me to say thanks and "Help!" I purchased an Ibanez AD-230 Delay and I've lost my owner's manual. I have

spoken to my dealer and have written to the company personally but my request has landed on deaf ears.

When an individual spends that amount of money on an article one would hope that he could obtain some service when needed. With your record of service to readers, I trust that you might assist me in this time of need.

On another note, allow me to congratulate you on your new section for instrument effects. It is something that should have been addressed a long time ago. Hopefully, you can incorporate in the articles a description of the effect at the various settings, and possibly an artist's example of that sound, for example, "at this setting, the effect that was achieved was similar to Robin Trower on this particular song."

Well, thank you again for the fine publication and continued success.

—Stephen M. Gurden
Fitchburg, Mass.

We've given the folks at Ibanez your address, and they will be forwarding an owner's manual for the AD-230 to you.

Thanks for the comments on our incipient "Notes" column. It's good to know we've developed a new editorial idea that our readers anticipate finding as useful as we expect it will be.

Small Business Discrimination

After reading Mr. Rupert's "Wild Studio Customer" article (*MR*, April '80), I would like to thank him for taking the time and effort to encourage and instruct those about to start and/or open a small studio. (As we are now about to open our first, the realization came hard and fast that opening an 8-track facility may not demand an Electric Lady budget but still, financing is by no means a small undertaking. Now to the point:

After the demise of our first effort, my partners and I turned to the most logical (we thought) source for aid in financing and assistance—the SBA (Small Business Administration). Upon contacting two different branch offices of the SBA in the greater Philadelphia/southern New Jersey area, we were curtly informed that "neither financing or assistance" were available for "any sort of recording studio facility or radio station." This sort of discrimination on their part caused me some surprise when I noted Mr. Rupert's suggestion that the SBA could lend valuable aid in this respect to the fledgling recording entrepreneur.

Perhaps the SBA guidelines for financial assistance vary from state to state, although I can't see why, as it is a federally subsidized program.

In any case, I thought Mr. Rupert would like to be informed of this apparent discrepancy in either SBA policy or his latest journalistic effort.

—John Harris
South Jersey Sound Studios
Berlin, N.J.

James Rupert readily acknowledged, when we posed this dilemma to him, that the SBA is not so well-geared to the service type of business as it is regarding retail operations. It seems that they are also loath to sponsor any business that might get into highly charged matters of censorship. Rupert had nothing but good to say of the SBA outfits in the midwest, but did advise that use of the word "edit" in referring to one's studio practices would tend to alienate them.

Perhaps it would be advisable to contact the national office, state your purpose, and query as to why you have been denied assistance. Good luck to you.

Diamond Guy

Gentlemen: I cannot delay a note to you any longer. Why do you so obviously neglect (in my opinion and I am surely not alone in my thoughts) the best of the best, Neil Diamond?

I have not seen a "Groove View," a "Session With," or an "Interview with" this man since my interest in *MR* began about two years ago. Perhaps you have a particular method of choosing your subject that has not been apparent to me. Surely you recognize the talent he has in his group. The artists, the engineers, not to mention Mr. Diamond's own talent with a lyric and arrangement. And he is not a bad vocalist, either. If there is a reason for this neglect on your part, then please forgive my impertinence.

Yes, yes, I think your mag is the greatest, too. In fact if I could get a lifetime subscription I would take it like yesterday. We have needed this type of publication for a long time and I for one don't want anything to happen to it. Thanks for listening.

—Merv Denman
Euless, Tex.

Well, why didn't you say so sooner?

Actually, Neil's name pops up on our notepads whenever we hear there may

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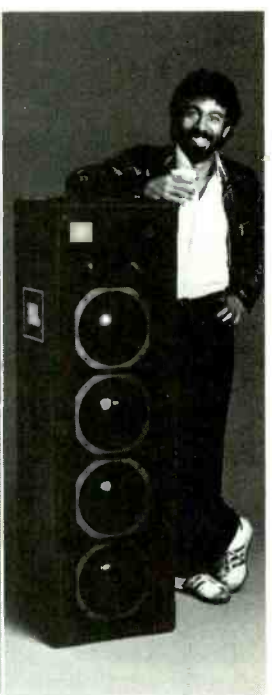
Model	Frequency Range	Power Capacity (Continuous Sine Wave)	Continuous Program	Crossover Frequencies	Enclosure Volume
4680	55 Hz-15 kHz	300 W	600 W	3 kHz	142 litres 5 ft³



JBL First with the pros.

CIRCLE 140 ON READER SERVICE CARD

be a chance to do a story. The various mitigating factors that inevitably shoot us down do not dampen our spirits, though, and we're still trying to get into the studio with Diamond and his people. As far as Groove Views go, omission of Neil Diamond is an oversight we will do our best to remedy immediately.

Constructive Articles

Yes, yes, yes, a thousand times yes. In reply to your question concerning recording projects, I do not believe there are enough of these being presented to the budding professional. By that I mean top of the line projects. Yes, there are books, manuals, periodicals, publications etc. on the market, but it seems they are geared to the general audio market and not to the serious individual who has to record on a limited budget, yet at the same time know that his product compares favorably with the *majors* with their mega-buck studios and equipment. How can they? Like I did by building a lot of their equipment, mixers, compressors, etc.

As stated above there abound countless projects on a vast variety of items (on a do-it-yourself basis) by the same vast number of authors, some known, some unknown who design projects on a patch anywhere, match anything basis. This is not a derogatory statement against these thoughty individuals, for it takes a lot of gray matter to design an electronic project that someone who knows just barely the difference between a soldering iron and chinese arithmetic can successfully put together and not have it disappear in a puff of silicon smoke the first time the switch is thrown.

When it comes to construction articles some electronic magazines seem to think that everybody needs at least 3 blinky blink lights, 4 mother speed controls, 2 strobe light slaves, 5 oscillators, and GOD forbid 6 timers every year. So I am all in favor of the direction *MR* is taking in presenting quality and let me emphasize the word quality projects, because the struggling artist, engineer and producers in the real world are not idiots and don't mind taking up a soldering iron and roasting a few chips, but they must have projects, authors and publications they can trust before they expend their time and effort only to find the mixer they build has a 40 dB S/N and the music coming out sounds like someone filing a rusty hoe.

Having been in the music business for 22 years (performing and electronics) I have seen a lot of talent go to waste for want of a resonable place to record. With studio prices ranging from $60 to $150 per hour and the majors frantically merging and buying each other out where does this leave the talented but flat broke artist? Up the old fecal creek without a paddle.

Let's face it. Most majors are reluctant to sign an unproven artist no matter how talented, so the only way to prove yourself is through smaller companies or on your own. Which brings us right back to the do-it-yourself syndrome. Electronics is probably the only segment of industry where prices have gone down as fast as everything else has gone up, so it makes sense to build your own. But! Where do you start? *MR*, it

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CIRCLE 92 ON READER SERVICE CARD

looks like you are setting the trend with your articles on theory and construction articles—which I dare say will become the most popular.

Having read the problems some readers are having with turn-on thumps, sometime in the future I will send a cheep, cheep, cheap schematic of a voltage regulator I have been using for years that has excellent regulation, 3 amp capability (and up) and also programmable turn on.

—Vince Chory
Vice President
Nashville American
Elizabeth City, N.J.

Bradley on Synare

A call from Star Instruments of Stafford Springs, Conn. advised us of some misinformation we inadvertently passed on to our readers in our May issue. To correct matters, let it be known that James Bradley, drummer for Chuck Mangione, plays Star's Synare drum synthesizer and not the Syndrum from Pollard Industries (as stated on p. 63 in the Chuck Mangione "Live!" cover story). The interviewee apparently used the trade name as a generic term. (By the way, Chuck "Live" at Radio City Music Hall in April was true to form. Fine concert.)

Bruford Supporter

I have to disagree with the reviewer on Bill Bruford's record that was reviewed in your January '80 issue (p. 80). I feel the LP is very creative and original, and very well done. I admit that on first listening it does sound questionable, but that is because this is real music and not an album with one catchy hit geared for the trend-followers. I think Mike Derevlany ought to listen with his ears next time, and not with his pen. Thank you.

—David Lucas
Lexington, Ky.

Illinois Central Lines

Hello! I am from "Central Illinois" and am finding it hard to get hands-on exposure to some "Carvin" sound reinforcement equipment. I have seen some of their guitar and musical amplifiers, but have never had any contact with their mixers or power amplifiers. I understand that Carvin only deals factory direct and that they have no dealer outlets all over the country.

I work for a commercial sound company and have been trying to get my boss interested in Carvin equipment. Being the "old sound man" that he is, he refuses to consider buying any sound equipment that has not been proven to his own eyes and ears.

Since your magazine sets the standards of the business to me (and my boss knows it) I wish to ask if you would feature the new Carvin MX-1602-EQ mixer in either the Hands-On or Lab Reports sections of your fine magazine. Life would be very difficult without *Modern Recording* to read in my time off (and sometimes even my time "on"). Thanks.

—Jim McCullough
Mattoon, Ill.

Your boss, think we, has got his head screwed on straight. But a first-hand listen (especially out in Central Illinois) is clearly not always easy to arrange. So we're gonna see if we can't get that mixer from Carvin and give it the bench test. Thanks for writing.

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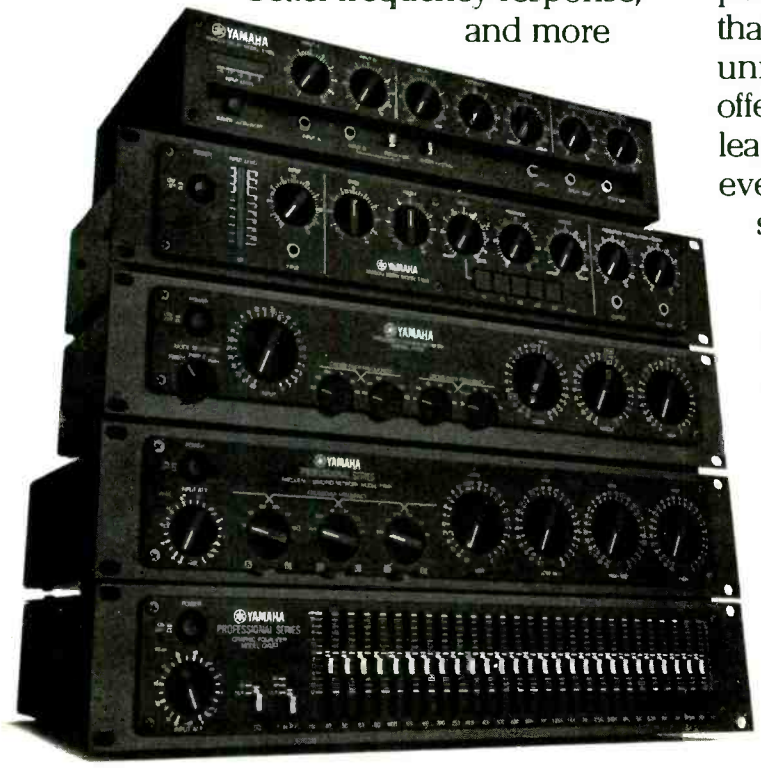

The analog delays: E1010 & E1005 The creative applications of these two analog delays are almost endless. They offer echo, flanging, reverb, time delay, and double-tracking—just to name a few. And being analog, these delays retain the original audio signal for a true musical sound.

The graphic equalizer: Q1027 The Q1027 monaural 1/3 octave EQ provides virtually infinite tonal control, from subtle to dramatic. A center detent position on each filter control removes that filter from the signal path, eliminating unnecessary phase shift. The Q1027 offers many attractive features, not the least of which is its reasonable price. It even includes rack-mount and acrylic security cover.

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TALKBACK

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

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

Calibration, California Style

I own a TEAC 3300-S that is badly in need of a calibration. My problem is acquiring the proper calibration tapes. TEAC in New Jersey says the standard NAB calibration tapes are unacceptable for this machine, but they don't stock the TEAC calibration tapes!

I refuse to pay the $50 or $60 price that I've been quoted for the calibration. Where can I get the TEAC tapes to do the job myself, what is their cost and what is the difference between the YTT 1000 series and the YTT 2000 series tapes?

Thank you for your help.

—A. David Boonstein
Freeport, N.Y.

We've all heard what a difference a day can make, but apparently 3,000 miles can change things around a bit, too. Contrary to what you were told by the TEAC representative in New Jersey, there are standard calibration tapes available that can be used on your 3300-S. A spokesman for TEAC in Montebello, California informed us that both Magnetic Reference Labs, Inc. (MRL), 229 Polaris Ave., Suite 4, Mountain View, California 94043 (415-965-8187), or Standard Tape Labs, Inc., 26120 Eden Landing Rd., No. 5, Hayward, California 94545 (415-786-3546) offer the full-track, 7-½ ips tape that you are looking for, and the cost should be about $35. to $40. per tape. We have been told that these tapes are regarded as being highly accurate and well suited to your purpose.

The YTT tapes that you are interested in are no longer available to the public so we will not go into a discussion of the differences in the 1000 and 2000 series at this time. For about a year now, TEAC has inexplicably reserved them for in-house and factory use. Interestingly enough, however, this applies only to the reel-to-reel test tapes; the cassette deck tapes are still sold for in-home calibrations.

To Tube or Not to Tube

I am a guitarist and I prefer the "tube" sound from a guitar amplifier. I want to purchase a new amplifier and I prefer it to be in component form: a separate preamp, amplifier and speaker. Before I make any purchases, however, I'd like to know if that terrific tube sound is generated by the preamp or the amplifier or a combination of the two. Must I purchase a tube preamp and a tube amplifier to capture the sound I want, or can one of these components be fully transistorized and still deliver the end result I desire?

—Keith Williams
Oxford, Ala.

Keith, why couldn't you have asked a nice simple question instead, like, "How many strings does a 12-string have?" However, since you've decided to open up a can of worms, let's go fishing.

Actually, there is a fair amount of controversy as to what gives the most essential part of the "tube" sound. Here are some of the variables:

1. *Preamp.* Tube preamps tend to have higher input impedances than transistor types, which gives a crisper, brighter kind of sound.

2. *Preamp/power amp interface.* The preamp can often overload the power amp stage, which produces a distinctive type of distortion. Tubes tend to accent a different set of harmonics from transistor amps, and overload in a smoother way; the tube will give predominantly even border harmonics, while transistors will emphasize third harmonic distortion (considered by many to be the most disagreeable form of distortion to the ear.). Incidentally, *some* FET amps (not all types, as some ads would have me believe) distort in a manner very similar to tubes; however, this distortion is only one part of the tube sound.

3. *Output transformer.* Most tube equipment includes an output transformer while transistor equipment drives the speaker more directly. Some people think that the saturating characteristic of the transformer slow down the response of the tube guitar amplifier, thereby smoothing out the initial transient of the guitar note and giving an attenuated type of attack. The whole topic is highly subjective and has never been exposed to any kind of vigorous scientific testing.

4. *Miscellaneous variables.* The output transformer changes the damping of the amplifier; also, the power supply decreases in voltage under heavy loads, which creates additional potential for distortion. Tubes also age, are subject to microphonics, and are generally less consistent than transistors. As a result, many players regard their tube amps as having more "personality," while considering transistor amps to be too clinical.

My suggestion is that if you want a tube sound, then get a tube amp. These

create a specific type of coloration which may, or may not, have anything to do with the concept of "high fidelity." Rack-mounted systems tend to be more like P.A. or recording equipment; while more predictable in their operation, they have a cleaner sound which does not appeal to some players.

My personal preference? I used my last tube thirteen years ago, and frankly, was glad not to have to worry about fragility, replacement costs, microphonics, sound changing with age, and the like. Instead, I opted for the cleanest possible amplification system, and use various effects devices which simulate—and, to my ears, often improve upon—the sound associated with tube amps.

—Craig Anderton
Contributing Editor
Modern Recording & Music

ARP Recording Odyssey

What is the best way to record an Arp Odyssey onto a Teac 3440S? I am trying to get the same sound on tape that I get from my Arp played through my Fender Bassman 100. Seeing as I can't run the signal from the bass amp directly into the Teac, I took the signal from the Arp and ran it into an ADC Sound Shaper 1 Graphic Equalizer. This improved the signal level somewhat and gave me an equal VU deflection throughout a set frequency range. Do the bass amp and speaker add a certain color to the already processed waveform? If so, is there any way that I can approximate this sound other than by placing a microphone in front of the speaker bottom of the amp?

—Frank S. Puchalski, Jr.
West Mifflin, Pa.

Very few, if any, musical instrument amplifiers will pass a signal without some change in tone of the original sound. The same is true with the speaker cabinet. Many artists prefer the sound of their synthesizer through the amp/speaker combination rather than the "direct" sound into the console. The most obvious way to get this on tape is, of course, a good microphone picking up the sound coming from the speaker. Most often, it is some combination of the direct and miked signals that gets the best results.

If, for whatever reason, one chooses not to mic the amp, the use of an outboard equalizer is a good alternative. However, it is possible to get a signal

from the amp to the recorder, although care must be taken when setting levels. Some amps are equipped with a "pre-amp out" jack which taps the signal after the channel tone and volume controls, but before the power amp section. This signal would most easily interface with the line input level of the recorder and would include the particular tone settings. A qualified technician could install this jack if it's not already there. Another possibility is to purchase one of the commercially available "power attenuators" from a musical instrument dealer. This device connects between the usual "speaker out" jack and the speaker itself. The power stage of the amp is now part of the processed signal but at the proper level to feed the recorder line in.

All of these methods still do not include the characteristic sound of the speaker itself. If the volume of the amp in the recording environment prevents miking the speaker, the power attenuator method not only lets one lower the overall level in the room while maintaining full amplifier power, but also provides the proper signal level to include the use of an outboard equalizer in recording the sound of the musical instrument amp.

—Dave Wittman
Electric Lady Studios
New York, N.Y.

Oscillators Explained

The bias oscillator circuit is a fixed-frequency oscillator built into a tape recorder to supply bias current. How do they manage to achieve sufficient output for tape erasure and a high enough frequency for a good recording without saturation?

—Bonny Shenkin
San Francisco, Ca.

Simple. An amplifier supplies the current and design provides the frequency. Actually, an oscillator does not supply any current or power at all. You are assuming an oscillator to be similar to an audio oscillator or a signal generator. The oscillator is only one element of that entire device. The actual oscillator part only provides a small rising and falling voltage that cycles or repeats at a certain interval or frequency. In order to get a usable signal out of a signal generator or any oscillator, you must use an amplifier to amplify the current and/or voltage depending on the device. So a signal generator is really an amplifier with a tank circuit permanently built onto its input, plus controls to vary output, frequency, etc. Given the example of a signal generator, the oscillator part is a resonant circuit the parameters of which can be altered to obtain the desired frequency. Other types of oscillators are rather fixed or at least not easily altered. Then there is the highly stable type found in computers, radio station transmitters, watches and so on which rely on a crystal to generate the desired frequency. These are designed so as not to be altered as frequency is critical.

In your tape recorder you have an oscillator which was designed to generate a relatively fixed frequency (usually 100-150 kHz). The actual number is chosen by determining the highest frequency the recorder is designed to record and multiplying that by at least 5. (If the recorder is capable of recording 20,000 Hz then the bias frequency should be 100,000 Hz; for 25,000 it would be 125,000.) It is then a simple matter to design the oscillator to resonate at that frequency. When that is done, a current amplifier is added suf-

IS YOUR TAPE ERASING ITSELF EVERY TIME YOU PLAY IT?

If lately your favorite recordings sound like they're gradually unrecording, it could be the tape they're on.

You see the oxide particles on some tapes just aren't bound on very well. And when the oxide particles come off, your music could come off sounding faded and weak.

Maxell, however, has developed a unique binding process that helps stop those oxide particles from taking a hike. We also polish our tape to a mirror finish to reduce friction, the major cause of oxide shedding.

So with Maxell, even if you play a tape over and over, the music won't disappear before your very ears.

IT'S WORTH IT.

Maxell Corporation of America, 60 Oxford Drive, Moonachie N.J. 07074.

CIRCLE 79 ON READER SERVICE CARD

ficient to drive the record head. The signal is then used to serve a dual purpose. First, it is sent to the record head through various controls (bias current adj) where the user is able to adjust the desired bias current suitable for the tape being used. This signal is not actually recorded on the tape, although it goes through the record head, because the frequency is too high; hence, the wavelength is too short for the particle size in the tape to be left there. It is only to bias the head with relation to the tape to make up for the non-linearity of magnetic tape. Second, the oscillator signal is run through the erase head. Here the whole idea *is* to saturate the tape. This completely disorients the directions of the magnetic particles which results in the near absence of sound.

—David Moyssiadis
Contributing Editor
Modern Recording & Music

Discretion Advised on Distortion Question

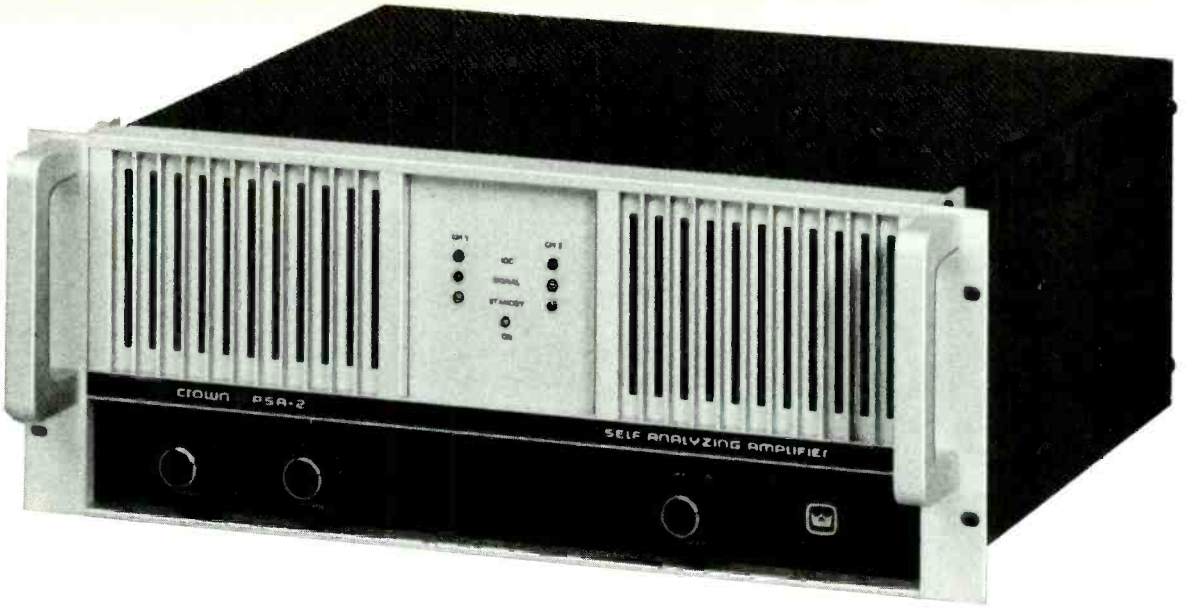
If two diodes were used to limit (as with a peak limiter) an audio signal, would this cause any distortion or other disturbing effects? If I wished to limit the signal to around 0.7-1 volt, what type of diodes should I use?

—Paul (Rum-Z) Rumsey
Long Beach, Ca.

Two *silicon* diodes, arranged as shown in the accompanying figure, will begin to act as a limiter as the alternating voltage (the audio signal) at terminals A and B exceeds 0.7 volts. The input and output

waveforms are also shown. This form of limiting introduces some amount of distortion. Whether this amount of distortion is acceptable or not is a decision that must be left to the user.

—Tom Dwyer
Engineer
CBS Recording Studios
New York, N.Y.



This amp isn't getting a lot of attention...it doesn't need it.

The Crown PSA-2 is the most reliable high-power professional power amplifier you can buy at any price. One reviewer described it as "indestructible," since the PSA-2 accepts seemingly impossible loads, and unlike many other amp designs, will continue to produce useable output power.

PROOF OF PERFORMANCE

Crown engineers devised a simple test to show how the PSA-2 operates. Two flat metal bars are wired into the output circuit of one channel of the amp, with a music signal input. The other input is connected to a 1½ volt battery, requiring the PSA-2 to deal also with a DC signal. A heavy round steel bar is laid across the speaker leads. The amp *continues* to produce useable power, and the metal bar becomes a transducer, producing small sounds from the output signal!

ON-BOARD COMPUTING

The PSA-2 uses its built-in computer logic and unique sensing systems to determine the limits of the safe operating area of the output transistors. The PSA-2 does not just thermal out or shut down as other designs tend to do under strange loads. It computes the level of output power at which it can continue to operate, and then orders itself to do that.

Under normal load conditions, this on-board computing makes it possible for the PSA-2 to use its output transistors more efficiently than any other protection system. There are no arbitrary cut-off points, but a continuous computing of the conditions of the output devices, and an adjustment of output to the maximum comfortable level for the amp.

NEW CONVENIENCE

Versions of the PSA-2 are now available with a choice of front and rear panel configurations. Users can select a model with on/off LED indicators for overload, signal and standby; or they can select the version equipped with the Crown "Dynamic Range Indicator," an LED array that displays peak/hold and instantaneous output for both channels. For the rear panel, a balanced input module (including variable gain and switchable hi/low Butterworth filters) is available, or unbalanced input only.

FIELD TESTED

The Crown PSA-2 amp has already proven its ability to require very little attention after it's been set up in the field. The PSA-2 has provided trouble-free power for several major touring setups, and it is now installed in a number of top-flight recording studios and auditoriums.*

TOP QUALITY SOUND

A bonus for users of the PSA-2 is its excellent sound quality. The amp proves that sonic quality, ruggedness and reliability *can* be combined in one amp.

If you haven't already considered the PSA-2 for the systems you are currently designing, write to Crown today. We'll send you a fully descriptive brochure and reprints of several reviews. They're worth your full attention.

*Names on request.

crown

1718 W. Mishawaka Road, Elkhart, Indiana 46514

Innovation. High technology. American. That's Crown.

CIRCLE 104 ON READER SERVICE CARD

Rule of Thumb

I recently purchased a pair of Peavey 412H sound columns. They were used and I received no technical information with them. Could you please tell me the maximum continuous power handling capacity for this model?

Is there a formula or rule of thumb for converting the output of a power amp rated at 210 watts at 2 ohms into X number of watts at 4 ohms, 8 ohms, etc.?

Thanks for your help and keep up the great work.

—Jim Hunt
Owner/Chief Sound Engineer
Sound Specialists
Frankfort, Ind.

The 412H enclosure is rated at 150 watts RMS with average program material. However, for normal public address use, the enclosures could be driven with considerably more power if the power amps remain clean and are not allowed to clip.

A rough rule of thumb for converting amplifier power (watts RMS) to a different than specified speaker load is simply half the power when impedance is doubled. For instance, a particular amp produces 100 watts into 4 ohms and approximately 50 watts into an 8 ohm load. The actual formula is:

$$P\ (\text{power}) = \frac{E^2\ (\text{Volts})}{R\ (\text{Resistance})}$$

$$P = \frac{20V^2}{4\ \text{ohms}} \qquad P = 100\ \text{watts}$$

$$P = \frac{20V^2}{8\ \text{ohms}} \qquad P = 50\ \text{watts}$$

This rule of thumb varies slightly with different designs, heatsinks, output devices, etc., but will generally put you in the ball park.

—Hollis T. Calvert
Director, Sales Promotion/Education
Peavey Electronics Corp.
Meridian, Miss.

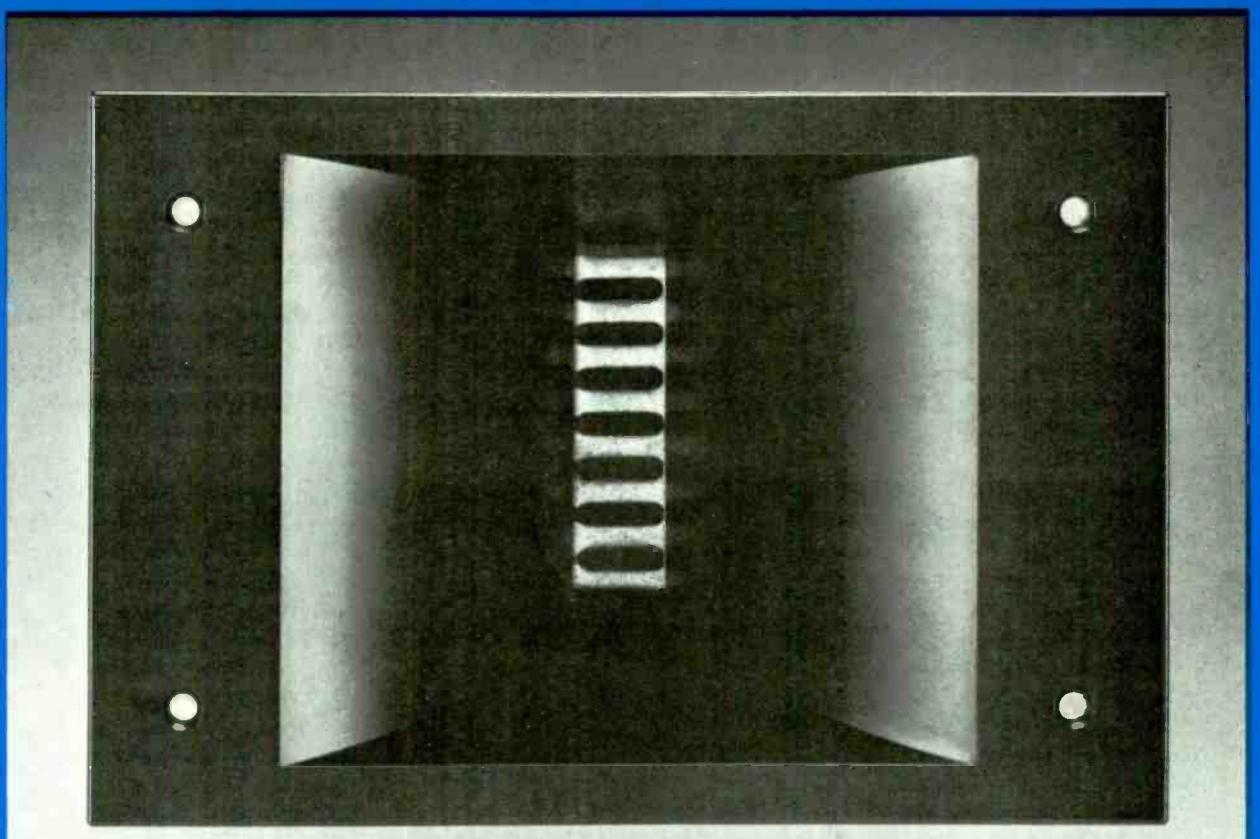
Teac Transistor Trouble

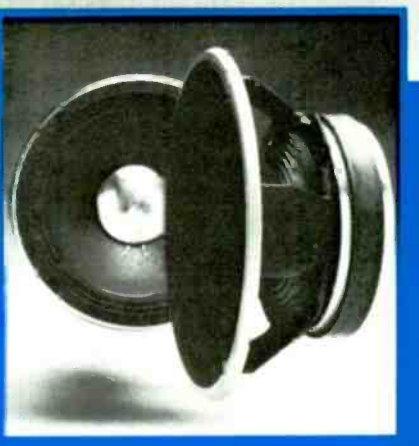
HELP!! I own a Teac A-4300 tape deck, serial number 7429. It has a problem. The regulator transistor for the transport solenoids was blown a year ago and lost while repairs were being attempted. Upon trying to replace the transistor, I discovered to my horror that my deck has a different solenoid control than their schematics depict. *So* different, in fact, that the missing transistor is in fact *not included.*

I wrote to Teac in California in January, and the reply in March from John R. Powell, technical correspondent, was that "the only wiring diagram available" was not the same as mine. He sent *two* schematics, said *three* different boards were used and, in short, didn't answer my question. Can you help? Maybe someone else out there has an A-4300 with a near serial number and the same board in it. They could, if wonderful enough a person, pop off the back, look on the upper left-hand P.C. board and name the tab-style transistor used.

—Michael Eric Munson
Arlington, Va.

'Nuff said. While Mr. Munson's problem is indeed confusing, his request is pretty straightforward. Any info (if Mr./Ms. Wonderful is out there) should be directed to Mr. Munson, care of our Editorial Offices.





...and now ESS Pro.

In answer to the demands of the serious professional, ESS introduces a superior catalogue of high technology sound reinforcement equipment. The initial series focusing on products for the M.I. market, includes precision electronics, powerful low frequency and midrange transducers, plus the incomparable Heil air-motion transformer high frequency driver.

Visit us at NAMM booth 326. Experience the new standard of excellence: The ESS standard.

For complete information, telephone Ewald Consen at (213) 709-7853.

ESS PRO

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CIRCLE 139 ON READER SERVICE CARD

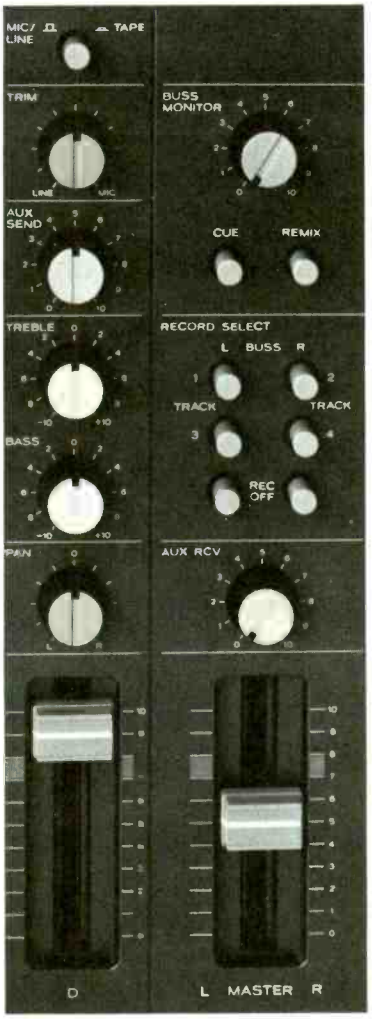
PORTASTUDIO.

LEARN ON IT.
REHEARSE ON IT.
CREATE ON IT.

Portastudio gives you all the essential functions of multitrack recording in one compact, self-contained unit.

You can work anywhere you have an electrical outlet. Connect electronic instruments directly. And try out new musical ideas. Will a keyboard work well in the break? Do you want a chorus behind the vocal? With Portastudio, you can find out before you put out hard cash for studio time.

Whether you're recording basic tracks, overdubbing, punching-in or mixing down to another cassette deck, Portastudio helps you get all the signals to the right places.



Portastudio's versatile 4 x 2 mixer section gives you mic/line/tape switching, trim control, high and low EQ, fader, pan and Aux Send for each input. The failsafe group switching matrix lets you record on up to two tracks at the same time. And the master fader gives you overall level control during recording and mixdown.

The full-logic cue system in Portastudio lets you hear everything you're doing all the time. Input and tape cueing, monitoring for recording or mixdown are all available. And every signal can be metered. Coming or going.

TEAC engineers created a totally unique format for Portastudio. Four tracks in sync on cassette tape at 3-3/4 ips. It's fast, simple, reliable and economical.

Portastudio's drive system is built specifically for the rugged needs of multitrack recording. Transport controls are all solenoid-operated for faster, easier switching. And you get a built-in variable speed control that lets you add special effects, fix a flat note or solve timing and cueing problems.

You can work with Portastudio using nothing more than headphones and a microphone. Or send the output through your home audio system. You'll also find the patch points and controls that let you use Portastudio with other equipment like echo units, equalizers and additional mixers.

Nothing else in the world hands you so much multitrack function in such a sensible way. So see your dealer today for a demonstration of the very affordable Portastudio.

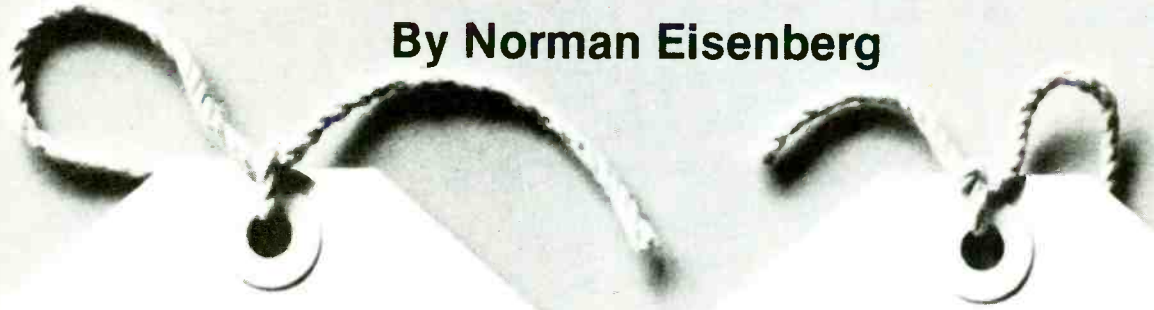
TASCAM CREATIVE SERIES

TEAC Professional Products Group

CIRCLE 125 ON READER SERVICE CARD

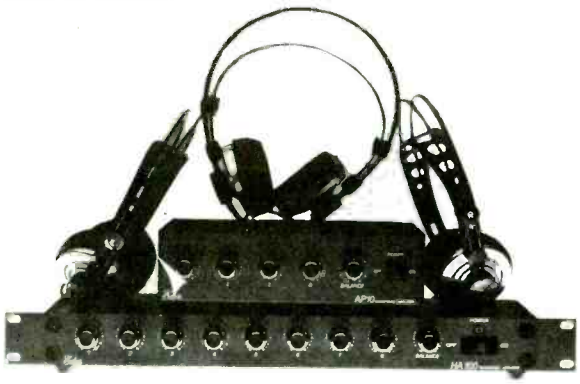
THE PRODUCT SCENE

By Norman Eisenberg



HEADPHONE AMPLIFIERS

Suitable for rack mount or desk-top installation are two new professional headphone amplifiers from Edcor of Irvine, Ca. The model HA 100 provides eight stereo channels; the model AP 10, four stereo channels. Either amplifier may be used with any combination of 8-ohm to 2000-ohm headphones. The manufacturer claims flat frequency response, less than 0.1 percent THD and an "A" weighted S/N ratio of 101 dB.



CIRCLE 19 ON READER SERVICE CARD

HEAD CLEANER SAYS WHEN

New video head cleaner cassettes from 3M feature a recorded video message that reads: "When you can read this message your heads are clean. Stop the recorder now." Formulations are available for the VHS format ($28.95) and for the Beta format ($27.95). The cleaning cassette contains five minutes of specially formulated tape which, according to lab tests at 3M, has proven safe and effective for cleaning clogged recorder heads of dirt and debris. In most applications, the complete cleaning job takes less than 30 seconds.

CIRCLE 20 ON READER SERVICE CARD

NEW GENERATION B & O RECORDER

Microcomputers are put to extensive use in the new Beocord 8000 cassette recorder. One feature, claimed to be exclusive with B & O, is the plotting of tape position in real time, which makes it possible to tell how much tape has been played (in minutes and seconds) and to relate tape length to the actual length of a recorded piece. A related feature is the deck's automatic search system for locating a desired selection on the tape. An automatic memory (while recording) makes it possible to return to the last starting point at the press of a button. A display panel employs several code signals to indicate whether the machine has understood the commands fed into it, and also to show which function it is performing. For most operations, touching the function button activates the deck without the need to turn the power on separately. The cassette-eject system may be activated without first stopping the transport. Automatic demagnetization of the head is provided, and the headphone output has its own volume control. Price of the Beocord 8000 is $995.

CIRCLE 21 ON READER SERVICE CARD

BEYER HEADPHONES AND MICROPHONES

The Beyer DT-220 dynamic headphones, which recently became available in the U.S., are the closed type for use where a high degree of isolation from external sounds is desired. Weighing 9.2 ounces, the headset has an impedance of 400 ohms. Output capability is given as 102 dB/SPL for 1 milliwatt input at 1 kHz. Price is $65.

Beyer also has introduced the model M-130 bi-directional ribbon microphone, said to produce excellent transient response and rated for the range from 40 Hz to 18 kHz. Its polar pattern provides more than 3 dB attenuation at 90 degrees. A little over 5 inches long, including the "figure 8" headpiece, the M)130 is supplied with a standard three-pin Switchcraft connector and is priced at $389.

Also from Beyer is the M-111 lavalier microphone. This dynamic model is supplied with a filter designed to provide flat freuency response when the unit is suspended over the chest. Its specially plotted frequency response curve is described as having a decrease of about 6 dB in the range from 700 to 800 Hz, and a gentle rise up to 8 dB from 1 kHz to 10 kHz. Length is 3.35 inches; overall frequency range is 60 Hz to 15 kHz; output is −62 dBm; impedance is 200 ohms. Supplied with a standard (Cannon-type) three-pin connector or with a one-meter cable and special connector for use with a pocket transmitter, the model M-111 costs $169.

CIRCLE 22 ON READER SERVICE CARD

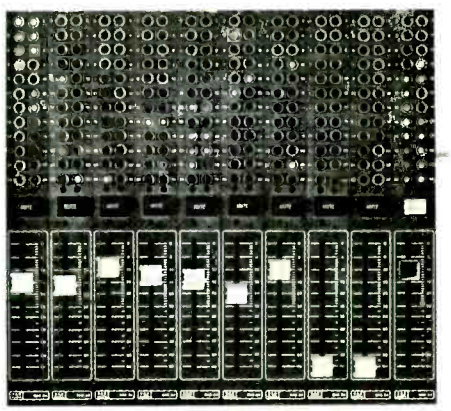
SUB-COMPACT CASSETTE PLAYER

Possibly the world's smallest self-contained stereo device is the new Sony TPS-L2 "Soundabout" cassette player. Weighing less than 1 pound (with batteries), the device measures 5 5/16 inches long, 3½ inches wide and 1 3/16 inches deep. It will run for about eight hours on two alkaline "AA" batteries. It also may be powered, via adaptors, from car batteries, line AC voltage or a rechargeable battery pack. The output signal (15 mW per channel) is available at two headphone jacks for simultaneous listening by two persons. One pair of stereophones is supplied with the player, together with carrying case and strap. Response is 40 Hz to 12 kHz.

CIRCLE 23 ON READER SERVICE CARD

"GROUPER" AIDS MIXING WORK

The B&B Audio model OAS-24, alias The Grouper and marketed by Aphex Systems Ltd, is a modular system composed of a VCA/Connector package, remote control console and power supply. The Grouper lets you balance the various parts of a mix without having "to move more faders than you have fingers." Panning, EQ and echo remain as flexible as ever since the signals are not actually combined. The system brings elements in and out of a mix precisely at desired cues with the touch of a button. Since inactive tracks are kept out of the mix, noise is reduced in multi-channel work. The standard configuration handles up to twenty-four audio channels and up to nine sub-groups (plus group master). The Grouper may be added to any mixing console quickly via patch cables.



CIRCLE 24 ON READER SERVICE CARD

PARAMETRIC EQ DIVIDER

Tannoy's XO5000 dividing network is a stereo unit in which each channel incorporates an independently adjustable single-point parametric equalizer operating in the 20 Hz to 200 Hz frequency band. The operating characteristics of the crossover voltage response required by a given speaker system (slope, frequency and band-pass parameters) are defined by a plug-in module. Modules are available for all Tannoy monitors as well as for Altec Lansing model 604-G, and JBL models 4350, 4343, 4333 in the bi-amp mode. In addition to the parametric EQ action, the Tannoy divider provides variable time-delay, switchable filters and gain controls.

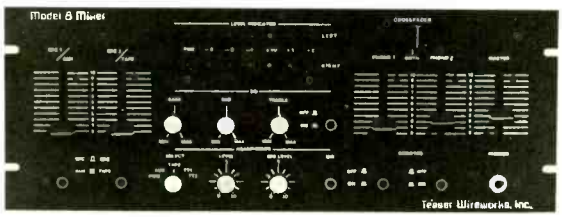
CIRCLE 25 ON READER SERVICE CARD

PREAMP/MIXERS

The models 8 and 8A from Teaser Wireworks of Dallas, Texas are EIA standard rack-mount preamp-mixers. Both units have six separate inputs (two phono, one auxiliary, one tape and two microphone); full cueing facilities and control monitoring. Teaser's "two-time" mixing feature enables a deejay to preview a mix before it is played to the audience. Used in conjunction with headphones, this facility permits the operator to monitor the main program source in one earcup, and his standby program in the other.

Both mixers use stereo LED displays. The 8A, in addition, has three "beat match" LED indicators for beat mixing. Two outer LEDs pulsate to indicate record beats, and the center LED glows when both phono programs are in sync. For "bang" mixing, the 8A also features level matching LEDs.

Outputs for both units include stereo main, mono for driving light controllers and stereo EQ. The EQ output forms a loop with the EQ input for connection of an outboard signal processor. The model 8A also features a mic equalizer circuit. Prices are $900 for the model 8, and $999 for the model 8A.



CIRCLE 26 ON READER SERVICE CARD

STEREO MIC ADAPTER

Two microphones may be mounted on a single stand with the aid of the new Shure Model A27M adapter which permits horizontal coincident (mounted on same axis) or closely spaced mounting of microphones in a wide range of directional angles. The user can select the X-Y, ORTF or other stereo pickup configurations. Suggested applications include miking for stereo broadcasting, recording and sound reinforcement—including, says Shure, improved pickup of ambience in comparison to other methods such as two or more microphones widely spaced, or individual miking of instruments or sections. Price is $22.05.

CIRCLE 27 ON READER SERVICE CARD

AUTOMATED CONSOLE

The new Series 30 recording console from Sound Workshop Professional Audio Products offers most of the features and performance found in Sound Workshop's Series 1600, but in a smaller size and at lower cost. The Series 30 comes equipped with 8, 16 or 24 discrete output channels (determined by the number of inputs ordered) and eight active mix busses. Mainframe sizes of up to 36 inputs are available, permitting console configurations ranging from 12 × 8 to 36 × 32. An in-line (input/output) design, the Series 30 allows full monitor capabilities of any multi-track format, limited only by the number of inputs present. Metering is via LED ladder display. An optional meter bridge housing with standard VU meters and peak-reading LEDs also is available. Other options include VCA input subgrouping (utilizing the Allison EGC-101 gain cell) and ARMS automation (MCI compatible). Standard output level is a nominal +4 dBm, but other interface levels may be accommodated with no decrease in performance. The Series 30 format "A" is designed for applications "demanding sonic excellence without a full array of supplementary functions and frills," explains the company. Format "B" is more elaborate. Both formats include a pedestal base and power supply.

CIRCLE 28 ON READER SERVICE CARD

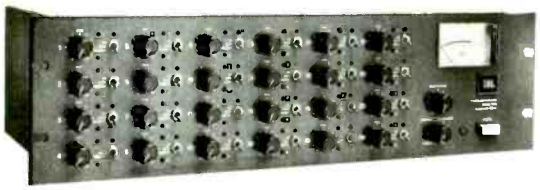
DUAL 15-BAND GRAPHIC EQ

Two sets of 15 bands on 2/3 ISO frequency centers are featured in the new R-830 graphic equalizer from DOD Electronics of Salt Lake City. Boost or cut range on each slider is ±12 dB. Both balanced and unbalanced inputs and outputs are provided. The EQ bypass switch does not disable the balanced input and output. The R-830 fits standard rack mounts.

CIRCLE 29 ON READER SERVICE CARD

JBL MIC MIXER

Described as a state-of-the-art automatic microphone mixer, the new JBL model 7510 comes standard as a four-input module expandable to 24-input capacity. The device features automatic mic turn-ON/turn-OFF, and output level correction, said to allow for considerable gain without feedback. In addition, advanced level sensing circuitry makes for extremely fast attack, which JBL points out as being excellent for use in gated mixing. Each four-input module has front-panel controls for level, threshold and release times. Another switch allows each channel to be set for manual, automatic or priority modes. In all three modes, a digital attenuator automatically reduces output gain by 3 dB for each doubling of an active microphone. The unit also has a built-in 48-volt phantom power supply, and direct outputs for each input channel. The model 7510 may be rack-mounted in three EIA standard rack spaces.



CIRCLE 30 ON READER SERVICE CARD

PATCH BAY SYSTEM

The new Patch Bay, from Audiovisual Systems of L.A., features sixteen stereo inputs and outputs (a total of 256 two-channel crosspoints) with 64 gold-plated RCA phono connectors on the rear panel and 3-conductor "bantam" jacks on the front. The unit's "fully-normalled" design means that no patch cords are needed for normal system operation. However, cords may be inserted to break normal connections and to insert or rearrange components or signal-processing devices. Once set up, says the manufacturer, there should be no need for access to the rear of any equipment. All connection points can be accessed from the front panel. The Patch Bay uses no active circuitry or power and is contained in a 1¾-inch EIA standard rack package. Price is $540.

CIRCLE 31 ON READER SERVICE CARD

SOUND SYSTEM SNIFFLES

Does your sound system ever catch cold, sounding choked up for no apparent reason? You know the kind of thing I mean—one day, mysteriously, the highs are squashed down and the bass just isn't all there. You check controls and switch settings, interconnections, etc., and can find nothing wrong.

You are about to call for help when, just as mysteriously, usually a day or two later, the system starts to sound as good as it used to. The highs are smooth and extended; the bass is ample and solid.

I, and others, have puzzled over this kind of thing for years and until some additional wisdom is forthcoming on the subject, there seem to be two possible explanations for the occasional gloomy case of "stereo sniffles."

One is the effect of humidity and temperature on electroacoustic transducers, and especially on loudspeakers whose diaphragms are loaded fairly directly into a room. Depending on a host of complex and generally unpredictable factors, a particular speaker diaphragm may "prefer" one kind of environment to another, and so when something in the environment changes the balance in the air against which that diaphragm must work, the speaker reacts accordingly. Then, when the environment returns to its former state, the optimum relationship of source and load is once again established and things come out the way they should. A concomitant of this theory has it that the more indirectly a speaker radiates, the less chance there is for the upset to occur.

Explanation number two concerns the metal connectors at the ends of signal cables. Over a time, goes the theory, there's a gradual build-up of corrosion on metal connectors that can become signal-resistant. Interestingly enough, many sound-system owners actually solve this problem without realizing it—by the old dodge of simply removing and reinserting all signal cables from and to their mating jacks. This routine action can have the effect of removing the "coating" and thus restore full contact. The corollary of this theory is the often-heard story of the system that was brought into the service shop with the owner complaining that things "just don't sound right." The system is hooked up in the shop with a new set of cables, and turned on. There isn't a thing wrong with it now!

I'd be interested in hearing from our readers on this—have you had similar experiences?

MUSICAL NEWSICALS

MUSICAL INSTRUMENTS

A name that may not be familiar to many electric guitarists is Veillette-Citron from Sundown Music, Inc. The latest additions to the Veillette-Citron line are three guitar models all of which feature a neck which extends the full length of the body and are equipped with Schaller tuning machines and V-C's own dual-coil humbucking pickups. The basic model is logically enough called the Standard and is available in Sunburst Satin, opaque black or a clear satin finish trimmed with chrome plated hardware. The Classic is a more sophisticated model featuring two-stage pickups and potentiometers with integrated push/pull switches. To complement the Classic's sophisticated electronics, the model is finished with fifteen coats of clear lacquer to show off its select maple body (other hardwoods also available) which is further set off by all brass hardware. V-C's Limited Edition model is electronically identical to the Classic, but the body of the guitar is faced with a 5/16-inch thick lamination of exotic hardwoods such as ebony, rosewood or koa wood, and the neck and headpiece have matching laminations.

CIRCLE 1 ON READER SERVICE CARD

A very interesting line of English-made acoustic instruments is now available in America from Fylde Instruments US, Inc. Fylde instruments are owned and played by many of today's finest guitarists, including Al Di Meola, John Abercrombie, Pete Townshend and Elliott Randall who have publicly praised their Fylde guitars. Several models are available from Fylde, all of which share such common features as a mahogany neck with H-shaped aluminum alloy truss rod, nickel silver frets, a zero fret and a lignum vitae wood nut for perfect intonation and excellent sustain, Schaller machine heads and optional fiberglass flight cases. The Prospero is a 12-string model of unique design with a short, 12-fret neck for strength and a single cutaway body to restore full use of the fingerboard; this short-scale (24.13″) instrument features a spruce top, mahogany sides and back and ebony fingerboard. The Ariel is a relatively long scale (25″) steel string guitar with an extra-light body for extra response; the Ariel's top is cedar, while the back and sides are mahogany. The Caliban is a cedar-topped, rosewood body guitar designed for a more forceful tone similar to an arch-top instrument; the narrow fretboard and fast action were designed for fast lead playing which is also aided by the cutaway body. In a less conventional vein, Fylde offers the Octavius mandocello and the Sir Toby acoustic bass guitar.

The Sir Toby is cedar-topped and mahogany-bodied and has a choice of ebony or rosewood fretboards atop the 17-fret neck; standard scale length is 30″ with longer scales available. The Octavia is a very rich sounding eight-string instrument which can be tuned as a mandocello or a bouzouki for more unusual musical textures. For those interested in what Fylde instruments sound like, there is a commercially released LP, entitled "Fylde Acoustic" (Trailer Records, LER 2105, an English release) which features more than a dozen of Great Britain's top folk artists playing their Fyldes.

CIRCLE 2 ON READER SERVICE CARD

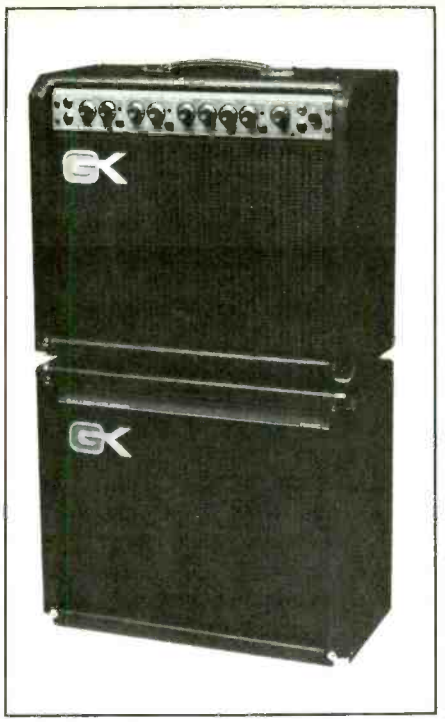
Helpinstill Designs, Inc. is justifiably well-known for its excellent magnetic pickup systems for pianos, but the company has branched out into the manufacture of instruments

with the introduction of the RoadMaster Flightcase Piano. This new instrument is basically a spinet type piano with a unique folding keyboard and a built-in Helpinstill Sensor system for electric or acoustic use. For a true acoustic sound, the 64-note instrument has a laminated spruce sound-board and uses double stringing (for an explanation of why double stringing is so important to the characteristic sound of the piano see the cover story on the physics of piano strings in the January, 1979 issue of *Scientific American*). The RoadMaster was designed to be fully road-worthy with heavy-duty casters and an integral formica-over-plywood flight case complete with extruded aluminum edging and steel corners; for transporting, the keyboard mechanism folds down into the flight case. To aid tuning stability, the piano uses a 14-ply laminated pinblock. With the keyboard folded down, the RoadMaster piano measures only 43½" wide x 37¾" high x 12¾" deep, and weighs in at a reasonable 210 pounds.

CIRCLE 15 ON READER SERVICE CARD

MUSICAL INSTRUMENT AMPLIFIERS

Gallien-Kruger has announced the first model in what is to be a new series of guitar and bass guitar amplifiers. The Gallien-Kruger 112SC is a 75-watt RMS combo guitar amp with a single Celestion G12-80 speaker. The 112SC has two separate input channels, a normal channel and a high gain channel with bright switch, each of which has an input volume control and a master volume control to give each channel a full range of overdrive sounds available. The two channels are selectable with a footswitch which has LED indicators to signal the player his amplifier mode regardless of whether he can see the amp itself. The two channels may also be operated in series for more extreme distortion simply by pushing a front panel button. Also available on the footswitch unit are selector switches for reverb and contour, again with LED indicators. Contour is a tone shaping function which is rather similar to loudness compensation on a hi-fi amplifier; switching on contour boosts the bass and treble and subdues the midrange for a fuller "clean" sound, while an overdriven sound will generally benefit from the greater midrange with the contour off. A four-band active equalization section is included which was designed for maximum musical usefulness and non-interaction between EQ sections. A pre-reverb effects loop with convenient front panel jacks is also provided on the 112SC, and there is a jack on the back of the amp for connection of an extension speaker such as the matching 112 EC for occasions where very high power levels are needed.



CIRCLE 16 ON READER SERVICE CARD

The latest news from Rhodes Keyboard Instruments concerns its new Rhodes Janus I keyboard amplification system which was specifically designed to provide superior amplification for the Rhodes piano. (The Rhodes piano is better known to most musicians as the Fender Rhodes, although parent company CBS has now divided Rhodes Keyboard Instruments USA and Fender Musical Instruments into two separate entities.) The Janus I system starts with a replacement preamp control panel which replaces the standard preamp panel of a Rhodes piano in its entirety. The new preamp panel has a rotary volume control, horizontal sliders for bass and treble controls, and vibrato intensity and speed controls along with a vibrato on/off switch and a vibrato indicator LED which pulses to show the vibrato speed. A 5-conductor cable assembly with 5-pin XLR-type connectors connects the preamp panel with the 50-watt RMS per channel stereo power amplifier housed in each speaker cabinet. Each power amp as a master input jack for the feed from the preamp and a slave output jack for the addition of additional power amp/speaker enclosure units. Also provided are preamp output and power amp input jacks to allow direct feeds to mixing consoles or insertion of stereo effects devices between preamp and power amp. A gain control adjusts the power amp gain over a +6 to −20 dB range to allow multiple cabinets to be balanced as desired, and a stereo headphone jack which automatically disconnects the speakers is also provided. The speaker cabinet itself is a vented design housing two 12-inch speakers which are driven from separate power amp channels for stereo vibrato effects with a single speaker unit. The speaker enclosures are vinyl covered and come complete with carrying handles and casters and weigh in at only 62 lbs. The Rhodes Janus I is most useful with the Rhodes Stage Piano, but it is also very useful with the Suitcase model for a more powerful sound and a more dramatic stereo vibrato effect.

CIRCLE 17 ON READER SERVICE CARD

International Music Corporation has announced a new top model in their Texas Amplifier line. The new model is the TA-50 which is a compact 60-watt RMS combo amp. Electronically the TA-50 features two inputs (one high gain and one low), gain control, active tone controls, midrange frequency expander, master volume control and a separate distortion control for maximum control over the amplifier's sound. The amplifier cabinet has a slanted front panel for improved sound projection, and is constructed from ¾-inch material with a double-ply covering.

CIRCLE 18 ON READER SERVICE CARD

Acoustic Control Corp. has always been renowned for its solid-state instrument amplifiers, but they have recently expanded into tube-type amplifiers with their 160 series amplifier. The Model 160 is a full-tube design with a power output of 60 or 100 watts RMS selectable via a front panel switch. For more tonal versatility, the Model 160 has an FET front end stage in addition to the tube front end, and the user may select between the two with a switch. The amp has two input channels each of which has its own master volume control in addition to input gain controls. Bass, mid, treble and presence tone controls are provided with pull-switches for boost on the bass and treble controls, plus the unit has a five-band graphic equalizer and a reverb circuit. The basic 160 series amp is available in three versions: the Model 160 is a separate power head in a vinyl-covered cabinet, while the 164 and 165 are combo amps featuring a single Electro-Voice EVM 12L (12-inch) speaker. The Model 164 is covered in heavy-duty brown vinyl while the Model 165 is housed in a hand-rubbed oak and walnut cabinet. For users of the Model 160, Acoustic offers the Model 464 speaker enclosure which houses the same Electro-Voice speaker as the 164 and 165 use in a vinyl-covered, open-backed cabinet.

CIRCLE 8 ON READER SERVICE CARD

Fender Musical Instruments has introduced an updated tube-type guitar amplifier known as the Fender 75. As the name implies, the Fender 75 is a 75-watt RMS amplifier which uses a single special design 15-inch speaker. The Fender 75 was designed to give the musician a wide range of tonal possibilities in addition to the basic Fender tube amp sound. The amp is a two channel design with a rhythm channel providing the traditional Fender sound and a lead channel with its own separate master volume control in addition to the overall master volume control which affects both channels simultaneously. For additional flexibility, the two channels may be cascaded for even greater distortion than the lead channel alone can provide by means of a footswitch. A red LED lights up when the lead channel is in use and a green LED indicates that the three-spring reverb is enabled. Tone controls on the Fender 75 are quite comprehensive with bass, mid-range and treble controls each of which

has a pull-switch for boost. The front panel also boasts a high/low power switch to reduce the power output without changing the amp's sound, and rear panel connectors are provided for line/direct signal out, effects send and return, reverb send and return and main and extension speaker outputs.

CIRCLE 9 ON READER SERVICE CARD

Morley has been known for years for its high-quality photo-electric volume and wah-wah pedals so it shouldn't come as too much of a shock that the company has now introduced a power amplifier integrated with a volume pedal in a convenient, eight pound package. The Morley Bigfoot can be used as a conventional volume pedal with its line output jack, or it may be used to drive a speaker cabinet of 4 ohms or greater directly from its built-in 25-watt RMS power amplifier. The Bigfoot is said to feature a tube-type sound ranging from soft distortion to hard fuzz. Volume, bass and treble controls are furnished on the unit in addition to bass boost and treble boost footswitches.

CIRCLE 10 ON READER SERVICE CARD

MUSICAL INSTRUMENT ACCESSORIES

Tubes are not often thought of as an accessory item, but it is a fact that a good set of tubes can do wonders for the sound of a guitar amplifier. Groove Tubes is a California company which now offers balanced and matched sets of tubes for most musical instrument amplifiers. Besides the well-known improvement in sound, a matched set of power tubes will usually last longer than an unmatched set since the tubes will not be working against each other as they do when the match is poor. Prices and availability of Groove Tube matched tube sets for various applications can be had by contacting Aspen Associates ([P.O. Box 4753, Sylmar, Ca. 91342), who are the same folk who represent the Mainline™ Multiplex snake cable systems.

CIRCLE 11 ON READER SERVICE CARD

Owners of Gibson (and Gibson copy) guitars who like to play along with the radio or record will welcome news of the Pitchfinder speed tuner tailpiece from Lenny Pogan Productions. The Pitchfinder replaces the stock Les Paul or Gibson tailpiece and allows all six strings to be simultaneously adjusted up or down in pitch simply by turning a thumbscrew. Other products from Lenny Pogan include the Blu-Slide and BluNeck devices for bottleneck or slide guitar.

CIRCLE 12 ON READER SERVICE CARD

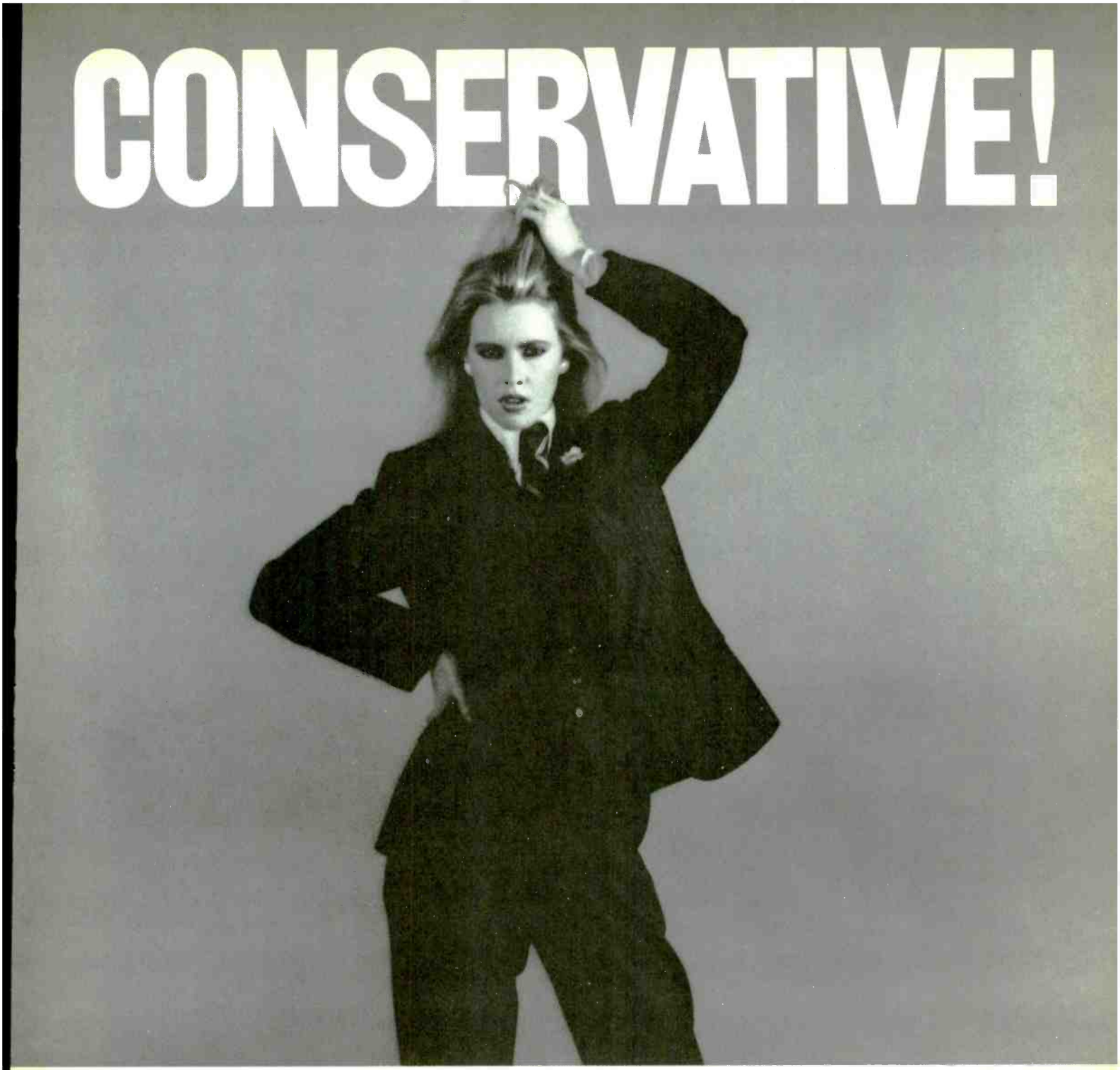
The Rat is the name of a footswitch-operated distortion device from Pro-Co Sound, Inc., which is best known for its line of Lifelines cables. The Rat has controls for distortion, tone and overall volume which are said to give the unit a very wide range of effects. The bypass footswitch on the unit switches both input and output so that the circuitry is truly bypassed when switched out. The Rat uses special micropower circuitry for maximum life from its 9-volt battery.

CIRCLE 13 ON READER SERVICE CARD

A new approach to tuning aids is seen in the Alphatone from Imagineering Audio. The Alphatone is the first tuning device which reads out the actual note alphabetically as the musician plays it. Alphatone is accurate over a 7-octave range, reads out the name of the note, indicates sharp or flat and provides a centering bar indicator for accurate tuning. Another feature is the ability to transpose to a different key by setting a switch on the unit. The Alphatone is battery powered and is available in professional (high accuracy), student (high speed) and combination versions.

CIRCLE 14 ON READER SERVICE CARD

CONSERVATIVE!



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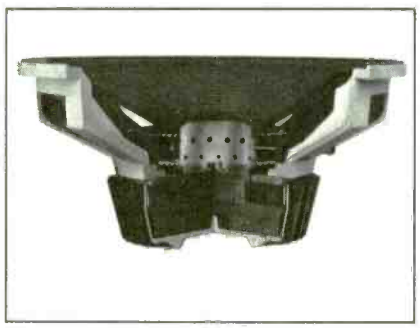

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CIRCLE 112 ON READER SERVICE CARD

We've kept

THE CREST P-3500 SERIES PROFESSIONAL AMPS
250 watts per channel, 8 ohms*/400 watts per channel, 4 ohms*
TOP: P-3500/BOTTOM: P-3501 (without VU meter)

We're Crest Audio. We make the world's best professional power amplifiers.

Last year we introduced our P-3500 series low profile amplifiers. Delivering 250 watts per channel into an 8 ohm load and standing just 3½" high, the P-3500 was an immediate winner.

The P-3500 quickly proved itself on major concert tours. It's been put to the test in huge stadiums, small clubs and recording studios. And it's passed every test with rave reviews.

Because the P-3500 isn't just "another" amp. It's a demonstrably better amp. Aside from it's flawless sonic qualities, it has a unique combination of design and engineering features that leave it unrivaled in the world of professional amplifiers. Quite simply, it's the best pro amp in its class.

Success breeds success.

Introducing the newest addition to the Crest line:

The P-2500 Series professional amplifiers. They're virtually identical to the P-3500 Series with two notable exceptions: Lower power rating and a lower price tag. Otherwise, they've inherited the same low profile, flawless sound, smart features and rugged reliability of our P-3500 Series. The P-2500 Series is now the best professional amplifier in its class.

Our low profile.

All the Crest amps pack their power into a rack mountable package standing just 3½" tall. That's ½ the height of conventional amps. And that saves a lot of rack space. Compared to conventional amps of comparable power, Crest amps give you the same power output while using just ½ the vertical rack space.

Our sound.

You can't buy better sound. It's solid. Tight. Incredibly clean. Undeniably accurate.

a low profile.

THE CREST P-2500 SERIES PROFESSIONAL AMPS
125 watts per channel, 8 ohms*/200 watts per channel, 4 ohms*
TOP: P-2500/BOTTOM: P-2501 (without VU meter)

It's what we put into our amps that accounts for what comes out. For example, we utilize Bi FET operational amplifiers coupled with 10 high speed output transistors per channel.

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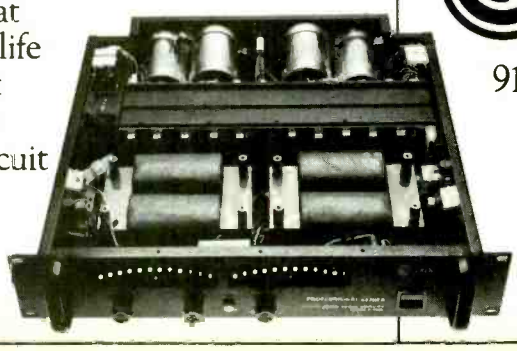

Toughest amps in the business.

Crest amps are practically bomb proof. Inside, everything's snug and tight, securely attached to the protective 16 gauge steel chassis. Although Crest amps are sophisticated, state-of-the-art electronic systems, fragile they are not. Check us out.

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*FTC rated continuous average sinewave over a bandwidth from 10Hz to 20kHz, both channels driven

CIRCLE 86 ON READER SERVICE CARD

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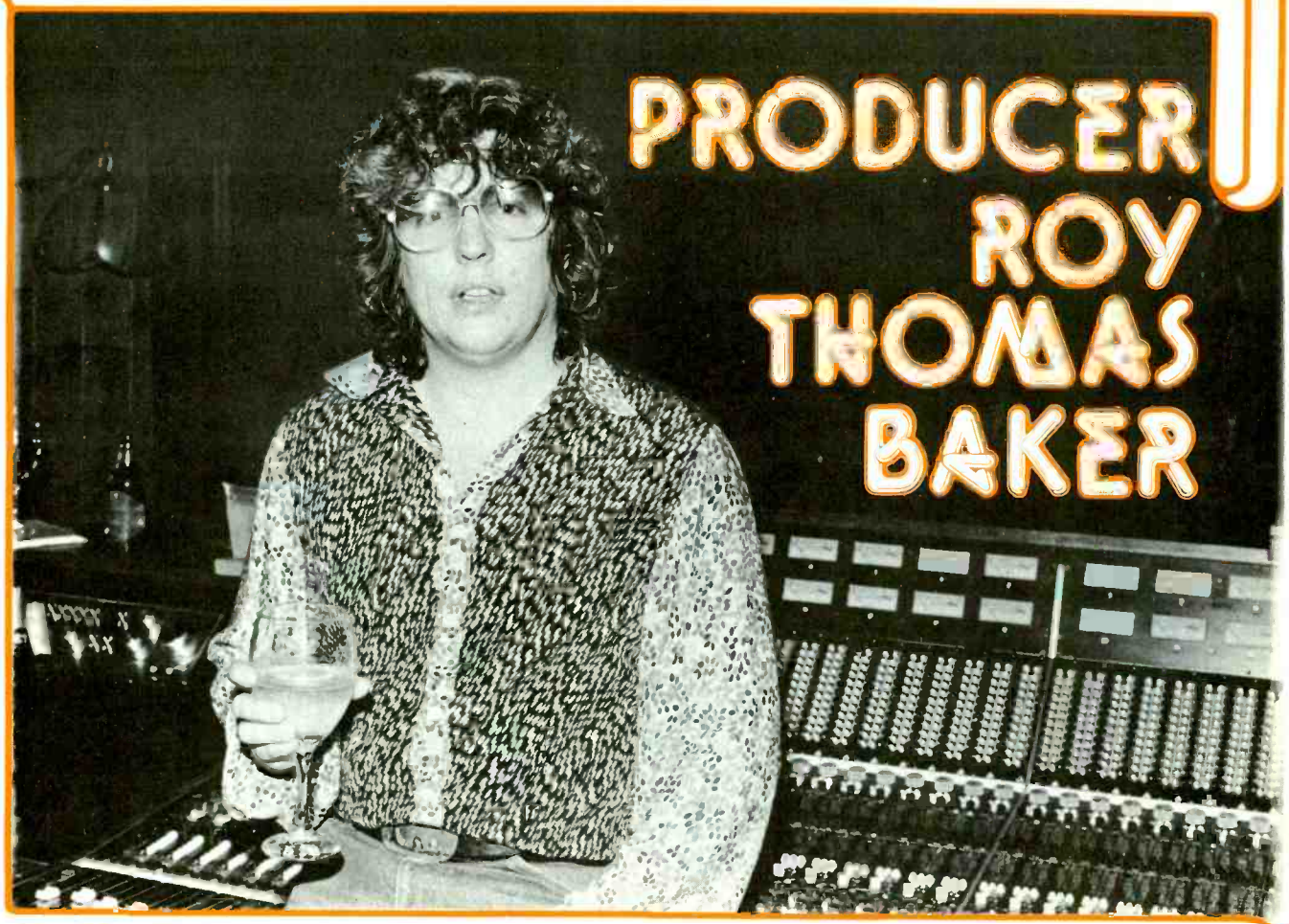

By Jim McCullaugh

Coming to prominence in the mid-70s as Queen's studio mentor, Roy Thomas Baker, 31, can be legitimately characterized a "super producer."

From the time he began as a teenage second engineer in London until now, he figures he's had a production and engineering hand in LPs that have sold approximately 30 to 40 million units worldwide.

At the time of this interview he had five albums on the charts: two by the Cars, two by Journey and one by Foreigner. Newer projects include Alice Cooper and newcomer Hilly Michaels, both for Warner Bros., and the Cars' third album. After that Baker "takes some time off."

Now basing his RTB Audio-Visual Productions in Los Angeles, Baker has perhaps more than any other contemporary producer helped mold a rock 'n' roll sound for the late 70s and early 80s that's proving to be widely popular—short, well-produced, driving rock tunes.

He uses a custom-made Stephens 40-track tape recorder but feels "the technical aspect is secondary. If it's a hit song, it can be recorded on a cassette player."

Modern Recording: How did you get your start?

Roy Thomas Baker: At the age of 12 I knew I wanted to be a record producer. But I didn't play a musical instrument and didn't want to. The only way I could train, then, was to become a recording engineer. At the age of 14 I went to Decca in London for an interview to become an assistant engineer.

MR: What were some of the early projects you were involved with?

RTB: Some of the first things were classical. It also included English MOR and a few pop things. After a while, I worked my way up to first engineer and got involved with a lot of the Decca London artists at the time—Ten Years After, Savoy Brown, groups like that. But then I wanted to make the change from engineer to producer and there were no outlets to do that through Decca. There was so much red tape and bureaucracy.

MR: What was the main obstacle?

RTB: Well, the production side of things was run from the head offices, not the studios. It was impossible for an engineer to become a producer there. They couldn't see it. To them an engineer was an engineer and a producer was a producer. That's wrong. And they couldn't understand that an

engineer could become a producer. It was easier for them to give the job of production to someone there who designed record sleeves or wrote liner notes than letting an engineer become an assistant producer. Basically, I'm afraid to say, that was the downfall of Decca. That kind of attitude.

On the engineering level at the time were people like Gus Dudgeon who later on became Elton John's producer. And other engineers there went on to become established producers with established artists. That talent was completely lost and wasted. They didn't know what talent they had there.

MR: So you were forced to leave?

RTB: That's right. I had to leave in order to become a producer. As it turned out, at the time there was a brand new studio in London called Trident and I started there where some of the engineers were Ken Scott and Robin Cable. Scott, of course, has gone on to produce artists like David Bowie, Supertramp, Devo, Stanley Clarke, the Dixie Dregs and others. At Trident I became involved with American artists such as Dr. John, Santana, Frank Zappa & the Mothers of Invention. And I also got involved with lots of good English artists such as Free, T-Rex with Marc Bolan and others. I also engineered the Rolling Stones.

MR: But you still had your sights on production?

RTB: Right. I convinced the people at Trident that we should have our own production company—but at first they were against it. They felt that they didn't want to be in competition basically with their own clients. But I urged them to give it a try. At the time I was engineering the first Nazareth LP and I wound up producing their second LP. That was my first-ever LP production.

MR: Which led to more production?

RTB: Yes. At about the same time I was producing Nazareth I was wandering around at night looking for talent and bumped into an unknown, unsigned band called Queen. It was funny. I remember telling Nazareth that I found this incredible band called Queen and they laughed. "A band called Queen," they said. But I did the first Queen LP and under very bad conditions. It was all done during studio down time since it was experimental. We went into the studio during off hours; at midnight, for example, when the main session of the evening might be over. That first Queen LP turned out to be a relative hit, particularly in Europe.

MR: Were you on your way then as a producer?

RTB: I was still doing some engineering. But I never wanted to be an engineer. It was just a means to an end. Of course the studios wanted me to engineer because I was a pretty good engineer. And that meant attracting clients and making more money for the studios. But I ended up making more money for them as a producer. Engineering remained my basic bread and butter for a while and I would half-engineer, half-produce certain projects. I also helped bring up young engineers there at the time such as Mike Stone. But the more I produced the more I knew I wanted to produce. I began doing artists like Be-Bop Deluxe and Gasoline, a big group in Denmark. And other groups who were big in Europe. I still was not concentrating on America. At the time America was just that big land over there.

MR: When did you start coming to the U.S.?

RTB: Well, I produced the first four Queen LPs and then I started coming to America. I came over for a visit to check it out. Now, of course, I'm concentrating on America more and more. It seems now the combination of me working in America is turning out very well. Perhaps things might be a little different if I was brought up in America. I don't know. But I started coming to America and started doing more and more American artists.

MR: What was your impression of America?

RTB: It was interesting. England had total censorship on radio for a long time, at least up until the mid 60s, because there was only the BBC Light Program. I never heard of people like B.B. King, for example, until the Rolling Stones said they were inspired by him. Sure, we heard people like Elvis Presley and Chubby Checker, but not people like Chuck Berry. I never heard of him. But in England in the mid-60s also were these pirate stations and many of them were pumping out the American hits. I had never heard many of the artists so it was really good. I didn't like everything I heard but I heard an awful lot I liked. And that inspired me to want to come to America.

MR: You split up with Queen for a while, didn't you?

RTB: Yes, we split company for two LPs as I was concentrating more and more on coming to America. Then we got back together again for *Bicycle Race*. It was great though because it wasn't the same relationship anymore. Even though we were not working together, we were still the best of friends. I was still doing things with lead singer Freddie Mercury, like co-producing people. We were close friends and have great times together. In fact, I think we became closer friends. If I had done their fifth LP, we may have broken up professionally as well as personally. Who knows? When it came to doing their seventh LP they asked me, "Do you fancy doing the next album?" I said yes. It was no longer a producer/artist relationship. We went into the studio and made a record.

MR: That was the LP where the nude women bicycle race was staged for the poster that came with the LP, right?

RTB: Yes. It was a little outrageous. We sat down and came up with some mad ideas for that LP. It was an indulgence, I admit it. But it was a good indulgence. We worked in the south of France. It was a total indulgence and it was successful. It was fun to get back together again. We're still good friends.

MR: And you haven't produced them since that album?

RTB: No. In fact, their recent number one single "Crazy Little Thing Called Love" says a lot about the type of band they are. They bought a recording studio in Switzerland and between that and other studios they go in periodically to cut songs. *Songs*, not LPs, when they feel like it. Out of that comes hit singles. I like that approach. Especially for kids. I feel kids still do get ripped off these days by LPs because they hear that hit single. Then they go out and buy the LP and discover it's absolute manure. I remember talking to the band about this at one point. If you release a single and it's a hit, fine. And when you are ready to put out an LP you might wind up putting three hit singles on it. That's giving kids a lot more value for their money. That Queen single is number one without an LP out there to go with it. To me that makes more sense. ABBA, which is my favorite band, does it that way.

MR: You're a big ABBA fan?

RTB: Yes. Christ knows why they are not bigger in America. I find it

" You need a continuity that is worked on from LP to LP. That's the root of longevity."

totally beyond me. They have such a unique pop sound. And they put out these brilliant, short pop songs. I listen to them all the time, for hours. It's pop and some people dismiss them, but there's a great deal of depth to what they do. Listen to short, unique songs like "Gimme, Gimme, Gimme." Absolutely brilliant.

MR: How did the association with the Cars come about?

RTB: I was producing a Journey LP because I had gotten to know various members of the band through my association with Santana. Journey is a good group of musicians who had never really broken big until now. They tended to be a bit too self-indulgent at the time. Long solos, things like that. They needed a direction, songs that were short as opposed to long and drawn out. I'm happy to say that I think I gave them a good direction with *Evolution* and *Infinity.* In the middle of *Infinity* my contacts at Elektra, who I knew well from my Queen association, told me the label was interested in signing an unknown band called Cars in Boston. I inquired if I could hear some demo tapes but I was told they were not that good. I had to be in New York the following week anyway so I decided to take a flight to Boston for a look. A lot of labels and producers had passed over them. I arrived in Boston in the middle of a blizzard and their manager picked me up in a white VW. It was freezing cold and there were huge snow drifts everywhere. We kept getting lost. We finally got to what looked like a school gymnasium that had been converted into a hall for Saturday night dances. There were only eight people in the audience since no one could get to the gig. In fact, with myself, the manager and group, it looked like more of us than of audience.

MR: You liked them?

RTB: They played very well, songs we now know from the first LP. I could not believe they had been passed over. The first thing that attracted me was the songs—they needed a little molding but the basics were there.

Afterwards we went to a little club and got drunk and I committed myself to doing the album right there. I asked the group what they were doing the following January. It was December. I had to be in London and told them to fly over and we'd do an LP. We recorded and mixed it in twenty-one days.

MR: Did you know that LP would be as huge as it has since become?

RTB: I felt it instinctively, even before we went into the studio. It was hilarious in a way since no one at the record company had heard it. Not that no one was interested but we were huddled at AIR Studios London and everyone at Elektra was back in Los Angeles. I went to New York to cut references and then played it one Sunday morning after breakfast for Joe Smith, the label president. He thought it was amazing and one of the freshest things he had heard in a long time. That LP has been on the charts ever since it came out.

MR: How did the association with Foreigner come about?

RTB: That started years ago. In fact, I had seen them before their first LP. Their manager, Bud Praeger, called me and told me about this new band of his. I went to his office rehearsal hall to see them and thought they were great. I wanted to do them but I was booked up. And they couldn't wait three or four months for me. They asked if I could recommend someone else, and I turned them on to my engineer Gary Lyons who produced the LP with John Sinclair in collaboration with Mick Jones and Ian McDonald of the band. Before their third LP I got a call from John Kalodner of Atlantic who said, "It's no good asking you if you want to produce Foreigner." I said yes, why not. And we made *Head Games.* I've never heard Lou Gramm sing any better than he did on the actual "Head Games" track.

MR: How did the Alice Cooper project come about?

RTB: I first met Alice at Bernie Taupin's birthday party. As I spent more time in Los Angeles I kept seeing more and more of Alice. I literally volunteered my services to him because I think he's great.

People think I'm mad, and I've had some even ask why I'm wasting my time with an aged star when I have all these new stars to pick from. But Alice is the type of person who knows what's going on. He likes New Wave. He likes the direction music is going. He's always been outrageous and a punker at heart. You can see that from his stage shows where he's had snakes and pretended to pull babies apart. But he's so intelligent and really knows what's going on. He will be doing new things. We're getting a lot of outside stuff. Alice has an intelligent creative approach and hopefully we'll have fresh songs we can put into a modern idiom. I have total freedom on the project as a producer.

MR: What's coming up for you after the Cooper project?

RTB: Hilly Michaels for Warner Bros. He's my new discovery for the year. I have to have one. Warner Bros. turned me onto him much the same way Elektra turned me on to the Cars. Actually, I started Hilly Michaels before Alice Cooper and will finish it after the Alice project. Then after that I'll take the Cars into a New York studio for their third LP. Michaels is a rock "artiste" who writes songs like ABBA but only in more of a rock vein. He's from New York and a talented songwriter. Some of the people we are using on the LP are Dan Hartman with Ellen Foley adding vocals.

MR: By now you must be swamped with tapes from newer artists as well as requests by established artists to produce them. How do you cope with it all?

RTB: I have a great system for screening tapes. I have this little JVC radio/cassette combination right next to my shower. I put it on in the morning when I'm feeling hung-over, tired and grotty. If it can cut through that it can cut through anything. That's how I found Hilly Michaels. I was listening to it in the shower and thought it was pretty damn good. I'm sure I've also turned down good material. But I don't know yet of any new band I've turned down that's really made it big. The system does seem to work.

MR: There seems to be a great versatility to your range as a producer.

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CIRCLE 143 ON READER SERVICE CARD

"It's so easy to overproduce. When you have a hole it's so easy to say, 'Let's fill it.' "

You can go from a spartan twenty-one day project with the Cars and be equally comfortable with a long, multi-layered project like Queen's "Bohemian Rhapsody." Do you have a particular style of working?

RTB: I vary everything all the time. And I change from day to day. I'm changing all the time. I also vary my attitudes, because I'm changing, towards the people I'm working with. I can spend months and months in the studio on something that needs months and months in the studio.

I got great pleasure in doing "Bohemian Rhapsody" because it was like a mini-art form. I'm glad it was a hit and it was fun. But even if it were not a hit I would have been satisfied with it. We spent months layering vocals and locking all those tape machines. But I also got a great deal of pleasure doing that twenty-one day Cars LP.

It's so easy to overproduce. People don't seem to realize that. When you have a hole it's so easy to say, "Let's fill it." You can think about putting five guitars here or fifteen vocals there. The Cars approach was that it was as overproduced as it should have been. When the voices came in there were lots of them. One thing wants one thing while another thing wants something completely different. For Foreigner we used six 24-tracks locked together at one time. That was a tremendous technical challenge. We used a lot of tracks.

MR: What's your attitude towards newer artists?

RTB: I always think long-term, never short- term, and that applies particularly to newer artists. Nobody wants to be a one shot wonder in this business. So a lot of the decisions I make are long-term decisions. On most of the demo tapes I get from new bands there's always the tendency to show how versatile they are. And because of that they lack a direction of style. When you think about the groups that have been around for a long time ... the Stones, Led Zeppelin or the Who ... you can recognize certain distinctive styles. When a song comes on the radio, you instantly know, for example, that's Pete Townsend's guitar.

The first thing I drum into any new artist is style. Some people might consider that typecasting. But it isn't. You still have the flexibility to change. The Beatles did it. They went from their "Please, Please Me's" and their "Yeah, Yeah's" to *Sgt. Pepper.* But they got their audience first and then changed them to their way of thinking. You need a continuity that is worked on from LP to LP. That's the root of longevity.

MR: Do you have particular studios and equipment that you prefer over others?

RTB: I like big rooms with lots of air. And I do enjoy working with new technology. But I think if a hit tune is a hit tune it can be recorded on a cassette machine. Everyone will hate me for saying that. Sure, I use technical effects all the time. But it has to be a hit. The technical aspect is secondary. I do prefer nice big airy rooms such as the big room at Cherokee in Los Angeles. I hate compact, little rooms for recording where drummers are stuck off in corners surrounded by blankets. I like the drummer in the middle of the room with people around him. I like the bass player next to him with all the other players enjoying visual and audio contact. I want them to be able to hear each other.

MR: What about consoles?

RTB: I'm biased towards English consoles because I think they are more advanced. MCI is perfectly adequate, but more, in my mind, like a Ford or Chevy. If you can tell the difference between a Cadillac and a Rolls, then stick with the Rolls. I can tell the difference. I prefer Neve and Trident because I can really hear the difference. If you can't tell the difference then stick with the MCI because it's cheaper. Don't get me wrong; MCI has done a great job. But I can hear the difference in transient response and equalization. Sure the Bee Gees have recorded all those hits on MCI, but I think "Staying Alive" would have been a hit on a cassette. Anyway, I think it's harder to record rock than disco. Disco has no real dynamics. When you are working with rock dynamics, then you need ultimate dynamic response and ultimate frequency response.

MR: Earlier you implied that the producer's role and the engineer's role are very distinct. Do you still believe that?

RTB: The producer and engineer roles are very separate, I believe. There's no way I could concentrate on producing if I had to engineer. Producing is an art and engineering is an art and they are not compatible in any sense. A lot of engineers today are selling their engineering talents and producing, but if you notice most of them don't have hits with more than one or two bands. I don't even sit next to the engineer. I sit in front of the board. When I work at A&R Studios in New York, for example, they put this platform in front of the console and that's where I sit. So I can see into the studio and have the monitors in front of me.

How the hell can you worry about whether or not to cut out a chorus or not when you have to worry about headphone balance or EQ balance? That is an art unto itself and should be left up to an engineer. There are some exceptions, of course. A lot of my work is done in the studio. I do some pre-production work before the studio, like concentrating on songs, but most of the creative arranging decisions are done in the studio during the project.

MR: Any final thoughts about musical direction in the 80s?

RTB: There won't be any major changes for at least three years. And even that might not be a major change. There will be a few slow changes. The days of a group like the Beatles are over. It will never happen again. The media is too big and too saturated. I love New Wave music and I think a form of that will be around for some time. The bottom line is, however, that it doesn't matter what it is or where it comes from. It has to have melody and the songs have to be good. The basic rules—the performance, the songs, the melodies—will always be the basic rules. You'll see some bandwagons being jumped on but the basics still have to be there. I think this slowdown in the record industry is the best thing that's ever happened. It's getting rid of the loose ends. The real talent is emerging.

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A PROFILE

HERBIE HANCOCK

By Sheryl Roberts

During the recording of Herbie Hancock's latest album release, Monster, *author Sheryl Roberts had the chance to sit down and speak with principals Herbie Hancock, keyboard engineer Bryan Bell and producer David Rubinson.* MR *feels that the musical technology that was involved in the making of this LP should be of great interest to its readers.—H.G.L.*

Herbie Hancock sits among his electronic playground of synthesized instruments. At his fingertips lies an infinite spectrum for producing a musical panorama.

"Ever since I've played the piano, I've thought orchestrally. I've always been interested in texture, colors, dynamics and touch. When I play a synthesizer, I'm able to create my own instruments. Everytime I program a sound, it's one instrument, and when I program another, it's a different instrument. I have as large a range as my creative mind will allow."

His fascination with electronics did not begin with his introduction to the synthesizer. As a young boy, Herbie was not only busy playing the piano, but he was also toying around with anything electrical or mechanical. At Grinnell College he was an engineering student, however, he eventually abandoned engineering for music.

"I was pretty good in physics, and math was my best subject in college, but then I got involved with music. I formed a big band and from then on I was hooked."

As technology has become a prominent factor in the music business, Herbie naturally has found himself returning to his old love—electronics. Interweaving his musical genius with his technical background, this artist has found he has the best of both worlds. But then again, a look at Herbie Hancock's musical career proves that he wouldn't be satisfied with anything else.

Unlike many other artists Hancock has *succeeded* in changing musical colors whenever he saw fit—from straightahead jazz to free jazz, from free jazz to jazz with a funky flavor, and recently, adding the rock/disco influence. Though criticized by many for "selling out" and commercializing

his style, Herbie nonetheless continues to experiment with different types of music and with various means of producing it.

"On one level I consider myself a jazz musician, but on a deeper level I consider myself a musician not restricted to jazz," Herbie explains.

On his last two albums, *Sunlight* (1978, Columbia) and *Feets, Don't Fail Me Now* (1979, Columbia), Herbie dared to do something he had never done in over thirty years of playing the piano—sing! The device that made it possible was the vocoder.

"A vocoder takes a sound source and a replacement sound source, and allows you to make a basic sound. In other words, what I've done is use my voice as the original sound and the synthesizer as the replacement sound. The sound that comes out is somewhat like my voice, but using the pitch of the notes I play on the synthesizer I can get a perfect vibrato and intonation. Because I'm a keyboard player I can control my hands much more easily than I can control my voice so I'm able to use the skills that I have, which are manual, to control those things that I wouldn't be able to control with my voice."

Herbie's singing venture worked. Leaning more towards the rock/disco style, both records attracted a new group of listeners. Bryan Bell, Herbie's keyboard engineer, commented:

"Herbie's willingness to learn, experiment and do research with the vocoder proved to be equitable. What I mean by that is that he proved his command over synthesizers and, even more than that, he was able to reach a different audience while not alienating the old audience."

Experimenting has been an important factor in Herbie's musical development. Over three years ago he built an environment in order to do this; he designed a home studio.

"My home studio is a very integral part of the whole recording process. The record begins with a concept that has to be developed into a concrete idea of composition, arrangement, organization, and the basics of that can be done at home."

(Left to right) Producer David Rubinson, engineer David Kulka, associate producer Jeff Cohen, Herbie's keyboard engineer Bryan Bell and Hancock.

His constant companion helping him throughout has been Bryan Bell. They met in 1975 when Bryan was the sound engineer for the Mahavishnu Orchestra. That band was the opening act for Herbie Hancock's "Headhunters." It wasn't until the spring of '76 that they got together again, this time when Bryan visited Herbie at his home in Los Angeles.

Herbie had just transformed his garage into a home studio by covering the walls with acoustical tiles, but he had not yet prepared it electronically. Bryan, on entering the studio, knew exactly what he could do with it. From then on he worked for Hancock.

"During that week I visited him I completely rewired his studio. Back then he had a Teac 4-track, Sony 2-track and several cassette machines. He only had a Rhodes, clavinet, Arp 2600, String Ensemble and Odyssey. And on the road he was using Fender guitar amps and two Fender satellite speakers."

But Bryan saw the potential in using electronics for Hancock's music and quickly refurbished Herbie's gear.

"I thought that my first obligation was to try to make things available to him that would bring Herbie up to an even keel. His band gear was not designed for optimum sound clarity or flexibility."

Today, Herbie's home studio is packed with an assortment of sophisticated equipment: a Teac/Tascam mixing board (Model 10), 8-in and 8-out (modified for monitoring), a cue system, a patch bay, miscellaneous signal processors, a Teac/Tascam 80-8 tape recorder, several Nakamichi cassette machines and an Aiwa metal-capable tape cassette deck. And then there are the keyboards: ARP Odyssey (modified), Fender Rhodes 88 Suitcase (modified), Yamaha CS80, Hohner clavinet, (Sequential Circuits) Prophet 5 (modified), Oberheim 8 voice with programmer (modified), ARP 2600 (modified), "Waves" Minimoog, Minimoog, Multimoog and Micromoog.

However, that's not all. Anticipating Herbie's upcoming album, the two men decided to technically go further than ever before. Their goal: to revolutionize the ever-expanding repertoire of the Hancock keyboard system and, perhaps, to revolutionize synthesizer equipment as well.

Bryan made it possible to use one keyboard (the Eμ 16 polyphonic keyboard) as a control unit for all the other synthesizers. Then he cleaned up the confusing mess of cables by designing a unique patchbay. Bryan explained:

"First we create the Eμ 16-voiced keyboard (not the voice part of it) as the master control voltage. It does not have any sound but turns notes on and off. It can also compose 16-part harmony sequences. Then we devised a system that connected all the synthesizers through a patchbay that enables Herbie to select any synthesizer voice

so that the Eμ will speak through it. That required a lot of modifications of the equipment. John Vieira was involved with the actual synthesizer hardware modification. Myself and Bill Hackard from Studio Maintenance worked on the patchbays and all the elaborate availablities of both the audio and control signals. There are two new interfaces and a lot of correction devices that make it possible to do that patching."

The Eμ and patchbay give Herbie a freedom he never had before.

"In the past if I wanted an effect put on an instrument, I would have to take the effect somewhere, grab a cable, go from the instrument into the effect, out of the effect and into an amplifier. If I wanted to chain together a few effects, then I had to grab a couple of cables, and it took forever. With this patchbay, I have all the effects, all signal processing, all the equalizers, everything I might need coming up on

"If I want to patch an instrument into an effect I just take a patch cord and plug it in where the instrument comes in and plug it in where the device goes in and it [the patchbay] automatically connects them all."

When performing onstage, Hancock will be able to play all his synthesizers from the Eμ; when preparing an album, he can record into its memory polyphonic and polyrhythmic sequences. Also for his convenience, an Apple II computer was installed to record the data as to where all the synthesizers and special effects are plugged into.

"When I go to the patchbay and see this maze of wires I don't have to start hunting for what each synthesizer is plugged into. I can punch a button on the computer and it will tell me where everything is."

There are also new additions to his synthesizers: a Clavitar, a portable monophonic keyboard that creates no voice but control data; a Steiner EVI, a synthesizer that one blows into like a trumpet; and the Roger Lynn drum synthesizer [listed as the "Lynn-Moffett Drum Synthesizer" in the *Monster* album credits]. This last is Herbie's pride and joy.

"Roger Lynn made digital recordings of basic drum sounds, bass, high-hats, bongos, tambourines, woodblocks, tomtoms and even hand claps. He took the digital information and stored it on computer chips and typed out a program. There's a button for each of the drum sounds. You can play the buttons and it will store two bar sequences and play them back. You can overdub and create change of sequences."

Hancock with one of his new additions: the Clavitar, used to create control data.

Equipped with all these tools, Herbie began preparing the music for the album in early fall. For the next month or so, his home studio would serve as the laboratory before entering the actual recording studio. Into the early hours of the morning the two craftsmen collaborated. Herbie composing, orchestrating on the synthesizers, then laying down the different tracks on the Eμ. Bryan buzzing around skillfully tinkering with the equipment, ensuring their productivity. Finally, in November Herbie was ready to record.

After seven years of going up to San Francisco to record, he decided to stay in L.A. to lay down most of the tracks.

"I've been away so much over the past two years doing concerts and recording [that] if I was recording up in San Francisco at this time, it would mean that out of twelve months I would be home two. That's not good for me now."

Instead, David Rubinson, who has been Herbie's manager/producer for the last ten years, travelled to Los Angeles. First they laid down the basic tracks at the Village Recorder Studios; however, a minor equipment problem resulted in a move to United Western studios.

"I'm at United Western because the facilities are good," Herbie commented. "We're using an MCI 24-track recorder which is what David Rubinson and [engineer] Fred Catero are used to working with. The board is an MCI, as well."

The working atmosphere in the studio pulsates with a congenial intensity while the keyboard overdubs and clean-up tracks are being done. There is a flow of command, as Bryan explains, yet the decision making process is a harmonious exercise not defined by position.

"Herbie is the artist, the composer and co-producer. David Rubinson is the producer; he has a lot of input as far as musical content, financial arrangements, choice of players and scheduling. Fred Catero is the head engineer and Jeffrey Cohen is David's associate producer. Jeff is at times involved lyrically and handles production matters. I am Herbie's keyboard engineer.

"There will be periods when Fred Catero will take off a week and David will engineer. David usually mixes the records with Fred there. Herbie knows how to mix and engineer too, so he's involved creatively with how much echo and what effects are used."

Before Herbie met David he had had no experience in post production work. Seeing this as an unnecessary restriction, the producer immediately established an open door policy.

"The first time I worked with Herbie was in 1969. He had never been aware that there were more tools in the studio than just coming in with the pencil scratchings on the paper, having good musicians and then laying down the stuff. He was always on a real tight budget and the people he worked with said: 'Don't touch the board. You go play in the studio, we'll play with the board.' So he had no control over the creative aspect of the product and no knowledge of studio techniques. I made sure that he got involved.

"Also, I felt an inprovisational musician should never be made to go into the studio and do a 32 bar solo and that's it. So we created an environment where everybody could just blow, and after everybody played what they had to, then we went to the next section. We spliced the tape and took the best parts and put it together."

With this type of flexibility, Herbie has been given the space to move as quickly or as cautiously as he prefers. Even on precious studio time, he's allowed to experiment. Ironically, the man who invented this generous environment has the hardest time dealing with it.

Hancock and Bryan Bell checking the readout of the Apple II computer system.

"It's very important for me to be positive and supportive even when I'm absolutely sure we are going down the wrong path to a cliff," David Rubinson revealed. "Herbie's process of developing ideas is to milk every possibility even when it's obviously wrong because something of useful value may turn out. The way I create things is not that way. I say, 'Let me hear those four bars, no that's not it . . .' But maybe that also means I would never find that little piece of magic that was down the road after four hours."

And magic is what Herbie Hancock seeks. Each instrument represents a multifaceted pocket of information. For example, the obvious use of the Roger Lynn drum synthesizer was to program drum patterns which Herbie could devise for recording. The possibilities were endless . . . this was not enough. Herbie also figured out a way to use its clock pulse by channeling it through the Eμ keyboard.

"I used the Eμ to control the drum synthesizer. The band played with the drum synthesizer as a metronome. Then we recorded the Eμ clock on the 24-track as well as the drum synthesizer and the real drums. We then made a 2 track with the clock pulse on one track and the rough mix of the song on the other track. Then I took the keyboards and the two track to my home studio where I composed sections and sequences in the Eμ memory. This process is extremely time consuming and is often frustrating in a normal studio situation. Next, with the sequence stored in digital data on cassette, I returned to the 24-track studio where once again the clock pulse was played from the master machine into the keyboards. However, this time all of the sections composed at home were played back by the synthesizer 'live' onto the 24-track in sync. As far as I know, this has never been done before."

Herbie's sensitivity and ability to advance in electronics has increased the time he spends in the recording studio. Another factor has been his venture into song writing. Ever since the release of *Sunlight* the pianist has taken on the extra responsibility of writing melodies, lyrics, and finding background singers. There is no set way a song is produced as David

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In today's electronic music, some devices can change your sounds radically. You can get a guitar to sound like an organ; or a keyboard to sound like steel drums. But what happens when you need your guitar to sound like a guitar?

Did you ever feel that your sound was lifeless and dull? This is because your pickup is loaded by the amplifiers input. Loading causes a loss of highs and lows. If you play an acoustic instrument with a contact-type pickup you are probably experiencing this. If you are running long wires on stage, or are using several effects devices, consider the following alternatives.

The new MXR Micro Amp is a bi-fet operational amplifier with a high input impedance, which eliminates the effects of loading on an instruments' pickups. It has a low output impedance so it can drive a wide range of amplifiers, and a gain control so you can adjust the gain from unity (output is level equal to input level) to 26 dB, or *twenty times* the input level.

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The MXR Micro Amp was designed to preserve the full bandwidth produced by any instrument and pickup, (freq. resp. 12Hz-25kHZ) without adding any coloration of its own. Using the Micro Amp, you control how your sound is modified, if at all. Your sounds' tonal qualities are not predetermined by the effects of pickup loading. If you are currently using another preamp in conjunction with your instrument's pickups, the MXR Micro Amp will perform better with more transparency and less noise.

The MXR Noise Gate Line Driver was developed to solve the problems of background noise and hum that occur in live performance. This unit is particularly useful when using many effects devices. In the front of a signal chain, the Noise Gate Line Driver, provides a buffer to preserve the proper line level for successive devices and amplification. At the end of the chain, it is used to "gate-out" unwanted noise leaving only clean signal. The threshold level, is adjustable allowing the unit to discriminate between program material and unwanted noise. In addition, the Noise Gate Line Driver provides a convenient high/low impedance interface for direct signal taps (i.e., live recording/PA).

Both the Noise Gate Line Driver and the new Micro Amp are ruggedly constructed, designed for long battery life, and backed by MXR's long term commitment and experience in providing the finest electronic devices for the music industry.

So, in the light of the many different modification devices available today; if musical accuracy is important to you, see your MXR dealer. Sometimes it's the little things that count.

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Rubinson commented:

"Some songs, Herbie has written completely. He has a melody, lyrics and basic idea of structure for bass lines and orchestration long before he walks into the studio. Most of the time though, when we start to record, the material doesn't have a final melody, words or chorus."

The reason for Herbie's approach to song writing stems from his background as a jazz musician.

"Herbie will write a five bar verse, like he did on this album," Rubinson interjects. "Then an eleven bar bridge and a chorus for as long as he feels like it. "It's important to keep this feeling and not structure him into 32-bar sections. On the other hand, I must prepare the material for the person who will write the lyrics so it makes sense."

When this is the case, they record chords and changes and then adapt them as much as possible to a song structure with an introduction, vamp and verse. An over abundance of material is recorded so they can pick choice sections and cut [splicē] them. Finally a melody and lyrics are superimposed on the tracks.

The lyrics to these songs are derived in numerous ways. For this particular album the following people were involved: Ray Parker, Jr. played his guitar on some tracks and also cut an original tune and left it with Herbie —Jeffrey Cohen wrote the words to the song; Jean Hancock (Herbie's sister), wrote words to a couple of songs which Herbie composed. And then there were free-for-all discussions where everyone offered his ideas.

Some of the people who contributed their writing and playing talents to the album are Guitars—Wah Wah Watson, Randy Hansen, Carlos Santana; Bass—Freddie Washington; Drums —Alphonse Mouzon; Percussion— Sheila Escovedo.

Herbie Hancock's future lies in good hands. Even before the completion of this album, Bryan and David had already begun working on new plans.

"We're going fully automated," Bryan declared. "This means the transformation of the dedicated Apple II system into a non-dedicated system so the computer will be capable of handling many commands at once. The patchbay will be fully automated. We're modifying all the instruments—the Prophet, the Eμ, the Oberheim, so they can receive commands from the computer. During a concert not only can we patch the key information to the Oberheim, but we will be able to change programs in the Oberheim and we will be able to turn on and off the effects in the patchbay.

"After viewing all the available digital synthesizers, we realized that it will be a long time, let's say two to five years, before anyone really can get a sound like the early [Arp] 2600s.

"We've made it so you can keep the oscillator elements of all the synthesizers. We're using the Eμ controller, the portable clavitar, the micro processors, the computer control switcher and the automated patchbay to do what could be done with the technology except replace the sound. The system is looking forward to the future when they do come up with a digital synthesizer that will sound good. Then we'll be able to expand from there."

As Bryan develops the hardware, David Rubinson develops the supportive environment for Herbie's career.

"We sit down and have long planning meetings. I ask Herbie where do you want to go? And then it's my job to see that he gets there. He wants to study orchestration, synthesizer programming, voice, dance, yoga. He wants to stretch his creative self."

Herbie Hancock limbers up his creative muscles by taking risks and letting his imagination wander into unknown territory. Whether he plays the acoustic piano or any of his synthesizers he has the whole world of music in his hands, and still he says: "I have a lot of catching up to do. I haven't even scratched the surface."

Studio Mic Chart

Acoustic piano:	U-87 Neumann on top (2) SM57 Shure out of phase, underneath (1)
All electric keys:	Jensen directs with ground lift, phase reverse, filter, pad usually UREI LA4 & 1176 Limiters
Solo Synthesizer:	Shure SM56 close; U-87 room
Bass Synthesizer:	"Fat Box" direct with RCA tube limiter
Guitar (rhythm):	Sennheiser 421 and direct
Guitar (solo):	Sennheiser 441 close; Neumann U-87 room mic against glass
Drums:	
Kick:	Shure SM7, Tube RCA limiter
Snare:	Shure SM57
Hi-hat:	Sony C-22
Tom:	Shure SM56
Tom:	Shure SM56
Tom:	Shure SM56
Overhead:	Neumann U-87
Overhead:	Neumann U-87

Hancock surrounded by some of the keyboards he played on *Monster*.

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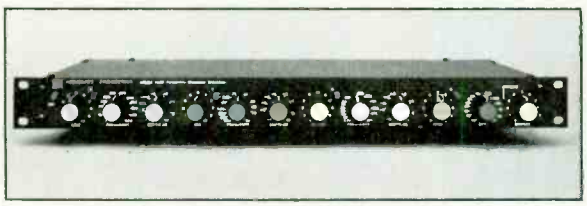

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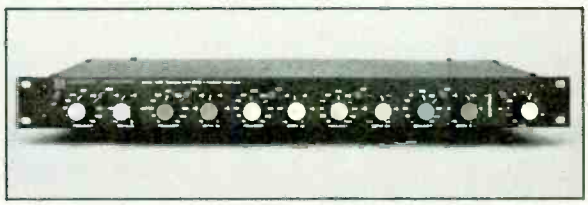

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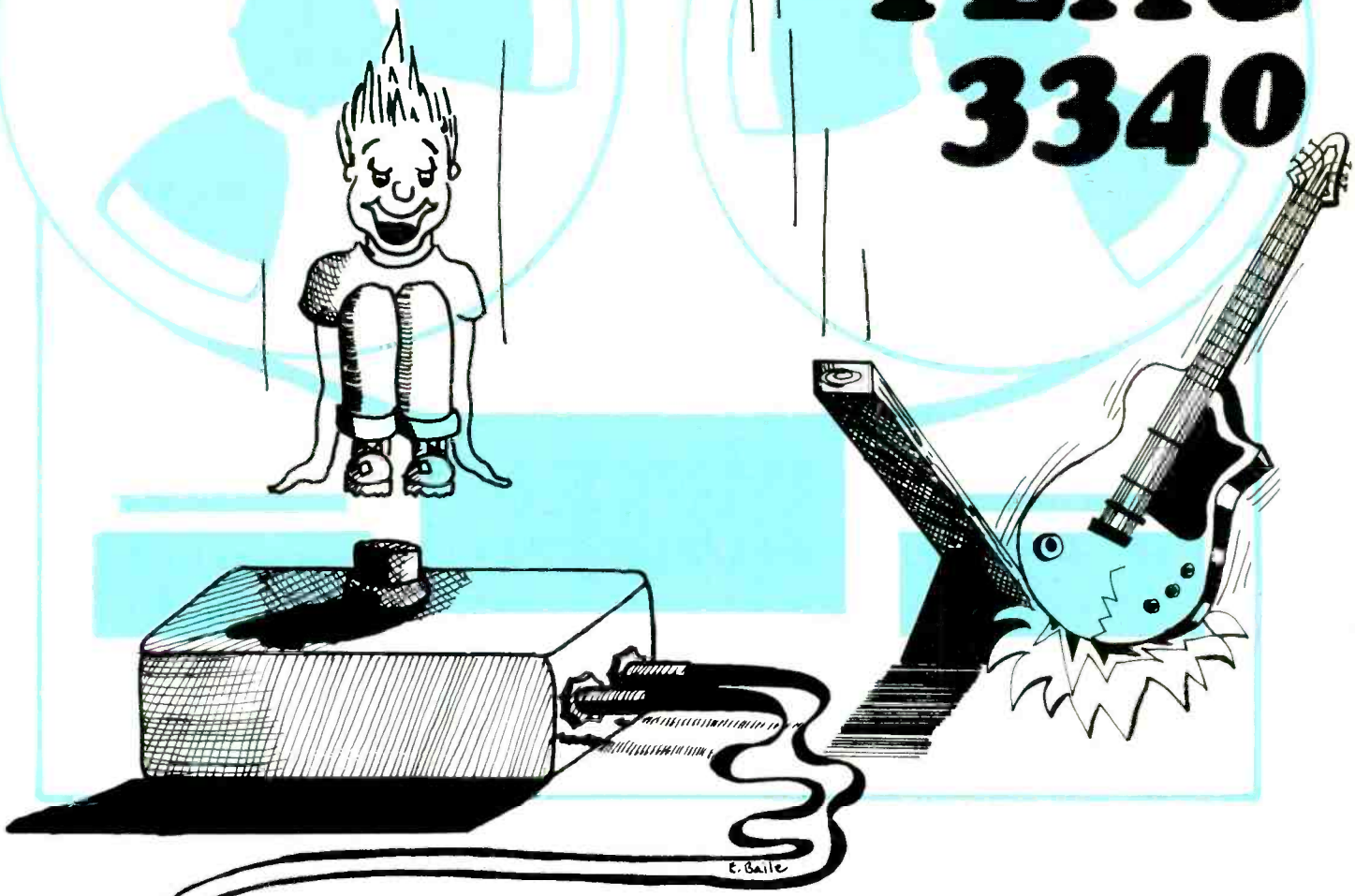

By Craig Anderton

If you're a musician with a trusted assistant who pushes all the right tape deck controls as you play, then you might as well skip ahead to the next article. If, however, you sometimes find yourself doing your own engineering with a 3340, you're going to really appreciate the flexibility that comes from being able to punch-in and punch-out via footswitch.

When doing overdubs—especially with a 4-track tape where instruments must often share a track with other instruments—timing on punch-ins and punch-outs can be critical. There have been many instances in my own work where I've had to punch in something like a guitar solo *immediately* after another part had finished, and punch out just before another part started. As you can imagine, it's very difficult to control the recorder and play at the same time. Growing a third arm would have solved the problem, but that didn't seem practical . . . which led to the following solution.

On the back of the 3340 is an 11-pin accessory socket jack labelled "remote control/timer control." This is specifically designed to mate with the TEAC RC-120 remote control unit. While the remote control unit is useful for punch-outs (you can put it on the floor and hit "stop" to punch out), it is not suitable for foot controlled punch-ins since you have to hit play and record at the same time. What's *really* needed is a custom remote control unit that is optimized to perform two specific footswitched functions, namely punch-in and punch-out. Luckily, such a box is not difficult to build, nor is it expensive—$10 to $20 should cover all necessary parts.

A FEW WORDS OF *CAUTION:* The TEAC warranty doesn't cover

misuse or abuse on the part of the owner, so if you build this box incorrectly and blow something up, don't expect the factory to help you out! However, as long as you wire up everything as shown, the odds of doing any damage are extremely remote. Nonetheless, a 3340 represents quite an investment, so if you aren't too sure of your own skills, be sure to consult with someone who is knowledgeable about electronic matters.

Getting Started

First, look on the back of the 3340 and check out the accessory jack area. There should be an 11-pin, "dummy" plug already plugged into the accessory socket. Remove this "dummy" plug, and examine it carefully. You'll note that each pin has a little number to help you identify which pin is which, and that there is a central shaft that goes into the socket; this shaft also

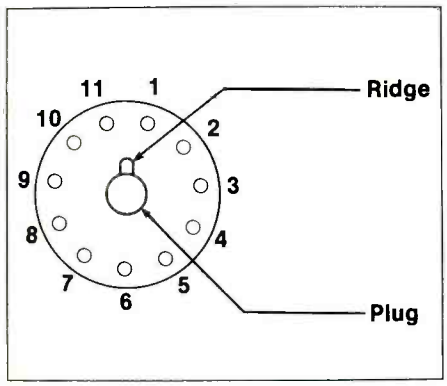

Fig. 1: Bottom view of the 11-pin plug.

has a "key" or ridge so that the plug can only be plugged in one way. *Figure 1* shows the bottom view of this plug.

As it turns out, the 3340 uses a standard plug configuration and replacement plugs are available. Unlike the "dummy" plug, however, replacement plugs have provisions for soldering wires to the pins (which we'll get into later). Unfortunately, while this plug configuration is in fact standard, it is not exactly commonly available. While you can try taking the dummy plug into your local electronics emporium and asking, "Do you have one of these, except one where you can solder to the pins?", the chances of finding a replacement are rather slim. However, Allied Electronics (401 E. 8th St., Fort Worth, TX 76102) stocks these plugs and they may be ordered by mail (the stock number is 750-1025; look under "Chassis and Cable Mount Connectors"). As it so happens, Radio Shack sells the Allied catalogue for about a dollar, so I'd advise getting one for full details on ordering parts from Allied.

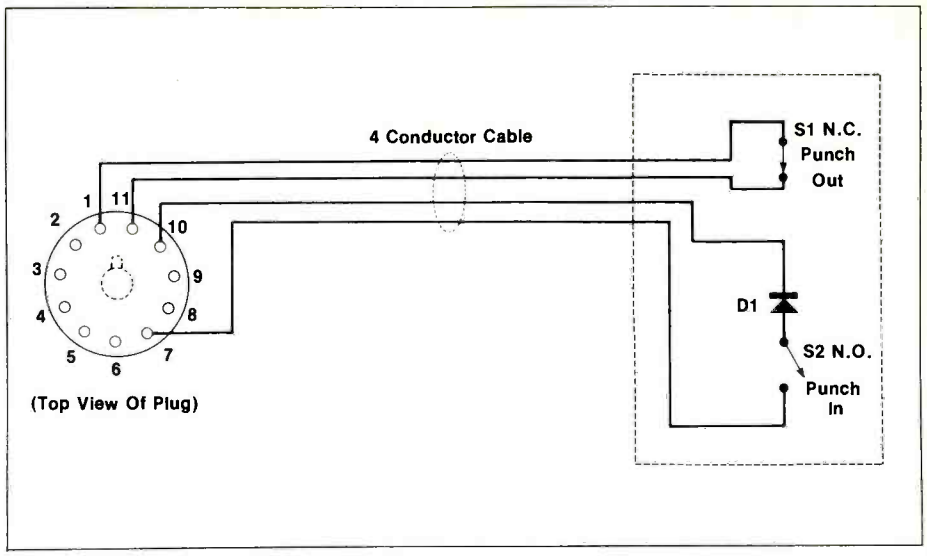

Fig. 2: Top view of plug, and 4-conductor cable.

Now that we've talked about the infamous 11-pin plug, here's what to do with it *(see Figure 2)*. Take a length of 4-conductor cable (such as Radio Shack 4-conductor telephone or intercom cable—stock number 278-365), and solder one wire lead to pin 1, another wire lead to pin 11, the third lead to pin 10 and the fourth lead to pin 7. Carefully note which wire colors connect to which terminals; you'll be glad you did when it's time to wire up S1 and S2.

Soldering these leads to the plug's pins is a bit of a lost art. These kinds of plugs were real big in vacuum tube days, but they are pretty much a rare item in 1980. However, by carefully researching the secrets of the ancients, I've found out how to solder leads to these plugs in the best possible way, as shown in *Figures 3a and 3b*.

Figure 3a shows a side view of the connector and *one* of its pins. Each pin is a hollow tube that opens out to a larger hole at the top of the plug. What you want to do is take the piece of wire to be soldered to the pin, and strip about 1½ cm of insulation from the end. Twist the strands together (it helps to use stranded wire cable for longest life, although solid wire is o.k. if you don't twist the cord up too much), and tin the end by melting a very sparing amount of solder into the twisted strands. Now, push the wire down into the hollow pin until you can just see the tip of the wire poking through the hole at the end of the pin. Take the plug/wire combination and turn it sideways, making sure that the wire stays put inside the hollow pin. Next, heat up the *entire* pin with your soldering iron for about twenty to thirty seconds and feed some solder into the little hole at the end of the pin. As the pin heats up, the solder will start filling up the pin and make an electrical connection between the pin and wire. Go slowly here; you want to feed the solder *into the hole*. Do not let it slobber around the outside of the pin, or you'll have a hard time inserting the plug into its matching socket. There's little need to worry about heat damage, because the plugs are real

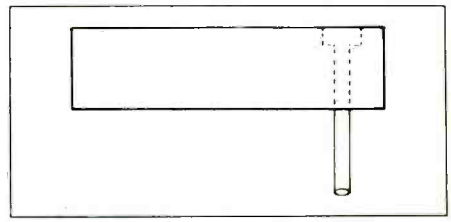

Fig 3a: Side view of *one* of the plug's eleven pins.

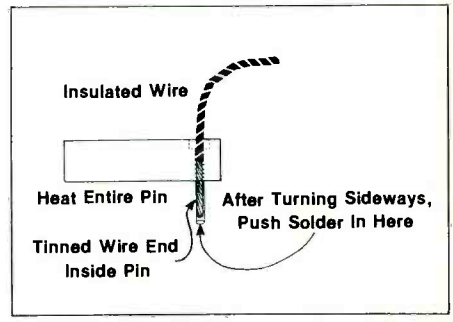

Fig. 3b: Attaching wire to plug.

sturdy and wire is hard to damage. No doubt you'll find soldering the first pin frustrating, but by the time you've soldered all four leads in place you should have gotten pretty good at it.

Selecting the Switches

At this point, you've got a plug with a cable connected to it. That's a start, but now we need to get our switching scene sorted out. S1 is a normally closed (N.C.), momentary contact SPST pushbutton switch. *Note that you can not use a normally open switch (which most pushbuttons are) for S1, or the footswitch will not work correctly.* S2 is a normally open (N.O.), momentary contact SPST pushbutton switch. Both S1 and S2 *must* be momentary contact types; you can not use the push-on/push-off type of switch used with special effects without asking for trouble.

While normally open pushbuttons are easy to find, normally closed types are much rarer. One way around the availability problem is to use SPDT momentary contact pushbuttons *(see Figure 4).* In this case, one contact is

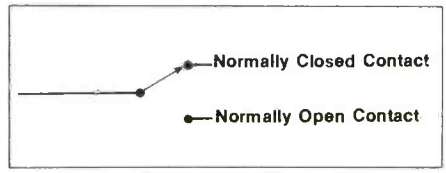

Fig. 4: SPDT Momentary contact pushbuttons.

the normally closed contact, while the other contact is the normally open contact. Pushing down on the pushbutton opens the normally closed contact and closed the normally open contact. Redrawing the footswitch box in *Figure 2* with SPDT switches gives us *Figure 5.*

If you can't locate any suitable SPST switches, Allied Electronics has the somewhat more expensive SPDT types (stock number 652-0552). You can also buy little plastic caps for these switches from the same source; I recommend red for punch-in and black for punch-out.

In my particular case, the footswitches came from a local surplus outlet. They are ex-military types that will probably outlast me, yet cost only 50¢ each. If you're lucky enough to have a surplus electronics place in your area, they might have a suitable type of switch . . . it seems the armed forces

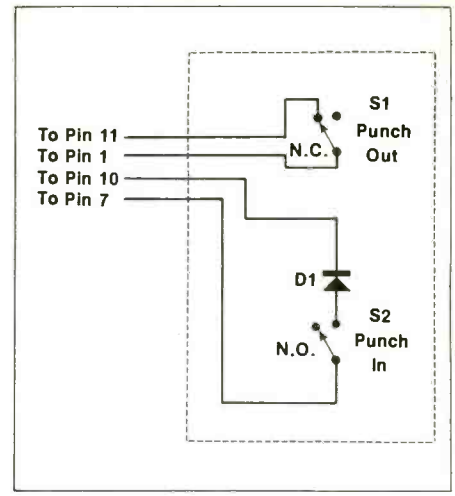

Fig. 5: Remote footswitch box using SPDT footswitches.

needed a lot of pushbutton switches at one time.

There's only one other part we need to explain: D1. Actually, this part is probably not necessary, but has been included to simulate the electronics inside the recorder as closely as possible. A 1N4001 type of diode is suitable, as is the 1N4002 or 1N4003. Note that diodes have a band towards one end of the part; this should be oriented as shown in *Figure 6.*

Assembling the Footswitch Box

First, you have to choose an appropriate footswitch box. Any heavy-duty plastic or metal enclosure will work just fine as long as you don't stomp on the thing every time you want to punch-in or punch-out. If you're hard on floor units, use something like the die-cast aluminum boxes favored by companies such as MXR.

Mount the two footswitches in the chosen box, drill a hole for the cable to enter into the box, and insert a grommet in this hole to prevent the cable insulation from scraping against the

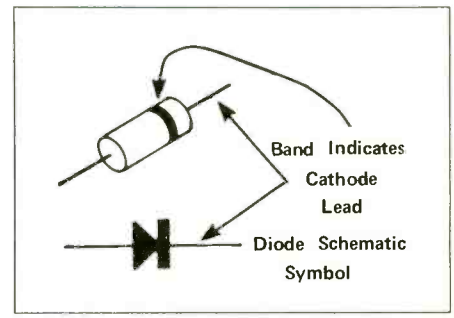

Fig 6: Diode D1 should be oriented as shown above.

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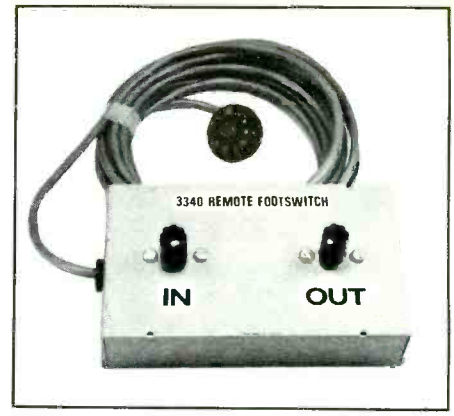
hole's potentially sharp metal sides. Connect up the various ends of the cable to the switch terminals indicated in either *Figure 2* or *Figure 5*, remembering to include diode D1 in series with the punch-in switch and the lead going to pin 10.

Testing

Now comes the big moment (also known affectionately as the "smoke test"). Double check your wiring, insert your new plug into the 11 pin connector on the back of the TEAC in place of the "dummy" plug, load a blank reel of tape and turn on power. Check the tape motion controls on the 3340; they should all work normally. If they don't, there's a mistake somewhere in the footswitch box that needs to be corrected before you go further.

After establishing that the machine's tape motion controls are operating properly, push the recorder's "Play" button. The tape should move along as usual. Now, turn on the record button for channel 1, then punch the punch-in footswitch. The red record light should come on, and the machine is now in the record mode. Next push the punch-out button; the 3340 should come to a full stop.



The finished Teac 3340 footswitch unit.

If you push the punch-in button *before* hitting the machine's "Play" button, then the record "ready" light will go on and the red light in the pause button will light up as well to show that you're ready to record. Pressing the play button will now cause the machine to begin recording *immediately* upon pushing play. Again, you can punch-out by hitting the punch-out footswitch.

Getting the Most Out of Punching

There are a few basic rules of punching. First is that with the 3340, if you punch-in while the tape is rolling you'll get a slight click; therefore, it's a good idea to do all punch-ins on the beat so that any click becomes a part of the music. Second, if you wish to eliminate the click, push the punch-in button *before* you begin rolling tape. Pushing "Play" will then put the machine in the record mode, but with a drastically attenuated (virtually inaudible) click. However, this second technique will not be applicable much of the time, since you'll want to do "rolling" punches (*i.e.*, punching in while the tape is rolling).

This brings us to the end of our saga. Once you start using this footswitch box, you'll be amazed at how much easier it is to do overdubs and punch-ins. The cost is certainly reasonable (mine cost less than $10, thanks to the surplus switches) and construction is not difficult. Good luck with using your new toy, and I hope you find it to be a useful addition to your studio.

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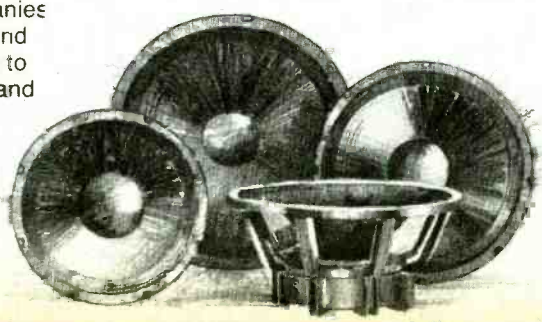

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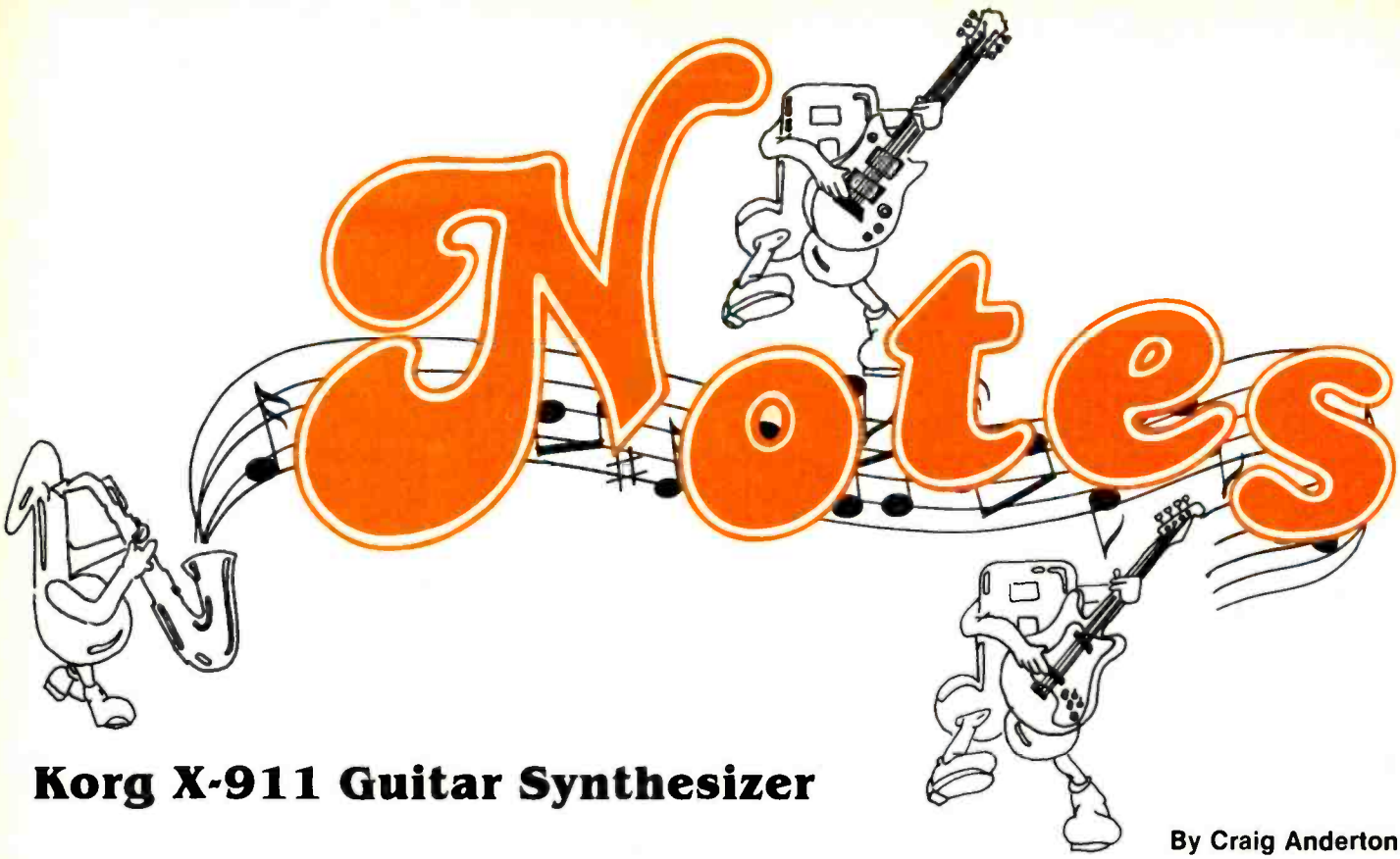

Korg X-911 Guitar Synthesizer

By Craig Anderton

This month Modern Recording & Music *is very happy to bring our readers the first "Notes" column. As we stated in our April 1980 issue, the purpose of "Notes" is at least three-fold: 1) to inform the musician on the latest equipment available; 2) to illustrate what a speciial effects unit can and cannot do; and 3) to guide the reader "through" the device so that he feels that he now knows the equipment to the point of being able to best utilize it.*

The column will primarily be written by Craig Anderton, with additional reports by Brian Roth. Also, when applicable, there will be comments by well-known musicians. Whatever we can do to make "Notes" helpful as possible we will do.

So, read on, we are sure you will like what you see. And... don't hesitate to write and let us know what you think. ——H.G.L.

The whole aim of this column, as mentioned above, is to help you feel as if you've spent some time with the device being reviewed, and give an insight into its capabilities and limitations. Based on this information, you can then decide whether the device appeals to you and whether you'd be interested in checking it out further. I don't like to say something is "good" or something is "bad"; I'd rather tell you what it *is* and let you decide whether it's good or bad for *you*. Many times, what makes an effect invaluable to your playing is how you use it and whether it fits into your musical action, not any particular characteristic that can be scrutinized in an objective manner. Now that we have the ground rules covered, on with the show.

WHAT IS IT? The Korg X-911 is a single-note guitar synthesizer, which requires no special pickup or modifications to the guitar. It uses both variable and preset settings to produce six basic instrument voices and five basic "synthesizer" voices. Two of the X-911's most outstanding characteristics, however, have nothing to do with the sound: it's very compact (roughly 34 x 20 cm) and lists for $550, essentially filling the gap between single function effects boxes and elaborate guitar synthesizer systems like the ARP Avatar. The X-911 will not work with bass.

Referring to *Figure 1*, there are seven basic sections or submodules to the X-911. These are:

1.) ***Input module pitch-to-voltage converter***—This conditions your guitar signal to mate with the synthesizer. It includes an input volume control, along with two level setting LEDs to help you set that input level control; a three-position slide switch to accommodate line-level to low-level signals (nice touch); and a somewhat inscrutable "polarity" switch, marked A and B.

2.) ***VCO (oscillator) module***—This has a broad tune control ("interval"), fine tune control, three-position octave select switch (high, middle and low) and a portamento (or glide-between-notes) control. The X-911 only has one oscillator; however, this one oscillator puts out a number of waveforms over a number of octaves.

3.) ***Instrument voice bank***—These voices are designed to simulate the sounds of traditional instruments (electric bass, tuba, trumpet, distortion guitar, violin and flute). Each may be used individually or in combination. The in/out switches are cute little light-touch switches (push on/push off type) with LED indicators that show when a particular voice has been selected. Above each voice is a control that varies a par-

ticular parameter of that voice, such as decay time, attack time, tonal quality, etc.

4.) ***Synthesizer voice bank***—Five different LED switches, exactly like the instrument bank ones except that they're made of yellow instead of white plastic, bring in different "synthesizer" effects. (Now, since the instrumental voices are already synthesized, why bother having a separate synthe section? Well, in this case, by "synthesizer" Korg means those bread-and-butter keyboard synthesizer sounds that one finds on commercials and hit records.) Each synthesizer voice has an associated control, which again varies different parameters for different voices.

A balance control strikes a balance between the mix of the two banks; this means that you can have one or more instrument voices selected along with several of the synthesizer voices, and then select the desired proportion with the balance control. If you've gone off the deep end with the preset tabs and want to go back to square one, a "cancel" button de-activates all the voice switches electronically.

5.) ***Filter module***—This is mostly used in conjunction with the synthesizer voices; you cannot process the instrument voices through the filter. However, there is a three-position switch for selecting the input signal—you can put either the synthesizer VCO sound, straight guitar or fuzz guitar into the filter input. Additional controls include a three-position "synthe wa" switch (more on this later) and an initial frequency control for the filter.

6.) ***Output module***—This has a volume control and a three-position "touch sense" switch (which adds an envelope follower effect to the overall amplitude envelope).

7.) ***Patch bay***—There are seven different patch points located on the front of the box, and six more on the back for footswitching and expansion.

Korg now offers a modulation pedal (not received in time for this review) that could be considered as an eighth module. It allows you to inject vibrato, radical pitch bends and other effects into the basic synthesizer signal.

PRE-FLIGHT FOR THE X-911. Getting the X-911 up and running is not difficult. However, there are a few things that are important to remember when playing any guitar synthesizer, and there are some other considerations that relate principally to the X-911.

These are:

- Never play more than one string at a time, or let more than one string vibrate at a time, since this confuses the pitch-to-voltage (P/V) converter. Unfortunately, much of the custom work done to guitars to increase sustain and the like make for a signal that is less compatible with guitar synthesizers, but luckily the Korg unit is pretty tolerant. I usually damp the strings I'm not playing.
- "Tweak" your guitar carefully. For best results with guitar synthesizer devices, make sure your pickups are properly positioned with respect to the strings, and that the pickup slugs are adjusted so that different strings give equal outputs. This helps a lot in presenting a consistent signal that the P/V finds easy to digest.
- Pick cleanly. The X-911 meets you halfway, but still, the cleaner you play the better the device will respond.
- Don't be fooled into thinking nothing's happening when you first turn it on. The X-911 powers up with all preset tabs in the "off" position. You must press at least one of them for something to happen.

EVALUATING THE SEVEN MODULES. The input module can accommodate a wide variety of input signals, from the most anemic to the most macho pickups. A lot of this is due to the three-position input level switch, which I wish all devices would have—you can then fine tune the input sensitivity with the input volume control. There are a couple of LEDs to help you set the control, but, frankly, they are only helpful when you first start fooling with the X-911; after a while, you set the input level by ear for the best results. The "polarity" switch compensates for the fact that the average guitar pickup puts out an assymetrical signal (for example, the positive peaks may be weaker than the negative peaks). The best way to determine the proper polarity switch setting is to play a few runs. If there are a lot of goofs or false notes (and the level setting LEDs show that the other controls are o.k.), flipping the polarity switch will usually clean things up.

The foremost question on the mind of any guitarist who has tried a guitar synthesizer is, "How well does it track?" The X-911 does quite well ... not flawless, but very good indeed. Sometimes it will take a while to get from one note to the next if you're going from a high note on one string to a low note on another string, but if you're playing in mostly the same area of the neck speed is not really a problem. Although using the guitar's bass pickup unquestionably gives the best results, I was surprised when the treble pickup, and combined pickup, position worked almost as well.

There are a few caveats, though. The X-911 likes humbuckers more than single-coil-type pickups, and will not respond reliably to out-of-phase pickup positions or to some super, "hot-rod" single-coil models. Overall, the X-911 performs well with regards to tracking. Once you get the hang of things, you can pretty much count on the P/V converter to not go off on any free-form tangents.

The instrument voices are, to me, the most successful part of the X-911. The *electric bass* voice sounds great and records very well; its associated control seems to mostly vary the initial frequency of the filter, and also the amplitude to some degree. This gives you a sonic range from very percussive with a sharp percussive filtered transient, to a smoother, more trebly sound. The *tuba* voice can in fact sound like a tuba, but it also works well as an alternate bass sound, or selected in conjunction with the electric bass voice. It's similar to the bass but has a certain amount of attack time compared to the electric bass' percussive transient. The control above the in/out switch regulates the initial frequency.

With the octave switch in the middle position, the bass and tuba voices are an octave below the input note (16'). You can obtain additional sounds by moving the bass sounds up an octave or down an octave. The next three voices we'll discuss are in the same octave range as the input (8'). The *trumpet* voice is my favorite, phrase your licks like a trumpet player, and the effect is very, very close to a real trumpet. I've also tried the X-911 with a sax player to add a trumpet line along

with the sax at a different melodic interval; it works great. A tone control varies the filter's initial frequency from muted to brassy. The *distortion guitar* voice might seem a little out of place—why not just use a fuzzbox—but the sound does have its place, especially when mixed with other voices. Its associated control varies the high frequency content.

No doubt when you hear the *violin* voice you'll think, "That doesn't sound like a violin." Well, at least that's what I thought at first. But layer about eight or nine of them in the studio, voice the parts like string parts, add some echo or reverb, and use a lot of vibrato—instant strings, and the effect is quite good. You'll have to trust me on this one, but the violin voice really comes into its own in the studio. The violin's associated control varies the attack time of the amplitude envelope, which allows you to simulate fast bowing or slow bowing effects.

The final instrument voice is labelled *flute* (perhaps pennywhistle would be more appropriate), and is an octave above the input note (4'). The tone control above the in/out switch varies the high frequency content, which I feel was a mistake. Had there been an attack time control like the violin voice, a *much* more realistic flute imitation would have resulted. Oh well, the flute's o.k., I guess, but definitely falls short of the sonic quality displayed by the other instrument preset voices.

By varying the X-911's VCO interval control, you can have the selected voice play at, say, a 4th or 5th above or below your straight signal. You can also do slight detuning effects, where you're maybe a 1/16 tone away from the straight signal, to create a fuller type of sound.

Now on to the synthe voices and filter, which should be considered as a pair. The five synthe presets are: 16' (octave below the input) pulse wave, with variable amplitude attack that also varies the pulse width dynamically; same thing, but with variable amplitude decay instead of attack; 8' (same octave as input) sawtooth wave with variable amplitude attack; 8' square wave with variable filter attack time (amplitude remains constant); and 4' square wave with variable amplitude decay time. There is also a switch called "synthe wa" that syncs the filter sweep to the amplitude sweep. For example, if you select the 16' pulse wave with variable amplitude decay, the filter will follow the amplitude decay curve as well. The synthe wa can either be off, have a moderate synching effect or a wide-range synching effect.

Now we come to my biggest gripe about the X-911, which is the filter resonance. I happen to prefer relatively low filter resonances; I don't like Donald Duck quacking filter sounds and similar cliches of the synthesizer genre. Yet there are times when I do want a lot of resonance, say when sweeping the harmonics of a harmonically rich waveform. The X-911 has no provision for varying the resonance, so you're stuck with a compromise setting that, at least to my ears, produces mostly gimmicky kinds of synthesizer sounds. This is too bad—the X-911 is a classy little box for the price, but the fixed filter resonance seriously limits the usefulness of the synthesizer section for me. It's like having a guitar that sounds just great except for one little fret buzz problem.

The *output level* control is straightforward, while the "touch sense" switch adds an envelope follower effect that helps impart the dynamics of a guitar to the electronic sounds. The *patch bay* includes an input, direct (unmodified) output when you want to do parallel stuff or feed another amp and processed sound output on the front of the X-911, while four additional front access jacks are meant for footswitch connections. Adding footswitches really enhances the versatility of this unit, and I strongly suggest using footswitches. One switch controls portamento in/out, another switches between VCO at the same pitch as your instrument and a preset interval (great for punching in a parallel harmony line when needed), a third switch freezes the VCO note when depressed (you can then play guitar over this in a pedal point fashion), while the final footswitch cuts the overall effect in and out. Korg has also done a real service by adding patch points at the back for frequency modulation in, VCF modulation in, trigger out (for controlling other boxes), trigger in (for being controlled), CV out (for driving more VCOs) and VCO in (for being driven by other control voltage sources).

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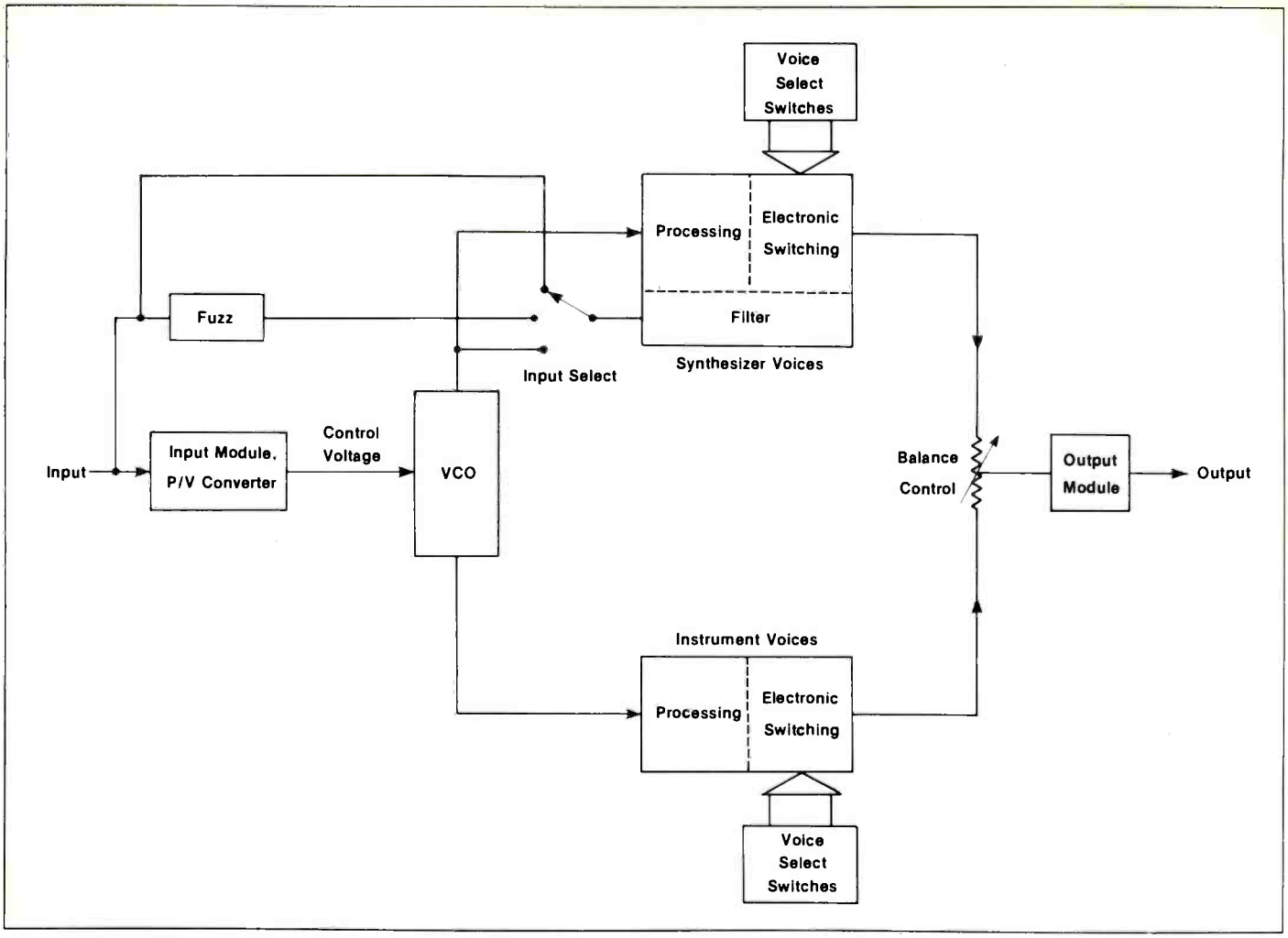

Fig. 1: Korg X-911: Basic block diagram.

One particularly nice effect with the X-911 is to combine the guitar instrument voice (tuned very slightly sharp) with the fuzz guitar going through the filter. The net result is a doubled, thick guitar sound. The X-911 also lends itself well to horn- and brass-like parts. Like most synthesizers, the X-911's basic sound is rather "flat" and lacks ambience. Therefore, any kind of spatial processing—reverb, echo, etc.—are *most* effective and helpful in giving a more natural sound.

OVERALL EVALUATION. As a "live" performance device, the X-911 is exceptional. The speed with which you can change sounds (thanks to the preset voices and logical array of controls) is a tremendous asset, giving essentially programmable performance without the expense of a true programmer. The instrument voices are realistic and pretty warm-sounding, making them an excellent addition to an ensemble when you're looking for a different timbre. In fact, if you're a home recording buff, with a single guitar you can lay down bass, trumpet, synthesizer, pseudo-strings and, of course, guitar parts, which makes the X-911 pretty versatile. The compactness, portability and "cuteness factor" also are strong points for "live" use. Yet despite this maximum ease-of-use approach, Korg still added a number of patch points for expansion—a thoughtful concession to the admittedly small segment of the market that likes to expand, tinker and try exotic setups. I would imagine that someone playing in a club band would find something with the X-911's capabilities to be indispensable for getting a large number of sounds with a minimum amount of hassle, confusion and expense.

But with all these compliments (and the X-911 does deserve them), I still feel that not including a filter resonance control was a definite oversight. Now, I'm not trying to play synthesizer elitist; I just can't help but think that with less resonance, the X-911 synthe voices would sound less thin and less . . . well, gimmicky. I sincerely hope that someone at Korg will look into adding a filter resonance control (even a three-position slide switch for low, medium and high resonance would be a big improvement) to future generations of the X-911, because they have a potential winner here and that one control would make quite a difference. I know it's easy to say, "Just one more control . . .", but this is a case where I feel my comments are not dealing with a frill, but instead with a very basic part of the filter sound. Still, that's only one major complaint among a host of attractive features.

If you're a synthesizer fanatic who has to have a rack-mounted polyphonic system under computer control, then the X-911 isn't going to do much for you. But if you're a working guitarist on a tight budget who needs a batch of different, easy to set up sounds, then it looks to me like the X-911 was designed just for you.

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CIRCLE 89 ON READER SERVICE CARD

Ambient Sound

BY LEN FELDMAN

Will the Videodisc Affect Audio Recording?

A few weeks ago, U.S. Pioneer Electronics Corporation held a press conference at which it announced its marketing plans for a consumer-type, laser-optical videodisc player and software. By the time you read this, Pioneer will have already begun offering its version of the Philips/MCA/Magnavox videodisc that Magnavox has been gradually introducing in test market areas around the country. The Pioneer version has a suggested retail price of $749. The reason why I think this introduction is extremely important for anyone involved in audio recording can be understood by referring to a statement made by Ken Kai, executive vice president of U.S. Pioneer Electronics Corp., in which he said, "The potential impact of the laser-optical format, not only as an excellent movie delivery system, *but as a medium for music enjoyment*, home instruction and education, is very significant." (Emphasis ours.)

Unlike the very first optical-laser videodisc players which I saw more than three years ago, the unit to be offered by Pioneer has provisions for stereophonic sound tracks (or two separate audio channels that could be used for offering bilingual audio). That simple fact, of course, places the laser-optical videodisc in a completely new light. Could there be an analogy between what happened to radio shortly after TV burst upon the scene and what is likely to happen to the recording industry (or, more specifically, the record industry) when the videodisc hits in a big way? To some degree, yes, but other factors suggest that a completely different course will be followed.

Clearing Up Some Misconceptions

Much to my chagrin, I have been reading stories in highly respected publications, written by equally respected audio journalists, in which the videodisc has been described as a "digital video disc." If you know anything about digital technology, you will realize that the video information contained on any kind of video disc (or, for that matter, on video tape) cannot possibly be stored in the form of digital information or codes. Just think about it for a minute. Audio signals, which contain frequencies of up to 20 kHz, require a sampling rate of over 40,000 per second and, in professional digital audio systems, a 16-bit system per channel, plus error-correction words, etc., all of which leads to a bit density of more than two megabits per second. If you had to translate *video* analog signals into digital form, even assuming that a 16-bit word code would be adequate, you would be talking about pulse densities (whatever the storage medium, tape or disc) approaching the *Gigahertz* regions! No, for the moment at least, videodiscs store their information in an *analog* fashion. And the audio tracks (be they mono, bi-lingual or stereo) are *also* stored in analog form.

To be sure, the method of storage is pretty slick. *Figure 1* shows the microscopic detail of the surface of a laser-optical videodisc. The cylindrical craters you see follow a circular path and are in reality minute pits. There may be as many as fourteen billion of these indentations on a typical half-hour disc arranged in up to 54,000 circular tracks. A beam of light, illustrated in *Figure 2*, focused down to one thirty-thousandth of an inch passes through a plastic layer, striking the pits which interrupt the reflected beam. This on/off reflected beam might be the reason why the unsuspecting journalists have been referring to these discs as "digital." In fact, the system involves a form of frequency modulation, both for the video information and for the audio channels, as illustrated in *Figure 3*. It is the *distance* between pits that is read by the laser beam of light as well as the number and shape of the pits, enabling the mixing of the video and audio signals together. There is, as you see, absolutely nothing digital about the process, unless you consider the fact that each frame of video is encoded with a frame number to be a form of digitization.

So, now we get to the heart of the matter: Just how

good is the audio signal (or signals, in the case of stereo programming) that will accompany the video information on these discs? A glance at the tentative spec sheet tells the story. Frequency response will extend from 40 Hz to 20 kHz (they don't give a plus-or-minus dB tolerance) at a +3 dB reference level with respect to 10% modulation at 1 kHz. We can already do at least that well with many cassette tape decks and certainly a lot better with reel-to-reel tape machines and, of course, with conventional discs used in playback. As for harmonic distortion, we are told that it will be less than 0.3% for a 1 kHz signal at 75% modulation. That's better than most tonearm/cartridge combinations can do when tracking a conventional record (though the groove itself may well contain as low or even lower THD) and even a bit better than we can get from an analog open-reel tape deck.

But now we get to the real stumbling block: signal-to-noise ratio. It is quoted as being "more than 55 dB, using an "A" weighting network, and referenced to a 1 kHz signal at 100% modulation."

Heck! We can do that well with a cheapie cassette deck these days, even before Dolby is applied. If all we can expect from the audio tracks of this videodisc is a dynamic range of little more than 50 dB, then it is hardly likely that the combination video/audio laser disc is going to replace audio-only discs as we know them. I suspect that even the people at Pioneer recognize the limitations of the audio portion of the new laser-optical disc. In further remarks at the press conference referred to earlier, Ken Kai went on to say, "This Pioneer videodisc player incorporates state-of-the-art refinements such as the provision for a future adaptor unit to play true, digital ('PCM') audio." In other words, the audio of the presently announced videodisc is "good enough" for the kind of audio most of us expect along with a video program, but hardly good enough to be considered as a new program source for audio-only material.

That brings us to the controversy that is brewing within the consumer electronics industry over whether the American public wants a single machine that can play video as well as *digital* audio discs or a separate machine for bringing out the best of video and another one for handling digital audio exclusively. As most readers know from a previous discussion of the subject, Philips, the very company that is in part responsible for the optical-laser videodisc, has also announced and shown a much smaller (about 4 inches in diameter) digital audio disc that would require a completely different type of player. Their argument (and I must confess that I lean towards it) is that it makes no sense to have to tailor digital audio so that it fits within a videodisc format. Audio does *not* need to be

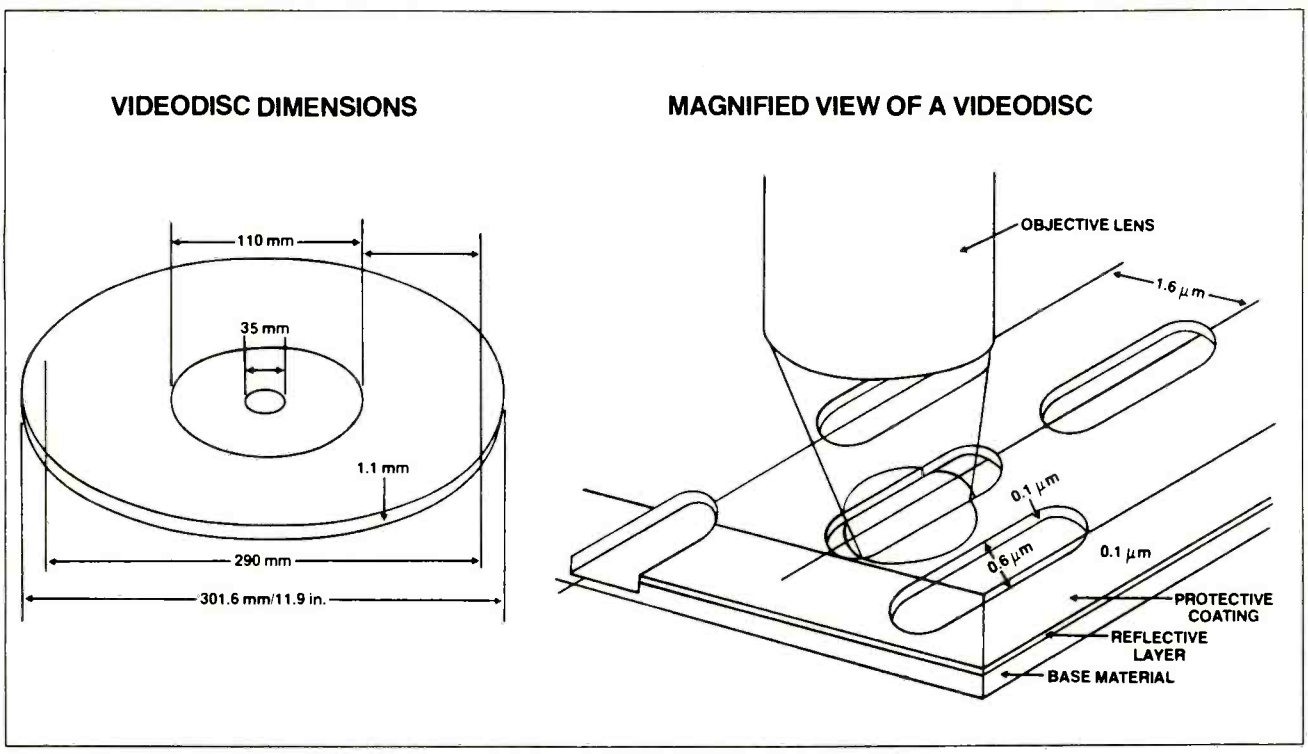


Fig. 1. Videotape construction.

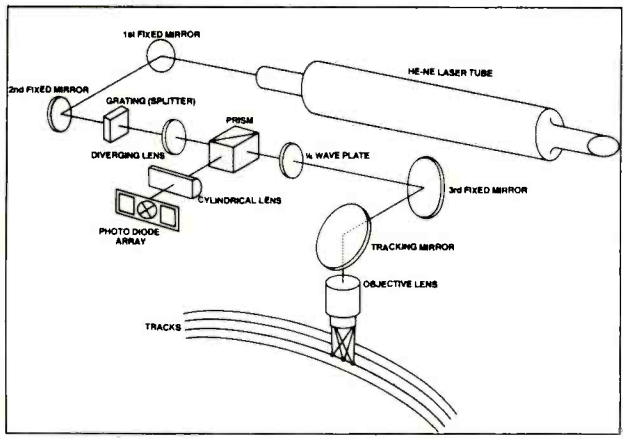


Fig. 2. Playback laser path.

squeezed in between horizontal and vertical sync pulses, which take up a significant amount of available recording space on any videodisc format. On the other hand, the public may well feel that being asked to buy two kinds of new players is asking a bit much of them in view of the fact that a single player could have been made to accomodate *both* video and digital audio.

Although it hasn't been as yet, the same sort of argument can be applied to home digital audio tape recording equipment. All we have seen so far are a few PCM audio processors which must be linked with video cassette recorders to work. Why not a PCM tape deck, complete unto itself, which handles the digital encoding as well as the storage of the digital information on tape. Here again, the PCM audio processors have been made with a lot of circuitry that simply is used to synchronize the signals so that they can be fitted within the framework of a standard NTSC television format. Surely a PCM deck devoted exclusively to audio might be priced at considerably lower levels than what is now proposed as the solution to home PCM audio recording.

For the professional recording engineer who is concerned with the future, it really matters very little which way things go for the consumer. His or her analog studio equipment is more than up to the task of providing audio program sources (in analog recorded form) for integration into the new Pioneer videodisc. And, when the time comes for digital audio discs, chances are that the studio will long since have converted to digital mastering (on tape) of new audio programs. Such masters, of course, can be used as program sources regardless of whether the world turns to the optical-laser disc, the RCA groove-type capacitance pickup disc or even the JVC-Panasonic grooveless capacitance disc. Once the information is safely stored in digital form on tape, it will not be degraded in any way when it is transferred to any of these disc formats for consumers to use and listen to at home.

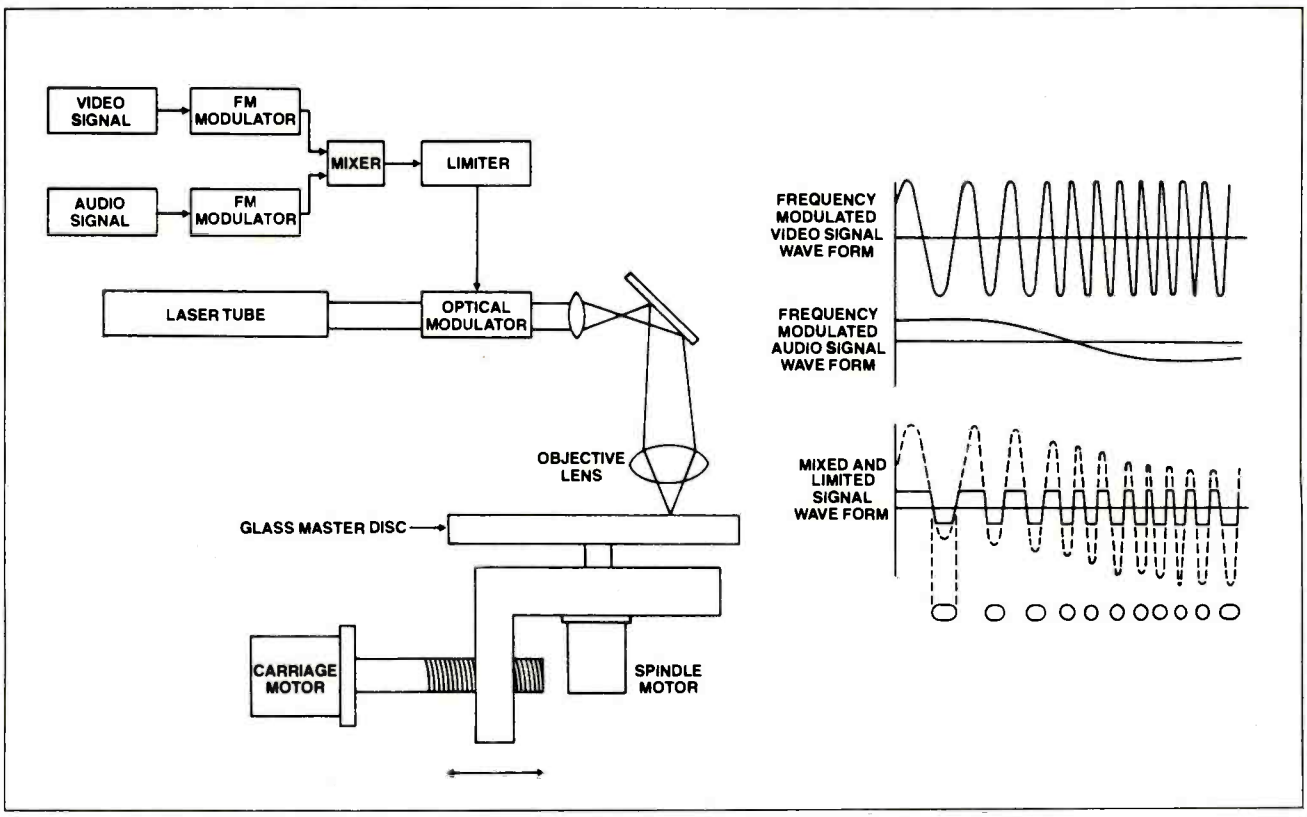
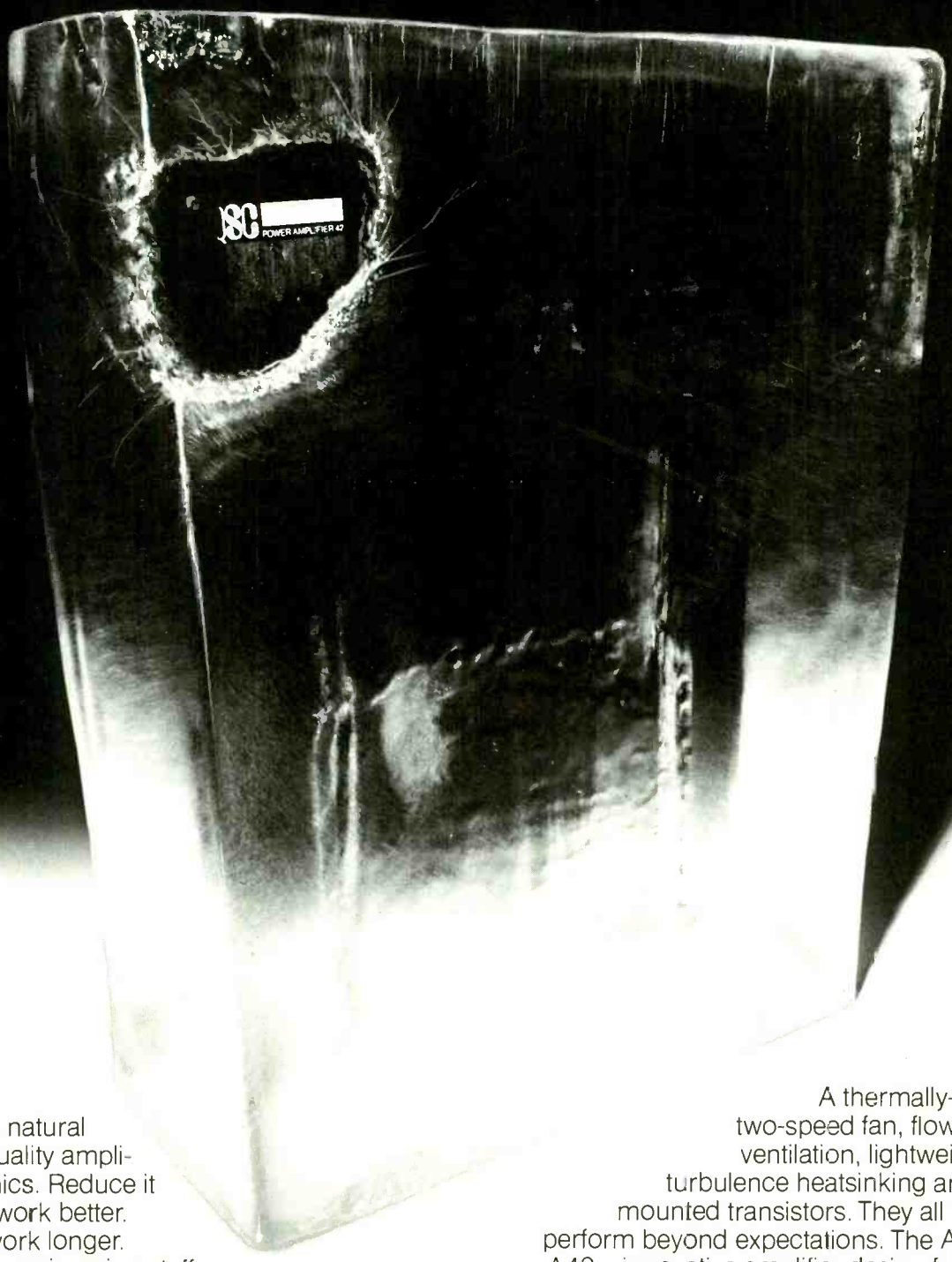


Fig. 3. Videodisc recording system.

PLAY IT COOL.



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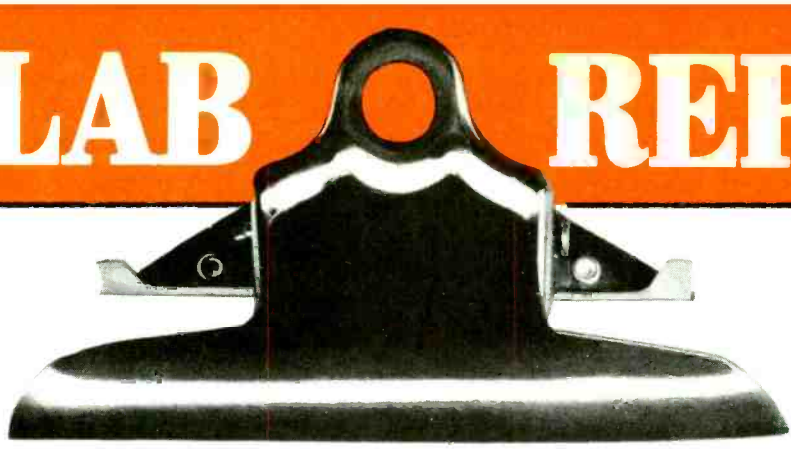

NORMAN EISENBERG AND LEN FELDMAN

Premium Open-Reel Tapes

To offer a representative cross-section of open-reel tapes and still keep this project within manageable dimensions (not to mention the need to meet publication deadlines), we chose seven popular open-reel tapes representing the premium offerings of their respective manufacturers. The tape decks used (see fuller explanation in comments by L.F.) were the Revox B-77 and the Teac 6100 Mk II. The latter model has user-adjustable equalization and bias controls labeled "1" and "2." These controls were set to the positions indicated in the owner's manual as being suited for the particular tape used. Where no such listing was given (as, for example, for the BASF tape samples), we experimented with the bias and EQ adjustments and used the settings that yielded the best overall results for the tests we conducted.

The list of tapes tested (and the bias and EQ settings for each used on the Teac) follows:

Tape	EQ	Bias
Ampex 456	2	1
BASF SPR-50 LHL	1	2
Fuji FB	1	1
Maxell UD-XL	1	1
Sony FeCr	1	1
TDK GX	1	1
3M (Scotch) 226	2	1

The Tests

Using the two recorders, we ran eleven tests of each tape sample on both recorders to obtain the data presented in the accompanying Tables 1 (A and B) through 11 (A and B). In addition, "subjective" evaluations were made of the characteristics detailed in

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OPEN-REEL TAPES: Test Data

Note: **Tapes are listed by brands alphabetically. Test results and relative rankings are given for each tape tested in turn on the two tape recorders for tests from 1A through 11B. Test results and relative rankings for tests 12 through 15 are given for each tape as used on the particular recorder indicated. Small differences in response figures at the low end of the frequency range were not regarded as significant in ranking the tapes.**

Tables 12, 13, 14 and 15 for all tape samples using the particular recorder indicated.

The complete roster of tests includes:

1.) Record/playback response at +10 dB record level;
2.) Record/playback response at 0 dB record level;
3.) Record/playback response at −10 dB record level;
4.) Maximum record level for 3% THD at 400 Hz;
5.) Total harmonic distortion at 1 kHz, 0 dB record level;
6.) Total harmonic distortion at 6.3 kHz, 0 dB record level;
7.) Total harmonic distortion at 100 Hz, 0 dB record level;
8.) Maximum output level at 12.5 kHz;
9.) Playback sensitivity at 1 kHz, 0 dB record level;
10.) Playback sensitivity at 10 kHz, −10 dB record level;
11.) Signal-to-noise re 3% THD, "A" weighted and unweighted;
12.) Drop-out susceptibility (subjective rating);
13.) Coating uniformity (subjective rating);
14.) Slitting uniformity (subjective rating);
15.) Retention of signal (subjective rating).

The general approach to the performance measurements was somewhat similar to that used for our earlier tests of cassette tapes (*Modern Recording*, May 1980). For these open-reel tapes, however, used at the speed of 15 inches-per-second on both recorders, we modified many of the reference levels because open-reel tape at this speed is expected to provide better headroom and wider-range response.

Thus, the record/playback frequency response was run at reference levels of +10 dB, 0 dB and −10 dB (as indicated on each deck's meters).

Instead of measuring only the 1-kHz distortion at the 0-dB record level, we also measured distortion at that level for frequencies of 100 Hz and 6.3 kHz. Why 6.3 kHz and not 10 kHz or 12.5 kHz? Simply because the largest component of distortion in a tape-and-recorder combination is almost always a third-order (third harmonic) component. The third harmonic of 6.3 kHz is just under 19 kHz, a frequency that a reel-to-reel recorder operated at 15 ips should be able to handle. The third-order distortion of a 10-kHz or a 12.5 kHz fundamental tone would be well outside the useful audio band, and information about THD at those frequencies would really be academic rather than significant from a user's standpoint.

Readers accustomed to seeing performance specifications for cassette tapes or decks may be surprised as the results obtained for our tests of "maximum record level for 3% THD" and for "maximum output level at 12.5 kHz." No wonder no one is pushing metal-particle tape for use on open-reel machines! The high-frequency headroom of even the "poorest" of the tapes we tested is still far better than that of the best metal tape tested on the costliest of cassette decks, according to our tests.

We measured playback sensitivity at 1 kHz for the 0-dB record level, just as we had done for cassettes. However, because of the better headroom of an open-reel system, we also measured the high-frequency (10 kHz) output sensitivity at a record level of only −10 dB (instead of at −20 dB as with cassettes).

Finally, the results obtained in our signal-to-noise tests (all referenced to the 3% THD record level of the particular tape used) show, rather dramatically, why so few consumer-version open-reel decks have built-in Dolby or any other form of noise reduction. With the "A" weighted S/N figures showing up as consistently better than 70 dB, adding Dolby would, in many cases, be a needless frill *unless* you are involved in multiple dubbings from multi-track tapes down to a final master. In that event, the signal degradation incurred by such repeated dubbings might well call for Dolby (perhaps even the professional Dolby-A system), or for the use of some other appropriate noise-reduction system.

Table 1: Record/playback response, +10 dB record level (Hz to kHz, −3 dB)

Tape	Test Results	Ranking
1A: Tested on Revox B 77		
Ampex type 456	22 to 18	1
BASF type SPR-50 LHL	22 to 16	5
Fuji type FB	26 to 15	7
Maxell UD-XL	22 to 18	1
Sony FeCr	22 to 17	4
TDK GX	22 to 17.5	3
3M (Scotch) 226	23 to 15.4	6
1B: Tested on Teac 6100 Mk II		
Ampex type 456	29 to 24	4
BASF type SPR-50 LHL	30 to 26	1
Fuji type FB	32 to 22	6
Maxell UD-XL	30 to 26	1
Sony FeCr	31 to 22	6
TDK GX	30 to 25.5	3
3M (Scotch) 226	29 to 23.5	5

Table 2: Record/playback response, 0 dB record level (Hz to kHz, −3 dB)

Tape	Test Results	Ranking
2A: Tested on Revox B 77		
Ampex type 456	22 to 22.0	2
BASF type SPR-50 LHL	22 to 21.5	6
Fuji type FB	24 to 22.0	2
Maxell UD-XL	21 to 23.0	1
Sony FeCr	22 to 21.0	7
TDK GX	22 to 22.0	2
3M (Scotch) 226	22 to 22.0	2
2B: Tested on Teac 6100 Mk II		
Ampex type 456	29 to 27.0	4
BASF type SPR-50 LHL	28 to 29.0	1
Fuji type FB	29 to 24.0	7
Maxell UD-XL	28 to 28.5	2
Sony FeCr	28 to 25.5	6
TDK GX	28 to 27.7	3
3M (Scotch) 226	29 to 26.5	5

Table 3: Record/playback response, −10 dB record level (Hz to kHz, −3 dB)

Tape	Test Results	Ranking
3A: Tested on Revox B 77		
Ampex type 456	22 to 22.5	4
BASF type SPR-50 LHL	22 to 22.0	5
Fuji type FB	24 to 22.7	2
Maxell UD-XL	21 to 23.6	1
Sony FeCr	21 to 21.0	7
TDK GX	22 to 22.6	3
3M (Scotch) 226	22 to 22.0	5
3B: Tested on Teac 6100 Mk II		
Ampex type 456	29 to 27.0	4
BASF type SPR-50 LHL	28 to 29.0	1
Fuji type FB	29 to 24.0	7
Maxell UD-XL	28 to 28.5	2
Sony FeCr	28 to 25.5	6
TDK GX	28 to 27.7	3
3M (Scotch) 226	29 to 26.5	5

The test results obtained for a given tape used on one recorder often are quite different from the results seen with the other recorder. For this reason, our data charts are presented so as to let the reader see how things came out on each deck.

Record/Playback Response

To illustrate, Table 1A presents frequency response (record/playback) at the +10 dB record level for the tapes tested on the Revox B-77, while Table 1B shows the results of the same test of the same tapes using the Teac 6100 Mk II. The +10 dB record level tells us something about the high-frequency headroom, or saturation characteristics, of the machine/tape combination (given the fixed bias and EQ settings of the Revox, and the selectable bias and EQ of the Teac). Interestingly, even though the results were quite different between the two machines (the Teac obviously has a wider bandwidth), the same tape—Maxell UD-XL—did rank first in this test on both machines.

When we reduced record levels and rechecked response at 0 dB, the Maxell UD-XL tape still came out ahead on the Revox *(see Table 2A)*. However, on the Teac, top honors shift to BASF SPR-50 tape. (One might have guessed the reverse, judging solely by the country of origin of the decks and the tapes.)

To check out whether saturation at high frequencies was still having any bearing on the tests at the 0-dB level, we further reduced recording levels to −10 dB. Maxell UD-XL still did best on the Revox, and BASF tape was still the winner on the Teac. However, the relative rankings of some of the other tapes changed somewhat on the Revox *(Table 3A)*, but remained essentially the same on the Teac *(compare Table 3B with Table 2B)*.

The overall conclusion to be made from all the response tests is this: Once you get down to or below the 0-dB record level, all of the tapes tested will easily handle the full audio range from 20 Hz to 20 kHz. So unless you are a believer in the need for recorded frequencies in the ultasonic region, you should really look

Table 4: Maximum record level for 3% THD, 400 Hz (dB)

Tape	Test Results	Ranking
4A: Tested on Revox B 77		
Ampex type 456	+15.0	1
BASF type SPR-50 LHL	+13.5	3
Fuji type FB	+12.0	7
Maxell UD-XL	+12.5	5
Sony FeCr	+14.5	2
TDK GX	+13.0	4
3M (Scotch) 226	+12.5	5
4B: Tested on Teac 6100 Mk II		
Ampex type 456	+13.0	3
BASF type SPR-50 LHL	+13.25	2
Fuji type FB	+12.0	5
Maxell UD-XL	+12.0	5
Sony FeCr	+10.0	7
TDK GX	+13.0	3
3M (Scotch) 226	+14.5	1

for other differences among tapes, and not merely for the tape that "goes out farthest in frequency response."

Maximum Record Level

Using the Revox, the maximum record levels (for 3% THD) covered a spread from +12 to +15 dB, with the Ampex type 456 tape placing first.

When the same tests were run on the Teac, it became clear that the availability of two bias settings caused the rankings of tapes to change in this characteristic. This time, the 3M (Scotch) 226 samples ranked first, with a mid-frequency headroom of +14.5 dB. Scotch 226, by the way, is a new product from 3M; its signal-to-noise capabilities are similar to those of Scotch 250, but the type 226 requires less bias than type 250 (it actually is bias-compatible with Scotch 206). It was evident, from the results shown in *Tables 4A and 4B,* that being able to select one of two bias values on the Teac also made a big difference in the rankings of the other tapes tested.

Total Harmonic Distortion

Mid-frequency THD results are summarized in *Tables 5A and 5B.* Differences among the tested tapes were very slight on either tape recorder. The "worst-case" reading of 0.46 percent (for Sony FeCr) on the Revox machine is probably due to the fact that the Revox's bias was too far off for optimum operation with ferrichrome tape. Note that when this same tape was used on the Teac deck, and a more favorable bias setting was chosen, the THD for the Sony tape dropped to 0.38%, equalling the reading obtained for the Scotch 226 samples.

Note too what happens to the THD figures for the BASF tape samples when they are changed from the Revox deck (where THD readings, at 0.35%, were the best of the group) to the Teac deck (where the BASF tape had the poorest THD readings). If that doesn't illustrate the fact that certain tapes are better for cer-

Table 5: Total harmonic distortion, 1 kHz, 0 dB record level (%)

Tape	Test Results	Ranking
5A: Tested on Revox B 77		
Ampex type 456	0.37	3
BASF type SPR-50 LHL	0.35	1
Fuji type FB	0.38	4
Maxell UD-XL	0.35	1
Sony FeCr	0.46	7
TDK GX	0.40	6
3M (Scotch) 226	0.38	4
5B: Tested on Teac 6100 Mk II		
Ampex type 456	0.35	1
BASF type SPR-50 LHL	0.44	7
Fuji type FB	0.37	4
Maxell UD-XL	0.35	1
Sony FeCr	0.38	5
TDK GX	0.35	1
3M (Scotch) 226	0.38	5

Table 6: Total harmonic distortion, 6.3 kHz, 0 dB record level (%)

Tape	Test Results	Ranking
6A: Tested on Revox B 77		
Ampex type 456	0.78	6
BASF type SPR-50 LHL	0.87	7
Fuji type FB	0.54	2
Maxell UD-XL	0.55	3
Sony FeCr	0.45	1
TDK GX	0.64	5
3M (Scotch) 226	0.63	4
6B: Tested on Teac 6100 Mk II		
Ampex type 456	0.48	5
BASF type SPR-50 LHL	0.75	7
Fuji type FB	0.50	6
Maxell UD-XL	0.37	1
Sony FeCr	0.40	2
TDK GX	0.40	2
3M (Scotch) 226	0.44	4

Table 7: Total harmonic distortion, 100 Hz, 0 dB record level (%)

Tape	Test Results	Ranking
7A: Tested on Revox B 77		
Ampex type 456	0.6	2
BASF type SPR-50 LHL	0.65	4
Fuji type FB	0.6	2
Maxell UD-XL	0.9	7
Sony FeCr	0.87	6
TDK GX	0.75	5
3M (Scotch) 226	0.57	1
7B: Tested on Teac 6100 Mk II		
Ampex type 456	0.4	3
BASF type SPR-50 LHL	0.5	7
Fuji type FB	0.44	5
Maxell UD-XL	0.37	1
Sony FeCr	0.44	5
TDK GX	0.37	1
3M (Scotch) 226	0.42	4

Table 8: Maximum output level at 12.5 kHz (dB)

Tape	Test Results	Ranking
8A: Tested on Revox B 77		
Ampex type 456	+11.0	3
BASF type SPR-50 LHL	+ 9.5	7
Fuji type FB	+10.0	6
Maxell UD-XL	+12.0	1
Sony FeCr	+10.5	4
TDK GX	+11.5	2
3M (Scotch) 226	+10.5	4
8B: Tested on Teac 6100 Mk II		
Ampex type 456	+14.0	7
BASF type SPR-50 LHL	+14.5	5
Fuji type FB	+14.5	5
Maxell UD-XL	+15.5	2
Sony FeCr	+16.5	1
TDK GX	+15.5	2
3M (Scotch) 226	+15.0	4

Table 9: Playback sensitivity, 1 kHz, 0 dB record level (dB)

Tape	Test Results	Ranking
9A: Tested on Revox B 77		
Ampex type 456	−1.5	4
BASF type SPR-50 LHL	−1.5	4
Fuji type FB	−2.0	6
Maxell UD-XL	−0.75	2
Sony FeCr	−2.0	6
TDK GX	−1.0	3
3M (Scotch) 226	−0.25	1
9B: Tested on Teac 6100 Mk II		
Ampex type 456	+0.5	3
BASF type SPR-50 LHL	−1.0	6
Fuji type FB	0.0	5
Maxell UD-XL	−1.0	6
Sony FeCr	+2.0	1
TDK GX	+0.8	2
3M (Scotch) 226	+0.5	3

tain machines, we don't know what does!

For the high-frequency THD tests, the Sony FeCr tapes did best on the Revox, while Maxell's UD-XL tape did best on the Teac. In general, however, the trend was upward for THD percentages at this test frequency, as might be expected. Results for all the tapes are shown in *Tables 6A and 6B.*

As for THD results at low frequencies (*Tables 7A and 7B),* readings were consistently higher for all the tapes using the Revox machine than they were for the same tapes using the Teac machine. Scotch 226 fared best on the Revox; Maxell UD-XL and TDK GX tapes ranked first when used on the Teac.

Maximum Output Level

Maximum output levels at high frequencies *(Tables 8A and 8B)* varied from a low of +9.5 dB (for the BASF tape) to a high of +12 dB (for the Maxell UD-XL) when tested on the Revox. The levels varied from a low of +14 (for the Ampex 456) to a high of +16.5 dB (Sony FeCr) when the tapes were tested on the Teac. Note the general trend of higher headroom at high frequencies using the Teac. Such higher dB readings may, at first, appear to mean that the Teac deck will provide greater dynamic range, but subsequent signal-to-noise measurements do not confirm that assumption.

Playback Sensitivity

Mid-frequency playback sensitivity ranged from −0.25 dB (Scotch 226) to −2 dB (Fuji FB and Sony FeCr) on the Revox deck. It ranged from +2 dB (Sony FeCr) to −1 dB (BASF SPR-50 LHL and Maxell UD-XL) on the Teac deck *(see Tables 9A and 9B).*

High-frequency playback sensitivity, measured with reference to a −10 dB recording level, ranged from −9.1 dB (Scotch) to −11.5 dB (Ampex 456) using the Revox deck, and from −7.5 dB (Sony FeCr) to −10 dB (BASF) on the Teac machine *(see Tables 10A and 10B).*

Signal-to-Noise

S/N measurements are given in *Tables 11A and 11B.* Two sets of figures are shown for each tape tested on

Table 10: Playback sensitivity, 10 kHz, −10 dB record level (dB)

Tape	Test Results	Ranking
10A: Tested on Revox B 77		
Ampex type 456	−11.5	7
BASF type SPR-50 LHL	−10.7	4
Fuji type FB	−10.7	4
Maxell UD-XL	−10.7	4
Sony FeCr	−10.0	3
TDK GX	−9.5	2
3M (Scotch) 226	−9.1	1
10B: Tested on Teac 6100 Mk II		
Ampex type 456	−8.5	3
BASF type SPR-50 LHL	−10.0	7
Fuji type FB	−9.0	6
Maxell UD-XL	−8.5	3
Sony FeCr	−7.5	1
TDK GX	−8.0	2
3M (Scotch) 226	−8.5	3

Table 11: Signal-to-noise re 3% THD, "A" weighted/unweighted (dB/dB)

Tape	Test Results	Ranking
11A: Tested on Revox B 77		
Ampex type 456	75/71	2/2
BASF type SPR-50 LHL	75/68	2/6
Fuji type FB	74/70	5/4
Maxell UD-XL	73/68	6/6
Sony FeCr	75.5/71.5	1/1
TDK GX	73/69	6/5
3M (Scotch) 226	74.5/70.5	4/3
11B: Tested on Teac 6100 Mk II		
Ampex type 456	72/66	2/1
BASF type SPR-50 LHL	70/64	6/3
Fuji type FB	68/62	7/7
Maxell UD-XL	71.5/64	3/3
Sony FeCr	70.5/64	4/3
TDK GX	70.5/64	4/3
3M (Scotch) 226	72.5/66	1/1

each machine. The figures to the left of the slash-mark (/) are S/N measurements obtained using the standard "A"-weighting network. The figures to the right of the slash-mark (/) are wideband, unweighted S/N measurements. The sets of rankings follow a similar pattern.

The tests show that there is a greater difference between weighted and unweighted results using the Teac deck than there is using the Revox. A possible explanation for this may be found by referring back to the frequency response measurements. The Teac obviously provided a wider bandwidth response than did the Revox. This could be due to a combination of wideband electronics and head construction. Whatever the reason, when you measure unweighted signal-to-noise, the total noise bandwidth is important, and the wider the bandwidth, the greater the noise content. That fact, indeed, is a major justification for using "A"-weighting (or some other corrective weighting factor such as the CCIR/ARM). The resultant S/N figures correlate better with the subjective annoyance factor of the noise. With the "A"-weighting network applied, Sony FeCr ranked first among the tapes when tested on the Revox, with a signal-to-noise ratio figure of 75.5 dB. When the tapes were tested on the Teac, Scotch 226 led the pack with an "A"-weighted S/N figure of 72.5 dB

Subjective Tests

Tables 12, 13, 14 and 15 summarize our subjective ratings (on a scale from 1 to 10) of the tape samples for such important and practical matters as drop-out susceptibility, uniformity of coating, uniformity of slitting and the ability to retain signal levels with repeated playings and run-through. It must be emphasized that we were dealing, in the first place, with premium-grade tapes (all were back-coated) and that the differences between them with the respect to these physical properties were indeed minute. We tried to rank the tapes for susceptibility to print-through, but we found that all the tested samples were sufficiently immune to this problem so as to make any test for it difficult to concoct.

Perhaps, though, the major problem in testing tapes is the real difference that exists between the "as is" specifications for tape, and the actual performance specifications for tape. That is to say, the magnetic properties of tape are given in terms of coercivity (in oersteds), and retentivity (in gauss). Physical properties are given for such things as base material, base thickness, oxide thickness, and so on. Verifying such specifications in their own terms would mean little or nothing to the recordist, whose primary concern is with performance and reliability. In other words, how do those rather arcane specifications translate into living performance results? To answer this all-important question, however, we must use the tape, not merely study it *in vacuo*. And that, in turn, means putting it on a deck and running the deck. Which, in turn, means that the performance results of any tape depend as much on the interface of tape and recorder as on the basic properties of the tape itself.

Table 12: Drop-out susceptibility (subjective ratings, scale 1 to 10)

Tape	Rating	Ranking
Tested on Revox B 77		
Ampex type 456	9.8	1
BASF type SPR-50 LHL	9.0	5
Fuji type FB	9.5	2
Maxell UD-XL	9.0	3
Sony FeCr	9.5	2
TDK GX	9.5	2
3M (Scotch) 226	8.5	7

Table 13: Coating uniformity (subjective ratings, scale 1 to 10)

Tape	Rating	Ranking
Tested on Teac 6100 Mk II		
Ampex type 456	9.5	1
BASF type SPR-50 LHL	9.0	2
Fuji type FB	9.0	2
Maxell UD-XL	9.0	2
Sony FeCr	9.0	2
TDK GX	9.0	2
3M (Scotch) 226	8.5	7

Table 14: Slitting uniformity (subjective ratings, scale 1 to 10)

Tape	Rating	Ranking
	Tested on Revox B 77	
Ampex type 456	8.5	5
BASF type SPR-50 LHL	9.0	2
Fuji type FB	8.0	6
Maxell UD-XL	9.5	1
Sony FeCr	8.0	6
TDK GX	9.0	2
3M (Scotch) 226	9.0	2

While our present test results do not point to any "winner" among the tape samples we used, they do show clearly that at least seven leading brands all are admirably suited for very fine performance with at least two fairly different kinds of open-reel deck. Again, it must be emphasized that the differences we measured (and most of the time could not actually hear) were truly small. For all this, it may be that one's final preference for this or that tape might be made on really subjective and fairly insignificant grounds, such as the packaging, or whether or not a leader is attached, or even the kind of printed index-log supplied with the tape. It seems to have come to that.

Individual Comment by L.F.: A couple of months ago we tested and evaluated nineteen different cassette tapes and tried to reach some conclusions regarding their performance on high-grade cassette decks. This time we tried to do something similar for open-reel tapes. But there the similarity ends. For the user of a reel-to-reel tape deck is concerned with many things which are of little or no concern to the more casual user of a cassette deck. For example, the serious reel-to-reel recordist using a machine intended for home or so-called "consumer use" may actually be confronted with a deck that has less user-adjustment capability than do some of the newer cassette decks. Thus, the owner of a Revox B-77, for example, has no choices to make regarding bias or playback equalization. Yet, as readers of *MR* know from our earlier report on the Revox B-77, it is on the whole a superb machine in many ways. It therefore becomes extremely important for the owner of such a machine to know which tapes will work best on it, given the "ground rules" that the average owner is not going to poke inside the machine and readjust the bias or other operating parameters.

On an even more specific level, it is important to know what recording parameters are most important to you, the user. If you judge performance on the basis of frequency response, certain of the tapes we tested may be better for you, or even equal to each other. But if you are looking for lowest third-order harmonic distortion at high recording levels, or best signal-to-noise ratios, you might conclude that one of the tapes is better than the others for *those* reasons.

Chances are that if you are involved with a reel-to-reel deck at all, you also will be concerned with such physical properties of tape as its susceptibility to print-through, susceptibility to drop-outs, uniformity of coating, uniformity of slitting, and its ability to retain its recorded signal (magnetization) with repeated playings during editing. In fact, one of the chief reasons why a serious recordist opts for an open-reel deck is because he or she needs to be able to edit quickly and efficiently. Obviously, you can't do that with cassette tape.

Getting back to the more easily measured performance specs such as frequency response, headroom, distortion, and the like, we could have sought out a more professional type open-reel deck in which one or more of these parameters could have been optimized for each of the tapes tested. That would not really have proved too much to the non-professional or even to the "semi-pro" reel-to-reel deck owner who is not about to change operating bias every time a new reel or brand of tape is put on the machine. Faced with the conflict between the pro user (and reader) who will adjust the machine for the tape in any case, and the semi-pro user who owns a non-adjustable deck (or one with limited adjustment capabilities), we decided to check out our seven tape samples on two totally different machines. One was the Revox B-77, of European origin. The other was the Teac 6100 Mk II, of Japanese origin, and one that is also very popular, especially for half-track mastering.

We felt there was no point in testing the tapes at the slower of the two speeds available in both machines, and so 15 ips was used throughout. If there were differences between the tapes when used in turn on the two decks, those differences ought to show up at the faster speed of 15 ips as well as at the lower 7½ ips speed. As suspected, they did. Nevertheless, as was true in our earlier tests of cassette tapes, there was no clear winner in the open-reel sweepstakes. As a purely statistical exercise, we determined that for the measured

Table 15: Retention of signal (subjective ratings, scale 1 to 10)

Tape	Rating	Ranking
	Tested on Teac 6100 Mk II	
Ampex type 456	9.0	5
BASF type SPR-50 LHL	9.5	1
Fuji type FB	9.5	1
Maxell UD-XL	9.5	1
Sony FeCr	9.0	5
TDK GX	9.5	1
3M (Scotch) 226	9.0	5

performance specifications, Maxell UD-XL ranked first in five tests using the Revox deck, and had four first-place showings when tested on the Teac deck. The BASF tapes and the Sony tapes took first place for three different specifications when tested on the Teac deck, while the 3M Scotch 226 ranked first for three different specifications when used on the Revox deck.

As we stated earlier, we can not possibly guess which of the test specifications would be of the greatest importance to any individual recordist. Nor do we know if you are necessarily using either of the machines we used in these tests. We do feel, though, that by studying the tables carefully you should be able to draw your own conclusions regarding which, if any, of these tapes will be "right" for you and your tape deck.

Individual Comment by N.E.: In a sense, selecting a favorite tape for open-reel recording is simpler than it is for cassette recording. For one thing, the proliferation of different magnetic formulations that typifies the cassette field is virtually non-existent in open-reel tape. The prevailing formulation is ferric-oxide (the one exception in our tests published here being Sony's ferrichrome which, of course, does not disprove the generalization.

For another thing, the faster speeds and wider tracks used in open-reel work make differences in tape formulations far less critical than in cassettes. It is obvious from our tests that ferric-oxide at 15 ips will out-perform metal tape at 1⅞ ips. What is more, there is an implication in the test results (and some would say it is more than an implication, rather a definite scientific conclusion) that there is little or no point in considering anything more exotic than ferric-oxide or perhaps ferrichrome for high-speed, open-reel, analog recording—that is to say, "the glass is full, and anything more you pour into it will spill over the sides."

For yet another thing, a reel of tape is just about all software. That is to say, it does not add "parts" to the tape machine, which is literally what happens when you load a cassette onto a cassette deck—the cassette housing actually contains elements that are "missing" from the deck and which become working parts of it. The reels that hold tape are relatively simple devices that, aside from minor variations in the cutouts on the faces of the reels, are all quite alike.

For all this, the serious open-reel recordist—following time-honored practice—is expected to adjust his or her deck to suit a particular tape (or to select a tape for which the deck is known to be optimally adjusted), and that's that. The rest, as one pro recordist puts it, is up to God and the musicians.

Nevertheless, there are different brands of tape and competing performance claims. Also over the years we have had tangible evidence of a general upgrading of tape both in terms of its magnetic coating and its backing. The former has resulted in higher output, smoother response, better signal-to-noise, lower distortion, and so on. The latter has resulted in the kind of backing that boasts the advantages of polyester but with the facility for being spliced and edited. We take these things for granted now, but it wasn't too many years ago when the open-reel recordist faced a Hobson's choice between tape that was flexible and would lap easily around heads and tape guides and could be readily spliced (acetate backed tape), or tape that did not lap as easily and was harder to cut for editing but which was also generally stronger, more dimensionally stable and could be stored more safely for longer periods (polyester). Today we have the kind of backing known as improved polyester which combines the best of both types.

Interestingly, the literature of audio contains precious little on the subject of comparative tests of recording tape. There are several reasons for this hiatus, an obvious one being that the really small differences to be found among competing brands could easily be misinterpreted or misused as "hype" which would only confuse the less-than-technically sophisticated consumer. The very tests that could be performed on tape could easily become a source of controversy as to which tests, their relative importance, their interpretaton in terms of listening results, and so on. Apropos of this particular point, by the way, the actual recording and playback sessions we ran with the tapes could produce no audible evidence to indicate that any tape "sounded better" than any other.

Perhaps, though, the major problem in testing tapes is the real difference that exists between the "as is" specifications for tape, and the actual performance specifications for tape. That is to say, the magnetic properties of tape are given in terms of coercivity (in oersteds), and retentivity (in gauss). Physical properties are given for such things as base material, base thickness, oxide thickness, and so on. Verifying such specifications in their own terms would mean little or nothing to the recordist, whose primary concern is with performance and reliability. In other words, how do those rather arcane specifications translate into living performance results? To answer this all-important question, however, we must use the tape, not merely study it *in vacuo*. And that, in turn, means putting it on a deck and running the deck. Which, in turn, means that the performance results of any tape depend as much on the interface of tape and recorder as on the basic properties of the tape itself.

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Omni Craft GT-4 Noise Gate

By John Murphy and Jim Ford

The GT-4 from Omni Craft, Inc. provides a set of four independent noise gates in a slim rack mountable package. The unit features front panel controls for adjusting the gating threshold and release time for each channel. There are also "key" switches for switching control of the channel over to the key input. When properly used, the GT-4 can virtually eliminate background noise on audio lines during quiet program passages. The gates can also be used to modify the sound of instruments processed through them. The keying feature allows the characteristic dynamics of one instrument to be superimposed on a second instrument thereby providing a wide range of effects for both the artist and the engineer to explore. The GT-4 costs $395.

About Noise Gates

Before getting into the specifics on the GT-4, let's briefly review the reasons for using noise gates and the fundamental concepts necessary to understand the operation and application of noise gates.

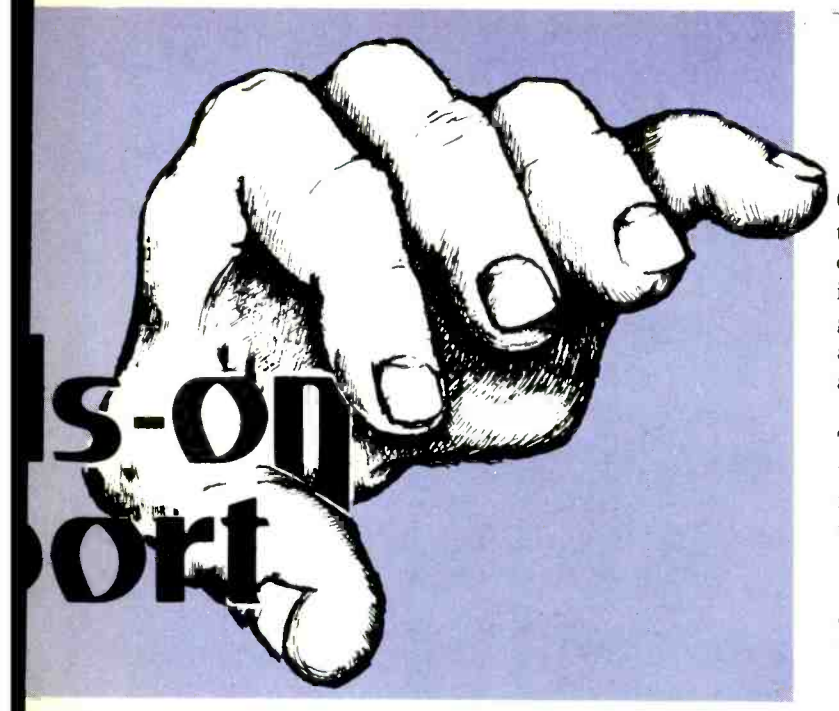
Frequently in recording and P.A. systems there are unwanted low level noises that appear in the signal channel along with the desired signal. For the purpose of this discussion, let's refer to the desired signal as the "primary signal" and consider any other signals to be "noise."

Now, consider the case of a group of musicians recording in the studio with several instruments performing and being recorded at the same time through multiple microphones. Each instrument is individually miked and we would ideally like to hear only the individual instruments on their respective channels when the channels are auditioned in the control room. Unfortunately, in addition to picking up the sound of the primary source to which the mic is assigned, each mic also "hears" the other instruments in the room. That is, the sounds of the other instruments leak into each mic along with the sound from the primary source and contaminate the channel. This "leakage" is particularly undesirable because it steals control of the signal mix away from the recording engineer and "muds up" the sound of the full program mix. For example, a snare drum leaking into a vocal mic across the room will not generally sound good and causes the relative level of the snare drum in the full program mix to change as the level of that vocal track is changed. Indeed, the snare drum cannot be eliminated from the mix by simply pulling down the snare fader because the snare leakage into the other mics will still be heard, and, in general, this snare leakage will have a "trashy" sound. In some cases the leakage can be so great that even with the primary snare drum channel eliminated from the mix, the sound of the snare is still too loud.

One way of dealing with this signal leakage is to employ noise gates on those channels where it is a problem. The noise gate effectively turns the channel up or down depending on whether the signal level is above or below the gate's threshold level. It is up to the operator to adjust the threshold level such that it falls above the level of the noise but below the level of the program. If the threshold is set too low then the noise will trigger the gate on and the benefits of the gate will not be realized. On the other hand, if the threshold is set too high then the gate will cut off the quietest portions of the program resulting in a very unnatural sound as the gate opens and closes.

Although noise gates are particularly helpful in dealing with leakage problems, they are also effective at reducing just about any type of background noise in an audio channel. Hums, buzzes and hisses can often be eliminated quite effectively with very little effect on the program material. Now that we have established the requirement for a noise gating device, let's consider the operation of the gate in more detail.

As a member of that family of signal processors known as "dynamic range expanders," the noise gate increases the dynamic range of the signal processed



through it. The gate distinguishes between two ranges of signal level: signal levels above the threshold level and signal levels below the threshold level. Signals above the threshold level pass through the gate unaffected (ideally). Signals with levels below the threshold level are "expanded" by the gate in that they are attenuated by an amount that depends on how far below threshold the signal level actually is. This "expansion region" of the gate's operation can be characterized by its "expansion ratio." The expansion ratio is defined as the change in output level (in dB) of the processor divided by the corresponding change in input level (in dB). For a normal (or "linear") amplifier a 1 dB change in input level results in a 1 dB change in output level and the amplifier has an expansion ratio of 1. That is, the output level changed by the same amount as the input level changed. For an expander with an expansion ratio of say, 2, an input level change of 1 dB would result in an output level change of 2 dB; and an input level change of 10 dB would result in an output level change of 20 dB. That is, the change in output level is equal to the change in input level multiplied by the expansion ratio.

For the high expansion ratios (10+) typically used in noise gates, the output signal level is attenuated very sharply as the input signal level drops below the threshold and the output level quickly falls below the residual noise level of the system. That is, the gate quickly turns "off" as the input signal falls below threshold. This gives noise gates their characteristic "on/off" action with the gate being "on" (signal not attenuated) whenever the input signal is above threshold, and being "off" (signal greatly attenuated) whenever the signal is much below threshold.

General Description: The front panel controls of the Omni Craft GT-4 are relatively simple and are organized in four groups corresponding to the four independent gates. At the left within each group is the gate's threshold control. The threshold level can be set anywhere between "infinity" (which holds the gate off) at the counter-clockwise extreme and "−40" (about −40 dBV, or very sensitive) at the clockwise extreme. There is a red LED to the right of the threshold control which lights to indicate when the channel is "on." This indicator is highly useful in setting the threshold control since it indicates whether the signal is above or below the threshold level.

There is a "release" control located to the right in each control group. It is labeled "fast" and "slow" at its counter-clockwise and clockwise rotation extremes, respectively, and varies the release time (to −20 dB) between 0.1 seconds and 1.0 seconds. The setting of the release time control determines how fast the gate shuts off after the signal level falls below threshold. Fast release times provide a maximum of noise reduction but tend to produce the greatest audible side effects on the program; slow release times provide less noise reduction benefits (the channel stays open longer after the signal level falls) but reduce the gating side effects. It is also worth noting that the faster decay times tend to result in greater distortion (especially at low frequencies) than the slower decay settings.

Located between the threshold and release controls (below the threshold LED) is a push-button switch for selecting the "key" input. When this button is depressed, the signal through the gate no longer controls the gating action, instead, control is based on the signal present at the channel's key input. Now the channel will gate on only when there is an over-threshold signal present at the key input. This keying feature provides a means for exploring new sounds by allowing one signal (the key signal) to control another signal (the channel signal).

The rear panel of the GT-4 contains only the line cord, line fuse and a printed circuit board edge connector for making all the input and output connections. The unit is supplied with the mating card edge receptacle and it is necessary to solder connect the input/output and key lines onto this connector in order to interface the unit. Although this approach to signal connections seemed a bit awkward to us, it probably helped establish the modest cost of the unit. It is recommended that the unit be interfaced with line-level signals and that the key inputs be brought out to a patch bay for easy access.

Field Test Listening Test: In order to evaluate the GT-4 in actual use, we employed it during a video taping session for a locally produced country/western music TV show. We had noticed on previous sessions

that there was serious drum leakage into the vocal mics and we hoped the GT-4 would help clean up the drum sound. The instruments were all close miked with mic orientations chosen so as to minimize leakage. Even so, drum leakage into the vocal mics was degrading the sound of the drums in the final mix. When the audio was monitored in the control room, we noted that the faders for the drum channels could be pulled all the way down and the drum set remained clearly audible (but sounded like trash!). We verified that the leakage was into the vocal mics by pulling down the vocal faders and observing that the drum leakage was greatly reduced. This made the vocal mics excellent candidates for gating.

In order to get the signals in and out of the GT-4, we had previously terminated the card edge connector with ¼-inch phone plugs on about four feet of cable for each of the four inputs and outputs. Snapping the connector over the exposed printed circuit card edge at the rear of the unit then completed the input/output connections for all four channels. The phone plugs were then used to patch the gates into our mixer at channel access points for the main vocal mics.

In accordance with Omni Craft's recommended procedure we started out with both the threshold and release controls in the full counter-clockwise position (high threshold and fast release time). The threshold was then lowered until the LED began to flicker and the program began switching in and out. The release time was then increased (to about a two o'clock position) to smooth out the sound and eliminate the chopping on and off. The results with these settings were quite good. The vocals held the gate open when they were present, and during vocal pauses the channels gated off quickly to eliminate leakage. The net result was a significant reduction of drum leakage. With the leakge reduced it was then possible to mix the primary drum channels at a higher level and maintain the same overall balance (actually, since the drums sounded much better than usual we probably tended to mix them a little "hotter").

The only problem we encountered was on spoken voice introductions to songs where the voice levels were not as high as on the actual vocals. In order to avoid chopping up the introductions it was necessary to drop the threshold level a bit. The effectiveness of the gate was then compromised somewhat since it became easier for the ambient sound to hold the gate open. However, the bottom line is that the GT-4 provided significant help with our drum leakage problem and contributed to an improved overall mix.

Back at the shop we performed our usual listening test by inserting the GT-4 into our reference system and listening to some high quality albums through it. We interfaced two channels of the unit through the effects loop of our preamp so that the gates could alternately be included in the listening chain or bypassed by pressing a switch.

Upon comparing the gates in and out of the listening chain, the first thing we noticed was a slight drop in

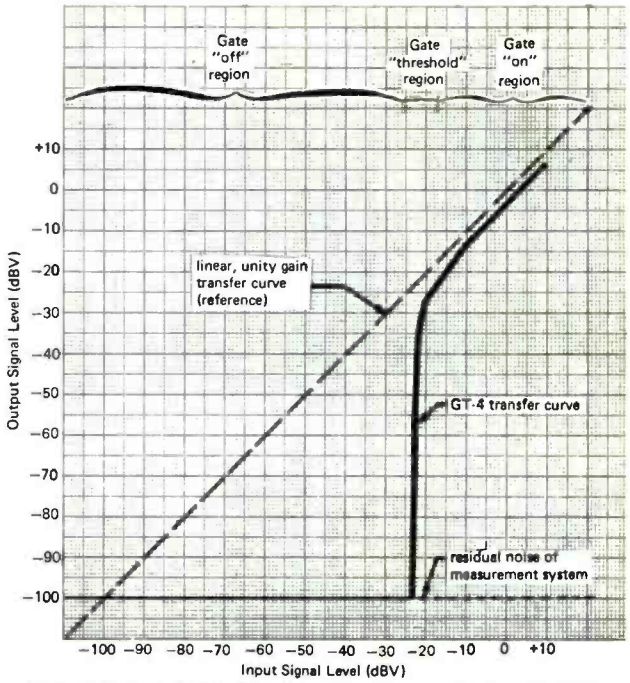


Fig. 1: Omni Craft GT-4: Input/output transfer curve.

level through the unit. This simply corresponds to the insertion loss of the gates which depends on the input impedance of the following stage (for a 600-ohm termination the insertion loss is about 3 dB). After a period of listening and experimenting we determined that the audio quality of the unit is excellent for signals well above the threshold. However, as the threshold was raised the audio quality dropped slightly and with the threshold set right at the program level there was audible "grit" as the channels gated on and off.

This would probably not be a problem in use since the signal level will normally be far enough above the threshold to avoid these problems. But this does suggest that for optimum audio quality, signals should not be allowed to linger in the threshold region.

Lab Test: For specific results of the lab test see the accompanying "Lab Test Summary." Because of the simplicity of the circuitry of the GT-4, there were only a few tests that could be made. The signal path includes no active devices and as a result it cannot be overdriven with line-level signals. The noise contribution of the unit is simply the thermal noise of its output shunt resistor (10 K ohms) or about −112 dBv. So the unit is very unlikely to contribute noise to any system. The distortion through the unit is quite low at mid and high frequencies but increases at low frequencies. The distortion was also observed to increase at all frequencies when the release time was changed from "slow" to "fast." The THD also increased as the threshold level was raised toward the signal level. When the threshold was raised to a level that reduced the output signal by 1 dB (signal just above threshold) the THD was observed to be 1.5% at 100 Hz and about .25% at 1 kHz.

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CIRCLE 96 ON READER SERVICE CARD

We prepared an input/output transfer curve for the unit by plotting signal output level versus signal input level. This curve is reproduced in *Figure 1* and is labeled to indicate the "off," "on" and "threshold" regions of operation. The "expansion ratio" in the threshold region is in excess of 40. That is, in the threshold region, an input level change of 1 dB will produce an output level change of 40 dB or more. This gives the gate the characteristic of being either "on" or "off" without much intermediate area.

The operating instructions supplied with the GT-4 provide enough information to allow the owner to interface the unit and properly operate it. The instructions also include some interesting suggestions for use of the gates in the keyed mode.

Conclusion: The Omni Craft GT-4 noise gates were found to be effective for eliminating background noise and sound leakage from audio channels. The gates are easy to use and provide a sufficiently wide range of control over the threshold and release time parameters. By switching to the keyed mode they can be used to create a variety of new sounds. The audio quality on listening through the unit is very good provided the signal is well above the threshold region and fast release times are avoided. We can't help but feel that for the signal improvement capability that the GT-4 offers, it's a real bargain.

LAB TEST SUMMARY

(Note: 0 dBV is referenced to .775 Vrms)

Input/Output Levels

As a "passive" signal processor neither the input nor the output of the GT-4 can be overdriven or "clipped."

Noise Performance

The only noise the GT-4 adds to the signal processed through it is the thermal noise from its 10 K ohm output shunt resistor at about – 112 dBV.

Distortion Performance (THD)

THD was measured with the threshold control at a 12 o'clock setting (about – 23 dBV) and the release control at the "slow" (full clockwise) setting.

Frequency	Input	Signal	Level
	– 10 dBV	0 dBV	+ 10 dBV
10 kHz	.0094%	.0061%	.0062%
1 kHz	.039%	.024%	.034%
100 Hz	.221%	.108%	.148%

Frequency Response

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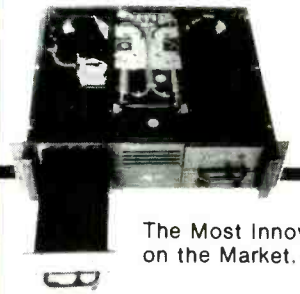

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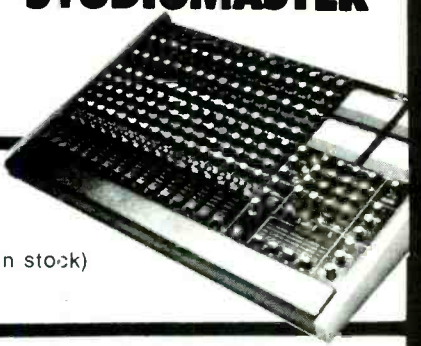

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POPULAR

THE MUSE CONCERTS FOR A NON-NUCLEAR FUTURE: *No Nukes.* [Jackson Browne, Graham Nash, John Hall and Bonnie Raitt, producers; Greg Ladanyi, Stanley Johnston, Dennis Kirk, Don Gooch, Jimmy Iovine, Shelly Yakus, Joe Chiccarelli and David Hewitt, engineers; recorded at Madison Square Garden, New York, N.Y., September 19-23, 1979.] Asylum ML-801.

Performance: **Knockouts overpower draws**

Recording: **"You Are There"**

If Poco had performed their *No Nukes* version of "Heart Of The Night" at Three Mile Island during the nuclear meltdown, instead of possible radiation leakage there probably would have been an explosion. That's not to say that *No Nukes* maintains this impact throughout its six sides, but that there are enough high power performances here to make one hope that musicians of this caliber will coalesce around pressing social and environmental causes like these more often.

Released less than three months after the Garden concerts and edited down from 20 hours of music, this two-hour package represents a monumental effort—apparent from the long list of participants—assembled with the democratic philosophy of the MUSE Foundation that everyone has an opinion to air. The most obvious production problem on a project like *No Nukes* is that there are only a few performances available from each of the acts. A band making a "live" album can usually choose from numerous performances of the same songs.

"Heart Of The Night" takes an ironic interpretative twist when looked at in the light of nuclear protest. (All but a few English majors may want to jump forward to the next paragraph.) "Cool southern rain" becomes radioactive fallout, New Orleans a bomb or reactor, and the "heart of the night" symbolizes the center of the atom. So the song is transformed into an innocent ode to nuclear technology that climaxes in a spectacular exchange of solos between Phil Kenzie's saxophone, and Rusty Young and Paul Cotton's guitars.

Other highlights include Tom Petty's acknowledgement of his blues-rock roots on "Cry To Me," a tip of the hat to the early Rolling Stones; Ry Cooder's soulful "Little Sister," which only needs a little more of William Smith's organ in the mix; Graham Nash and Jackson Browne's wistful vocals blending with David Lindley's mournful fiddle on "The Crow On The Cradle"; James Taylor's faithful rendering of the weary yet insightful singer/songwriter genre on "Captain Jim's Drunken Dream"; Chaka Khan's "Once You Get Started" that outdoes anything on 1978's *Chaka;* and Bruce Springsteen's no-holds-barred Mitch Ryder medley, which gives us the first authorized

NO NUKES: (Left to right) John Hall, Carly Simon, James Taylor, Graham Nash, Nicolette Larson and Bonnie Raitt, among others, sing out for a non-nuclear future.

"live" Springsteen.

Crosby, Stills, and Nash's "Teach Your Children" reemerges in the context of *No Nukes* as a stronger message for the beginning of the '80s than it was for the early '70s. Yet, the classic CSN harmonies that weave in and out of an informal "You Don't Have To Cry" lack the sense of discovery that bolstered their early work. Also, Graham Nash's brave attempt at his "Cathedral" is overwhelmed by the sheer size of Madison Sqaure Garden.

John Hall *can't* be excused for his silly "Plutonium Is Forever," which is carried along by sentiment rather than musical expertise or song structure. "Power," from Hall's largely overlooked, yet highly listenable *Power* album, *does* contain some nice pedal steel guitar by the Doobie Brothers' John McFee and is one of the best anti-nuclear anthems around. By comparison, the Doobie Brothers' own contributions sound more mechanical. The same fate almost falls to Bonnie Raitt's rendition of Del Shannon's "Runaway," but the song is saved by the arrangement.

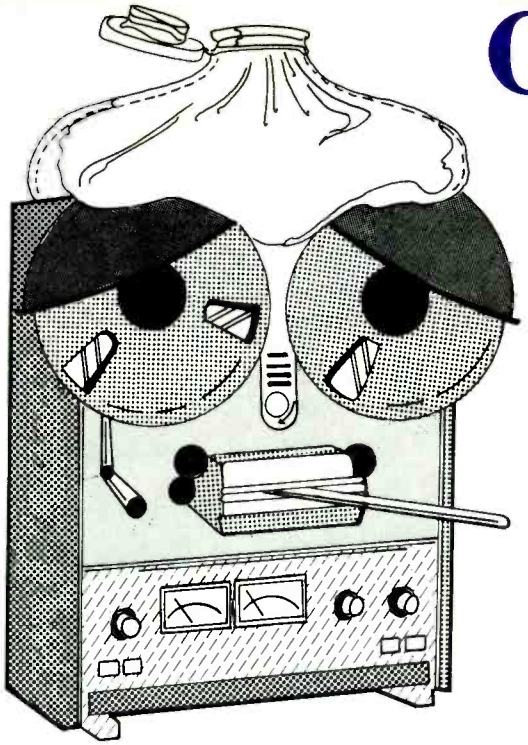
Perhaps the biggest contrast on *No Nukes* occurs in the uneven recording quality of many of the songs. The huge, ambient vastness of the Garden does not make *No Nukes* unlistenable. But on a tune like "Mockingbird," David Sanborn's saxophone comes across like a kazoo while Russ Kunkel's simple drum techniques nevertheless manage to achieve his typically big sound.

No Nukes, then, may not force you to move from a nearby nuclear reactor. But it may inspire you to set up a stereo system in your neighborhood fallout shelter. S.S.

MARIANNE FAITHFUL: *Broken English.* [Mark Miller Mundy, producer; Bob Potter, Ed Thacker, engineers; recorded at Matrix Studios and Roundhouse Studios, London] Island ILPS 9570.

Performance: **To die for**
Recording: **Cloak and dagger perfection**

Marianne Faithful (an ex-Mick Jagger girlfriend who last had a hit in 1964 with The Stones' "As Tears Go By") has a new album, *Broken English*, which presents the strongest example of musical hypnotism I have ever encountered. Her voice casts a hallucinogenic spell, perfectly supported by the unusual production tecnniques. Producer Mark Miller Mundy renders the main instruments here (the bass and synthesizers) as vaguely suppressed mutants for a kind of padded cell effect; with exacting drums and a sharp up-front vocal on top. The overall feel is of pulsating ooze, while each individual element is actually entered quite clearly and straightforwardly. All the sound on the album works (please excuse the California-cuisinart expression) *organically*—such as the smooth sax solo which glides out of the end of "Guilt." The moog in tracks like "Broken English remains ominously in the background like a murderer crouched in the bushes, ready to strike. It's the thunder far off, creating more fear in the present by sheer anticipation. Other than some of Eno's recordings, a synthesized instrument has never sounded so bloodthirstily human. Interestingly, if this title track were mixed differently (with even stronger moog and drums) it might have been the best disco song



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ever written. Also exciting is John Lennon's "Working Class Hero" where the bass is an Edgar Allan Poe recurring nightmare—the drums like a knife plunging deep into entrails, and all around the edges are tsetse fly cymbals, giving it all a quicksand effect.

But beyond the funky and unique production, beyond the eight gorgeous melodies and revelatory lyrics, is Marianne Faithful's voice—part Sandy Denny in phrasing, part Nico in mystery, but still totally its own terrifying icon. It's the Berlin Wall in David Bowie's "Heroes." It's cigarette smoke blown in your face that only later seems the product of affection. It's hair color too platinum to be judged real or fake. It's a Mona Lisa smile. It's the heroin addicts from all the Warhol-Morrissey films—the people who make sloth seem like an art form. It is astonishing. And it will stand. J.F.

LINDA RONSTADT: *Mad Love.* [Peter Asher, producer; Val Garay, engineer; recorded at Record One, Los Angeles, Ca.] Asylum 5E-510.

Performance: **Wooing controversy**
Recording: **Class conscious**

Ronstadt's cover of Elvis Costello's "Alison" on her last album prepared the way for *Mad Love.* Let's face it, Linda's already seen the American Dream many times over, and all of Hollywood is at her disposal. What remains is aberration from the norm, and L.A.'s favorite aberration these days is the newest New Wave.

All kidding aside, this is a surprisingly good album, the most important Ronstadt since country-rock had its say in the early Seventies. It isn't hard to doubt the artistic sincerity of today's indulgent, cliquish rock superstars, particularly one who doesn't write her own material and could be suspect in terms of trendiness. But this time Ronstadt's cover tunes aren't all wishy-washy cowgirl laments and old Motown remakes. With three compositions each by Elvis Costello and Mark Goldenberg, this package has plenty of punch and heads off in an impudent new direction.

It is Mark Goldenberg, in fact, that Ronstadt has discovered amid the new musical circles of L.A. He fronts an unknown new wave band called The Cretones, who once backed Wendy Waldman and have a debut release on Planet called *Thin Red Line.* His gutsy

rock tunes, said Ronstadt in her recent Playboy interview, are second only to Costello's among New Rock favorites. "Mad Love," Goldenberg's opening title track, is perhaps the least impressive tune on the record, but it sets the punky tone for things to come. "Cost Of Love" and "Justine" on side two are stronger vehicles for Ronstadt, bratty basic rock with a hint of rockabilly and simple but riveting lyrics. Goldenberg plays hot, tense guitar throughout the album.

Costello's three contributions are highpoints, and Ronstadt does "Party Girl," "Girls Talk," and "Talking In The

LINDA RONSTADT: Semi-tough

Dark" with considerably more angst than she did "Alison" last year. "How Do I Make You" by Billy Steinberg is the album's single (b/w a country tune, "Rambler Gambler," that didn't make the album) and it's the big beat rather than Ronstadt's treatment that dominates here. Side one closes with two golden oldies, "I Can't Let Go" (Hollies) and "Hurt So Bad" (Little Anthony), and both are better than average exploitations of the rock classics that Hollywood has been resurrecting so blandly of late.

Mixed to the 3M digital system at The Mastering Lab (by Doug Sax and Mike Reese), *Mad Love* is clean and dynamic—let's hope its quality isn't jeopardized by hectic pressings. Ronstadt's semi-tough new stance, whether it represents a jump on the New Wave bandwagon or an earnest feel for what's happening, comes off well. She sounds like she's into it, and *Mad Love* may be her most convincing album to date. R.H.

JOLIS & SIMONE: ***Jolis & Simone.*** [Ron Dante, producer; Mike DeLugg, Artie Friedman, Doug Epstein, Vici Fabry, engineers; recorded at Media-sound Studios, New York and Automated Sound Studios, New York.] Columbia JC 36249.

Performance: **Repetitious, repetitious, repetitious . . .**
Recording: **A pop masterpiece**

"Jolis and what?," you may very well ask, since that's the usual first impression that this album seems to give to most people. This not-so-dynamic duo with the unusual name which sounds like an imported cosmetic, has chosen the perfect vehicle to go from obscurity to oblivion in one easy step, their own album. They probably would have been safer in cosmetics.

It's hard to imagine what made these guys leave their basement, where the world was safe from them, and go on to maliciously churn out this relentless onslaught of unequivocably boring glop. The chance of an album, any album, not having a single worthwhile cut is low, but these guys were able to do it anyway. The first side has cutely-titled ditties like "The Paradise," on which J & S sound like they're trying to imitate several slightly more famous rock groups in one schizophrenic attempt; the ever-crass "Cafe Au Lait;" "Just A Little Love," stolen from the soundtrack of the late-late-late show; "Midnight Lady," which is nothing more than "The Paradise" played backwards; and a Henry Mancini rip-off, "Rainin'." Absolutely yawn-inspiring.

And what more could one ask for, than another side of more of the same. Well, not quite the same; it isn't up to the standards set by the first side. The second side, although it purports to consist of several songs, is nothing more than one long musical misadventure broken up into five indistinct segments.

Jolis & Simone can't really be faulted on the more technical aspects of the album. The production could be best described as adequate, and done in the typical pop format of solid percussion with crystal clear, sometimes too sibilant, high-hat, "mellow" guitar licks that pop up out of nowhere and fade out, and the predictably amorphous blend of instruments washing over the whole product with a powerful blandness. The vocals are fairly clean, with harmonies that, despite being more than occasionally overpowering, are easily the

best thing J & S have to offer. Harmonies aside, though, you can find more entertaining music being played in elevators. M.D.

PINK FLOYD: ***The Wall.*** [David Gilmour, Bob Ezrin, Roger Waters, producers; James Guthrie, main engineer; recorded at Superbear, France, Producers Workshop, L.A., Ca., and CBS Studios, N.Y., New York.] Columbia PE2 36183.

Performance: **Desperately in need of visual or mental/drug accompaniment**
Recording: **Too sanitized**

Above all, Pink Floyd's music has always tailored itself to whatever drug was fashionable at a given time. In the late sixties - early seventies, when it was *de rigueur* to fry your brains on acid, their music made sure to trip the light fantastic with every psychedelic grok and blam their instruments could muster. Over the last few years, when valium has become as much a trendy household fixture as hanging plants and track lighting, so Pink Floyd's music has become a downer-freak's delight, reveling in apathetic musical arrangements and dull lyrical concepts.

Their new double album, *The Wall*, is again a low-key affair with the same crisper approach used on their two previous albums, aided by a fine rendering of a funky bass. Actually, this works against the band conceptually. The flat melodies here are more suited to the old Creature-From-The Black-Lagoon production murk of *Meddle* and *Ummagumma* (the 1969 album that set the mold for everything the band has done since, with the exception of the wonderfully commercial *Dark Side Of The Moon*). Everything here is pre-washed fluff, except the orchestra; the one element which *should* have been cleaned up. Instead it comes off like some cheap organ-y mellotron. Roger Waters' sinus attack vocals are as bland as ever, though the lyrics have some nice twists of black humor beyond their fashionable isolationism. The added elements of "musique concrete" (telephone rings, children whining; even helicopter sounds like those on the *Apocalypse Now* soundtrack) are as sharply recorded and relevantly integrated as on recent albums, but again this works to the band's disadvantage.

Most strange, though, is the concep-

tual upshot of the album, which is staunchly anti-drug and strongly mocking of rock concert conventions and even their own fans. Though the latter two may possibly be worth putting down, the band still comes off as obnoxiously elitist and ultimately as bitterly self-indulgent as the sound itself. J.F.

JAZZ

JOHNNY MINCE: *Summer of '79.* [Bill Borden, producer; Claire Olivier, associate producer; Fred Christie, engineer; recorded at Mediasound Studios, New York, N.Y., June 4-5, 1979.] Monmouth Evergreen MES 7090.

Performance: **Mince is the spice**
Recording: **Excellent, well-focused, clean**

All the musicians on this aptly titled (it was completed during the summer of 1979) release go back a lot further than 1979—all but pianist Lou Stein are swing-era veterans of bands including those of Bob Crosby, Tommy Dorsey, Ray Noble and Artie Shaw. Stein, the baby of the group at age 57 when this record was made, just missed the swing era, coming in with the bebop bands of Ray McKinley and Charlie Ventura. Actually, Johnny Mince had the unfair advantage of growing up in the Chicago area in the 1920s where he heard clarinetists like Jimmie Noone and Frank Teschmaker, as well as the first proddings of the later day king of swing Benny Goodman. Mince is often compared with the smooth, sophisticated style of Goodman but, to the contrary, I find his playing more hot and inspired than even that coming out of Noone and Teschmaker, and only narrowly missing that split-edged excitement that Pee Wee Russell used to get from the instrument.

The tunes here are also a litany from the swing era book. "If I Had You" and "Poor Butterfly" from the Goodman repertoire, "Pennies From Heaven" and "When You're Smiling" out of Louis Armstrong and "Alexander's Ragtime Band," which was a favorite with all the swing era bands.

But this is far from simply a swing-era record. Johnny Mince has listened

to the beboppers and all those trends in jazz which came after and assimilated them into his style. Perhaps egged on by Stein's Mel Powell- and Bud Powell-inspired piano, this comes to the fore more than it would have if the pianist had been Teddy Wilson or someone of a more traditional persuasion than Stein. Cliff Leeman keeps up on drums like he did for Artie Shaw and Charlie Barnet and a lot of the other big bands. Sometimes he gets a bit loud and stiff, but most of the time he manages to fit into the proceedings perfectly. Listening to this recording, it's difficult to realize that at one time Bob Haggart was one of the firmest and strongest bass players in the business. Today, with the help of a bass amplifier, he sounds squashy and tentative. His playing no longer sparkles the way it used to. Of course it's perhaps not fair to expect Bob Haggart to play as well at 65 as he did in the '30s and '40s with Crosby's Bobcats, yet Mince (two years Haggart's senior) still has that drive and verve and joie de vivre that he exhibited in his tenure with Ray Noble, Joe Haymes and Tommy Dorsey.

I hate to second guess a producer as good as Bill Borden, but I think that if I were making a record like this I would have opted for an older pianist and a stronger bassist. However, there are moments here which I wouldn't change for the world, such as the two part invention woven by Mince and Stein on "When You're Smiling."

The music may be the product of the '30s and '40s, but the Spirit of '79 is still going strong in souls like Johnny Mince and Bill Borden and the gang at M.E.

J.K.

JOE PASS: ***I Remember Charlie Parker.*** [Norman Granz, producer; Val Valentin, engineer; recorded Feb. 17, 1979 at Group IV, Hollywood, Ca.] Pablo Today 2312 109.

Performance: **A good Pass, but not the real Bird**
Recording: **Loud and clear, including the pick noise and string slide**

Let's begin with what's good about this recording, and it is very good indeed. Joe Pass is an excellent guitarist especially when he's playing the sort of lush ballads he plays here! If at times he is considered background music it

two formidable jazz powers: count basie and cecil taylor

By Nat Hentoff

Even the most self-stimulating big bands have their mechanical nights. No one ever seems to know why the same group of players can catch fire on a Tuesday and then just go through the motions the next evening. I've heard the fabled Ellington band come into town after ten hours on a bus and soar. Another time, fully rested, they played like sleepwalkers. The same with Basie. What makes *On The Road/Count Basie and Orchestra* so wondrous an album is that Norman Granz happened to catch the Basie crew on one of those incandescent nights. The place was Montreux, Switzerland, and the date: July 12, 1979.

"Yeah," Norman Granz told me recently, "the band was really hopping that night!" Always, with Basie, there is that enormous reservoir of power—the biting brass and rolling saxes, complemented by the leader's dramatically spare piano. Somehow, with the judicious application of one finger, Basie projects a more propelling pulse than the whole band. But when the orchestra is really wailing, there is an extra dimension of exultation in both the band's attack and Basie's sly form of rhythmic jujitsu. And that's what happens on every track of this Pablo Live session.

There are also, of course, a number of incisive soloists—from trumpeter Ray Brown to trombonist "Bootie" Wood to reedman Eric Dixon and the nonpareil Basie himself. The charts include originals from within the band, commissions from outside, and Duke Ellington's "In A Mellow Tone." There's much good humor in the playing, and the quality of the sound is appropriately crisp and buoyant.

The "life force," as he calls it, of Cecil Taylor is both similar to and different from Count Basie's. Similar because it is as deeply rooted as Basie's in the black experience, including the myriad shades and celebrations of the blues. Different because Taylor's background and curiosity extends to all music, from "the conservatory," in his term, to Japanese Kabuki revelations. But at the core, Taylor is irrepressibly jazz—his own formative influences having encompassed Fats Waller, Jelly Roll Morton, Duke Ellington, Bud Powell, Thelonious Monk, and Horace Silver. And much, much more. Being now at the forefront of jazz innovation, Taylor also extends all the way back to field hollers. So he is different from Basie primarily in the scope of his musical obsessions. Different, but not better. Each is invaluably beyond category.

Cecil Taylor Live in the Black Forest on Pausa is a "live" session on June 3, 1978—a SWF-Radio Jazz Concert in Kirchzarten, Black Forest, West Germany. Taylor's intensely resourceful colleagues are trumpeter Raphe Malik, alto saxophonist Jimmy Lyons (a long-time sharer of Taylor's probes into the unforeseeable); violinist Ramsey Ameen; bassist Sirone; and drummer Ron Jackson. This is true, persistently challenging *collective* improvisation—a fascinating continuum of anticipation and response. But the fiery center is Taylor whose piano improvising creates more sustained, inventive energy than anyone else on the instrument—all aimed toward "the magical lifting of one's spirits to a state of trance."

The recording is vividly resonant, projecting the extraordinary and sometimes exhausting presence of Cecil Taylor's unrelenting way of shaking himself and the listener into new dimensions of feeling.

COUNT BASIE: *On The Road.* [Norman Granz, producer; Dave Richards, engineer.] Pablo Live D2312112.

CECIL TAYLOR: *Live in the Black Forest.* [Joachim Berendt, producer; Norbert Klovekorn, engineer.] Pausa 7053.

certainly is true that his guitar playing works on that level as well as on the inspirational jazz level. I cannot think of any other guitar virtuoso in the jazz field today with Pass' ability to get around the instrument and do things that are totally amazing. There's also a lot of fine music in what Pass plays exclusive of his astounding technique and this collection of ballads (including some seldom heard gems such as "Just Friends," "I Didn't Know What Time It Was" and "If I Should Lose You") is the occasion for much fine playing by Pass.

What's bad about this record is the hook, the gimmick, the half-truth that Joe Pass remembers Charlie Parker. Bird died March 12, 1955. Joe Pass did not surface as a major jazz voice until the 1960s and his style has only the remotest connection with Charlie Parker's. As a technical virtuoso guitarist whose style relies as much on chordal statements as linear melodies his inspirations were probably players like Barney Kessel, who did, in fact, play and record with Parker, and Charlie Byrd, who did not.

Joe Pass is not the first post-Parker musician to come along and dedicate albums to Bird concentrating on tunes that Parker played. I guess there's really nothing terribly wrong with that, except that there are players around who *do* remember Charlie Parker. They knew him. They played with him. They are still good players and if you're going to pay tribute to Bird why not do so with Howard McGhee, Dizzy Gillespie, Barney Kessell and other players who *really* knew him and played with him and would have reminiscences that were not only personal but more in keeping with Bird's style?

Charlie Parker was a fleet-footed messenger who spun out long lines of notes gracefully interconnected in a way which was totally compatible with the saxophone. The guitar, especially the unaccompanied acoustic guitar, is not the ideal instrument for such forays of quick passages as Bird wove. And when it comes to sustaining notes, the acoustic guitar is one of the most difficult instruments for that purpose.

Forgetting the Bird syndrome, Joe Pass gives us a pleasant recital of ballads that make for pleasant enough listening. Only on the second take of "Out of Nowhere" does Pass get brave enough to venture into the world of linear swoops and swirls where the true Charlie Parker lived. It's nice that he

chose these tunes, all of them good tunes and all of them tunes that Parker recorded on his famous "with strings" albums but whatever the dedication, it comes out Joe Pass and, as often happens with solo guitar, it doesn't swing often enough to approach the goals that the concept would imply. *Bird always swung*—whether he was playing with strings, without strings or even with a bad rhythm section. Pass doesn't always swing, but just consistently enough that we critics can't accuse him of being a non-swinger.

Actually my complaint about this record isn't so much about what it is, as about what it could have and would have been if the artist and the concept had been better matched. J.K.

CLASSICAL

SIR EDWARD ELGAR: *The Dream of Gerontius.* Alfreda Hodgson, contralto; Robert Tear, tenor; Benjamin Luxon, baritone; The Scottish National Orchestra and Chorus, Sir Alexander Gibson, cond. [Simon Lawman, producer; Bob Auger, engineer; recorded in Britain in 1976.] Vanguard VSD 71258/71259.

Performance: **In the Elgar tradition**
Recording: **Soloists and orchestra okay, chorus could be clearer**

Although this is the third version of *Dream of Gerontius* to be listed in the Schwann catalog, it remains a work which is not as well known as it should be. As a sacred oratorio it details the final confrontation between man's soul and man's maker. The text is from John Henry Cardinal Newman's dramatic poem of the same name, a copy of which was thoughtfully given to Mr. and Mrs. Elgar by their parish priest as a wedding present. I wonder if that nameless cleric had any idea the wheels he was setting in motion. Some years later Elgar chose the text as the libretto for his Opus 38 composed for the Birmingham Festival of 1900. This, despite the fact that a projected setting of the text by Dvorak had been rejected ten years earlier as being too Catholic for an English festival. Perhaps being a Roman Catholic in a Protestant land,

the concept of *The Dream of Gerontius*" appealed to Elgar for that very reason.

The work itself is highly liturgical, including such elements of the mass as the Kyrie (both in Greek and in a rough English paraphrase), a litany, a strongly put credo, beginning with the words "Firmly I believe and truly," a brief allusion to the Ave Maria and a finely crafted paraphrase of the opening words of the twenty-third psalm, "My soul is in my hand . . . I have no fear." It was clearly a work of faith on the part of Elgar as much as was *The Resurrection Symphony* on the part of Mahler.

Robert Tear is considerably better known today than he was in 1976, largely due to his inclusion in the cast of the first full-length production of Alban Berg's *Lulu* which took place in 1979 at the Paris Opera. His is an excellent, firmly controlled tenor voice able to communicate both the despair of Gerontius' opening "Jesu, Maria—I am near to death" and the expectant exultation of the soul on its way to see God. Less well known are contralto Alfredo Hodgson and baritone Benjamin Luxon but this too is only a matter of time. Both sing their parts nicely and will in the tradition of Sir Edward Elgar and the English oratorio. While the chorus handles its part well it is not as clearly recorded as it could have been, and especially in the counterpoint of the chorus of Demons, things tend to blur. For their work, it is well to follow the thoughtfully printed libretto on the inner sleeve of this double album at least the first time around.

To be sure there are reasons why this work is not as well known as Handel's *Messiah* or some of the other chestnuts that we hear so frequently in church or in the concert hall. For one thing, *Messiah* is theologically a universal Christian text which can be utilized by Catholic and Protestant alike whereas *Dream Of Gerontius* is nothing if not denominationally Catholic. Also it is, as pointed out by liner annotator Diana McVeagh, a thoroughly written piece. It does not excerpt easily the way that Handel's *Messiah* does with its convenient "Hallelujah Chorus" or solos like "He Shall Feed His Flock." It also deals with the theological problem of life and death rather than setting events from the gospels to music in dramatic fashion.

I hope that this recording achieves some success for in Sir Edward Elgar the world had a great composer who wrote much more valuable music than the occasional marches and the *Enigma Variations* for which he is primarily remembered. J.K.

BACH: *Chromatic Fantasia and Fugue; Italian Concerto; Four Duets from the Clavierubung, Book 3.* Rosalyn Tureck, piano. [Steven Epstein, producer; Milton Cherin, Bud Graham, engineers. Recorded at CBS Recording Studios, New York, N.Y.] Columbia M 35822.

Performance: **Gripping**
Recording: **Clear**

I admit to having been, not so long ago, one of those people who steadfastly believed that Bach should not be played on the piano. It wasn't entirely a question of authenticity: I just didn't think the music sounded as well on the piano as on the harpsichord. But then, I attended one of Rosalyn Tureck's marathon concerts at which she played the

Goldberg Variations (repeats and all) on both instruments, and to my surprise, I found the piano rendition by far the more striking. Having developed a piano technique specifically suited to bringing out the details of Bach's subtly weaving voices, Tureck brought just this sort of revelation to thousands of people over the last 40 years or so, and in the course of her career, she has recorded the full Bach keyboard canon—some parts more than once. Sadly, her recordings for Decca Gold label have been out of print for many years.

It is particularly heartening to learn, therefore, that Columbia is having Tureck record this glorious literature once again, leaving the instrumentation up to her. The present disc is her first piano recording in many years, and it captures her approach extremely well. In the opening and closing movements of the *Italian Concerto*, Tureck's playing is full of energy. Yet, it is not the king of unbridled energy that, on many a piano recording of Bach, causes the textures to melt together. Rather, Tureck's careful attention to dynamics and her intuition about ornamentation lead to performances that are as finely detailed as one could want. The middle *Adagio*, by contrast, is played with the most sublime elegance. Here, she has chosen to add embellishments to the alto line—an attractive idea which she justifies in her liner notes, and one she follows with consistency throughout the movement.

The four Duets are attractive enough, and in Tureck's reading they command more attention than they might otherwise deserve. After these short works, though, the *Chromatic Fantasia and Fugue* comes as quite a contrast. As in the *Italian Concerto*, individual voices in a complicated structure are brought out with remarkable clarity, and the dexterity evident in the scrambling single-line runs of the *Fantasia* leave no doubt that Bach's most difficult keyboard writing is still well within Tureck's grasp. To some, the longish pause between the *Fantasia* and the *Fugue*, and the slow, deliberate statement of the *Fugue* theme, may seem overly dramatic. It is, however, typical of Tureck's thoughtful Bach style, and I find it effective.

The recording itself is very good, apparently miked not too closely and in a suitably ambient room. The only complaint I really have would concern the pre-echo before most cuts. A.K.

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