

**Profile:
Michael
Franks**

MODERN RECORDING & MUSIC

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Vol. 7 No. 7
April 1982

Todd Rundgren A to V

**OVERVIEW OF
SYNTHESIZERS
Part 1**

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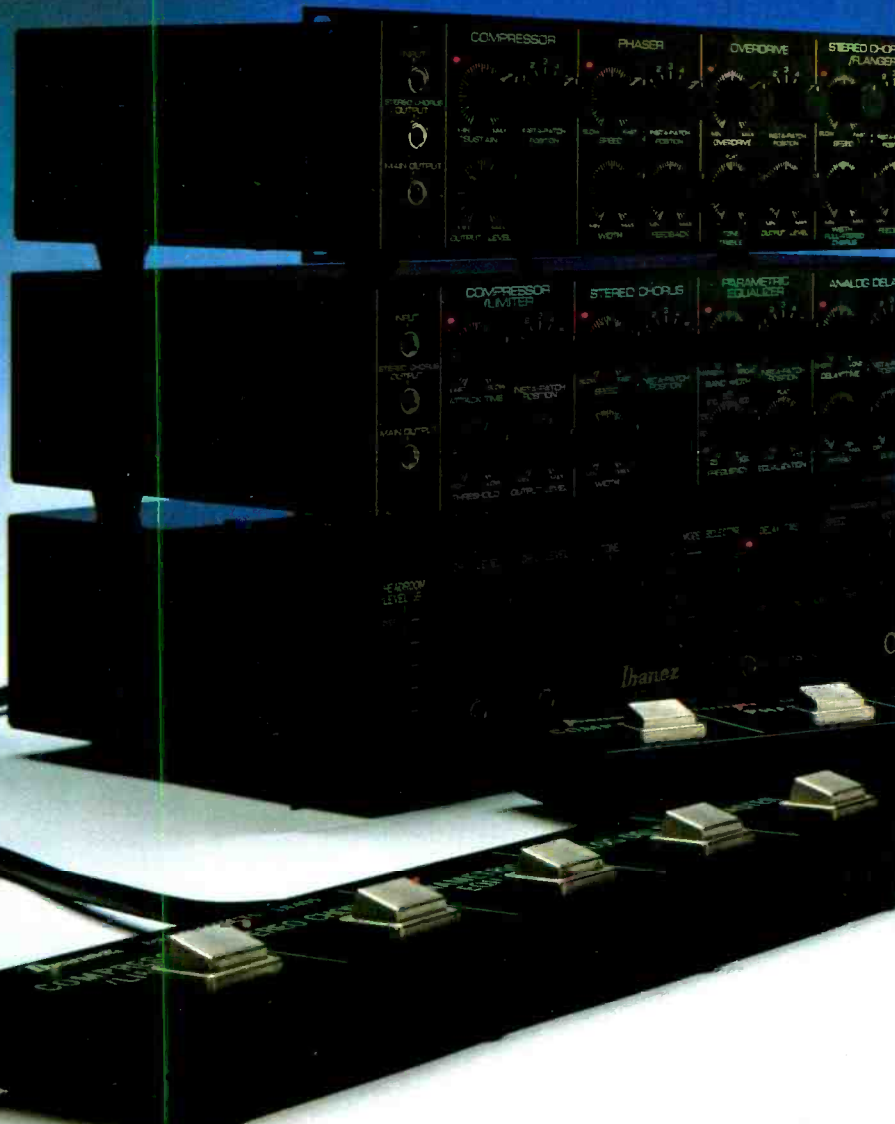


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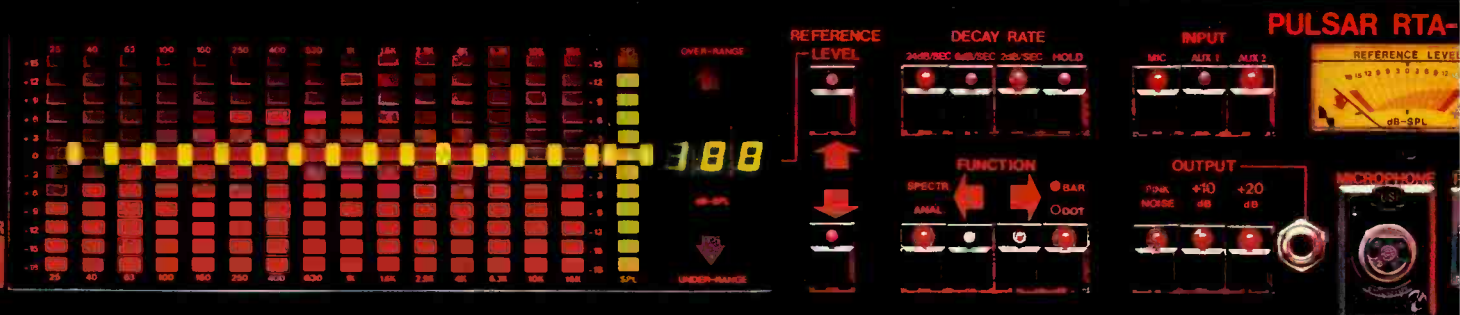


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MODERN RECORDING & MUSIC

APRIL 1982
VOL. 7 NO. 7

THE FEATURES

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By James F. Rupert
Caveat emptor! (And you, too!) All that snazzy equipment you picked out after Jim's last visit is going to cost plenty! Some tips on spending wisely!

AN OVERVIEW OF SYNTHESIZERS, PART I **34**
By Devarahi
Monophonic, polyphonic, quasi-modular, VCO's, VCF's...how do you decipher the synthesizer hieroglyph? A look beyond the bells and whistles to what's available to you in today's synthesizer market.

TODD RUNDGREN A TO V **42**
By Rob Patterson
The hermit of Mink Hollow revealed...to a degree. With the release of Utopia's latest album *Swing to the Right* and the start of a truly solo series of concerts behind him, Rundgren took some time out to talk to *MR&M* about his interests in music and video and whether Utopia is really to be found in upstate New York.

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By Ellen Zoe Golden
You must admit a man has taste when he requests back up on his very first album from none other than the Crusaders! He hasn't let a dedicated legion of kindred spirits down since *The Art of Tea* in 1976, and now with *Objects of Desire*, Franks continues in his unique pop-jazz tradition.

COMING NEXT ISSUE!

The Police "Live!"
Profile: Moe Bandy
Recording Techniques, Part III

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Rundgren Photos: Ralph Gabriner
Franks Photos: Harrison Funk



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Remember the Alamo?

The following was directed to Craig Anderton:

I'm hesitant about writing to you because you're probably deluged by multitudes of tinkerers and grippers, but you're the only person I know of who could help me in a single shot.

I need schematics on a couple of items. A) on Alamo "Jet" guitar head; I wrote to San Antonio, TX but the letter got returned INSUFFICIENT ADDRESS: B) Mutron Phasor II—I wrote to Musitronics 1977 address and this letter got returned too (the phasor doesn't oscillate anymore, the speed control is kaput). Where is a good place to write to for obtaining schematics of various pedals, like a date central or something?

2) I need technical advice. I have a Peavey MK III mixer which I want to disconnect the internal reverb in order to plug other effects into. Peavey wouldn't send me a schematic of the mixer, and a technician I talked to said there is an amp which drives the reverb spring transducers and another receiver that converts this signal into usable voltage. How could I modify the mixer to have a high impedance effect send/ret. where the reverb used to be? Incidentally, the Peavey 1200S board had a setup where if one plugged into the reverb send you could disconnect the on board reverb and have another effects send.

3) I need HELP!! I built a compressor rack, an EQ rack, and a noisegate rack based on your circuits. Neither the compressors or EQ's work (I don't know about the N.G. yet, I haven't a ± 150 power supply yet); So, is there any way to determine with an O-scope what's *not* going where? I've already checked it, but we're only on LRC circuits in school right now, no complex voltage testing yet, I spent all summer working on these boards, and I'm kind of hurt they didn't work. (Yes, I *have* built your circuits before which *did* work too!)

4) I'd just like to congratulate you for all the things you've accomplished in the last couple of years! Like, you're Lech Walesa of home recordists! I think you've inspired a lot of people to take steps they wouldn't have ordinarily. So, keep up the good work!!

One more thing—who else besides Godbout sells revised *Electronics Projects For Musicians*? I love my copy so much it has fallen apart on me! I wrote to Godbout 4 times this summer trying to obtain parts on *EPFM* and they were about as helpful as mammaries on a warthog. So please, where can I buy a copy?

—Jerry Webster
1005 Bay Ridge Ave.
Annapolis, Md.

We received the following response from Craig:

Well, that's a lot of questions but I'll do my best. By the way, I do get deluged with mail, but luckily the proportion seems to be about 98% tinkerers and only 2% grippers.

1. The Alamo Jet is a toughie, but Mutron was purchased by ARP prior to ARP being absorbed by CBS. So, I'm pretty sure the ARP repair department would be able to provide you with a schematic for the Mutron Phasor. As far as getting other schematics, most companies are very secretive about their circuits—why I don't know, since any one (i.e. competitive com-

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panies) intent on copying the circuit can do so without a schematic if they really want to. Besides, only a small number of these circuits show any kind of real originality; and if the circuits are truly innovative, then they can be protected by patents. If any companies would care to write and explain why they are so reluctant to give out schematics to people who have bought their devices, let's hear from you.

2. Sorry, but I don't have a schematic either and haven't the foggiest idea of what you would do. Perhaps a local service center familiar with Peavey gear can help you out.

3. Saying "it doesn't work" doesn't help much in determining the problem! You say the racks are "based on" my circuits. What kind of changes did you make? How good is the power supply? What are the symptoms? Does the compressor amplify but not compress, is it completely dead, or what? This is the kind of information that is required to make a diagnosis. You can't just go to a doctor and say "something's wrong with me, guess what it is." The more symptoms you can describe, the better the chances of isolating the problem.

4. I always appreciate compliments, so thanks! The main objective of my work, whether musical or technical, is to inspire people.

5. As you may know, Godbout's has dropped out of the parts business in order to concentrate on their line of CompuPro high-level computers. You can order the revised *Electronic Projects for Musicians* from any good bookstore, or by mail (add \$2 shipping and handling) from Polymart (Polyphony's marketing division), P.O. Box 20305, Oklahoma City, OK 73156. The book costs \$14.95. Polymart also sells a couple other of my publications, the "4/8 Track Studio Log Book," and "Craig Anderton's *Contemporary Keyboard Articles*," a reprint of all my articles and columns that appeared in *Contemporary Keyboard* from June 1977 to February 1981.

—Craig Anderton
Contributing Editor
Modern Recording & Music

Chrome

The February issue of *Modern Recording & Music* contained a letter from Mr. Begley concerning the lack of C-45

lengths in CrO₂ tape. The answer did not discuss tape length at all but contained a statement that "the few companies we spoke to" felt that "there are other materials [than chromium dioxide] that seem to be giving better results."

This comes as a surprise to us at BASF, one of the three companies mentioned by Mr. Begley but not one of the few who were consulted! This must come as a surprise to a few others as well: the prestigious Mobile Fidelity Sound Lab, CBS Masterworks, RCA, Sine Qua Non, In Synch/Connoisseur Society, Inner City Jazz, and many others who produce audiophile cassettes on chromium dioxide which have received international acclaim and awards; to the international newsletter for magnetic media whose editors have stated, "The fact is that, in terms of the physical uniformity of its particles in size and shape, and in its intrinsic magnetic properties, chromium dioxide is the best magnetic pigment that has been developed to date [MMIS, 1980]; and to the International Electrotechnical Commission (IEC) who selected a chromium dioxide formulation, Batch S 4592 A, as the only inter-

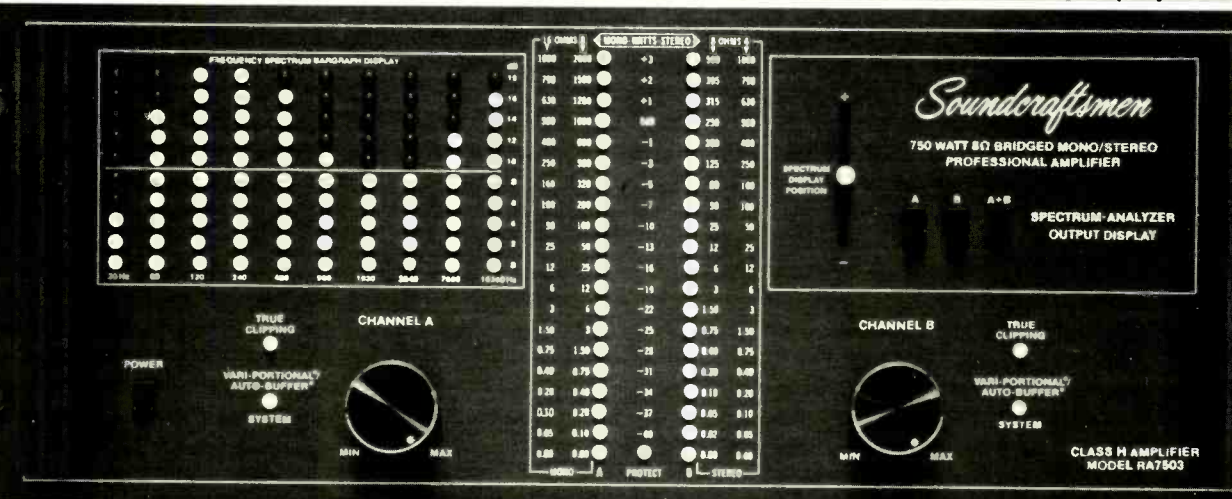
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nationally accepted reference tape for the Type II CrO₂/High Bias position. TDK makes superb tapes; but their claim that super avilyn "can produce a wider dynamic range and has better frequency response along with better overall fidelity" is not substantiated by the majority of tests conducted by audio magazines in the United States or overseas. BASF and duPont chromium dioxide tapes consistently show superior figures in dynamic range tests. As for better overall fidelity, we believe the engineers and experts who have almost unanimously chosen chromium dioxide for audiophile reproduction must feel differently about the question of fidelity. Chrome is not just for bumpers anymore.

Chromium dioxide is a very difficult and expensive particle to make; and the costs involved in the high temperature/high pressure manufacturing process have meant that only BASF and duPont, the inventor of CrO₂, two of the largest chemical companies in the world, manufacture the particle. Expense and supply are the two major reasons why other manufacturers have developed "chrome-equivalent" particles.

We at BASF are happy to explain our side of the issue and, finally, to answer Mr. Begley's question. C-45's have never been as popular as C-60's or C-90's because people generally prefer longer playing times in the cassette format. Production scheduling is also better balanced when loading greater lengths of tape in cassettes. C-45's on a large scale would begin to tie up great inventories of cassette shells, and we can make more tape available to the public with greater lengths. BASF will be offering C-45's, C-60's, and C-90's on a *professional* basis only, that is, to studios in bulk quantities. Most consumers today still prefer C-90's.

—Terence D. O'Kelly, Manager
Technical Marketing Services
BASF Systems Corporation
Bedford, MA

In Praise of Eight

Regarding Murray R. Allen's article on the studio business, (*MR&M*, January 1982) I must confess that I agree with him. In my area of the world (Northern California) there is an abundance of 24 track studios hungry for work. Some of which are in the process of selling equipment to help them through this last cold winter. This to me would indicate a

situation paralleling that of Murray's article, I have built up a small business recording and mixing for friends and local bands, and over the last three or four years have invested this money in equipment. My wife and I have spent the last two years extending and rebuilding our garage to house what is now a very efficient 8-track studio. I must admit that 8 tracks is not 24, but we own all of our equipment out right, have no rent to pay and therefore can continue to expand and grow on a positive basis. It seems to me that going in this direction does not only give one a good educational foundation, but gives ones customers more time at less cost, with better end results. So what if it takes us 10 years to get 24 tracks, if you love what you do, time is not important. I think if you are prepared to put your heart and imagination and creativity ahead of your ego, you can't help but succeed in the recording business.

—Robert M. Pratt
Shelly Sound
Davis, Ca.

Designs

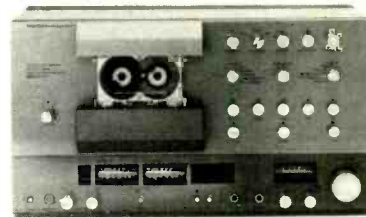
The following is a rebuttal to a letter published in your January 1982 issue under the heading "Plenty of Horns." In this letter I make additional offers that will be of interest to the readers of *MR&M*.

Gee golly, golly I think I bent someone's nose. My ears are still ringing. I agree with Mr. Young in that when two identical systems are compared to one another, the one that "sounds the best" is often a personal and subjective decision made by the listener. However EXPERIENCE shows that no one speaker system sounds exactly the same in any two venues. EXPERIENCE also shows that all those "golden eared subtleties" are quickly masked by crowd noise, room reflections, abused equalizers and on and on. What I propose doing is to build a capable system around proven designs that can grow with you. Leave all that "golden eared" crap behind in the super-fi audio salon. And what's more, the plans to do so should be had for much less than 20 to 30 bucks a crack.

As for what I offer outside of a file full of cabinet plans, the answer is I offer a collection of technical papers and handbooks. For example, one of the technical

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papers is, "On Horn Design," which describes in detail the design process of both folded and radial horns. Two other papers entitled, "Crossover Design" and "Building Rock 'N Roll Speaker Cabinets" are available as well. I also offer detailed handbooks on how to build your own Thiele equalizer/crossover, a lab quality 1/3 octave spectrum analyzer, as well as a complete manual on building your own "state of the art" modular mixing console for tour or studio. And oh yes, while the handbooks are more, the technical papers cost only 2 to 3 dollars, not \$20 to \$30.

—Carl Huff
Karlton Sound Co.
P.O. Box 144
Owosso, Michigan 48867

The Legendary Martin

I read with great interest the "Talkback" letter from Stewart Percy regarding the famous Martin Horn in your December 1981 issue.

Martin Audio is indeed legendary in Europe and in use with many well known acts such as Supertramp, The Who, Pink Floyd, etc. Perhaps because of Canada's close ties with the United

Kingdom, Martin Audio has become somewhat of an audio phenomenon here. Heinel Electronics Inc., 1241 Denison Street, Unit #44, Markham, Ontario, L3R 4B4, (416) 495-0688, is now manufacturing the full range of Martin products in Toronto under license from Martin, England. We have been in full production for 6 months and the market acceptance of this equipment has been simply incredible.

Should any of your Canadian readers require further information, please feel free to call or write myself directly.

—Russell F. Heinel
President
Heinel Electronics Inc.
Markham, Ont.

relationship was terminated. Malatchi Electronic Systems has since been acquired by Electronic Design Associates, Inc., 12860 West Cedar Drive, #107, Lakewood, Colorado 80228.

EDA is in the business of manufacturing ALICE Programmable Lighting Systems products first developed by Malatchi Electronics. Your customer who owns the Malatchi mixer may be interested in knowing that EDA still provides service and repair to all prior Malatchi products.

—James M. Malatchi, President
Electronic Design Associates, Inc.
Lakewood, CO

New York, New York

Could you please give me the addresses of ASCAP (American Society of Composers, Authors and Publishers) and the address of BMI (Broadcast Music Incorporated)? Thanks very much.

—William Andersen
Phoenix, AZ

ASCAP is located at 1 Lincoln Plaza, Broadway at 64th Street, New York, New York 10023. BMI's address is 40 W. 57th Street, New York, NY, 10019.

Correction

In your January, 1982 Letters to the Editor section a reader who owned a Malatchi Performer Six mixer requested information on the whereabouts of Malatchi Electronic Systems, Inc. of Denver, Colorado. Your answer that Malatchi was now part of BKL International was incorrect. The facts of the matter are that BKL distributed Malatchi products until early 1980, when that



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There are cheaper reverbs — with noise, flutter, "twang" sounds on transients, and questionable construction. There are more expensive reverbs — some of which are disappointing in "real world" situations. And there is the proven 111B — the right sound at the right price for the professional on a budget.

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AUDIO MAGAZINE QUOTES

The following are excerpts from AUDIO's 1/81 retest of TAPE 5

"performance level superior to (earlier test) worthwhile improvement in MRLs the best signal/noise ratio of all Type I tapes significant improvement in tape skew sensitivity and bias needs quite consistent output level stability very good a level of performance right among the best the Tape 5 Wide-Latitude formulation represents good value overall"

STUDIO MASTERING TAPE NOW AT BIG SAVINGS

Sure the "establishment" tapes are good products, but why put up with dropouts, jams, and tangles? And why ruin a tape with fuzzy, rasping distortion during loud music? And why not be able to make a tape that sounds good in your car?

Those are the questions that led us to distribute TAPE 5 to the home tapper. So now you can use the cassettes studios and broadcasters use and not settle for second best.

Since not all stores carry TAPE 5, here's an easy way to get hold of some, and save \$5 off the price of each dozen (Order 100 and get the quantity discount plus an additional \$40 off.)

WHAT TAPE ADS DON'T TELL YOU

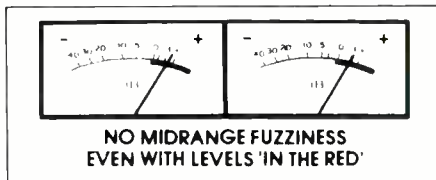
You probably know that the actual bias settings of almost all tape decks are different because each manufacturer sets its deck differently. Therefore, bias adjustments (except for some infinitely variable controls) hardly ever match the bias of an ordinary tape. Also, as your deck gets older, its internal components change with age, another source of bias mismatch. This mismatch causes tape to distort and lose frequency response. But TAPE 5's WIDE-LATITUDE[®] formulation minimizes the incompatibility problem by building in a generous 2 dB leeway around "standard" bias. This is why we can guarantee that your deck and TAPE 5 will be a good team.



COMPARE TAPE 5'S SPECS AND FEATURES

TAPE 5 is made with features the pros insist on. Like pre-stretched polyester film base, multiple-calendered non-abrasive gamma ferric oxide coating, precision-torqued 5-steel-screw case, and teflon-impregnated slip sheets to reduce internal friction. And never any annoying dropouts or splices, thicker screws, heavier shell, flanged guide rollers, and heavier steel pins. The labels now have lots of writing space and the outer box now has an overlapping, dustproof lid.

With a mirror-polished oxide surface and quality-control assembly, TAPE 5 cassettes can deliver the type of sound that you've never before been able to get onto a cassette. And even with recording levels "in the red," you won't get any fuzziness in the midrange. Check the specs. An astounding Signal-to-Noise Ratio of 64.4 dB, so quiet that many users find no objectionable tape hiss even without Dolby. Maximum Output Level at 3% THD is 6.7 dB. (These first specs are essential to making good tapes for your car stereo.) At 0 dB input, IM Distortion is 1%. Attainable Frequency Response is 30-18,000 Hz, ± 1.5 dB. And keep in mind that these figures were obtained using the widely-accepted DIN testing standards.



MUSICIANS, TAKE NOTE

You'll find TAPE 5's extraordinary ability to handle sudden loud peaks a real asset when recording live or when dubbing from reel-to-

reel to cassette. And without going into fancy language, let's just say that with TAPE 5's accurate reproduction of harmonics, a cymbal crash will sound like a cymbal crash and a plucked guitar will sound exactly like a plucked guitar. But don't buy TAPE 5 only for sound; we've sold thousands as demos because the mechanisms are rugged enough to stand up to duplicating at 30 inches per second. With a sizeable reserve in headroom and dynamic range, you'll be able to use your deck to its fullest ability, even for live concerts and digital discs.

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So now there's no need to pay stiff prices for chrome and exotic formulations when TAPE 5 guarantees better performance than the other name brands. Plus a 5-year warranty. If your local retailer does not yet stock TAPE 5, ask him to contact his rep. In the meantime, feel free to order directly from us and save \$5 a dozen. Phone or use the coupon.



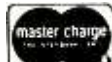
READ WHAT TAPE 5 USERS SAY

"I was amazed. My Nakamichi likes Tape 5 better than any of TDK, Maxell, Scotch, or Ampex's standard bias tapes. When a client requests some thing in cassette form, I go for Tape 5. It's the best quality for the least expenditure." — Bill Tullis, Progressive Music Services, Atlanta, GA

"In critical listening tests, I found Tape 5 to be at least as good as TDK-SA, Maxell UDXL-II and BASF Pro II. When I subjected the cassettes to intentional transport abuse to see if I could make them jam up, your mechanisms operated very smoothly and performed without a failure." — Al Valusek, Ann Arbor, MI

"Tape 5 has a better sound than any other tape I've used (Memorex, Maxell, TDK, Sony, and a few others). With Tape 5 I get all of the highs and all of the lows." — Jimmie Taylor, Elsberry, MO

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Climbing the Ant Hill

It was a hard reality to come to terms with, but alas, Ellen Zoe Golden's review of Adam and the Ants' *Prince Charming* was painfully accurate.

I recently bought the album hoping it would be better than its best art, "Stand and Deliver." I see genius in the album—however much in the raw. After all, "If evil be the food of genius/There aren't many demons around." At this point, I'd say Adam is only a small devil. For the sake of Adam and the Ant People of the world, let's hope he becomes a *monster*.

—Jocelyn Dumaresa
Winoshi, Vt.

P.A. Suggestion

Your articles on recording are just great, but I think you're missing out on another great area. That's the P.A.

Here are a few tips that will help to make your magazine that much better:

1) A monthly column of P.A.—sound man, set up, tips from the pros, etc.

2) A close look at some of the major and minor sound companies. How they got started, touring, set-ups, and crew.

3) Interviews with sound men and girls, road crews, and road managers.

4) Technical tips: splitter shakes, monitor mixes and systems, and sound systems used by different groups both large and small.

I hope you can give this some serious thought. I think the sound person out there deserves credit for jobs well done.

Don't forget: A band's live sound is only as good as the person doing the mix. A great crew makes a great band.

—Dennis Brunet
Big Bru Sound Productions
Toronto, Ontario

We will give your idea consideration. There is certainly an audience out there for articles of this sort, and as you say, plenty of topics to print.

Projects

I have been a subscriber of *MR&M* for three years, and find your features on build-it-yourself projects very worthwhile in every way.

Every featured project I've seen has interested me, but I never got around to actually making a lot of them. Over

the months I've lost some issues containing projects I wanted.

I would greatly appreciate it if you could tell me if there is any single publication containing all or some of the projects you've printed. If so, how can I get my hands on one? If not, could you suggest an alternative other than ordering back issues?

I heard that Craig Anderton's "Electronic Projects for Musicians" is the type of thing I'm looking for. Could you tell me where I could get a copy?

While I'm trying to solve this problem, keep those project features coming.

—Jim Cheatle
Hometown, IL

I'm afraid that there is no single publication containing a compilation of projects. You'll have to order back issues instead.

Yes, you can get a copy of Craig Anderton's "Electronic Projects for Musicians," First Revised Edition, by writing to the publisher of that book, Music Sales Corporation, 33 West 60th Street, N.Y., N.Y. 10023. Their phone number is 212-246-0325.



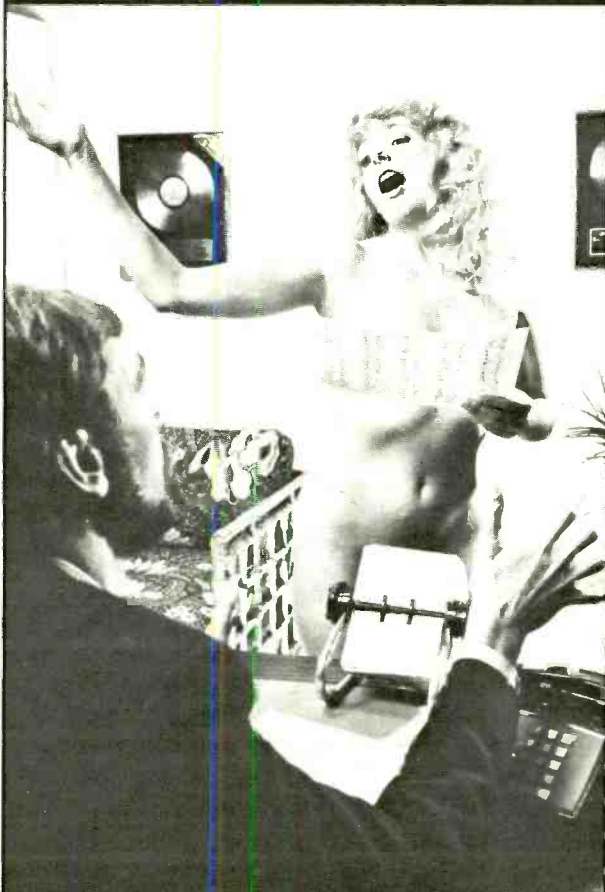
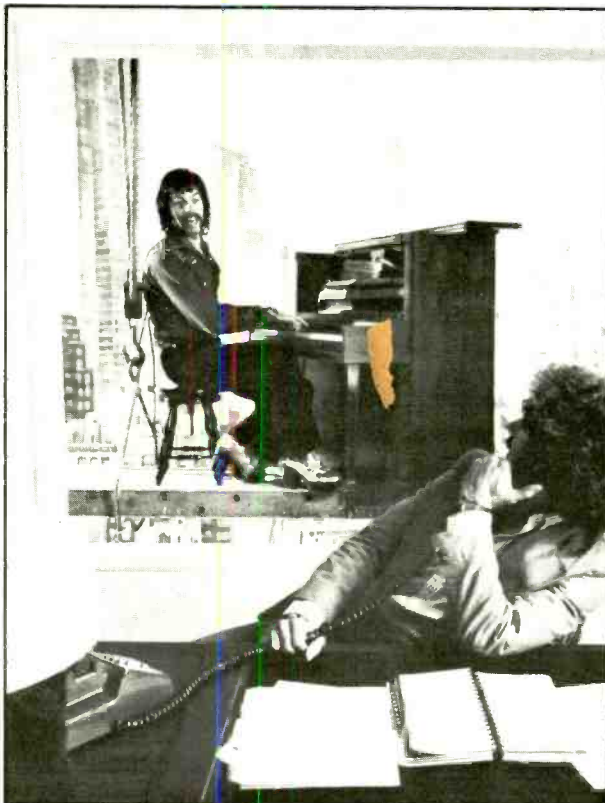
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MRS

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TALK BACK

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

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

Bouncing Along with dbx

Thanks for the great series "Multi-track Magic: Creative Multi-track Recording" by Craig Anderton (see the May, July and August 1981 issues). It was a great aid in helping beginners like me understand the capabilities of a 4-track machine.

Can you tell me why a dbx unit doesn't work well when bouncing tracks on a 4-track recorder? I've gotten varied opinions on this, but I'd like to hear what the pros say.

—John A. Marsiglio
Irwin, Penn.

Just to set the record straight before we go any further, and because we were a bit confused by what we thought you were insinuating, Craig Anderton didn't state in "Multi-Track Magic" that dbx noise reduction doesn't work well when bouncing tracks on a 4-track machine. Maybe you didn't mean to imply that he had said it in that article. If not, all it proves is that we can't take a compliment! Now on to an answer for your question. (See? We can recognize a question, however!)

When queried, Craig had to think for a brief moment before giving us the possi-

ble following explanation. All 4-track recorders to some degree have an anomaly in their playback response. This is called "head bump" and is a hum of, let's say, about 2 dB in the bass region that exists only in the playback mode. Craig thought that perhaps you meant that a dbx expansion unit would enlarge those anomalies upon playback, and a 2 dB hum might then become a 4-dB hum, etc. Thus the more times a track was ping-ponged, the greater the inherent hum would become, and the greater the chance of it ruining your recordings would become.

However, we decided to follow up on this with dbx, Inc., who are such a bright group of people, we felt sure they wouldn't allow such a situation to continue if they could help it. Harold Cohen, of their Customer Relations Department, agreed with Craig on the existence of the head bump phenomenon, but pointed out that most head bump occurs below 80 Hz, where in actual practice very little musical material exists. Harold pointed out that should this hum reach a point where it is audible and/or annoying, it can be EQ'd out. Further, the beauty of using dbx when ping-ponging tracks is that it will eliminate all the tape hiss that can accumulate from ping ponging tracks.

So, basically, any adverse effects that you think dbx noise reduction might cause really depends upon where the head bump occurs on your machine, and how severe it is to begin with, as well as the sort of music you'll be recording. We suggest that you do some work with a dbx unit and your recorder and see if the positive aspects don't outweigh any possible difficulties.

Bewitched, Bothered & Bewildered

I'm hoping that you can clear up my confusion over something I read in Len Feldman's Ambient Sound column in the

November 1981 issue (see pages 62–63). I found the article very informative but was bewildered by something I read in the section entitled "Weighting Wow and Flutter." Towards the end of the first paragraph of this section, Mr. Feldman states that the "reference 0 dB level" is set at 4 Hz for WRMS calculations of wow and flutter. Surely, it should have read 4 kilohertz, correct?

—Tim Moor
Homosassa, FL

Mais, non, Monsieur Feldman most certainly meant Hertz. Wow and flutter have a low repetition rate. Wow is a slow speed variation, usually occurring less than ten times a second. Flutter, as the word implies, is a quicker speed variation (ten or more times a second). While the causes can vary, both wow and flutter cause unwanted pitch changes. The reference of 4 Hz was chosen because the human ear seems to be most sensitive to frequency variations at the 4 Hertz rate. We cannot imagine where you got the idea that wow and flutter would be referenced to any measurement in kilohertz, but keeping this new information in mind, it might be a good idea to re-read the November Ambient Sound column.

A Backward Approach to Tape Conservation

Indeed, as Drew Daniels of Teac tells M.W. Fallon (see Talkback, "Seven on Eight," page 18, January 1982), splicing leader into the 2-track master is a most satisfactory way of eliminating the reference "click" or count-off at the beginning of a track. Certainly, it beats relying on an inaccurate tape counter to take the 8-track out of the "erase" mode just before the first note of the song! (I've even tried "marking" the tape with a piece of splicing tape, but if you're late punching-out, it's back to the drawing board, right?)

There is, however, an alternate method for those averse to cutting-up tape (although that's what it's there for...):

1. Turn the tape over, so that it plays backwards. (Note that track 1 information now appears on track 8, 2 on 7, etc.)
2. Roughly cue-up the tape to the beginning of the song; then in the edit mode, find the attack of the first note and mark it at the *playback* head with a grease pencil or splicing tape.
3. Move the tape so that the mark is just to the right of the *erase* head.
4. Put the machine into "record." It is now erasing your pre-song reference clicks.

—Mike Massena
 Producer
 CHQT Broadcasting
 Edmonton, Alberta,
 Canada

A Shielded City Environment for Sensitive Engineers

Regarding Bob Waxer's Talkback question "City Saturation" (February, 1982, page 16), I'd like to offer another answer.

Even if there *are* RF burns on the unlucky engineer, here's a simple way out. However, it may be applicable only if he owns the house.

Place 2" x 1" slats on *all* surfaces of the studio and control room. Once up, staple metallic (bronze or aluminum) screening, connecting the screens electrically to each other until the entire room is covered with two or three layers. Doors and windows should be covered and connected as well.

Connect from the covering screen with heavy (12 AGW or larger) ground lead to a *cold* water pipe. The input line to the building before the water meter is usually best.

The entire screening can be covered over with paneling, carpeting, flooring, (yes, I did say *all* surfaces), etc. This is usually used to shield test rooms in environments which are in high RF areas.

This method is used by a Cleveland electronics firm which sits about 150 yards from a 50 Kw AM transmitter that also shares a tower with a 10 Kw FM station. This method effectively shields the firm's sensitive equipment.

I hope this helps Mr. Waxer and anyone else with the same problem.

—Gregory A. Penchoen
 President
 Spectre Sound
 Cleveland, Ohio



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CIRCLE 92 ON READER SERVICE CARD

The Effect of Cheapo Slapback Echo on You!

I was experimenting with the "cheapo slapback echo" described in Craig Anderton's "Multi-Track Magic" article [see Part I, May 1981, pages 40-46]. I used a Teac 3440 with a Model 3 mixer. Fader 1 on the mixer controlled the original signal (pure tone recorded on a mic). Fader 2 controlled the amount of echo.

Boosting Fader 2 to distortion levels, I began getting a signal resembling a synthesizer tone. This tone could be made to change pitch when I rode Fader 2 up and down. However, the VU meters on my mixer and deck were pinned. My questions are:

Can I damage my meters by keeping them pinned?

When recording can I irreversibly saturate my tape and not be able to record over it again due to permanent magnetization?

—Stephen B. Myer
Bronx, N.Y.

Craig Anderton's articles always seem to bring out the experimenters among our readers, which is the way we like it (it's so good to feel appreciated!). It is

also wise though to check out the various effects on your equipment the new phenomena, that you might be creating has, as you are doing here.

To question number one regarding pinning your meters, Craig informs us that most machines manufactured today incorporate shunt resistors on the meters to prevent damage from over-voltage in circumstances similar to the ones you describe. The machines you are working with from Teac incorporate this circuitry and so you don't really have anything to worry about in terms of permanent damage. Drew Daniels of Teac Corp. does note that while keeping a meter pinned (holding it there) will not damage it, repeated, sharp "slamming" of the pin against the limit of the meter could do physical damage to it, either bending it or actually snapping it off.

As for the problem of "permanent" recording, it doesn't seem you need to worry about that either. Both Craig and Terence O'Kelly of BASF Systems in Bedford, Massachusetts, told us that they've never seen anything that a bulk eraser can't take off a tape. However, Craig also thought that perhaps you might experience leakage from one channel to another that would continue to exist even after you've recorded over the

original track, giving you the idea that your tape wasn't "erasing." To insure this from plaguing your recording sessions, it might be a good idea to invest in a good bulk eraser if you don't already have one.

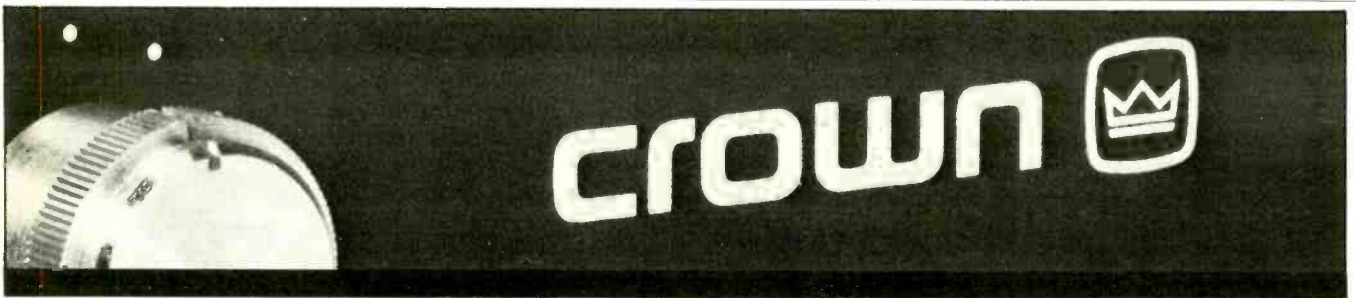
4 + 4 Doesn't Necessarily Equal 8

I have a small 4-track studio, utilizing a Teac A3340S, a Teac A3300S, and a Model 5 mixer. I would like to go 8-track, but I simply can't afford it right now.

I was very intrigued by Craig Anderton's "Multi-Track Magic" series (May, July and August 1981 issues) where he discussed syncing a 4-track machine with a 1/4-track machine. I was wondering if it is possible to sync two A3340S machines to get a usable 8-track. If this is feasible, can you give me some info on how to accomplish this?

—Gary W. Yocum
Green River Gospel Recording Studio
Hustonville, Ky.

In "Multi-Track Magic," I was talking about syncing two tapes together for special effects, as well as to help out during those "oh-oh, I've run out of tracks and what do I do next" situations. I



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It's modular, and has features too extensive to cover here. When an RX-7 is more than you need, we make three smaller RX Series consoles that will more than get the job done: The RX-5A (8 by 2); The RX-6A (12 by 2); and the RX-5/16A (16 by 2).

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would not recommend trying to hand sync two four tracks together as a regular recording technique; it takes a lot of patience and trial-and-error.

It is possible to sync tape recorders together electronically. Some studios even sync two 24-tracks together to get 48 tracks! However, not all equipment lends itself to this approach (contact the manufacturer to answer that question), and furthermore, I believe that you will have to give up one or two tracks to contain the sync information. Thus, if you need to lose two tracks in the sync process, your "8 track" will turn into a 6 track—not much of an advantage over 4

tracks. Syncing two 8 tracks together will give you 14 tracks, which makes a little more sense.

Bear in mind, though, that while I have done *lots* of hand syncing between tape machines, I have never done electronic syncing of machines so my reply is not the last word. My opinion, though, is that you won't be happy until you have an 8 track. Syncing two machines means twice as much tape costs, twice as much maintenance, expensive sync circuitry, rewinding two machines instead of one to get back to the beginning of a take, and so on. I'd say hone your skills on the 4-track for now, and save

your pennies until you can graduate to an 8-track. They're only going to get less expensive as time goes on anyway.

—Craig Anderton
Contributing Editor
Modern Recording & Music

A "New" Life for an "Old" Mic

I have just acquired an old broadcasting microphone and would like to know a little bit about it and how to adapt it to my present system.

It's an old RCA mic, 7 inches long, 1½ inches in diameter with the following markings: Type BK-5B, M1-11010-A. On the end is a screw that can be set to M, V1 or V2 (it was set on V1 when I got it). It has a 1-inch Cannon plug wired as follows: green-2, red-1, black-3. How would I wire this with an XLR connector to work with normal mixers? What about impedance?

—Steve Harris
Springfield, Ohio

Your mystery microphone is a mystery no more, thanks to some time spent with W.W. Warren of the Audio Division of RCA Corp. Based in their Camden, New Jersey facility, Mr. Warren had been involved the Type BK-5B when it was actively marketed before being discontinued 5 or 6 years ago. The microphone is a ribbon velocity type, which indicates that it is very sensitive to the velocity of the air particles that hit it. To put this in some sort of reference, a mic of this type is more sensitive than, say, a dynamic microphone which is pressure sensitive. A mic which is sensitive to velocity of air particles depends on this factor alone and so has an increased sensitivity. For this reason it was used in situations where a high-quality microphone was required. The impedance of the mic, as he recalled, was 150-200 ohms, but also said that it could be strapped for other impedances. The "M, V1, V2" switch that and Voice 2. This switch will change the equalization for the best possible results.

Mr. Warren didn't feel that you'd have any problem wiring an XLR connector to this mic to make it compatible with a mixer. He does suggest that you do write for a copy of the Owner's Manual which will provide you with the necessary details. Write to the attention of Mr. Gordon Allison, RCA Corp., Audio Division, Building 2-5, Front and Cooper Sts., Camden, New Jersey 08102, or call 609-338-3000.



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HEADROOM	+ 20dBV
FREQUENCY RESPONSE	±.5dB 20Hz-20kHz
DISTORTION	<.05% THD, 0dBV, 20Hz-20kHz, no limiting <.2% + 18dBV worst case.
HUM AND NOISE	-90dBV, unity gain

Since the specs can't really describe the sound, please check us out in person at your Ashly dealer. He'll be happy to give you a demo.

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CIRCLE 84 ON READER SERVICE CARD



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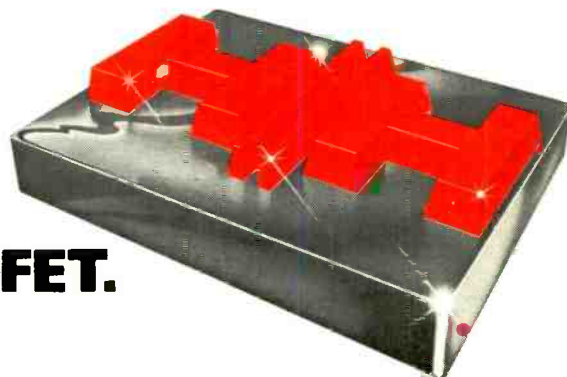
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CIRCLE 210 ON READER SERVICE CARD

DAL 9036

THE **PRODUCT** SCENE

By Norman Eisenberg

FOSTEX ANNOUNCES NEW ITEMS



From Fostex Corporation of Norwalk, California, there's word of new products. The model 2050 is an 8x2x2 line mixer which provides a separate 8x2 sub-mix with panpots for an additional cue/monitor mix, with a P.A. system for separate stereo recording mix; or serves as a keyboard mixer. It also offers a cue output and a built-in headphone amp that allows selection of program or cue busses. Front-panel priority jacks allow immediate patch-in of an extra stereo signal, with a "remix" control that blends this added signal with the stereo cue outputs. Three sets of stereo outputs permit separate monitoring of these signals. The 2050 is 1 3/4 inches high; price is \$200.



The model 3050 is a digital delay with selectable delay or echo time in ten steps from 0.13 to 270 milliseconds. Modulation width is adjustable up to a ratio of 1:4, providing flanging/chorus effects and double tracking. Modulation can be externally controlled by feeding a control signal into an "external" jack. Separate output level controls for both "dry" signals and the effect permit adjusting for the optimum output blend. This 1 3/4-inch high unit retails for \$450.

The model 3030 is a dual 10-band equalizer offering 12 dB of boost or cut on each channel. Each 10-band section has an input gain control and LED monitoring of output headroom. EQ defeat is provided. The 3030 is claimed to have 25 dB of headroom. Optional 19-inch rack-mount adaptors are available. The price of the unit is \$250.

CIRCLE 13 ON READER SERVICE CARD

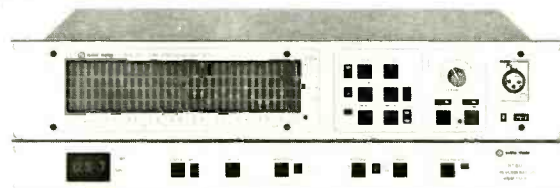
ANALOG ECHO MACHINE

Utilizing the "bucket brigade" idea is the "Time Machine" model EEM-2000 analog echo machine announced by Audio Sales Associates of San Francisco. Its infinitely adjustable time control (20 to 200 msec.) offers a wide variety of delays including reverb, slap back, doubling and discrete echo. A two-channel system, the EEM-2000 provides independent control and mixing capabilities for mic and instrument (line) inputs. Selectable input and output levels allow signal matching to microphones, instruments, amplifiers and mixing consoles. Dual outputs permit mix-out combining direct sound and echo, and delay-out for echo only. Of rack-mount width, the device has an optional remote footswitch.

CIRCLE 14 ON READER SERVICE CARD

DUAL CHANNEL 1/3-OCTAVE EQ

A dual-channel 1/3-octave graphic equalizer, the model DN 30/30, has been announced by Klark-Teknik of Farmingdale, N.Y. The device has two completely independent channels with 30 bands of control on each channel, centered on ISO frequencies. Control range for each channel is switchable for ± 6 dB or for ± 12 dB. Also on each channel is a switchable 30 Hz, 18 dB/octave subsonic filter. The device includes an "earth-lift" switch and a system by-pass facility for power interruption. The DN 30/30 also can be fitted with internal active crossover circuit cards for bi-amp or tri-amp applications. Slope and center frequency are user selectable. Of rack-mount width, the DN 30/30 is priced at \$1,450.



CIRCLE 15 ON READER SERVICE CARD

HILL PRODUCTS AVAILABLE

Hill Audio, a European-based company with U.S. offices in Anaheim, California, has announced that its complete catalog of products is now available in the U.S. Included is a new series of mixing consoles; power amplifiers; and monitor consoles. The J.2. series modular mixing consoles offer transformerless inputs, six aux sends, eight independent line returns, 8-band EQ and 12-way bar LEDs on all input and output channels. Mainframes are available in configurations of 16:8, 24:8 and 32:8. Among the amplifiers is the model DX-901, rated for an output of 900 watts/2-ohms per channel; price is \$1,250. The monitor consoles come with modular, expandable frame, parallel input XLRs, transformer-isolated zero-loss input stage, LED display, 4-band EQ in input channels, 8-band EQ on output channels.

CIRCLE 8 ON READER SERVICE CARD

PIONEER DISC PLAYER

Demonstrated for the first time in the U.S. at last fall's Audio Engineering Society meet in New York City was the prototype of Pioneer's Compact Disc digital audio disc player which uses the Philips-suggested Compact Disc optical system based on the recommendations of the Digital Audio Disc Standardization Conference held in Japan last spring. Like the earlier LaserDisc player, the CD version uses a laser pickup to read the information coded on reflective discs. In the CD unit, however, a semiconductor (solid state) laser is used in place of the larger, gas laser used in the LaserDisc model. The new player is incorporated into a unit whose general styling and dimensions resemble those of a typical home audio component, and the converted (digital-to-analog) signal is jacked into the "high level" or "aux" inputs of any standard receiver, preamp or integrated amplifier. Specs include: Two-channel (stereo) response within ± 0.5 dB from 2 Hz to 20 kHz; dynamic range, greater than 90 dB; distortion, 0.01 percent; wow-and-flutter, too low to measure. The sampling frequency is 44.1 kHz, and the device uses 16-bit linear quantization. Disc diameter is 12 cm (4.72 inches). Random-search capability built into the player allows the device to search out any program selection in three ways: by program number, by elapsed playing time from the start of a disc, by elapsed playing time in a given selection. Price has not yet been set.

CIRCLE 9 ON READER SERVICE CARD

POWER AMP FOR LO-Z LOADS

Made in England by Amplification & Recording (Cambridge) Ltd., and distributed in the U.S. by Arcam (USA) Inc. of Stamford, CT, the model SA200 is a two-channel power amp consisting of two identical mono amps, each with its own DC power supply. Each channel can deliver more than 100 watts into 8-ohm loads "with negligible distortion." According to the manufacturer, special care has been taken to ensure that power output is maintained into low impedance and reactive loads, and the SA200 is rated to deliver well over 200 watts per channel into 2-ohm loads. Electronic protection and fusing are built-in. An input-output comparator detects amplifier distortion (e.g., clipping) and activates a warning LED. The price of the unit is \$899.



CIRCLE 11 ON READER SERVICE CARD

NEW LITERATURE

A primer on equalization, written on a non-technical level, has been produced by BSR (USA) Ltd. Entitled "Shaping Sound at Home: A Guide to Equalization," it provides a basic introduction to the subject, as well as product descriptions of BSR's ADC Sound Shaper equalizers and a brief glossary of terms. Available at BSR-ADC dealers.

CIRCLE 7 ON READER SERVICE CARD

Heath Company's latest catalog includes new computer hardware and software products, as well as more familiar items from a portable AM radio kit for beginners to a 25-inch color TV for the advanced kit builder. Also includes audio components, test equipment and amateur radio equipment. The catalog is free by writing to Heath Co., Dept. 350-365, Benton Harbor, MI 49022 (in Canada, Heath Co., 1480 Dundas St. E., Mississauga, Ontario L4X 2R7).

CIRCLE 12 ON READER SERVICE CARD

ALTEC EQUALIZERS

Three new equalizers—described as “versatile” and “cost effective” have been announced by Altec Lansing. The model 1651A is a single-channel equalizer with ten minimum phase shift, active band rejection filter sections. Easy to read, center-detented sliders provide ± 12 dB boost/cut at ISO preferred 1-octave frequencies (31.5 Hz to 16 kHz).

Offering the same features on two channels is the model 1652A stereo graphic equalizer. Both the 1651A and the 1652A incorporate a continuously variable high-pass filter with 18 dB/octave rolloff, and user-selectable low-pass filter with 6 dB rolloff at 12.5 kHz.

For “maximum detail” in frequency response modification, there’s the 1/3-octave equalizer, model 1653A. This unit is a fourth-generation product intended for a wide range of professional and industrial applications. Its twenty-nine filters (25 Hz to 16 kHz) provide ± 12 dB via center-detented sliders. Continuously variable high-pass and low-pass filters provide rolloff at 18 dB/octave from off position to 20 through 160 Hz (high pass), and from off position to 5 kHz through 20 kHz (low pass). Filters in all three units are parallel summed so that failure of one section will not affect operation of the remaining filter sections.

CIRCLE 1 ON READER SERVICE CARD

CARVER UPGRADES MAGNETIC FIELD AMP

Carver’s magnetic field amplifier concept (see test report, *MR&M*, November 1980) has been applied to a new power amp rated for 250 watts per channel, or 600 watts in mono. The new model M-500 sports front panel meters calibrated from -40 to $+3$ dB, with “zero dB” standing for rated output of 250 watts into 8 ohms. Optional rack-mount adaptors are available. The M-500 incorporates protection circuitry that operates via the power supply circuits rather than the amplifier stages, and the amp will shut itself off automatically in the face of excessive voltage and current, prolonged clipping, DC components in the output signal, excessively high temperature and “any other potentially damaging condition.” Larger than the original magnetic field amp, the M-500 weighs 23 pounds. It is 17 3/8 inches wide (less the rack-mount adaptors); 4 1/4 inches high; 13 1/2 inches deep. Price is \$550.

CIRCLE 2 ON READER SERVICE CARD

SOUND WORKSHOP CONSOLES

Described as a modified Series 20 but budget priced is Sound Workshop’s new Logex 8 console which provides eight active mixing busses, plus stereo mix, solo and aux send busses. The Logex 8, available in a mainframe size which can accommodate a 12 input/8 buss input/output module, is fitted with a power supply of dual output design. (A similar single output supply of 50 volts supplies phantom power for condenser-type microphones.) All line-level interconnections [line input, pre-fader patch out, patch return, direct output (post -fader patch out) and buss output for each I/O] occur directly at the rear of the console, utilizing standard-type quarter-inch two-conductor phone jacks.

CIRCLE 3 ON READER SERVICE CARD

NAKAMICHI EXPANDS PRODUCT LINE

Nakamichi’s first turntable, the TX-1000, features a secondary platter and an elaborate internal system that permits the spindle to be accurately centered with respect to minute variations in a record’s center hole. This, says the manufacturer, eliminates a source of wow-and-flutter and more perfectly matches the record itself to the record player. No price has been announced yet.

New cassette decks include the ZX-7 and the LX-5, priced respectively at \$1,250 and \$850. Both decks have three discrete heads, use microprocessors, include Dolby-B and Dolby-C and use Nakamichi’s asymmetrical, diffused-resonance, dual-capstan transport.



CIRCLE 4 ON READER SERVICE CARD

"DOUBLE DUTY" AMPLIFIER

Functioning as both an audio and a video amplifier, with some options not offered before in a popular-priced product, is the model KVA-502 from Kenwood. Basic audio capabilities include rated power output of 50 watts per channel into 8 ohms at less than 0.03 percent distortion. For handling sound from video



sources (TV or videotapes), a phase-shifting circuit creates a broadened sound field "akin to that of stereo, and frequency response appears to be broadened also as a consequence." For videotapes, the amp also has a de-noiser circuit designed to improve the "average 40 dB signal-to-noise ratio of narrow-audio-track videotapes to levels typical of fine quality audio reproduction."

CIRCLE 5 ON READER SERVICE CARD

TEAC BROADENS LINE

Teac offers several new recorders—five open-reel and five cassette models—with specific features to appeal to a broad range of recordists. All new open-reel decks have the capability for handling "EE" tape. The model X-1000R has built-in dbx and its six heads and dual-capstan closed-loop transport permit bidirectional record and play. Speeds are 7½ and 3¼ ips; reel size is up to 10½ inches. Price is \$1,400.

The X-10MK II, at \$1,090, is generally similar, without built-in dbx, and without bidirectional R/P. The X-7RMK II, \$890, is the same as the X-10MK II except that it handles 7-inch reels and does have bidirectional R/P. The X-7MK II, \$790, is similar to the X-7RMK II but without bidirectional capability. Similar electrical specs are available in the X-3MK II, a single-capstan machine priced at \$590.

Top cassette deck is the V-95RX, \$625. It includes built-in dbx, Dolby-B and features bidirectional R/P. The V-1RX, \$590, is unidirectional, has built-in dbx and uses three heads. The V-90R, \$490, lacks the dbx but offers bidirectional R/P. The V-80, \$420, is a three-head cassette deck. The V-70C, which is priced at \$390, includes Dolby-C.

CIRCLE 6 ON READER SERVICE CARD

THOSE MINI HEADPHONES

Has it ever occurred to you that the working soundman probably wears headphones more than ties or hats? This obvious truism, plus the general never-ending interest in headphones, seems right now to focus on the newest development in this product area—the ultra-lightweight mini headphones of which dozens of models have recently appeared.

Two strike me as outstanding and as good examples of the trend. One is the Koss KSP at \$40; the other is the Sony, MDR-80T at \$85. Before I attempt to explain what the \$45 more for the Sony gets you, let's look at what these headphones have in common.

First, they are unprecedentedly light in weight. Either model, less the cord and plug, weighs 2 ounces. The earpads are soft foam that rest gently against the ears. Both have adjustable headbands, decently long signal cords, and two plugs—one for insertion into a mini-jack and the other (which fits over the mini-plug) for use with the standard ¼-inch phone jack. Both furnish respectable sound levels and cover most of the audio range handily from a bass reach that may surprise you through very smooth and clear middles up into the real highs. It is, in fact, this kind of audio performance that prompts me to suggest that while this type of headphone may originally have been developed to be used with those carry-it-on-you personal cassette players, it may go well beyond that use into more general applications. A featherweight, small-bulk, plug-into-anything headphone can be a mighty handy item for no-fuss stereo monitoring or just plain listening, especially when it sounds as good as these models do. Whether such a headphone also can be used for monitoring "live" performers, or by performers themselves when overdubbing their own parts to a "live" or pretaped session may be less certain since this type of headphone does permit a fair amount of room sound to be heard. It's worth a try.

The higher price of the Sony gets you a somewhat more efficient headphone, with a shade more bass. Its headband is padded; the Koss's is not. The Koss cord comes to about 9 feet and a few inches; the Sony's makes it to 9 feet, 9 inches. On the Koss, the phono-plug adaptor is held by a small rubberized attachment to the cord; on the Sony, it threads onto its holder and must be threaded onto the mini-plug (I'd say this was a standoff between the two).

Either model is worth some attention. You may be pleasantly surprised at how good they sound when reproducing a high-quality signal source.

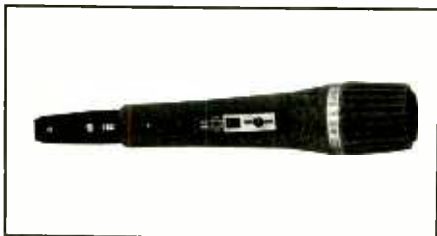


MUSICAL

NEWSIGNALS

MICROPHONES AND ACCESSORIES

Shure Brothers recently announced the introduction of two new series of microphones designed for use by professional entertainers. The two basic models are the PE1 and the PE2, and the most obviously unusual thing about the mics is their finish which is an attractive, brown matte finish known as Suedecoat™. Besides its sophisticated appearance, the Suedecoat finish provides comfortable handling qualities and is durable and easy to clean. The Suedecoat finish is applied over a rugged die-cast housing which features a raised grille made of the same die-cast material for durability and elimination of most pop and wind noises. Since the



mics are intended for hand-held use, their capsules are shock-mounted to reduce handling noise. Both the PE1 and the PE2 are dynamic designs with uniform cardioid pickup patterns and frequency response from 50 Hz to 15 kHz. The PE1 is a basic microphone with an on/off switch, while the PE2 version adds two tone-shaping switches to the on/off switch. The tone switches provide either a high frequency boost for greater presence and intelligibility or a low frequency roll-off to reduce the boominess caused by proximity effect when the mic is used close-up, or both. Both models are available in three packagings, either without mating cable, with a 25 ft. shielded cable terminated with a three-pin XLR-type connector, or with a 25 ft. cable with

matching transformer for high impedance mixer or amplifier inputs.

CIRCLE 20 ON READER SERVICE CARD

The D056 is a specially shock-isolated omnidirectional dynamic microphone from Electro-Voice. The D056 uses a sophisticated suspension system for the capsule element to virtually eliminate all forms of handling noise including clothing noises, cord shock, and vibration. Frequency response of the mic is given as 80 Hz to 18 kHz, and the response curve features a gentle roll-off below 200 Hz to reduce boominess and low frequency noise and a broad midrange-treble rise for a bright yet natural vocal sound. Physically the D056 features a steel and aluminum body with a thick-wall aluminum head housing for ruggedness and proper balance, a Memraflex grille screen which bounces back to keep its shape, an integral Acoustifoam blast filter, and an attractive silver-beige finish. The D056 is available in both a standard version, 6¼" overall, and a special long version, the D056L, which is 11½" long for more convenient hand-held interview use.

CIRCLE 21 ON READER SERVICE CARD

Atlas Sound, possibly the best-known name in microphone stands and accessories has announced a new series of professional mic stands known as the Omni Series. The unique aspect of the new series is the base, which is a tapered, rectangular, counter-weighted cast base with a special adjustable fulcrum (patent pending), which allows the upright tube to meet the base at a 75° or 105° angle as well as the customary 90°. This allows greater freedom of movement for performers, improved sight lines and better reach without having to use a boom arm. Model OS-12V is a floor stand

with height adjustable from 32" to 61", while Model OS-8V is a lectern/banquet stand adjustable from 12½" to 24". The steel tubes used for uprights on these new Atlas stands are finished in "Veloured Chrome," a new process which eliminates reflective "hot-spots" and maintains top appearance even after repeated use. Also available as part of the Omni Series is the Model OS-PB2V boom stand, a two section boom adjustable from 22" to 37" mounted to a 6" vertical tube and Omni Series base itself, available as Model OS-B, for use with existing 7/8" diameter mic stand tubes.

CIRCLE 22 ON READER SERVICE CARD

GUITARS

Fender has announced a new old guitar, a faithful replica of the 1952 Telecaster. Unlike many reissues, this is not just a cosmetic copy, but rather it is as exact a duplicate of the original as Fender can make, accurate down to the shape of the knobs and even the type of wax used to pot the pickups. But in an unusual marketing move, Fender will also be supplying with the guitar an update kit including a six-section bridge and various electronic parts to give the buyer the option of updating to today's standards rather than leaving the guitar truly original. The 1952 Telecaster Replica is available only in butterscotch blonde yellowed lacquer, and comes complete with a vintage-style twill case with leather trim and brass plated hardware.

CIRCLE 23 ON READER SERVICE CARD

St. Louis Music Supply has announced several additions to its Alvarez line of acoustic guitars. Two new dreadnaughts have been added to the Alvarez Artist series, a series distinguished by

deluxe appointments like maple binding inlays and tortoise shell accents in a moderately priced guitar. The two new models both feature natural spruce tops, fluted rosewood fingerboards and maple bindings. The Forestbrooke Dreadnaught (Model 5017) rounds out the basics with a triangular pattern mahogany inlay around the soundhole and a satin finish body, while the Timbercrest Dreadnaught (Model 5027) has a simple, wide band of mahogany inlay around the soundhole and the same warm, satin finish on the body.



CIRCLE 24 ON READER SERVICE CARD

Although Peavey is best known as an amplifier manufacturer, the company has also manufactured guitars and basses for some five years. Recently Peavey introduced four new guitars and two basses to quadruple its model offering. Common to all the new models are special Peavey pickups using blade-type pole pieces for more consistent output when bending notes than individual pole pieces, "frequency compensated" volume controls to prevent tone changes at lowered volume, custom-designed heavy duty hardware, and a quality assurance program designed to insure the most consistent instrument Peavey can build. The most unusual model in the Peavey line is the T-Jr.TM which is a very short scale (only 17 inches!) guitar tuned a full octave higher than a standard guitar making it particularly and uniquely useful for octave doubling and mandolin-like voicings. Both the body and the 19-fret neck are made of select maple, and the T-Jr. uses one single-coil pickup and a stainless steel bridge/saddle combination. Also on the small side

is the T-15, a short-scale (23½ inch) dual pickup model ideal for younger players who may have trouble with a full-size guitar. The T-15 has a 21-fret maple neck, a compensated die-cast bridge with 3-point mounting and two single-coil pickups. Also available in the 23½" scale length is the T-30, a natural-finish guitar with professional features like a fully adjustable bridge and triple single-coil pickups with five-position selector switch. In a full professional model, the T-25 has a 23¾" scale with 23-fret neck, fully adjustable bridge, and twin dual-coil pickups with unique circuitry which allows single or dual coil operation by rotating the tone control to the appropriate position. On the bass side, Peavey offers the T-20, a sunburst model with one single-coil pickup and an adjustable bridge, and the T-45, a natural finish model with fully adjustable bridge and dual coil pickup, again with Peavey's patented tone control circuit to allow single-coil or dual-coil operation. Both models feature deep cutaways for access to all 21 frets and 22:1 tuning machines for accuracy.

CIRCLE 18 ON READER SERVICE CARD

MUSICAL INSTRUMENT AMPLIFIERS

Microtronics Corporation recently introduced an all-new line of tube guitar amps under the Tusc Prestige Series banner. The Tusc Prestige Series was designed by musicians for the discriminating musician and includes features not to be found in other amps. For example, the amps feature programmable overdrive and parametric



equalization allowing the musician to pre-program a wide variety of sounds and recall them instantly during a performance. Other interesting features include stereo inputs for keyboards with split outputs, preamp line output and pre-and post-reverb. Amp heads are available in 50- and 100-watt RMS

ratings and a variety of speaker cabinets are available featuring premium Fane speakers from England.

CIRCLE 25 ON READER SERVICE CARD

The Crate line of amplifiers from St. Louis Music Supply has proved to be one of the most prolific lines around, and as if to prove the point two new models were announced recently. The two new models are part of what is referred to as the Crate Spring line and are designated the CR-160 and the CR-212. Both models are dual channel amps with channel switching for versatility and the ability to preset at least two sounds and feature 60 watts RMS in their power amp stages. Both amps feature a normal channel with gain and active bass, midrange and treble controls, overdrive channel with gain and level controls, and master reverb and volume controls.



Channel switching may be accomplished instantaneously by touching a panel switch or via optional footswitch. Other features include high and low input jacks, line in/line out effects loop and an extension speaker jack. The Crate CR-160 features a single 12-inch Magnum projector speaker while the CR-212 uses a pair of 12-inch Crate Magnum projectors for a more powerful output.

CIRCLE 26 ON READER SERVICE CARD

Road Electronics now makes available Speaker Armor Kits which feature the extra-heavy hardware used in Road's own amps to protect the speaker, which is the most vulnerable component of an amp or speaker cabinet. The kit includes a die-cast speaker ring, heavy gauge wire mesh grille, speaker mounting gaskets and hardware and instructions. Versions are available for 12-inch, 15-inch and 18-inch speakers.

CIRCLE 27 ON READER SERVICE CARD

MIXERS

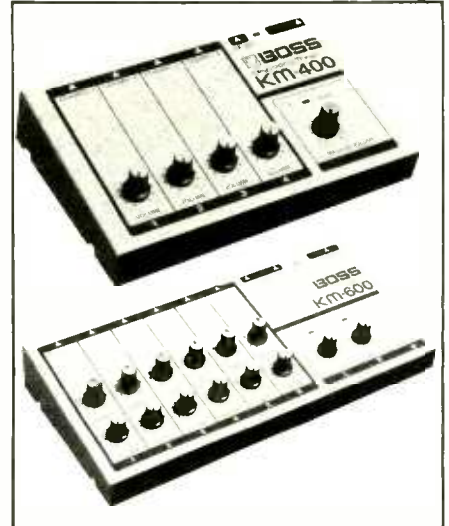
For many years (more than some of us care to admit to) the Shure M67 and M68 mic mixers have been a mainstay of the audio industry whenever a small mixer was needed or whenever another mixer had to be stretched by a few more inputs. Shure has now announced two new, updated mixers with expanded features and improved performance for the same kinds of applications as the venerable M67 and M68 mixers. The Shure M267 is a full-function, four-input mixer with switchable limiter and an illuminated VU meter, while the M268 is a more basic mixer with four mic/line inputs and a line-level auxiliary input. Both models are normally AC powered although the M267 has an integral battery pack with automatic switchover when AC power is interrupted and will also accept an external 30 volt DC supply, and the M268 will accept an optional battery pack or external 30 volt supply. The M267 features four transformer-balanced inputs switchable to mic or line level, each with its own mic/line switch, low-cut filter switch, and active gain control which virtually eliminates the

need for input attenuators and yields superior noise performance. A master volume control sets the overall output level, which is monitored by an illuminated dual-range VU meter with a peak indicator LED. Other features include a switchable limiter to prevent output overload distortion, a mix bus jack to allow stacking of mixers, switchable 30 volt simplex (phantom) mic powering for all mic inputs, front panel headphone jack with level control and driver amp, built-in tone oscillator with front panel switch and an automatic muting circuit to prevent thumps during turn-on and turn-off. The M268 was designed as a lower cost, general purpose mixer and features much of the same circuitry as the M267 for a high level of performance, but deletes some of the added features of the more expensive model such as the meter, the headphone amp, the low cut filter and the limiter and oscillator, but adds a fifth, line level only input. Both use XLR-type connectors for main inputs, and have both mic level (XLR-type male connector) and line level (binding posts on the M267, RCA and the M268 outputs).

CIRCLE 28 ON READER SERVICE CARD



RolandCorp US recently announced two products in its Boss line which should be of interest to keyboardists or anyone using multiple instruments during a performance. The KM-400 and KM-600 are rugged, compact mixers specifically designed for mixing high level inputs with a minimum of noise, distortion or coloration. The KM-400 is a



four-input mono mixer, while the KM-600 combines up to six inputs into a stereo output. Both units achieve their high level of performance by eliminating all unnecessary circuitry. The KM-400 has level controls for each of the four inputs plus a master output level pot, while the KM-600 has a level control and a stereo panpot per input and two master level controls for the stereo output. The KM-600 also features a stereo headphone output. Both models are AC powered and have 1/4" phone jacks for all audio inputs and outputs.

CIRCLE 29 ON READER SERVICE CARD

SYNTHESIZERS AND ACCESSORIES

Sequential Circuits has introduced two accessories to significantly expand the capabilities of its popular Prophet-5 programmable synthesizer. The Polyphonic Sequencer for the Prophet-5 is a self-contained unit with its own power supply and digital cassette deck which will expand the Prophet-5 to the same capabilities as the larger Prophet-10's sequencer, namely 2500-note storage in up to six separate sequences, instant transposition, variable playback speed, and flexible record and edit capabilities. Sequences may be recorded in real time or single-stepped, with the single-step

MUSICAL INSTRUMENT ACCESSORIES

mode optionally controlled by a foot-switch to leave both hands free for the keyboard. Notes may be overdubbed in the single step mode to allow for corrections, and single notes, chords or entire sequences may be edited or deleted at will. Program changes may be initiated from the sequencer as well as notes and chords and these, too, may be edited or deleted. Sequences and Prophet-5 programs may be stored on digital cassettes for later re-use; when loading from tape, only the sequence data or both the sequence data plus Prophet-5 programs may be loaded depending on the position of the Record Enable switch on the back of the Prophet-5. The Polyphonic Sequencer interfaces directly with all current Prophet-5's of Revision 3 or newer (serial number 1301 or higher), while older units will require the installation of an interface connector on the back of the unit by any Sequential Circuits service center. The Remote Prophet is, as the name implies, a remote keyboard for the Prophet-5 which gives the synthesist the same freedom of movement as a guitarist. The unit features a four-octave keyboard plus pitch and modulation wheels on a short "neck" and weighs in at less than ten pounds, not counting the included 20' connection cable. Program selection is accomplished via 5 band select and 8 program select switches located adjacent to the outer edge of the keyboard for easy access. Interfacing of the Remote Prophet is identical to that for the Sequencer.

CIRCLE 30 ON READER SERVICE CARD

Oberheim Electronics is now shipping their OB-Xa polyphonic synthesizers with greatly expanded memory circuitry for storage of sound programs and split and double combinations. The new version of the OB-Xa will be capable of storing 120 sounds as opposed to the original storage capability of 32 sounds, and split/double storage has been doubled from eight to sixteen. Owners of the older version of the OB-Xa needn't despair, however, as Oberheim will be making the memory expansion available as a kit for a retail price of \$120, which will also include a cassette tape with a multitude of new preset sounds. Authorized Oberheim Service Centers are said to be able to install the expansion kit in less than 30 minutes with no charge to owners whose units are still under warranty.

CIRCLE 31 ON READER SERVICE CARD

Roland has announced expanded, improved versions of two of its most popular Boss sound modifiers. The PH-1R is an expanded version of the Boss PH-1 Phaser. The new unit features variable Resonance (or feedback) for added depth of phasing effect. The PH-1R has controls for Rate, with a wide 100 ms. to 16 second sweep range, and Depth as well as the new Resonance control. The SD-1 Super Overdrive is an updated version of the Boss OD-1 Overdrive, adding an active tone control for a wider range of sound textures. The SD-1, like the OD-1, produces round, tube-like distortion or screaming overdrive regardless of the type of amp it is used with, but unlike most distortion effects, the Roland Boss units are touch sensitive and will respond to the guitarist's most subtle playing. The SD-1 includes controls for Overdrive (to control the strength of the effect) and Level (to match the level of the distorted sound to that of the unprocessed sound) as well as the wide range Tone control. Both units feature the usual Boss pedal strong points—rugged housing, switchless solid-state switching and 9-volt battery power.



CIRCLE 32 ON READER SERVICE CARD

New from Ibanez is the AF201 AutoFilter, the most versatile envelope controlled filter currently available as a compact footpedal. Unlike other filter units which produce only one sound, the AF201 has high-pass, band-pass and low-pass filter modes plus high and low ranges for each to allow a nearly infinite range of sounds. In addition, a switch is

provided to sweep the frequency of the filter down rather than up with increasing signal levels to produce synthesizer-like effects as well as the usual auto-wah effect. Two miniature sliders are provided to control the sensitivity (input gain) of the unit and the peak (resonance) of



the filter. The AF201 is housed in a rugged die-cast housing and features noiseless FET switching with a large actuator button and an LED indicator. The unit is powered by a single 9-volt battery or powered by an external battery eliminator.

CIRCLE 33 ON READER SERVICE CARD

Two new "stomp box" products available as kits as well as assembled and tested units are now available from PAIA Electronics. Both units feature heavy steel sheet metal enclosures with scuff-resistant baked-on paint. Both are powered by a single 9-volt battery switched automatically by the input jack to help avoid undue battery consumption, and feature noiseless electronic in/out switching activated from a heavy-duty footswitch. The "Mojo Filter" is an envelope controlled filter producing touch-controlled wah effects. Sensitivity and Initial Frequency controls are provided to accommodate different playing styles and use with bass or guitar. "Hot Lyx" is a sustain/distortion box with continuously variable sustain for a range of effects from a fattening up of the guitar's sound to full-blown distortion. A Level control allows the musician to adjust the output level of the processed sound relative to the straight-through sound.

CIRCLE 34 ON READER SERVICE CARD



Studio Notebook #6

By James F. Rupert

After talking about equipment selection in our last episode [MR&M, February 1982], we're going to skip ahead to actual purchase of the equipment you decide upon. Let's assume you not only have a firm line-up of gear in your mind, but you've also pinned down the make and model of the specific pieces you want to buy. Cash has been gathered, bank accounts have been established and the building is nearly ready for installation of all mixers, decks and any other hardware you will need. All you need is the equipment itself and you're ready to roll. Troubles are over, eh? Think again, Harvey.

Finding the best possible source from which to buy the pieces you need can be a real pain in the monkey joint. Choose the wrong place and it can become a real pain in the pocketbook, too. Obviously the best price possible is one of the most constant considerations in choosing where you wish to slap down your screaming eagles and say, "I'll take it!" But don't forget about considerations like service after the sale, expert advice and consultation and stability of the product lines carried by the supplier. What would you think if you bought something from a dealer who offered you the lowest price on the item but had absolutely no idea how it worked, no suggestions on how to go about getting it repaired in case of breakdown and didn't carry the manufacturer's line anymore two months after you've made your purchase? These aren't things that inspire confidence on the part of the consumer (this means you!) with whomever they are trying to do business. You want and need somebody who will be of help to you in the future as well as the quickly expiring "right now." Price is important, but it is far from the only thing to worry about.

Local dealers should ideally try to fit as many of the desired requirements as possible. With professional and semi-professional recording equipment however, many times there isn't anyone locally who has the slightest idea what you are talking about. Try going into a hi-fi shop in Spudburg, Kansas and asking if they carry any parametric equalizers and you'll see what I mean. Depending on your part of the country, the closest (yet not necessarily the best) dealer for the individual brands that you have selected for your studio may be hundreds of miles from you. If your budget is unlimited you might be able to take off for a couple of weeks worth of wild shopping and personally visit all the dealers of interest in the country. Now for everybody other than you two guys, this might be out of

the question. If no one can satisfy you locally, this is going to mean dealing with suppliers mucho far away.

I've included (see illustration) a sample form for just such an occasion. This is a basic bid form that I have used in the past to solicit bids and price quotes from those suppliers who carry the brand and model of piece that I was looking to buy. Bidding is a perfectly acceptable and accepted way of finding the best price for the goods you need to purchase. In my own case I sent out twenty such bid forms to dealers across the country as well as two semi-local stores. I was looking for replacement equipment following a fire and had the insurance money in hand, ready to swoop down on whatever I thought to be the best buy found through my mailed inquiries.

Out of the twenty forms mailed out I received fourteen back with price quotations, or about a 70% response ratio. I had asked for a price on a small eight-channel reel deck, a small mixer, a two-track mixdown deck and a line-level mixer. I found the supplier's addresses through their advertisements in MR&M as well as other studio based periodicals. Total suggested retail on the equipment I was asking about was exactly \$7,000. It was very interesting to learn the disparity in pricing from dealer to dealer. Sample price quotes given to me ranged from a low of \$5665 to a high of several hundred dollars above suggested retail! Some companies enclosed very nice letters explaining the value of their service, one company even enclosing a toll-free phone number for me to call if I had any service problems. Others wrote letters warning me of an imminent price increase and how the quoted price could only be honored for a scant few days beyond my receipt of their letter. Others just popped the completed form back into an envelope and shot 'er back at me. (Curiously enough, not one of the firms which advertised available catalogs of its products sent me a single catalog with its price quote.)

From these quotes I was able to pick the two or three best priced ones and check out the policies and histories of the companies that supplied them. (Hello, Better Business Bureau!) The result was an excellent relationship before, during and after I made the purchase with the supplier I finally settled on. It was a bit of work and time, but I saved hundreds of extra dollars that I would have tossed away if I would have just made the buy from the first seller I contacted.

Anyone can use this approach. A form like the one pictured here can be made perhaps on a piece of your

stationery and photocopied off for multiple bids. Just be sure to include complete and full descriptions of the make, model and other information on the item to insure you are being returned a quote on the specific equipment you had in mind. State if the "Wazoo Model 25 or 6 to 4" is a mixer, a tape deck or whatever. Also, clearly state that all terms with regard to payment will be cash. (Rest assured if you don't tell them, they will certainly tell you in their reply.) Most importantly, don't send out any bid forms of any type until you have the money in your fist. In fairness to the dealers, they do have plenty of important things to do other than follow up leads from somebody who just likes to get something in the mail from an equipment company. Additionally, any price quotes are subject to sudden change due to changes in pricing from the manufacturer. Don't be upset if the price quote you got on Valentine's Day is no longer valid the next Halloween. After a few of these forms in the mail hit them with no results, the supplier might be forced to figure you are just yelling "Wolf!" with no intentions of ever buying anything. Treat that supplier with the same kind of respect that you would want him to return to you.

Finally, don't overlook those local dealers. Perhaps they could special order the items you need and you

would have the advantage of their in-town service facilities in case of an emergency repair. Maybe you could work out a "loaner" policy with the store manager so that he or she would loan you something to get you by if your equipment had to go into the shop. The advantages of working with somebody cooperative, interested and, best of all, close you should be obvious.

Just because you might be a little studio operating out of somebody's basement is no reason to assume that other companies might not be interested in competing for your business. That's what a bid form is really all about. It is (or should be) inviting competition between the studio supply companies to give you their best all-around shot. You're not asking for anything more than what's fair and you will not and should not have to accept anything less if they want your business.

As for me I'll be sending out bid forms myself later today for an item someone approached me about yesterday. I don't think anyone will be able to beat this guy's price, but I'll give a try anyhow. It's not anything I really need, but what's money for anyhow? Besides, I've always wanted to own a bridge in Brooklyn...

See you next time.



YOUR FIRM NAME
ADDRESS
CITY, STATE, ZIP
AREA CODE, PHONE NUMBER

BIDS MUST BE RECEIVED BY _____

RECEIVED FROM:
BIDDER'S FIRM NAME
ADDRESS
CITY, STATE, ZIP
AREA CODE, PHONE NUMBER

ESTIMATES OF FREIGHT/SHIPPING
CHARGES TO BE INCLUDED IF AT
ALL POSSIBLE
PLEASE STATE AVAILABILITY AND
ESTIMATED DELIVERY TIME IF
BID IS ACCEPTED

ITEM/DESCRIPTION	COST PER UNIT	TOTAL
IF BID IS ACCEPTED, ALL TERMS WILL BE NET CASH		TOTAL _____

An Overview of Synthesizers

Part One
by Devarahi

In this article I hope to give you some serious understanding of the similarities and differences between many brands of currently popular synthesizers. Rare or discontinued synthesizers (examples: Arp 2500, EML Synkey, Moog Sonic Six) will not be discussed unless they are still frequency used (examples: Arp 2600, Moog Prodigy, Yamaha CS-80).

Most synthesizers are completely built by the manufacturer. However, you should be aware of two other possibilities: you can build a synthesizer from scratch, if you understand some electronics theory and can read a schematic, using circuits described in *Electronotes* (1 Pheasant Lane, Ithaca, N.Y. 14850) or *The Engineer's Handbook* (\$2.00 from Radio Shack); or you can build a kit, available from companies such as Aries, PAIA and Serge-Modular. In addition, E-mu offers sub-

modules and voice cards (the electronic components of a synthesizer) for the experimenter. Godbout Electronics (Building 725, Oakland Airport, Ca. 94614) and Blacet Music Research (18405 Old Monte Rio Road, Gurneville, Ca. 95446) also offer a variety of kits of interest to the synthesist.

A word of caution: *Don't judge synthesizers by the presence or absence of special features.* All other things being equal, the more "bells and whistles" a synthesizer has, the more interesting it may be; but this does not mean it sounds good, and sounding good is the most important feature any synthesizer can have. Always listen to any synthesizer you are thinking about purchasing; do not be seduced by fancy features. The sound comes first.

Analog Synthesizers

Analog synthesizers consist of modules whose control voltages produce envelopes analogous to the shape of the voltage. They are contrasted with digital synthesizers which are generally much more expensive and store and return information through the extremely fast manipulation of numbers by one or

more microprocessors. Four types of analog synthesizer are generally available:

■ **(A) PRE-SET SYNTHESIZERS:** This class of synthesizer is generally used by the multi-keyboardist who wishes to be able to easily switch from one familiar instrumental sound (pre-programmed at the factory) to another. It offers little flexibility but great convenience at a modest price. It is typically monophonic although various "string synthesizers" (like the Arp Omni II and Korg Lambda) are polyphonic. Typically it will have buttons that read "Clarinet," "Tuba," "Banjo" and the like. It has few traditional synthesizer controls.

Examples include the Arp Pro/DGX Casiotone 301, Minimoog and Korg M500-SP Micropreset and Sigma.

■ **(B) HARD-WIRED SYNTHESIZERS:** Except for those which offer only modular equipment, all manufacturers have several such non-patchable synthesizers in their product line. Hard-wired synthesizers are characterized by control paths which offer a variety of possibilities (i.e., you may use one or

This two-part article was excerpted from *The Complete Guide to Synthesizers* (Prentiss-Hall, Inc.) by Devarahi. The author states that he "would be happy to communicate with readers who have questions regarding synthesizers. His address is: 1643 Riverview Street, Eugene, Oregon 97403. Be sure to enclose a large, stamped, self-addressed envelope.

more of several control paths offered), but which limit the user to those possibilities which the manufacturer has chosen to include in the synthesizer. They typically will have a signal path which cannot be changed: one or two VCO's fed into a low-pass (and rarely, a high-pass) filter which goes to a VCA and then out. A keyboard, LFO's and envelope generators are available as controllers. These synthesizers may include some extra modules like sample and hold, a noise source or a ring modulator (which has two VCOs, or a VCO and a noise source, as permanent inputs). Monophonic examples of hard-wired synthesizers include the Arp Axxe, Odyssey and Solus; Electro-Harmonix Mini-synthesizer; Minimoog, Multi-moog, Moog Rogue, Prodigy and Source¹; Oberheim OB-1 and SEM; Sequential Circuits Pro One; Yamaha CS-5 and CS-15; and Wasp.

Some synthesizers (like the Arp 2600, Octave CAT SRM and Korg Mono/Poly) are capable of sounding two or more distinct notes played simultaneously, but the notes are then routed through one signal path. These are still one-voice synthesizers. Arp calls its 2600 "duophonic." The Oberheim two-voice and Yamaha CS 40-M, which are capable of playing two notes simultaneously and routing them through two separate synthesizers slaved to one keyboard, are true two-voice (as opposed to two-note) synthesizers. The Korg Mono/Poly offers four VCOs but is still a one-voice synthesizer.



The current vogue in synthesizers is programmability—the ability of the synthesizer to store all or part of a desired patch and recall it at the push of a button. Some of the aforementioned monophonic synthesizers have built-in programmers. The Oberheim OB-1 and Yamaha CS 20-M can each store eight programs; the Moog Source stores sixteen programs, as does PAIA's Proteus, while the Yamaha CS 40-M can store twenty programs. Excluding the Proteus, all these synthesizers may be interfaced with a cassette deck onto which programs may be "dumped" and stored.

Then new programs may be placed in the programmer's memory and the old ones retrieved from the cassette tape.

Sequential Circuits offers its Model 700 programmer, a device which can store sixty-four programs and be interfaced with any otherwise non-programmable one-voice synthesizer. Its three simultaneous control voltage and two envelope generator outputs make it far less flexible than any of the built-in programmers (which store much more information than that), but far more flexible than having no programmer at all.

Polyphonic synthesizers with significant user-adjustable control possibilities first became available to the general public in 1975 with the introduction of the Polymoog. It achieves polyphony by a process known as "top-octave division": the division of the frequency of an ultrasonic oscillator into all the frequencies appropriate for the keys of a keyboard. The Polymoog has two master ultrasonic oscillators which are tunable so the user can set them at any interval. If they are set a 5th apart then depressing any one key will sound two pitches a 5th apart—one keyboard control voltage controlling two VCOs. Depressing three keys would sound six pitches. The two VCOs can be tuned to unison or to a slight beat frequency for more typical keyboard playing. Each of these pitches is processed through separate "synthesizer-on-a-chip" technology. This means that each key has its own separate synthesizer filter, VCA and envelope generators, so it will have its own separate articulation. Even if you press a key on the Polymoog that causes that key's filter to open completely, you can still press another key and have that key's filter open in the same way; it won't encounter an already open filter (and thus give no impression of filter movement). However, all pitches will have the same user-determined filter and amplitude envelopes. The Polymoog is truly polyphonic; you can play as many of its seventy-one velocity-sensitive keys as you desire simultaneously.

The Polymoog Keyboard is another Moog product which is essentially a Polymoog with fourteen factory presets and little user control. It is less

flexible and less expensive than the Polymoog.

The top-octave division principle is used by the Arp Quartet and Omni II; Moog Opus 3; Korg Lambda; Realistic MG-1; and Crumar Trilogy. It is a powerful method of achieving total polyphony.

Oberheim marketed a radically different synthesizer, the 4-voice with programmer, at about the time the Polymoog appeared. The 4-voice has four separate synthesizers (Oberheim SEMs), each of which has two VCOs, a multi-mode VCF, VCA, two envelope generators and an LFO. Since the Oberheim keyboard (designed by E-mu and licensed for use by Oberheim) outputs four (or more) discrete control voltages and timing signals, all voices can be played simultaneously and still sound completely different from one another. This is the unique advantage which this approach to polyphony has over all others. However, the *pièce de résistance* which made this instrument unique in its time was the development of the first polyphonic programmer, capable of remembering many (but not all) of the user-programmed parameters of each synthesizer. It can remember sixteen programs simultaneously.

The disadvantages of this approach to polyphony are that one can play only from four to eight notes simultaneously, not all parameters on the face of the synthesizer are programmable, key assignment to a particular synthesizer is not always predictable and the instrument requires considerable discipline to learn.

Polyfusion's Model 2058 keyboard module is capable of controlling up to eight individual voices separately. It has more advanced control mechanisms than the keyboard of the Oberheim 4-voice, including a polyphonic *glissando* (something the Arp Chroma, and Yamaha CS-80 also offer).

Roland's Jupiter 4 uses the same general scheme of four voices and a programmer. However, it has only one VCO per voice, can store only eight programs and all voices sound the same; it is far less flexible than the Oberheim 4-voice, but much easier to learn.

The third (and presently most popular) approach to polyphony is the

¹The Moog Source is the first of a new generation of synthesizers which have microprocessor generated (as well as controlled) waveforms. There are no attenuators on the face of the synthesizer—only touch switches which function with an incremental control at the left of the keyboard. (The ARP Chroma and Synclavier II have a similar control panel.) Like the Sequential Circuits Pro One, the Source has two built-in sequencers. Unlike the Pro One, the Source's sequencers play back notes in the exact rhythm in which they were entered: the Pro One's sequencers are always controlled by a low frequency square wave, no matter what rhythm in which the notes were entered. (To be fair, the Source retails for about twice as much as the Pro One

microprocessor-assisted total program-mability offered by Sequential Circuits in 1978 on its Prophet 5. Its programmer can store virtually every parameter that appears on the face panel of the Prophet, which makes it a very fast and easy "live" performance instrument. A keyboard player can literally plug it in and play it, since it comes with forty factory programmed patches. Of course, all those programs can be completely redone by the synthesist (which is done far too infrequently.) The Prophet 5 can be modified to store 120 patches in real time. (Modifications for the Prophet 5 are available from J.L. Cooper Electronics, 3512 Rosewood Avenue, Los Angeles, Ca. 90066.)

Shortly after the Prophet 5 appeared, Oberheim brought out its OBX and then, in early 1981, the OBX-a. The Prophet 5 and OBX-a are remarkably similar: they both are about the same size and weight, use microprocessor technology and a cassette interface to store programs, have automatic tuning, a five-octave keyboard, an edit mode for easy editing of programs in real time, quantized tuning (in semi-tone intervals) of one VCO and a synch mode for the two VCOs of each synthesizer.

The accompanying table shows that there are also important differences between the Prophet-5 and OBX-a. Each is

constantly being updated and offered in a revised edition.

The primary disadvantage to this approach to polyphony, as with the top-octave division approach is that all voices are homogenous—they sound the same, having the same filter and amplitude envelopes. However, that very homogeneity means that there is no problem with keyboard assignment of note to synthesizer. A secondary disadvantage is that the synthesizer can only play as many notes simultaneously as there are voices (as few as four on the four-voice version of the OBX-a). In that respect these synthesizers might more accurately be called "multi-phonics" to distinguish them from true polyphonics which can sound every note of the keyboard simultaneously.

Oberheim also markets the OB-SX, a less expensive and less flexible version of the OBX-a which, in the latest revision, includes fifty-six preset patches.

The Yamaha CS-50, CS-60 and CS-80 polyphonic synthesizers, which offered pressure sensitive keyboards and limited analog programmers, were replaced in 1981 by the SK-series. Billed as "symphonic ensembles," they are hybrid electronic organ/synthesizer combinations. However, the CS 70-M is a true six-voice polyphonic synthesizer which uses magnetic data cards (instead

of cassettes) to store patches externally and which offers a built-in limited polyphonic sequencer.

Korg's entry in this class of synthesizers is the Trident, an eight-voice polyphonic synthesizer whose sixteen VCOs are routed to three separate sections which are called "polyphonic synthesizer," "brass" and "strings." Any oscillators not used in one section of this "layers of sound" approach are available for use at another. The "synthesizer" section has two VCOs, one of which makes available only a sawtooth wave. Its one ADSR envelope generator serves as a control voltage to both its VCF and VCA. The Trident has a built-in flanger, keyboard split facility, two-axis joystick and three presets: piano 1, piano 2 and clav. Its programmer works like the Prophet's, remembering all the parameters of a particular patch; however, it remembers only sixteen patches, has no edit mode and no cassette interface for external storage of patch information. Korg intends to upgrade the Trident later this year to store 32 patches and store programs on a cassette tape.

The "layer of sounds" approach is also taken by the Arp Quadra, Korg Lambda and Roland RS-09.

Korg Poly Six, while having far fewer features than any of the other program-

	Sequential Circuits Prophet 5 & 10	Oberheim OBX-a	Korg Trident	Roland Jupiter-8	Memorymoog
Types of filter	4-pole	switchable 2- or 4- pole	4-pole 8	switchable 2- or 4- pole 8	4-pole 6
No. of voices	5 or 10	4, 6, or 8	8	8	6
Modulation hardware	wheels	spring-loaded levers	2-axis joystick	spring-loaded lever and touch-pad	wheels & pedals
"Layers of sound"	No	No	Yes	No	No
Sample & Hold available as control voltage	No	Yes	No	Yes	Yes
No. of patches stored in real time	40 or 64*	120	16	64	40
Cassette Interface	Yes	Yes	No	Yes	Yes
Ability to play two or more different sounds simultaneously	No	Yes	Yes	Yes	No
Sequencer/Arpeggiator	*	No	No	Arpeggiator	Arpeggiator
Keyboard Split	No; but 10-voice has 2 keyboards	Yes	Yes	Yes	No
Oscillator synch	Yes	Yes	No	Yes	Yes
Additional*	Prophet 10 has 2 keyboards & built in poly. seq.; outboard poly seq. available for Prophet 5	Dual range transpose switch; poly-phonics portamento	Built-in flanger; no edit mode or method of storing patches externally	Each voice includes its own voltage-controlled high-pass filter	Optional external poly-phonics sequencer available in late '83 and increased memory

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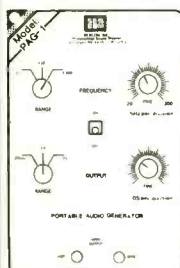
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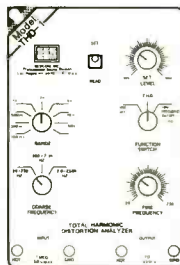
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3-POSITION FUNCTION SWITCH.

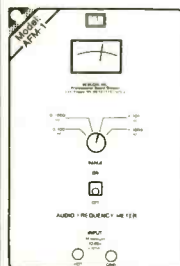
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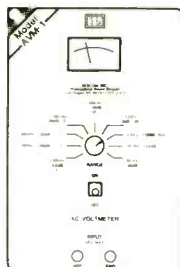
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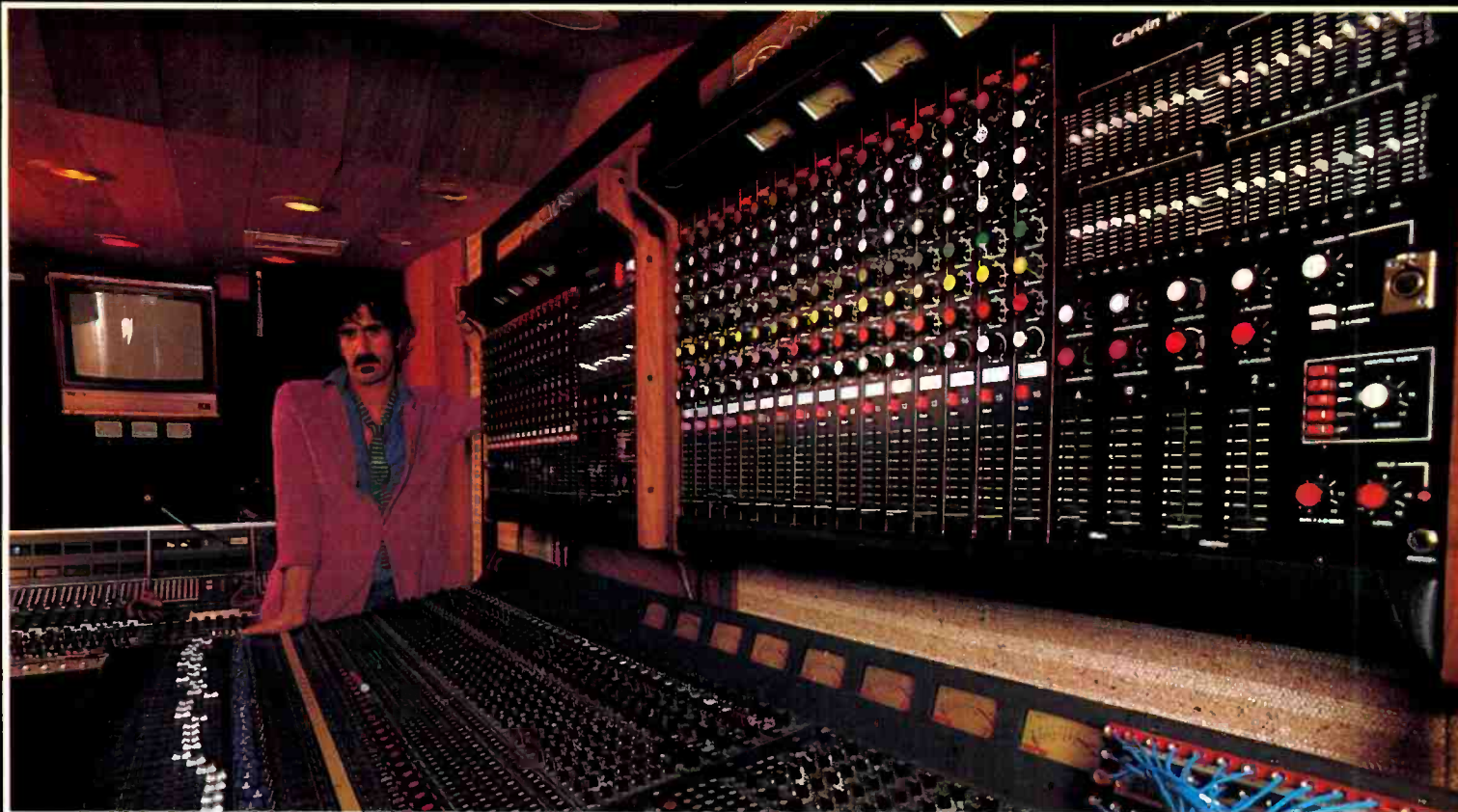
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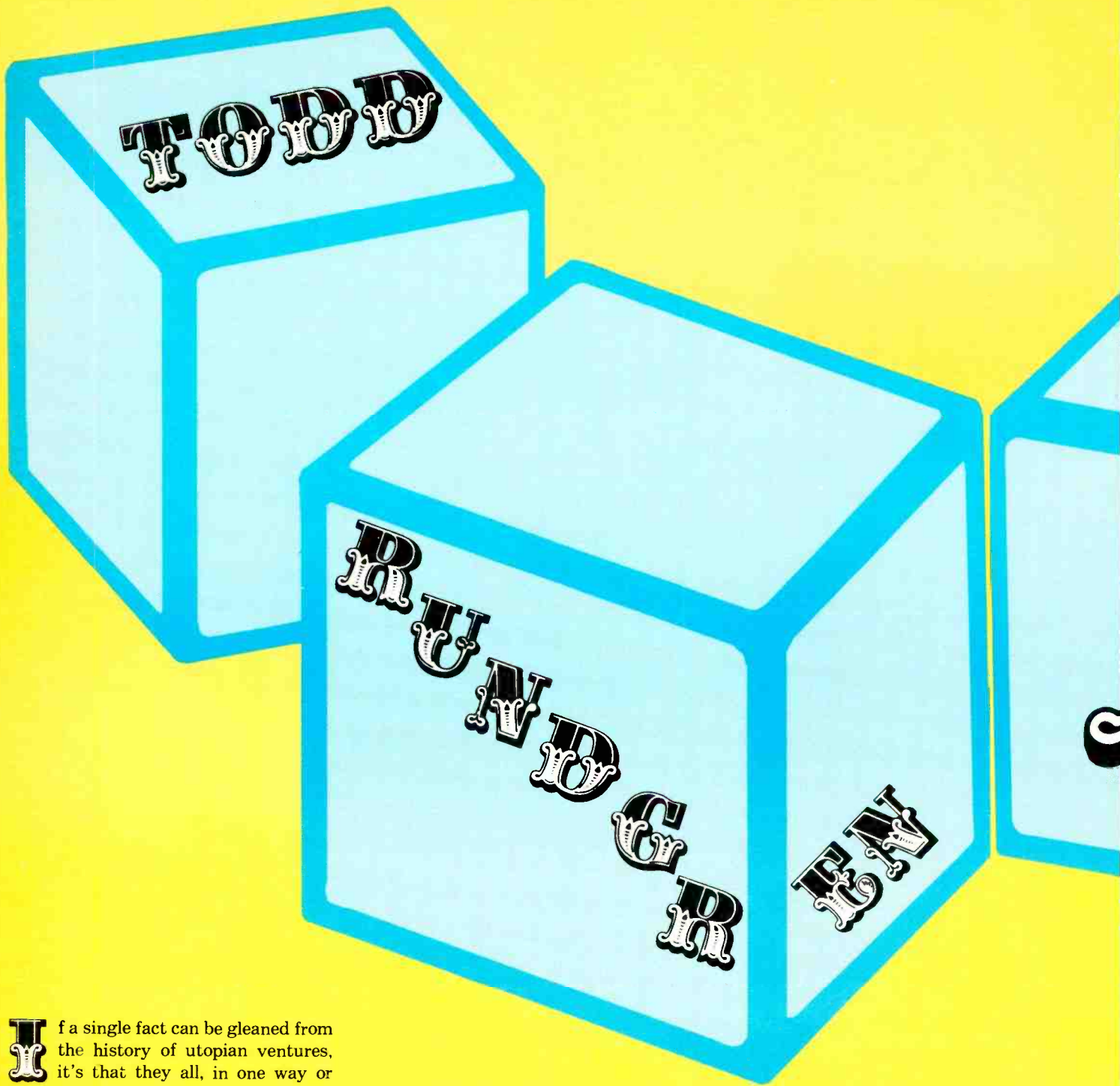
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If a single fact can be gleaned from the history of utopian ventures, it's that they all, in one way or another, failed. With that in mind, one must admire the consistent audacity of Todd Rundgren in naming a variety of his creative ventures "Utopia."

It is apropos that Rundgren's utopian community is a satellite network based around Woodstock (ahh, the utopian visions that name summons!), N.Y., which looks remarkably like heaven on earth to the city dweller as he arrives on the crowded Trailways bus. The upscale, upstate hamlet covered in clean white snow exudes the sort of traditional community hominess most suburban

villages strive for with false storefronts. But Woodstock, despite the seemingly-planned cheeriness of it all, is the real thing—an artist's retreat, a musician's haven. First famed as the nurturing wellspring for Bob Dylan and The Band—not the festival that in reality occurred some miles away—Woodstock has a rich musical legacy that now rests on Todd Rundgren's shoulders.

While others may have made Woodstock their safe country home, Rundgren has made it his artistic playground; with a recording studio at home, a state-of-the-art video studio a short drive away in Bearsville, two recording careers (Todd Rundgren as a solo act, and the band Utopia as a separate entity), a probably even more successful producing career, and a lovely wife and

A

V

TV

**By
Rob
Patterson**



recently newborn child, what more could an artist ask for, other than, say, a string of quadruple platinum albums? And that is the one facet of the music business dream that seems to have eluded Rundgren the artist—large scale success—although Rundgren has produced such hit albums as Meat Loaf's *Bat Out Of Hell*, which sold just as the title would imply.

Or perhaps it's Rundgren who has eluded commercial success. Hailed as a "popmeister" of the first order, affirmed in his self-acclamation as "a wizard, a true star," the only thing Todd Rundgren hasn't done is live up to all that has been predicted for him. That doesn't appear to bother Rundgren too much. After all, he's carved out a rabidly fanatical cult audience large enough for him to operate comfortably.

Rundgren's audience holds a long-standing admiration for him because of the same qualities Rundgren displays during an unusually relaxed interview (one of Rundgren's least favorite pastimes) at the facilities of Utopia Video: a keen intelligence, a biting sarcasm, and an artistic ego so well in-check that those usually defensive qualities gain great credence.

For whether or not he planned it that way (I think not—luck and pluck are probably equal factors here), Todd Rundgren has created a utopia that seems destined to succeed, and the current range of his activities indicates that the pieces are almost all in place. Although scientists may argue against the notion of a perpetual motion machine, Rundgren appears to be the human embodiment of just that. His talk with *Modern Recording & Music's* Rob Patterson ranges Rundgren's multi-faceted current activities: a new Utopia album, *Swing To The Right*, a set of (truly) solo concerts sans backing musicians, his career as a producer, his home recording facility, and the 2 million dollar Utopia Video studio, perhaps Rundgren's most consuming interest. In the genesis of that one "Utopia," we can begin to see the design of Todd Rundgren's grand and bold experiment.

Rob Patterson: Could you explain how you got involved with video? What first interested you about it and what kind of equipment did you first use?

Todd Rundgren: I didn't have a lot of interest in video through the '60s or early '70s because I was interested in music, and also because television was a

different thing then. But around the mid-'70s, things started getting a bit more experimental in regard to techniques that were utilized. Not necessarily the content, but the techniques were different and I saw a lot of potential in them. So I acquired some equipment—various synthesizers and things like that. And then I got a couple of U-Matic recorders and began to expand with cameras, monitors, etc...

RP: Was this basically in your home?

TR: Yes it was in my home. And I just did experimental stuff, more or less to explore the realm of possibilities afforded by this new technology. That went on for a couple of years and then I decided that I had experimented long enough and I wanted to do something serious. I

thought I could do it with the equipment that I had. In other words, I could do things that were artistically acceptable, but they wouldn't be technically acceptable. So that was when I started Utopia Video, which, at first, was in Studio A at Bearsville Recording Studios. I put this camera in that room and started piling equipment in and made out a big shopping list, and it came in in dribs and drabs. While that was going on this building was being constructed. Then, when it was finished I moved everything down here.



Rundgren's shopping list for the 10,000 square foot facility included



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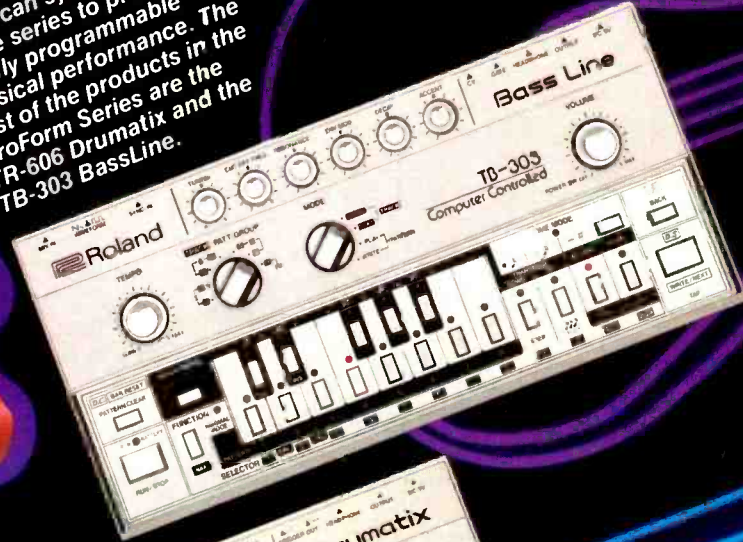
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In a short life span, "U.V." has had an impressive, if limited output. Rundgren was the first video artist commissioned to prepare a work specifically for video-disc, but when RCA executives saw his pilot for a video interpretation of Gustav Holst's *The Planets* (as recorded by Tomita), art was pre-empted by commerce. Rundgren's wildly colorful and imaginative fantasy trip through space remains unfinished, although European interest ("They can more readily accept different things there," says Rundgren) may finance the project's completion.

Video promos like "Time Heals" (from Rundgren's *Healing* LP)—where Rundgren espouses his humanist philosophy in song while superimposed against impressionist art by Dali and Magritte—display an intriguing imagination at work, but alas, those nasty dictates of commerce stop Rundgren short of previewing further U.V. ventures. "If you've read TV Guide this week, you'll know why," he explains. "It's all about Hollywood production ethics, and the fact that there are none. So if somebody hears a good idea, I may as well kiss it goodbye..." But if the world is less than a utopia, that hasn't stopped Rundgren's efforts at building his own.

RP: Tell me about the camera system you have here.

TR: We have CEI cameras. We use other cameras as well, but the ones that we own are CEI, which we chose because they make people look nice.

RP: I understand that you are computerizing?

TR: Various things are computerized. The whole studio is not computerized. That's one of those things that's ongoing and things come together at a whole different pace here. We do things that look computerized by painstaking pro-

cesses. Computer imitation, we call it. But to simplify things, we are computerizing various things in the studio.

RP: What kind of computer are you using?

TR: We're using an LSI 1123, which is a 16 bit mini-computer. We're not exactly sure what the ultimate computer is. There are a number of new processors out which are flexible and powerful and easier to program.

RP: What components of the video studio are presently interfaced with the computer?

TR: The lighting system is completely computerized. We have had things on it up and down the computer. I had everything all connected at once. We've had the switcher and the camera, but at this point I couldn't say what state we're in.

RP: The convenience of that is lighting pre-sets, so if you have to do three or four takes, the lighting stays the same?

TR: Actually, the lighting system came with its own computer, and that's the kind they use on Broadway. Rather than having to remember 203 sets of arrangements, it's preset. It controls maybe 200 instruments.

RP: Some of the other things you've got here, like your Rutt/Etra synthesizer, are very specialized pieces of equipment, aren't they?

TR: That's this one right here. That, as a matter of fact, was the last one ever manufactured because they stopped manufacturing it; we commissioned them to make one for us. So they had to sort of take some parts that were around, and order some parts. But we wanted certain things that weren't in the old model, so we commissioned them to make it.



RP: What were you looking for in your synthesizer?

TR: Well, they all do different things. The Rutt/Etra is an analog synthesizer which can only handle black and white information which you can colorize later, but the analog synthesizer can do things which you can't do with digital manipulation devices. The Rutt/Etra is mostly a manipulation device rather than an image generating device. You put image information into it which is then manipulated by various controls.

Other equipment is more for generating images. For instance, the EMS Spectre is more for generating images, you can't process images but it has its own special generating circuitry in it.

RP: Your Vital Special Effects Generator, is that part of your special setup here?

TR: Well this switcher is more or less standard equipment. We've modified a number of things in it, but most studios have to have a switcher in order to function. This is the Digital effects unit, which does all the things like flipping a picture around and sliding it on and off the screen and squishing it down. This is also a manipulation device—it doesn't generate pictures by itself.

RP: Is any of this equipment here a generating device for images?

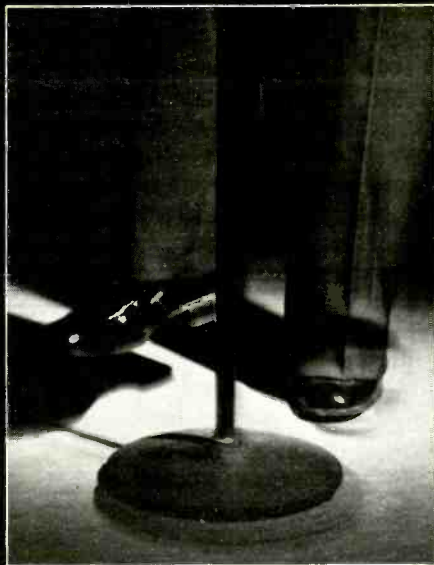
TR: Actually the thing that we are still working on that is the prime image generating piece of machinery is a "paint box system"—a digital frame buffer. Essentially, we can draw pictures on a TV screen, using a graphics tablet and a bit pad. It's essentially a big version of a program I wrote for Apple computer, which was an emulation of a big program which is running at NYIT and it is similar in some ways to a number of systems that are running around the country. The one at NYIT is sort of a progenitor of a lot of systems because they wrote a lot of the algorithms in use in other programs.

RP: What was your reason for creating a studio? You obviously wanted to do things that were a lot more creative than your average TV studio?


TR: There's that, but I also wanted to be involved with video in an environment that I would be comfortable in. I had previous experience in regular video studios here and there and it was uncomfortable. It's like recording studios used to be before they started catering to the artist. You know, "you're going too fast" and "don't touch the buttons." It's not my style of working. I like to be able to stop for a couple of minutes or a half-hour or an hour and think about what's going on and be able to be flexible and you know, move some things around and jury-rig something if you can't get what you want immediately. That's essentially why I built the studio—to be able to have that kind of flexibility.

RP: You've been using this facility for promo videos for yourself and Utopia. It's interesting to see them because they obviously have a lot more imagination

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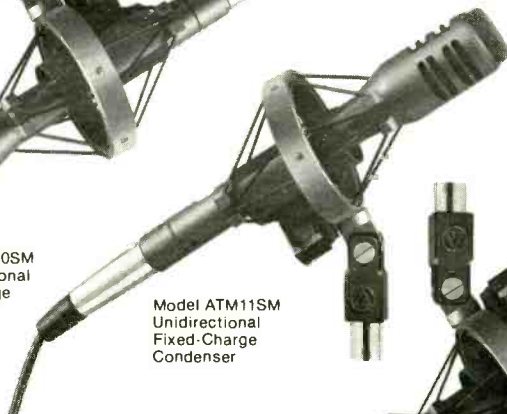
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and creative cheekiness than a lot of the stuff that is out there. What is your opinion of the general interface of video and music?

TR: I've never felt that it was an automatic thing. A lot of people think, well, it's a natural marriage. But I've always felt that so much of the music that is out is mediocre to start with that it's just mediocre music and mediocre video. Sometimes worse than that because people from the music area get involved with video and don't have a lot of experience in it and they just kind of coupe it out. Most of the time, the band will just stand up there and play and they don't have a storyline. Now they've got special effects, so they'll throw in some special effects while they're standing up there and playing, but I've never thought of the effects as the first order of business. You get a good piece of material that will make the transition well, then reading a good script and doing pre-production on it to get your idea really clear before going in to do it. And then, spend more time in the execution of it and do it right as opposed to doing something rushed and looking at it and saying, "Well, it's not right. Change this." We don't have to rush like most people.

Another component of Rundgren's Utopia is his home recording studio, where the band Utopia (not *his* band; Rundgren has always insisted on equal billing with Willie Wilcox, Roger Powell and the recently departed, soon to be replaced, Kasim Sultan) recorded their latest album, *Swing To The Right*. As the title implies, it's a surprisingly political album, caustically commenting on certain truisms of life in the Eighties—conservatism, militarism, commercialism and the decline of humanity.

Nonetheless, it is without a doubt Utopia's most commercial venture yet, a musically vibrant and melodically engaging disc. Even Rundgren admits, "As far as I'm concerned the album is as commercial as anything I've done," although he has certain doubts about how well it will be promoted, since it's Utopia's last album for Bearsville Records, where Rundgren remains as a solo artist. If Bearsville doesn't score a hit single with a song as appealing as "Lysistrata," it will be an opportunity shamefully missed.

Utopia seems designed for Rundgren, the hermit of Mink Hollow, to make music for mass acceptance, yet the band has yet to truly hit. *Swing To The Right*

carries an intelligent message to the masses to compete with the rock & roll Reaganisms from the likes of top-sellers like Styx, and the music fits yet elevates FM radio formats. Its recording was basic, but filled with interesting twists, as is Rundgren's forte.

RP: You recorded *Swing To The Right* in your home studio. Can you give me an idea of what kind of setup you have there? Recorders, board, etc.?

TR: We have an Ampex 1000, I think—I don't know about numbers. We have a customized board which is essentially all faders and busses. It has no equalizers. I use all outboard graphic equalizers on each channel. It's just more convenient, you don't have to patch in an equalizer because you can't get enough out of what's in the board, or, you can style the sound any way you want it. It doesn't have to sound like the kind of board you've got. A lot of records made in certain studios all sound like the board that's in the studio because it's got certain frequencies and limitations. Either the notch frequencies that they've chosen or the fact that they've got parametric equalization possibly, but in 3 bands, which means that you've got...

RP: A loss between the bands?

TR: Maybe barely perceptible, but it is a limitation for me. If I want to want to boost things like the bass or the bass drum, when you're diddling around with fine tuning and bottom frequencies, you may be dealing with 4 or 5 band widths that you want to fine tune...you want one up a lot, one down a lot...you can't do that with hardly any other kind of equalizer except the graphic equalizer.

RP: Do you run stuff straight to the board sometimes?

TR: Very rarely, it's not my style. When I make a record I try to get the EQ going down on the recorder as close to the final mix so I can minimize the mixdown time. I don't like to spend a whole lot of time mixing. I think it destroys your objectivity.

RP: So you put a lot of your effects on beforehand?

TR: Sometimes...sometimes I put the effects on a separate track so it's indelibly integrated with the sound so you can make adjustments later.

RP: Who built your board?

TR: It's actually somebody who used to work at Bearsville. It's due to be replaced at this point, because the studio used to be 16-track and we never really updated the board to 24-track. So

now we have essentially two boards. We have the original board and we have an extra board to handle the extra inputs. So we are replacing that.

RP: When you are recording with Utopia, do you basically record as a band or build it track by track?

TR: We do all the basics at once, and it's gotten to be more and more that way all the time. The latest album doesn't have a lot of overdubs on it. Most of it is "live" tracks.

RP: There's some interesting keyboard work on *Swing To The Right*. What keyboards did you use?

TR: The same keyboards that Roger usually uses. He uses an RMI and a Prophet, and then a piano. But the Prophet, you can tune it to make it sound like a Hammond Organ...anything you wish.

RP: On a number of songs on the album, it is hard to tell which is a guitar and which is a keyboard...

TR: Sometimes...Actually I used pretty much the same guitar sound all through the record. We changed the keyboard sound probably more than the guitar. On the other records, I'm usually changing the guitar sound from tune to tune and a lot of times I'll get this kind of really over-driven, heavy metal sound. But I hardly used that at all on this record.

RP: What kind of guitar did you use?

TR: I played a Rickenbacker through a Super Beatle amp on most of it.

RP: Did you use any effects? It sounds like there's some kind of phasing in there...

TR: Sometimes. I use an Electric Mistress, I think, on occasion...

RP: And that's all in before you even put it in the board?

TR: Yeah, I just mic the speaker cabinet and that's it.

RP: Some of the vocal effects are interesting like on "For The Love of Money" and some of the chorus effects on "Swing To The Right." What did you use for that? Phasing or some kind of chorus effect?

TR: "For The Love of Money" we used the same effect that was on the original song by the O'Jays which is a backwards chamber on the background vocals. A lot of the time, these things that sound like vocal effects are not really an effect at all but the combination of two sounds. For instance, the voices and maybe a synthesizer doing a certain number of things. On "Swing To The Right" there's a certain part that's a combination of the two.

RP: "Junk Rock" has a fractured sound to it—scattering guitars and keyboards in the mix—but there's also this metallic sounding thing in it. Is it a kalimba or what?

TR: Yeah, it's called a Nagoya harp. It may be called other things but it's a Japanese souvenir that you buy. It's a really cheesy little thing that looks like a little box with these strings on it and typewriter keys with bumpers on it. You press the key down and strum the string. It's kind of like a dulcimer that uses keys instead of your fingers. But they're really cheesy and crappy.

"I never felt that the marriage of audio and video was an automatic thing."

We do that every once in a while, we just go into the studio and start dicking around, and that was one of those things. And we don't know while we're doing it if we really should. We actually went ahead and made a song out of it. At first we were just goofing—me, and I think it was Willie. Willie had a really monotonous piano part and I would be banging this Nagoya harp.

Even rock fans who have never heard a note by Todd Rundgren himself or Utopia (their loss) have no doubt heard records he's produced. Learning the art of production as a member of the Nazz, Rundgren proved his talents in the studio with his first solo album—*Runt*.. That led to engineering work with The Band and Jesse Winchester, and launched one of the most eclectic record producing careers in the industry.

Among Rundgren's various production clients are Hall & Oates, Grand Funk Railroad, Tom Robinson, Shaun Cassidy, The Tubes, Patti Smith, Paul Butterfield and Alice Cooper. His most successful production project was Meat Loaf's multi-million selling debut, *Bat Out Of Hell*.

Rundgren's success in the studio is no doubt due in part to his highly organic

approach to recording, as he explains while relating his background and philosophies in the art of record production.

RP: How did you learn engineering and the art of production?

TR: I don't know if I knew what I was doing, but I started producing when I was in the Nazz. The first album we went through a lot of problems trying to find a producer who was right because in those days all we were concerned about was the sound. As it turned out, the guy was one of those old school producers who sat there and read the trades through everything. That was Bill Trout. He really didn't give us a whole lot of direction. So, anyway, after we had done the album and he had mixed it we weren't really satisfied with it so we had to go back and remix it ourselves. He was too busy. By the time we got to the second album, we didn't bother getting any producer. I essentially did it myself. I learned a scant bit of engineering while doing that, but it was when I was doing my first real production with a band from Philadelphia called the American Dream that I learned engineering. We were working in the Record Plant in New York: the studio had just been completed and they had this new board in there, and none of the engineers knew how to use the board yet. It had all those switches and gobbledey gook all over it—most of them didn't know what the hell they were doing anyway. So, I went through 2 or 3 engineers and I figured, "Well, if they are going to learn how to do it on my time I might as well learn how to do it myself." That's essentially what happened. I knew the head engineer so he didn't mind if I did it. I picked up a lot of engineering just during the course of that album. After that I did a couple of straight engineering projects like Jesse Winchester and The Band. Since then I've always done most of the engineering on the albums that I produce.

RP: Do you find yourself getting involved in the smaller aspects of engineering, such as the placement of microphones, etc.?

TR: I do the mic placement. The only mic placement that is really crucial for me is the drums. Everything else isn't really that crucial—you just kind of move it around till it sounds okay.

RP: When you're doing a solo album, how do you work in the studio?

TR: I start with some kind of rhythm track. It also depends on the song.

Sometimes you don't even have rhythm tracks, but on another, I might put the rhythm tracks down and then I'll overdub everything on top of that.

RP: Do you have a specific production philosophy in that way you approach making records?

TR: Well, I'd say it varies in some degree between what I'll do on my own records and what I'll do on other people's records. Of course, I know pretty much what I'm aiming for on my own records. Someone else's record is really their record and you have to preserve as much of what they do as possible. When I'm doing somebody else's record, I want to do the minimum of what I have to do and hope that they do the maximum of what they have to do because, ultimately, it's got their name on it.

RP: Well, critics sometimes say, "Oh, well this sounds like a Todd Rundgren-produced record."

TR: Of course, they even say that about records that I haven't produced! It may be some sound propensities that I have that may make other records sound similar, but if the name wasn't on it I don't know how many people could actually peg it as mine. I think that some of the things I do on records, like background vocals and a certain kind of drum sound—I don't like dried up drums—are distinctive.

RP: What were your favorite outside projects?

TR: There were a couple that were real

good. As a matter of fact, I thought the Shaun Cassidy record was a real good album, and I was disappointed that the record company did such a terrible job with it, which happens often. No matter how good a job you do with a record, the record company can always do a lousy job.

RP: You were saying you like a "live" sound on drums. Obviously you're very adept at technology. I think technology has affected the art of recording both for good and for bad. What do you think?

TR: I'm not really hung up on the technology part of it. That's why I've constructed the studio the way that I have, so that it's flexible and you can get over that. You don't have to go out and get this "super-duper parametric reverberation digitizer" or whatever. I have no interest at all in going digital. I mean, I think that at some point it may be easier to be digital than analog, but at this point, it's so much harder that I don't want to deal with it. People have told me about weird experiences with it—something they call "the green stuff," that goes on the tape before you do a punch-in. It's got to quickly clean the tape before you do the punch-in so you don't get a drop out. You've got to have this "green stuff," which is kind of impregnated fabric or something like that, that quickly rubs the tape before they do the punch in to make sure there's no dirt on it. I don't want to have to deal with that. I just want it to be as

easy as possible. That's **one** reason why I haven't gone to full automation yet, because it's another thing to think about.

RP: It probably can restrict you as much as free you...

TR: In some ways, yeah.

RP: What do you think makes a good record?

TR: The first thing that makes a good record is good material. Then the second thing that makes a good record is good performance. And the last thing that makes a good record is the sound. The thing that listeners pay the least attention to is the sound quality of the record. In the long run, it doesn't matter a whole lot. There are a lot of records that were big smashes that sound terrible. But if that "sound" becomes part of the record, then you accept that. The performance is *vital*. It has to be a performance worth recording, which doesn't necessarily mean a perfect performance, if there is such a thing. I really don't like to sit there while a band tries to get a perfect performance, when they've done something which they may consider to be imperfect, but may have more appeal or humaness or some other kind of dynamic that really makes it worth recording.

Rundgren also recently gave a series of solo shows on the east and west coasts, his first solo tour since his *Hermit Of Mink Hollow* LP, although this time out, the shows were *truly* solo—billed as "A man and his music and video." The ever-cheeky Rundgren changed the billing onstage to "A man and his cart machine," or, a man and his cart machine, video machine, piano, guitars and other assorted equipment.

Sans backing musicians, Rundgren performed a wide variety of material in an even wider variety of settings—a medley of soul hits like "Ooh Baby Baby" and "La La Means I Love You" backed by tape tracks, a piano instrumental that pays tribute to modern composers like Erik Satie, "Lysistrata," from the new *Utopia* album on 12-string acoustic guitar, and Rundgren standards like "I Saw The Light." The shows also featured a unique video interface where Rundgren sang behind a telling taped portrait of bag ladies on the streets of New York City, and presented his little-seen "Time Heals" video from his *Healing* LP.

RP: What sort of equipment are you using for the tour?

TR: I use an Ovation acoustic



12-string with a bridge pickup. I still use that old Eric Clapton Gibson SG electric. I use a Boogie amp with a lot of other equipment including equalizers on the front, back, middle and inside.

It seems that Todd Rundgren has created the perfect world for the pop artist of our times. He has dabbled in making records as a band member and soloist, produced all sorts of other artists, created a video studio whose output is among the most creative to be seen, and garnered an audience for all of his ventures that allows him this amazing flexibility. Even in his spare time, Rundgren keeps creating—one of his favorite home toys is his Apple computer, for which he has designed patented programs.

But Rundgren appears to rarely reflect on just how lucky he is, preferring instead to keep moving on into the future.

RP: Do you think the utopian way is actually possible?

TR: Well, it is for us.

RP: You have continually created atmospheres such as an ideal recording studio, an ideal video facility... You have always tried to design the best environments, and it's rather rare in the music business to find people with that kind of ambition for inherent greatness rather than greatness of credit. How, if I may ask, do you do it?

TR: We've always had to work real hard for this. We were never these overnight wonders or anything like that. I don't know if we'll ever be a wonder of any kind. We work. What we get, we get by working really hard for it. And usually we have a diversity of interests and we plow back whatever we've learned from them into present and future projects. And we all live very comfortably.

RP: Would you ever see yourself as moving from music into a more visual medium like what you're doing here at Utopia Video?

TR: Probably...

RP: I remember reading that you felt that music was becoming tiring...

TR: It's not that music is tiring. It's that the music scene is tired. I like to be where the action is [*Laughs*] and I'd like to be in something that seems like it's expanding rather than shrinking. I still like music and I will continue to do music and be involved with music, but I can't devote my creative energies solely to an industry that seems to have set such narrow priorities for itself.

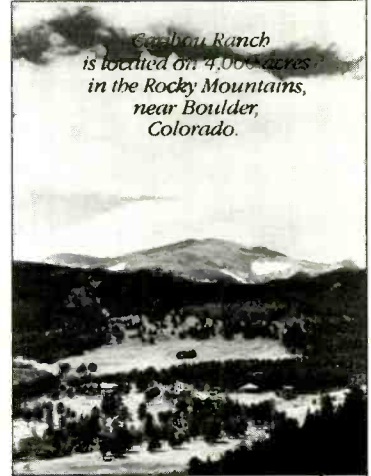


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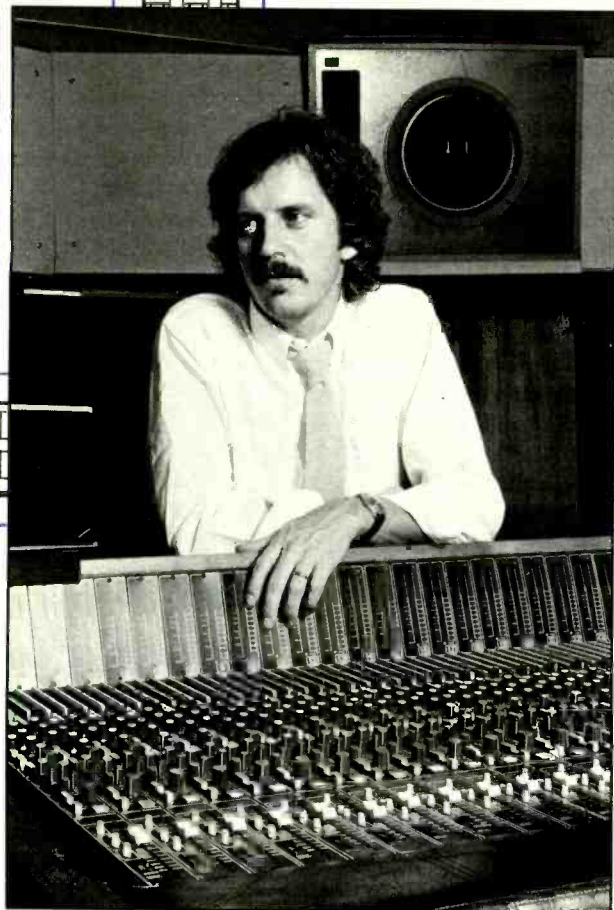
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MICHAEL FRANKS

by Ellen Zoe Golden

Upon first meeting Michael Franks, he appears to be a passive observer of the activities in today's world; but as the intelligent, albeit witty, compositions of his past five Warner Brothers albums indicate, he is more like a cultural voyeur, retaining a quiet manner and serene romantic style, while making thought provoking statements in his music. Michael Franks doesn't just imagine a locale and compose a piece from inspiration; he visits various world cultures to observe human relationships—which adds credibility and substance to his kind of jazz/pop music.

Though the flow of Franks' albums indicate a natural flare for jazzy melodies, his full-time participation in the music business was a long-time coming. As a professor at UCLA, Franks fueled a fondness for music by recording an LP on his own and doing some movie soundtrack work. His extra-

curricular activities culminated in a recording contract with Warner Brothers Records and the establishment of still-vital working relationships with such notable players as Larry Carlton, the Brecker Brothers and David Sanborn. His recording sessions have taken him from the West Coast of the United States to Brazil to Australia and finally, to New York State, where the native Californian now resides.

Recently, at Minot Studios in White Plains, NY, Michael Franks was busy working on his sixth Warner Brothers LP, entitled Objects of Desire. Ray Bardani (co-producer of Franks' new LP with Michael Colina) was seated at the console and opened the conversation with Modern Recording & Music with information on what he calls Minot Studios' "state-of-the-art" recording facilities. Franks joined in a minute later to discuss his work—past and present.

Modern Recording & Music: Tell us a little about the studio.

Ray Bardani: Minot is seven years old. It's grown over the years, shifted in the design and changed. In the condition the studio is in now, it's about six to eight months old. It's got an Altec 604 monitor and BGW power amplifiers, and this studio has all the microphones

you need from Sennheiser to Sony to Neumann to AKGs. Just a vast selection. There're Lexicon Prime Time digital delays and anything else you need, including Dolby noise reduction. We're also using a Sony digital reverb unit for the album. This is the only one there is on the East Coast right now.

MR&M: Can you run down the board?

RB: The board is Harrison transformerless automated console. We're using an MCI tape machine, 24-track, and we're mixing down to a two-track Mitsubishi digital audio mastering system.

MR&M: How do you mic Michael Franks' vocals?

RB: It depends on the song. There're a

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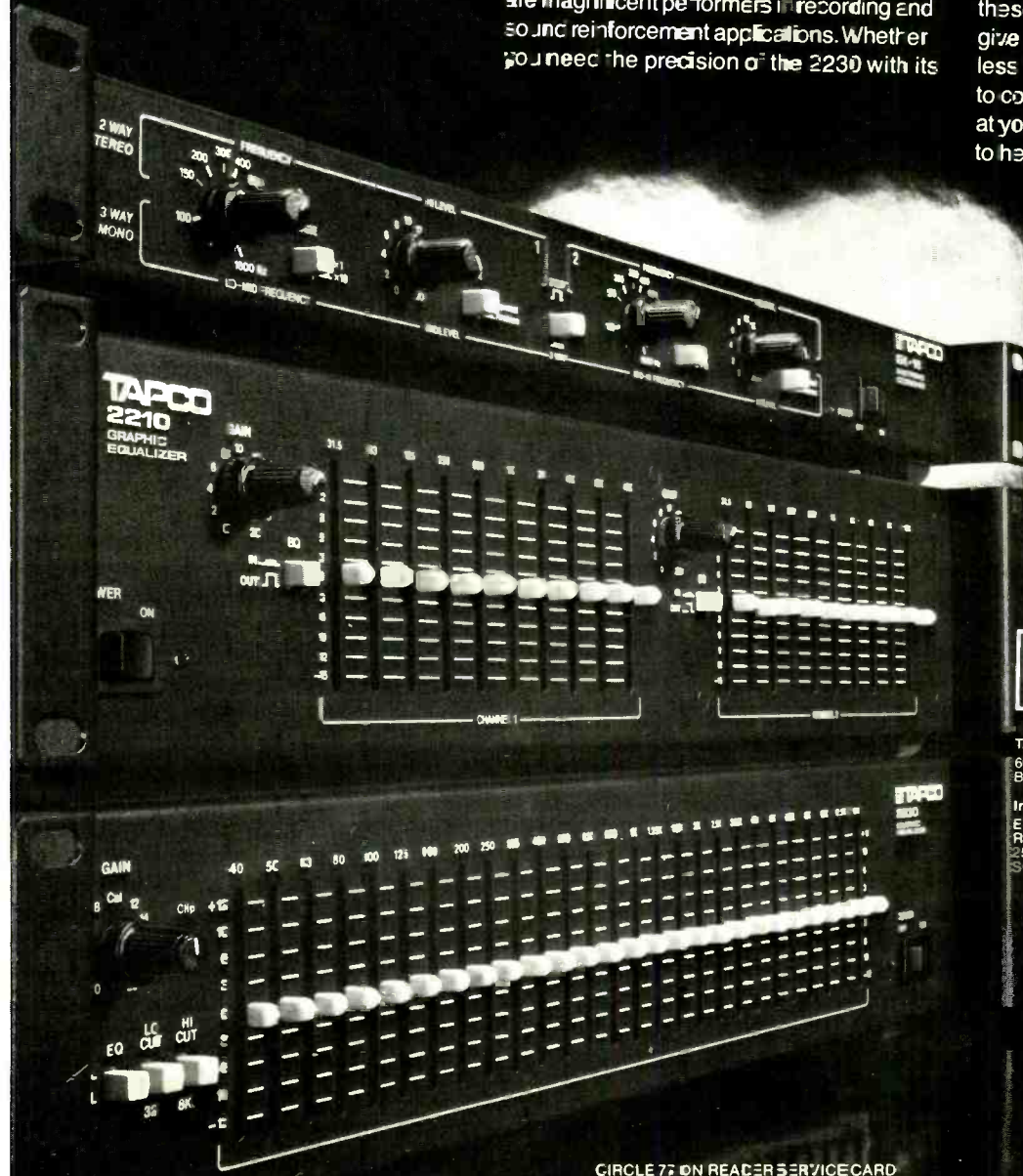
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couple of different microphones. There're Neumann's U-87s. We've tried Neumann U-47s; we've tried AKG-414s. It all depends on what the tune calls for.

MR&M: Michael, is this the first time you've recorded in this studio?

Michael Franks: Yes. Michael (Colina) and Ray kind of talked me into it. I was familiar with the two records they had made here and they sounded good.

RB: This is our (Michael Colina and my) first project with Michael and it's been nice.

MF: I know so little about the technical aspects. A lot of it eludes me.

MR&M: The technical aspects elude you? How much input do you actually have in the production of your albums?

MF: Well, I think I have qualitative suggestions. For example, I have a generic knowledge of the studio, but not of any particular kind of equipment. This will be the seventh record that I've made—I made one before I was with Warners and I made a "live" album last year for WEA International in Australia with an Australian band—and over that period of time I've learned what things are possible and what things to request. Working with Ray has been a real treat because he has a handle on the most contemporary innovative possibilities. In the past, I've worked with Al Schmitt a lot; he's a real samurai kind of engineer.

MR&M: Samurai, as in cut and dry?

MF: No, no, not like John Belushi's character, but samurai as in an enormous amount of experience. He's been a recording engineer through all the technological changes over quite a period of time. I think Al's first record was the Dorsey Brothers or something in mono. So, he's one of those guys that knows recording from its inception.

MR&M: How many albums did you make with Al Schmitt?

MF: I made four records with Al doing all the recording and Tommy LiPuma producing. I made one with a guy named Glenn Berger engineering at A&R studio two albums ago (*Tiger In The Rain*; produced by John Simon). That was good, too. It's nice to work with producers and engineers who are less conservative. If you want to hear something out, you can hear it because they'll throw it up for you. You can at least audition concepts. I just think that the younger people are more agreeable about doing things like that. And they're more open-minded than the more experienced producers. A lot of times, with me being the vocalist and also the

songwriter, I pretty much have control over everything artistic. At certain times, I'll just want to hear a different kind of thing and with somebody like Ray you can describe your concept verbally and you'll get a chance to hear those different ideas—even though you may not even know what you're talking about. You certainly wouldn't know what the ideas sounded like until you asked for them. The possibilities—from straight echo to basic digital delay to a Lexicon piece—are many.

I double my vocals in the choruses and things like that. I double myself in unison and it's been very interesting working with Ray because he's got a slightly different approach to the vocals on each composition. You know, like how much he wanted to spread the two unison voices. He's made it really interesting.



MR&M: You were a teacher at one point, but I understand that even then you were somewhat involved with music. How did you make the complete changeover to professional musician?

MF: I thought that being a musician would be a fairly easy thing to do. I was teaching "The History of Popular Song in America" at UCLA. In retrospect, it was a really good opportunity for me to just listen to things that I liked and things that I'd never heard and to do a lot of research. The class started with Scott Joplin and went all the way to the present. That was after the first album—the one I recorded on my own—and the film I scored for Warners. I was over at the picture lot, dubbing the soundtrack onto this movie, *Zandi's Bride* with Gene Hackman and Liv Ullman—a really nice picture, but not too commercial and not too successful.

In those days, the record company was near the picture lot, right across the street. The guy I was working for at Warner Brothers Pictures took me over to meet Mo Ostin, head of Warner's Records. The next day I met producer Tommy LiPuma. I had already done that one album on my own, so I had had a certain amount of time in the studio before I signed with Warners.

MR&M: You worked with the Crusaders on *The Art Of Tea*, that first WB album. How did that come about?

MF: At the time, Larry Carlton was a member of the Crusaders, and I met Larry, Joe Sample and Wilton Felder. I had made some demos with Larry at his house and one thing led to another. The

producer asked me who I would like to use on the record and I said, "Well, I'd like to use Larry Carlton, Wilton Felder, Joe Sample and Johnny Guerin." Johnny was with the L.A. Express, and at that time the L.A. Express and the Crusaders had a sort of cross-town rivalry. The Express was a pretty hot band, too.

Basically, Tommy LiPuma asked me what my dream rhythm section was and I told him. He called me a couple of days later, and said, "Everything's great, let's start on Monday."

MR&M: Do you think that working with the three guys from the Crusaders more or less guaranteed you an audience?

MF: Yes. I think there was a lot of similarity between their compositions and the compositions I had written. I had always been interested in jazz singers since my qualifications as a singer were more in the "unique" category, rather than the "everyday" category. I think working with them propelled me in the direction of a more jazzy context—contemporary, jazzy context.

MR&M: Were you comfortable in the studio with them?

MF: I think I was fairly comfortable. Bruce Botnick was actually engineering at that point. He did all the recording on the record and had developed a system for the room we were using, which was Capitol in Hollywood. It was a very big room—a good room for a string section, not such a hip room for other things. It was very "live" and very large, kind of impersonal.

Bruce constructed a format to record the rhythm section, which consisted of these "curvaliner" baffles that surrounded the whole rhythm section right in the middle of this room. Then there was a riser, and on that riser there was a sort of "man-in-a-glass-booth" setup that I was in. I didn't have, unfortunately, perfect separation, but at least I was close to the guys. On that level, there were certain shortcomings to working in that particular studio.

We recorded *The Art Of Tea* rhythm tracks and about 75% of the vocals in 12 hours; it was recorded "live." One week we worked on a Monday for three hours; on Wednesday for three hours; and Friday for six hours. It was unbelievable. But, I had rehearsed with Larry, and Larry was really familiar with everything. He was extremely helpful in translating everything. He should have

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been given credit as an arranger, but unfortunately, he was not. But he deserved it because he was really helpful. He had just become a member of the Crusaders and this was an opportunity for him to be in control of the rhythm dates with Joe and Wilton.

MR&M: Weren't there some other notable people on that first record?

MF: We recorded *The Art Of Tea* in May/June of '75 and we came to New York around August and recorded the solos at RCA, of all places. We put Michael Brecker and Dave Sanborn on the record. It was the first time I had met the Brecker Brothers and it was about the third time I had met Dave. It was really an exciting meeting, and since then I've enjoyed their company on so many other projects that that was kind of a high point for me, career-wise.

MR&M: It seems that each of your album has the flavor of a different region of the globe. You mentioned recording a "live" album in Australia, and for *Sleeping Gypsy* you went down to Brazil. Does your academic background—including a masters in Contemporary Culture—have anything to do with the fact that you seem to be a recording world traveler?

MF: I don't even think they teach Contemporary Culture anymore. I mean, they certainly don't give degrees in it. The late 1960s was a period where the universities tried to become a little more "pop..." In answer to your question, I made the first WB records on the

West Coast, basically. After *The Art Of Tea*, I met Antonio Carlos Jobim; he was one of my big heroes. He suggested that I go down to Rio and record an album. So, the producer, the engineer and I went down to record *Sleeping Gypsy* in ten days. Actually, we ended up coming back to L.A. and recording about half the album there.

MR&M: Did you use any local musicians while you were in Brazil?

MF: Yeah. It was a totally different sort of situation than the norm. The studio was more or less inadequate as a place to work. There were only two studios in Rio at that time. One was sort of government controlled. The government is very assertive in Brazil. We couldn't get into that studio, which was supposed to be the better of the two. We got into the only other studio, called Level Studios. I don't know why it was called Level—it was nice and appealing, but it didn't have too much equipment.

The second engineer came over to Al Schmitt and said, "I'm gonna go home now" and Al didn't know where anything was. He couldn't have found a Q-Tip. It worked, but now I would describe the situation as being typically Brazilian. I mean, the call was for 3 p.m., I think the first musician arrived around 10 p.m. and we got under way around 1 or 2 a.m. Conveniently, there was a steam room/bar right next door where everybody convened.

We finished the album at Capitol. Actually, I worked at Capitol quite a bit.

The third record (*Burchfield Nines*, with Tommy LiPuma) was made at the House of Music, in West Orange, N.J.

MR&M: You were quoted in the past as saying that *Burchfield Nines* was your "East Coast Sound." Why did you say that?

MF: I guess because I had just moved to the East Coast. I moved here early in '77 and it was scandalous for somebody to move from L.A. to New York. It really distressed people on the West Coast—friends, people at the record company... and others like that. I don't know why, maybe because everybody moves the other way. New York has always attracted me because of all the great musicians that live and work here. I guess it was tagged my "East Coast Album" because of the personnel. I used [drummer] Steve Gadd—who, to me, was like one of the A Teams from the East Coast—Jonh Tropea, Leon Pendarvis and Ralph MacDonald. And Deodato wrote some stuff when he was living on Long Island. With that in mind, it was easy to fall into the publicity concept of my "East Coast Sound."

MR&M: Who produced that one?

MF: Tommy LiPuma.

MR&M: What about *Tiger In The Rain*?

MF: That was recorded at A&R with John Simon as the producer. That was really a treat. It turned out really nice, and it was an opportunity for me to work with him.

MR&M: *Tiger* had more of a pop feel to it. Why the different style?

MF: I think it was a combination of songs and the personnel, really—which is probably true of almost every album I've done.

MR&M: Like *One Bad Habit*, which was co-produced by Andre Fischer?

MF: Yes. Tommy introduced me to Andre, who was previously the drummer for Rufus—though I think he probably got involved in the production [of Rufus] as well. Andre accounts for the funkier sound on *One Bad Habit*. Also, that was my first album where synthesizers were used.

MR&M: The new record, *Objects of Desire*, features "Two Tahitian Women with Mango Blossoms" by Paul Gauguin as the album cover. Is this an indication of a Tahitian concept album?

MF: Well, except for one song, which is called "Tahitian Moon," I don't think this is a Tahitian album. I think that particular song is one of the most spectacular songs I ever wrote, though I



"Popsicle Toes" creator Michael Franks at the Harrison console at Minot Studios with album co-producer Ray Bardani.

think there are several contenders for that category. I chose the painting because I felt it symbolized—I'm sure more so for Gauguin, than for me—a kind of idealized view of the South Seas, and that is the kind of thing I had in mind for "Tahitian Moon." The album title evolved from the fact that I wanted to have a title that wasn't the name of one of the compositions, because I had done that so much in the past: *Burchfield Nines*, *Tiger In The Rain* and *One Bad Habit* were all title songs. So, I wanted to come up with something that was loosely conceptual in a sense that it would at least surround all the different moods, statements, sentiments and ideas of all the songs. But, I think of the album as being like the painting.

Sonically, too. The album has its moments of being very lush and very ideal. Of course, there are compositions called "Jealousy" and "Flirtation," which have a more solid, groove-type feeling. I guess those songs present the darker desires.

MR&M: Have you ever been to Tahiti?

MF: I went to Tahiti after I recorded the "live" album in Australia. The song that mentions Tahiti is very much like the painting, and very much an

idealistic portrait of life in the South Sea Islands. Polynesia circa 1981. I mean, if you were to go there, you would get off the plane and see this beautiful place that had been somehow defiled by modern life. But, once you get five or six miles down the road, it's more like this coastal subsistence kind of life, where people just fish.

MR&M: Who are the musicians on the album?

MF: We used a few different rhythm sections. One included Andy Newmark and Neil Jason. Rob Mounsey played most of the keyboards and he was the center of the team, more or less, because he stayed with every rhythm section. We used Harvey Mason on one cut, and Randy Vanwarmer sang backup on "Tahitian Moon." I used some of the musicians that I've used with great suc-

cess in the past, like Larry Carlton and Dave Sanborn, which was really a treat. Also Michael and Randy Brecker.

MR&M: Did you try anything new this time?

MF: Yeah, like about a hundred million things, not the least of which was us singing a lot of harmony parts. Although I had sung two-parts on my other albums, I never really got into singing parts that were more complicated and used more voices. And, there are a couple of songs that are really spectacular in that regard. There are two duets: one with Bonnie Raitt and another one with a singer named Renee Diggs. That was a totally new thing. Although I had done something similar before, it wasn't really a duet with rotating vocals. It was really fun and I think doing it was a great leap forward.

SELECTED DISCOGRAPHY

<i>The Art of Tea</i>	(1976)	Warner Bros./Reprise WB 2230
<i>Sleeping Gypsy</i>	(1976)	Warner Bros./Reprise BS 3004
<i>Burchfield Nines</i>	(1977)	Warner Bros./Reprise WB 3167
<i>Tiger in the Rain</i>	(1978)	Warner Bros./Reprise WB 3294
<i>One Bad Habit</i>	(1979)	Warner Bros./Reprise 3427
<i>Objects of Desire</i>	(1981)	Warner Bros./Reprise BSK 3648



Crown amplifiers continue to be the first choice of U.S. recording studios, according to the **Billboard 1981-82 International Recording Equipment and Studio Directory**, published November 7, 1981. Crown amps are reported to provide monitor power for 55.2% of U.S. studios, which is more than twice the number using the second place brand.

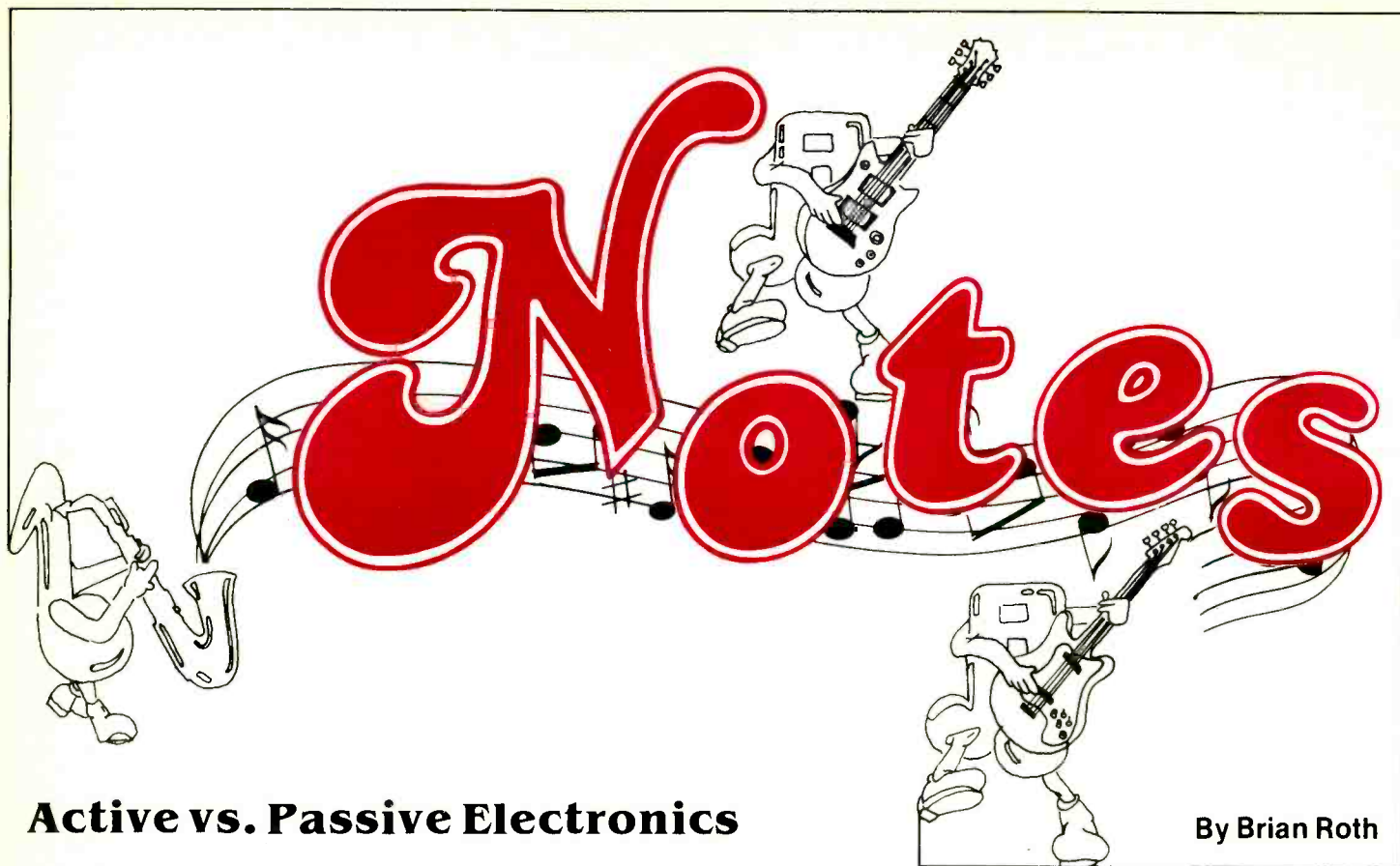
In addition, the PZMicrophone™ in its first year as a Crown product, has already captured the imagination of 7.4% of U.S. studios.

To all our friends in the recording industry,

THANKS!



...WHEN YOU'RE READY FOR REAL!



Active vs. Passive Electronics

By Brian Roth

The latest buzzwords heard from many guitarists are “active electronics.” More and more manufacturers, both original equipment as well as after-market, are offering various electronic packages designed to replace the so-called “passive electronics” used in guitars since the beginning of time (or, at least, the beginning of the electric guitar’s time).

Consequently, this month’s “Notes” column takes a look at both passive and active electronics—the advantages and disadvantages of each. Since passive electronics have long been the status quo, I’ll begin by discussing them.

History Lesson (a look at passive guitar electronics)

When the need to amplify the sound of a guitar or bass was originally determined, the first innovation was the pickup itself. Ranging from a microphone stuffed into the body of the instrument to the more conventional wire coil wound around a magnet, the pickup is really the heart of any electric guitar or bass.

The minute electrical impulses generated by the pickup are routed to the input of an instrument amplifier, and presto—you have an amplified guitar. However, somewhere along the way it was decided that some sort of control of the pickup’s electrical signal was necessary. So enter the volume and tone controls.

The original circuit configuration devised many moons ago is still found in virtually all guitars. I have drawn the schematic of a simple, one pickup guitar in *Figure 1*. Don’t be

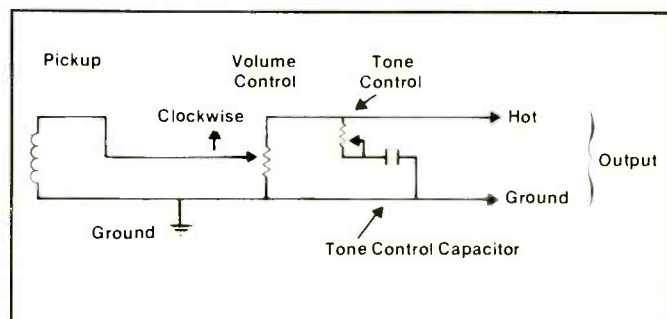


Fig. 1: Wiring diagram of single pickup guitar electronics

intimidated by the wiring diagram; it’s very basic as I will proceed to show.

Two wires provide the electrical output from the pickup. One of these connects to a common ground point within the guitar, and the other wire hooks to the center “wiper” terminal of the volume pot. When the shaft of the volume control is advanced fully clockwise, the electrical signal from the pickup basically bypasses the potentiometer and is fed to the tone control network and hence to the output jack. This is the maximum volume position.

When the pot is fully counter-clockwise, the wiper grounds the output of the pickup, thus “shorting out” the audio signal. This is the minimum volume setting since no audio is allowed to “escape” from the volume pot.

At various settings between these extremes, the musician

finds a range in volume from full maximum to no output at all. So far, so good.

The next stop in the electronics is the tone control. It consists of two components: potentiometer and a capacitor (also called a condenser). These two parts work together as a frequency selective volume control. In the lower range of the guitar's frequency response, the tone control network basically does nothing. However, at higher treble frequencies, the network begins to "short out" the pickup's signal, thus causing the treble frequencies to be diminished.

The amount of treble roll-off depends upon the setting of the tone control. At one extreme, fairly severe attenuation occurs, thus causing the guitar's sound to be "darker." When the control is set to the opposite end of its travel, the network causes very little treble attenuation so, as a result, the guitar's sound is brighter.

From here, the audio is sent to the output jack and hence to the guitar amplifier. This basic circuit is found in nearly any guitar, even those with multiple pickups and controls. In these latter cases, several of the volume/tone control networks are used along with a pickup selector switch; it's just the same thing repeated.



Well, so much for the technical section (sorry if it was boring!). Now let's look at how well this circuit does or doesn't perform.

The biggest advantage of passive controls is their extreme simplicity. There's really very little to go awry since there are only two pots and a tone control capacitor. Broken wiring is probably one of the most common failures, and that can happen even with fancy active electronics packages. I guess the original designers of guitar electronics followed the motto: K.I.S.S. ("Keep It Simple Stupid!"). Obviously, the passive electronics have served well for many years.

On the other hand, the very simplicity of this arrangement does have some rather significant limitations. Here are a few of them:

1) Control and Tonal Interactions

Ideally, the volume control and tone control would each do their job independently with no other side effects. This is not always the case.

For instance, nearly every guitarist has observed that the tone color of the instrument's sound changes as the volume pot is varied through its range. One reason for this is due to the "shorting out" of the pickup as the volume setting is reduced. This, then tends to reduce the treble response of the pickup.

Additionally, the tone and volume controls can interact with each other to some degree since there is really nothing to isolate one control from the other.

2) Lack of Versatility

Only two parameters can be altered: tone and volume. And the range of tone change is very limited because the standard network can only cause (more or less) treble attenuation. (Loss of treble response can give the impression of more bass output, but the overall effect is just not the same as boosting bass response while leaving the treble response the same.)

The tone controls on the guitar amplifier help overcome

this limited tonal versatility, but it sure would be more convenient to have the tone tweakers on the instrument itself.

3) High Impedance, Low Signal Strength

The vast majority of stock guitars use what is commonly called high-impedance electronics. It is not important in this discussion to understand just what "high impedance" means in a technical sense, but rather what effect it has in the instrument's performance.

First, high-impedance circuitry is very susceptible to external noise and interference. These undesirable rackets include hum, buzz, CB radio transmission and even static from neon lights and cash registers. Couple this with the fact that the audio signal is very small, and you begin to wonder how the poor little signal even survives.

To compound the problems, the high-impedance output can be very easily affected by what is connected "downstream" from the guitar. A long guitar cord will cause additional roll-off of treble response (not to mention the increased chances of noise pickup). Various effects boxes can also "load down" the guitar and cause a loss in volume, treble response or both. I have observed one popular "chorus" effect unit that causes a radical loss in volume and high-end response due to the loading effect it presents to the guitar.

So there you have some of the limiting factors due to the stock, high-impedance electronics packages. These problems can be overcome by active electronics. (But now things get more complex; translation: there's a lot more to go haywire!)

The Marvelous Active Electronics Systems

Not too many years ago, it would have been totally impossible to include any type of electronic processing within the body of a guitar. Imagine the size, bulk and weight of your axe if it had a bunch of vacuum tubes and related components stuffed inside. But, thanks to solid-state electronics and integrated circuits (NASA didn't *really* have guitars in mind, did they?), it is very possible to include sophisticated signal processing within the instrument. This merely can be a more effective tone and volume control, or a variety of effects (compression, noise gate, distortion, etc.) can be realized *all within the body of the instrument*. No more need to have a bunch of foot-stomp boxes.

A few guitar manufacturers are offering active electronics as a stock item. However, the majority of active packages are sold as a retrofit for the original passive electronics.

Most after-market electronics require a little bit of skill to install. Typically, mechanical disassembly of the guitar is required along with some soldering. If you desire to have an active electronics system in your guitar, but lack the tools/time/skills to do it properly, leave the installation to a technician.

Once installed, many of the problems associated with passive electronics will be gone. Volume and tone control interactions vanish because the circuitry effectively isolates the pickups and potentiometers.

Nearly all active electronics systems provide a very low output impedance. Thus, long cords and outboard effects boxes won't cause treble losses or noise problems.

Increased tonal range is also possible since the electronics provide much fancier equalization. Additionally, many electronics systems act as a preamp, or signal booster, which can help increase sustain and overdrive.

I can hear you all saying, "Boy, that sure sounds like the cat's meow! I'm gonna get my Strato Kruncher right this

“Active electronics can overcome the limitations of passive electronics, but remember... there’s more to go haywire.”

second!” Now hold your horses. I haven’t told you the entire story. You don’t get something for nothing, so read on.

All the nifty control and effects capabilities provided by active electronics come at a price—*greatly* increased complexity. Since each type of electronics requires the volume and tone puts, it should be apparent that the one remaining component of passive circuits (the capacitor) has been replaced by a multitude of transistors, resistors, diodes and other electronic whizbangs. Here’s the bottom line: there’s a helluva lot more to fail.

This extra complexity also means that troubleshooting and repair is more difficult, and will usually require audio test equipment (oscilloscopes, signal generators and so forth). Passive electronics, on the other hand, requires a minimal amount of electronics training to determine a problem and rectify it.

To further complicate matters, many active electronics circuits are “deep-sixed” in rock-hard epoxy, making any required repairs virtually impossible. If something dies within the plastic brick during the middle of your second set, you are out of luck.

You should also remember that active electronics systems require electrical power to energize the workings, and this typically means you have to mess with those highly reliable (*ha!*) 9-volt transistor radio batteries. If access to the wiring of your guitar is through the front pick guard, this means that you will then have to remove the strings in order to replace a defunct battery.

If you are contemplating the purchase of an active electronics package, be sure that the circuit assembly as well as the battery can physically fit inside of the instrument, otherwise, it will be time to dig out your wood chisel and start chipping away. Not a very pleasant thought, particularly if the guitar is a valuable vintage instrument.

Just because an electronics package is active doesn’t mean that it will yield superior performance compared to the stock passive system. Poor circuit design, cheezy parts and sloppy manufacturing can result in a noisy, distorted sound. Unfortunately, since many packages are sealed in epoxy, it is hard to determine the quality of design and parts. You have to take the risk of installing the system to actually tell if the sonic results are good, bad or indifferent. If the results don’t meet

your expectations, then get out the ol’ wire cutters and chalk one up to experience.

As you can see, active electronics are both good news and bad. There are so many variables that it’s hard to predict the final outcome. But, as years go by, we should be seeing more choices of high-quality design (which is not to say that currently available packages are necessarily bad, far from it). And, I predict that many guitars will come from the factory with active electronics as a standard feature; some already do. Today, the choice is up to you. The greatly increased control versatility you’ll get just might be worth the extra price and complexity.

Active Piano Electronics

The Fender Rhodes electric piano must be the most popular keyboard instrument of its type, judging by how many recording musicians and club bands use it. There are two basic models available: the “suitcase,” with its own electronics and amplification system, and the “stage,” which must be patched into an external instrument amplifier.

This latter model is totally passive with an electronics set-up almost identical to that of an electric guitar or bass. Thus, the “stage” piano is actually a perfect candidate for active electronics, and I am aware of at least one retrofit circuit for this instrument.

The stock controls are removed from the front panel, and a new circuit card is installed in their place. It appears to be a very straightforward procedure that can be done with minimum skill or effort.

The same pros and cons of active guitar electronics also apply to this piano retrofit. It does appear that the installation would be simpler due to the much greater amount of open space behind the Rhodes’ front panel.

Gazing Into the Crystal Ball

I have this habit of speculating upon what developments the future will bring, and I see improved instrument electronics as an area of potential explosive growth. For instance:

Combination Active Electronics and Wireless Transmitter: This one seems like a natural. Rather than use an out-board wireless radio, why not incorporate it with the rest of the audio electronics?

Studio Quality Processing: With microminiature electronics a reality, it is very likely we will soon see a complete processing system built into the guitar. The performance will equal that of the best recording studio equipment. One problem I see is how to cram all the necessary switches and controls onto the instrument. Perhaps active electronics packages of the future will be a combination of inboard circuitry with programming and switching functions externally located.

Microprocessor Based Control of Effects: This might tie in with the first suggestion, and thus help simplify the possible tonal selections.

Or...maybe this is all going overboard. Maybe it would be better if guitars just stayed the way they are—high impedance and all. What can I say, after all, my crystal ball has been known to have a horizontal hold problem.

Seriously, though, active electronics are one of the waves of the future, and the future is here today!



Obsession with Excellence...

**"The PL80 is the
only mike I'll use!"**

The consistently high quality of Crystal's standing-room-only concerts is a demonstration of her obsession with excellence and it says a lot about the equipment she chooses to use.

The PL80 was designed for entertainers. Entirely new applications of available computer-assisted technology were used to ensure that the PL80 performed exactly as it was originally designed to. Extensive field testing with groups like Journey and stars like Crystal Gayle were used to check the designs every step of the way. That is Electro-Voice's obsession with excellence.

The result is an entertainer's microphone that sounds exactly like you want it to. Its crisp high end and modest bass boost enhance a performer's voice without compromising the performer's vocal quality. And it sounds that way *on stage*, not just in a sterile test environment.

"I've used a lot of other mikes in my career and without doubt the PL80 gives my voice a truer sound than I could ever get using any other microphone." That is Crystal Gayle's obsession with excellence, and her statement says it all! Give your voice the sound it deserves. Get your voice a PL80 at your Electro-Voice PL microphone dealer!



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CIRCLE 82 ON READER SERVICE CARD

Ambient Sound

By Len Feldman

A Digital Alternative to Equalization

I had been led to believe (and you probably have, too) that the human ear "cannot distinguish" peaks and valleys in system frequency response that are narrower than about one-third of an octave in bandwidth. It is this often misunderstood "rule of thumb" that is probably responsible for the fact that the most elaborate equalizers built for professional applications divide the spectrum into third-octave bands. And many sound and acoustics engineers erroneously believe that once they "voice" a room or a system using a one-third octave equalizer properly, listeners won't be able to distinguish between the reproduced sounds of the system and absolutely true flat response. As matters turn out, that's just *not* true.

The true relevance of third octave equalization is that *if you use pink noise* as a signal source in evaluating the response of a sound system and in adjusting a one-third octave graphic equalizer, narrowing the pink-noise test signals to less than a third of an octave each will yield no improvement in accuracy of equalization. But, when we listen to music which is, after all, not random noise but *specific* tones and their complex harmonics, deviations from flat response, whether they are peaks or dips in response, can have a profound effect upon accuracy of sound reproduction even if those dips and peaks are just a few Hertz in width. That being the case, why do designers of professional graphic equalizers stop at one-third octave resolution? Why not a sixth of an octave? Or a twelfth of an octave? Or, in the very logical extreme, enough subdivisions of the audio spectrum to take care of as many dips and bumps as occur in the poorest of sound systems? The answer of course is that such an equalizer, built with conventional analog filters would not only be prohibitively expensive, but also highly unwieldy, physically.

Enter Computerized Digital Filter Designs

Just as digital program source material promises to revolutionize the audio industry's most basic software in

the near future, so too is it becoming evident that digital and computer technology is bound to alter our thinking concerning signal *processing*. A far reaching example of this was a prototype signal processor demonstrated by AR (Teledyne Acoustic Research) at the recently held Winter Consumer Electronic Show in Las Vegas. The device shown was called A.D.S.P., and while admittedly the new acronym is not nearly as imaginative as some of those emanating from the Orient (e.g., ADRES, Mavica, SEPP, OCL and the countless others which seem to delight Japanese innovators), it may well represent one of the most significant advances in acoustics and high-fidelity sound reproduction in several decades.

A.D.S.P. stands for Adaptive Digital Signal Processor, and the prototype A.D.S.P. demonstrated at Winter CES is the outgrowth of a continuing research project that began many years ago. This project was intended to improve AR's loudspeaker measurement criteria and to acquire a greater understanding of psychoacoustics. The heart of the new unit is a new NMOS microprocessor developed by Texas Instruments. This chip allows the A.D.S.P. to perform some four million mathematical calculations in less than 90 seconds. The hardware consists of over 100 integrated circuits driven by AR's internally developed software program. It determines with great precision the *exact* correction filter needed to eliminate inherent room aberrations or other deviations from truly flat system frequency response. Once the correct filter has been determined, additional digital circuitry automatically converts to the required filter.

As an input data link, the A.D.S.P. receives a "white noise" training signal for a few seconds. Then, it analyzes all of the frequency information contained in the lower half of the human hearing range; below around 1000 Hz. It then computes the frequency response evident at the listener's position in the room. Next, it calculates the exact frequency correction filter needed to flatten response at the listener's ear.

If, so far, the new unit sounds like a more elaborate form of graphic or parametric equalizer, rest assured that it is *not*. It differs completely from any equalizer you've encountered up to now in three important technical areas. First, the A.D.S.P. has no fixed frequency characteristics, such as number of frequency bands, center frequencies or even filter bandwidth. In addition, the A.D.S.P. operates in a *time* domain rather than in a frequency domain. Ordinary equalizers work by dividing music signals into a fixed number of frequency bands and then readjusting the gain of each of these bands. The A.D.S.P., on the other hand, slices the program into thousands of fragments per second and then adds error correction to each fragment, after which the fragments are *reassembled* into the original musical program material. Finally, the A.D.S.P. creates the required correction filter *without* first measuring the frequency response of the system in the conventional sense. Instead, A.D.S.P. analyzes a sound system (including the listening room) in a manner that is entirely new to high fidelity audio: in terms of relative order and disorder of sound patterns. This technique, we are informed by AR, is commonly employed in computer programming and analysis, but has not been previously employed in analog audio technology.

Traditional filter or equalizer circuits produce their effects by controlling voltage or current amplitudes with inductors (or equivalent), capacitors and resistors. Since the A.D.S.P. has no pre-set filter bands and does not require such components, it can synthesize as many filters as are required—usually a great many more than the eight, ten or even twenty bands available on conventional analog graphic equalizers. Conventional circuits, in order to have the capability of A.D.S.P., would require thousands of components, and even if such a complex analog system were practical to build, a user would require expensive and equally elaborate spectrum analysis equipment to determine how to set the controls of such a complicated analog device.

If necessary, the A.D.S.P. can produce a filter having an extremely narrow notch of only a few Hertz in width. In typical music system correction applications, A.D.S.P. may be called upon to provide filters with more than 50 peaks and dips in the frequency range from 20 Hz to 1000 Hz. We have mentioned before, and again here, that the A.D.S.P. operates only over the lower half of the human hearing range of frequencies—about five octaves' worth out of a possible ten octaves. Acousticians have concluded that above 1 kHz, a simple turn of the listener's head may do more to alter overall amplitude and phase response for high frequencies than would be worth correcting with a digital filter system such as this one. In fact, an elaboration of the software program presently used in the A.D.S.P. and an expansion of the hardware needed to perform analysis and digital filter correction over the entire audio spectrum

would probably increase the cost of the unit without offering significant overall improvement in performance of the device.

How Well Does A.D.S.P. Work?

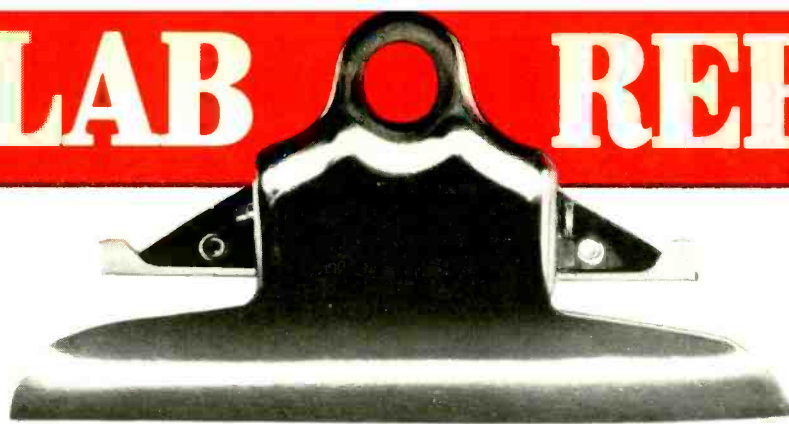
I had an opportunity to preview the A.D.S.P. some weeks before the CES during a visit to AR's facilities in Norwood, Massachusetts. To activate the device, you simply press a button on a hand-held module. Music stops and a test signal sounding like white noise is played through each stereo channel (over each loudspeaker) for several seconds. The test signals are picked up by a microphone also contained in the hand module. The picked-up signal is converted into thousands of numerical codes and stored in computer memory. Numbers are analyzed in a software program about which AR is not willing to disclose too much at this point and a proper complex of digital filtering is devised. As it was explained to us, the A.D.S.P. adds "opposite" frequency response errors to the music so that they are combined with those of the sound system and the room. When combined in this manner, the two sets of errors cancel each other out and the sound then available at the listener's ear is a more faithful reproduction of the recording or broadcasting than would otherwise have been possible.

When we speak of "errors" here we are not involving aesthetic or artistic considerations. The recorded performance of a piece of music, or a broadcast of that music may not be artistically what you would like it to be, but A.D.S.P. (or any other signal processing device used during *playback*) should not be concerned with such artistic deficiencies. A.D.S.P.'s function is to present to the listener's ears a true replica of the signal that is carried by, or contained in, the program source to begin with.

Almost as amazing as the technology involved in this device is the fact that the first commercially available A.D.S.P. unit is expected to sell for no more than a competing popular 10-band self-analyzing analog graphic analyzer which has now been available from dbx, Inc. for about a year or so. The research and innovativeness involved in the development of A.D.S.P. suggests yet another truth—one that seems to have been overlooked by those who bemoan the future of audio. These pessimists have said that once we have digital audio programming, there will be a monotonous sameness about all audio equipment; all of it will be so good that there will be little opportunity for one manufacturer to produce better equipment than the next.

To be sure, the program sources may all use "standardized" digital technology, but we're still going to need amplifiers and loudspeakers and those loudspeakers are still going to have to produce *analog* sounds in *analog* rooms intended for *analog* human ears! Accordingly, there will always be room for good, better and, yes, even *best* audio equipment.





NORMAN EISENBERG AND LEN FELDMAN

Pulsar Laboratories RTA-150 Real Time Analyzer



General Description: The RTA-150 from Pulsar Laboratories is a 2/3-octave analyzer, offering fifteen bands of real-time frequency spectrum analysis on ISO frequency centers of 25, 40, 63, 100, 160, 250, 400, 630, 1 K, 1.6 K, 2.5 K, 4 K, 6.3 K, 10 K and 16 K Hz. In addition, the instrument also performs full dB/SPL measurements as well as wave analysis. Both white noise and pink noise generators are built in. Controls and adjustments, inputs and outputs are elaborate and accurate to permit precise, professional-grade work with the device.

Spectrum display is handled by fifteen rows of LEDs, twelve LEDs per row. A sixteenth row of LEDs functions for sound level measurements. Vertical markings run in 3-dB steps from +15 to -18. The dB reference level is selected by front-panel switches and is displayed on a three-digit readout panel just to the right of the LEDs. The digital display is variable from 50 to 125 dB. RTA and SPL displays are peak-responding, and the decay rate is selectable on four switched 24 dB/sec., 6 dB/sec. and hold (for about 5 seconds). A cursor, selectable as an intensified display using either a bar or a dot, may be used to scan left or right continuously, or by single frequency-band steps. In "scan" mode, an additional moving-magnet meter shows

average dB levels of individual bands to which the cursor is pointing; in analysis mode, the meter shows the average of all the frequency bands. The selection of these modes, and of bar or dot cursor, is handled by four additional switches.

There also are three switches for input selection (microphone; aux 1; aux 2), and three more for output selection (pink noise; +10 dB; +20 dB). To the right of these switches are the sound-level meter; the pink-noise output jack; a mic-input; and the power off/on switch. All the switches on the unit are spring-loaded, and each has its own indicator light. The front-panel pink-noise output is a 1/4-inch phone jack; the mic input is a balanced XLR female connector. The panel extends beyond the chassis sides for standard 19-inch rack-mount installation.

Additional inputs and outputs are at the rear. These include the two auxiliary inputs with options for using balanced XLR connectors or 1/4-inch phone jacks. Each aux input has its own sensitivity adjustment. The mic sensitivity adjustment also is located here. There are four outputs. Two are BNC (bayonet coupled) types for analog out and trigger out. The former offers the logarithmic output of the frequency spectrum for use with an external oscilloscope. The latter provides a

0.033-msec. wide negative pulse at the leading edge of the SPL band for adjusting the oscilloscope. A ¼-inch phone jack makes available the white-noise output, while the pink-noise output may be taken from another ¼-inch jack or from a balanced XLR connector. Also found at the rear are an operating line-voltage selector (115 or 230 V AC); a fuse-holder; and the device's AC power-cord connector to which the separate AC cord is connected.

The mic, and both aux. inputs may be individually adjusted via the rear-panel controls over a 30-dB range. The white-noise output level is fixed at 100 mV RMS. Pink-noise level is adjustable in four steps for values of 31.6 mV RMS; 100 mV RMS; 316 mV RMS; 1.0 V RMS.

The RTA-150 is designed for use with a high-quality microphone that ideally has a "predictable" response, and whose sensitivity is known. While a calibrated mic is preferred, one that is not, but whose frequency characteristic is known, can be used since the RTA-150 can be adjusted on each of its fifteen bands to frequency-compensate the microphone. These adjustments are accessible through holes on the top of the chassis. Instructions for this procedure, and for matching the RTA-150's inputs to the microphone's own sensitivity, are included in the owner's manual. Recommended uses of the RTA-150 include spectrum analysis of room and system, sound-wave analysis; noise generator; measurements of sound level; frequency response; peak voltage; dB gain and other parameters.

Test Results: All published specs for the Pulsar RTA-150 were confirmed or bettered in our lab tests, and

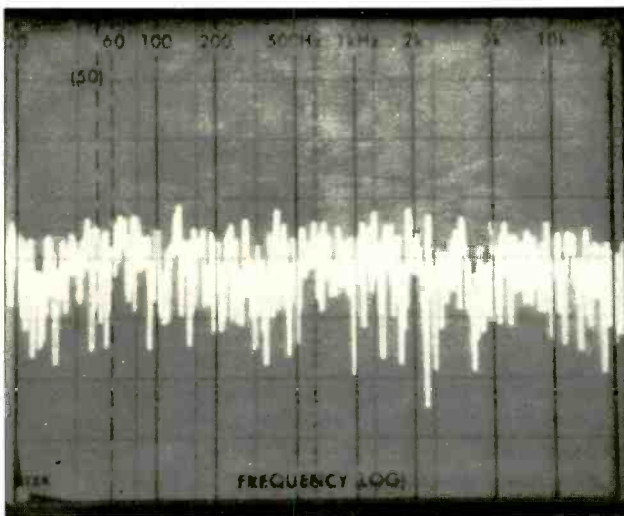


Fig. 1: Pulsar RTA-150: Spectrum analysis display (from 20 Hz to 20 kHz) of pseudo-random white noise signal produced by the unit.

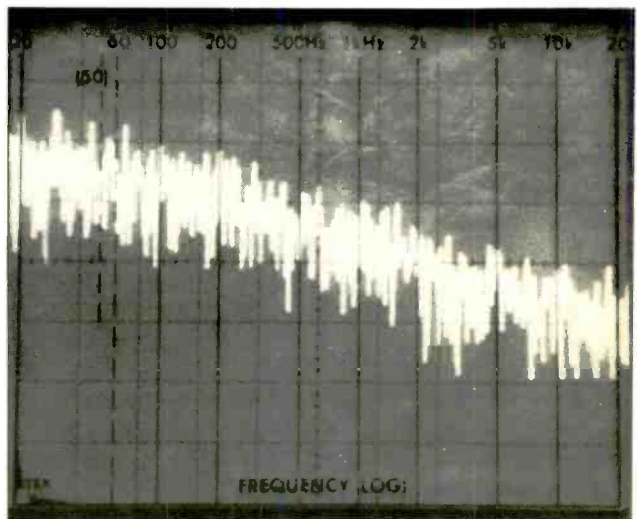


Fig. 2: Pulsar RTA-150: Spectrum analysis display (from 20 Hz to 20 kHz) of pink noise signal produced by the RTA-150.

the unit impressed us as a thoroughly professional instrument of enormous versatility and precise and excellent capabilities. *Fig. 1* and *Fig. 2* show the difference between white and pink noise as produced by the RTA-150 and plotted on our own storage 'scope spectrum analyzer. While white noise delivers constant amplitude at all audio frequencies, pink noise delivers constant power per bandwidth. Thus, the white-noise spectrum (*Fig. 1*) is averaged across the audio band as a horizontal display, while the pink noise (*Fig. 2*) slopes downward at the rate of 3 dB per octave. In both displays, frequencies increase logarithmically from 20 Hz to 20 kHz, so the distances between octaves are equal across the band.

The photo in *Fig. 3* is the analog output of the RTA-150 as shown on a conventional oscilloscope. To get this picture we used the "hold" switch in the decay rate group on the RTA's front panel. Unfortunately (and this is our only minor objection to the way this instrument works), the "hold" setting lasts no more than a few seconds, hardly long enough to study or to record the total response curve. In setting up to photograph how a nearly-flat response curve would be shown on a conventional 'scope, using the external trigger and analog outputs at the rear of the RTA-150, we noted that after a few seconds certain of the "bars" representing frequency bands began to "sink" unaccountably to the bottom of the display. Rather than risk a blurred exposure, we waited for them to sink as far as they would go. The results are shown in *Fig. 3*. Of course, using any of the other decay modes, the display would have been almost horizontal (assuming a flat-response system), but then

the "bars" would wiggle almost too much for this type of time-exposure 'scope photo.

SPL readings on the RTA-150 corresponded very well with readings obtained on single-function SPL meters in our lab—some of which cost nearly as much as this entire multi-function instrument.

General Info: Dimensions are 19 inches wide; 3.3 inches high; 9.8 inches deep. Weight is 12.5 pounds. Price: \$1,299 (\$1,399 with road case).

Individual Comment by L.F.: While the Pulsar RTA-150 is not the first "almost-all-in-one" real-time analyzer/sound level meter/wave analyzer/pink-and-white noise generator that we have evaluated, it is the first one that offers both a white noise and pink noise test signal. Another difference between the RTA-150 and other similar functioning devices is the important ability to calibrate each frequency band so that even with a microphone (not supplied with the device) that is not particularly flat in response, so long as you know what the response is you can calibrate the analyzer to compensate for deviations in the mic response.

The instrument's versatility is considerably enhanced by the wide range of adjustments provided for many of its functions. For example, gain of the amplifiers can be adjusted from -40 dB to +35 dB in 5-dB steps. The pink-noise output level is adjustable. A useful feature is the mechanical SPL meter (averaged reading) in addition to the LED display (peak responding). The filter bands at 2/3-octave spacing provide greater precision than single-octave spacing, but without increasing the cost to prohibitive levels that might result if an attempt had been made to provide 1/3 octave resolution. Considering the fact that the RTA-150 is priced well below some other professional real-time analyzers I have seen, it should be welcome news to anyone seriously involved in sound recording and reproduction.

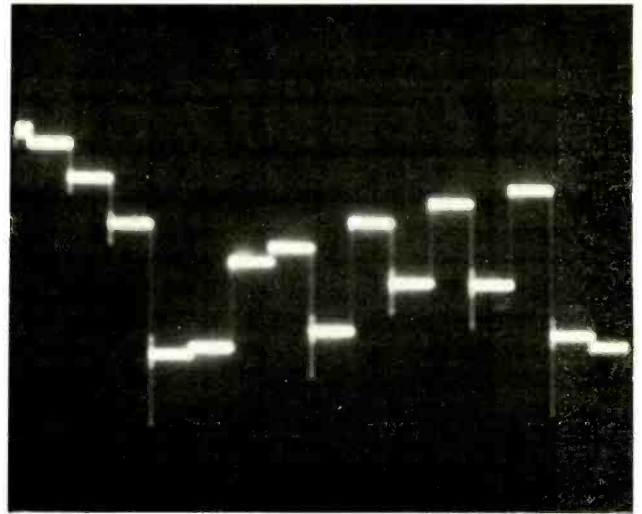


Fig. 3: Pulsar RTA-150: Analog output at rear provides logarithmic output of frequency spectrum in 2/3-octave increments for display on any external oscilloscope.

Individual Comment by N.E.: Unlike many other "multi-purpose" or "multi-function" devices, the RTA-150 shows no signs of compromise or limitation in the design and function of any of its incorporated "audio tools." It is a thoroughly professional-grade instrument from its front-panel facilities to its special rear-panel connectors, with all those options and adjustments in between. Apropos of which, anyone using this complex and versatile instrument has his (or her) work cut out. Not only does it offer all those possible functions, but setting up to use it will take more time and effort than may be required for less rigorously conceived instruments. Yet, for one who has to perform the work of sound-system voicing, room equalization and so on on a regular basis, and in demanding situations, the time and effort may well be worth the expending.

PULSAR RTA-150 REAL TIME ANALYZER: Vital Statistics

PERFORMANCE CHARACTERISTIC	MANUFACTURER'S SPEC	LAB MEASUREMENT
Filters	Fifteen (2/3 octave)	Confirmed
Filter Q	4.0	Confirmed
Filter Gain Range	- 20 dB to + 6 dB	Confirmed
Display Range	36 dB in 3 dB steps	Confirmed
Decay Rate (per second)	24 dB, 6 dB, 2 dB & 5 sec. hold	Confirmed
Frequency Response	20 Hz to 20 kHz, ± 0.4 dB	Confirmed
White Noise Level	100 mV	120 mV
Pink Noise Levels	31.6 mV, 100 mV, 316 mV, 1.0 rms	Confirmed
Analog Output Level	20 mV/displayed dB	Confirmed
Trigger Output Level	3.5 V	3.3 V
Power Consumption	30 Watts	25 Watts

CIRCLE 17 ON READER SERVICE CARD

Crown PS-400 Amplifier



General Description: The Crown PS-400 is a heavy-duty power amplifier for single-channel or two-channel use. Power output is rated across the audio band with reference to 0.05 percent THD. In stereo, the minimum RMS power output is rated as 165 watts per channel into 8-ohm loads, 265 watts per channel into 4-ohm loads. The mono rating, for a 16-ohm load, is 330 watts.

The PS-400 is built on an all-aluminum chassis for maximum heat conduction and minimum weight. Of standard rack-mount width, the front panel is fitted with handles. It contains the power off/on switch and power indicator; an optional output monitor jack for a standard ¼-inch phone plug; level controls for each channel; signal presence indicators, and Crown's IOC™ indicators. The level controls (one for each channel) are detented with thirty-one positions. The signal indicators come on when more than 0.6 volts RMS is present at the amplifier's output. The indicators for "IOC" (input output comparator) can alert the user to any problem such as excessively high input signal, incorrect load, clipping and so on. They also serve as stand-by indicators, and will glow during turn-on delay, temperature overload or low-frequency interrupt.

The rear of the PS-400 contains several signal connectors. There are two sets of inputs. One is a barrier strip with screw terminals. The other consists of two standard ¼-inch phone jacks. Only one set should be used at the same time. The barrier strip is provided as an alternate to the phone jacks for relatively permanent installations where quick disconnect is not deemed necessary.

For balanced input capability, there are two optional modules that may be added to the amplifier, either of which converts the inputs to XLR hookup. One module (passive) is a transformer; the other is active. The passive module provides 110 dB of S/N; the active module provides 108 dB of S/N but extends the high-end response somewhat. Either module is plugged into a multi-pin socket at the rear.

There are two sets of outputs. One consists of two pairs of standard banana-type jacks. For mono output, the two "hot" jacks of each stereo pair may be connected by one dual-pin banana plug since the mono output is balanced and isolated from chassis and input grounds. The other set of outputs consist of barrier strips which may be used instead of (but not simultaneously with) the banana jacks. Again, if the output barrier strip is used, the mono signal is taken from the two "plus" terminals. To the right of these connectors is the mono/stereo selector switch.

In mono mode, all equipment connected to the mono output lines must be balanced, with both sides of the line isolated from the input grounds to the PS-400. In mono mode, total speaker impedance should not be lower than 8 ohms.

Test Results: Although the Crown PS-400 amplifier's midband (1 kHz) power output is rated with reference to 0.1 percent THD, its power across the audio bandwidth is rated with reference to 0.05 percent THD. *MR&M* tested for both characteristics and confirmed them. Harmonic distortion generally was a bit lower than spec: IM, a bit higher. In any event, the few hundredths of a percent differences here either way are of little or no significance. S/N was a shade better than claimed, and damping factor went well beyond our capability for accurately measuring it.

Examination and use, to the extent we were able to do so, indicates that the PS-400 is extremely rugged and reliable. Its massive heat-sinks are thermally joined with the all-aluminum chassis. In addition, the amp embodies just about every kind of output protection imaginable, including turn-on delay; short, mismatch and open-circuit protection; thermal protection; and a low-frequency interrupt circuit that becomes activated at DC outputs greater than 10 V, or low-frequency outputs greater than 10 V at 2 Hz. The amp also incorporates

Crown's clever IOC (input-output comparator) circuit which helps the user to identify any problems during operation such as excessive input signals, incorrect load impedance or even some amplifier malfunction.

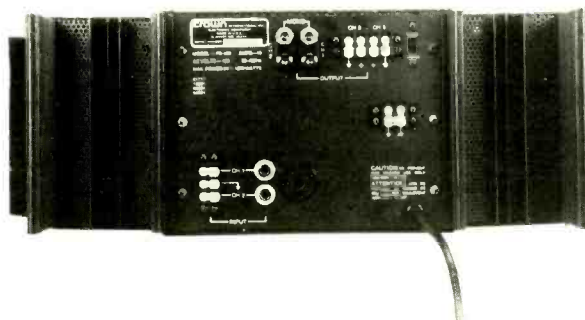
General Info: Dimensions are 19 inches wide; 7 inches high; 11 inches deep. Weight is 55 pounds. Price: \$1,149.

Individual Comment by L.F.: With the fine line between hi-fi amplifiers and professional sound-reinforcement amps becoming ever finer, I am often asked what I consider to be the differences between the two kinds of equipment. Crown International, Inc.—a company that certainly has enough experience manufacturing for both markets—offers a clear set of “differences” in its PS-400. In addition to its rugged construction and profuse protection devices, what really separates this amp from others is Crown's use of accessories by means of which you can “customize” the amplifier to your exact needs. Several of these were supplied with the samples we tested, and the ease with which they can be incorporated into the PS-400 and used with it show that a good deal of thought and ingenuity went into the total design of the unit. Some “do-everything/have everything” amplifiers remind me of some airline advertising—the kind that tells you how many times a day and from how many airports you can fly from, say, New York to Chicago. Well, normally, I only want to fly there from one airport and only one time on a given day.

In like manner, when I install an amplifier, I may want to use a balanced input—but then again I may be able to get away with an unbalanced input. In the latter case, if both forms of input are provided on the same amp, I'm paying for a feature I don't really need. Similarly, if I can install my amp where adequate ventilation makes forced-air cooling unnecessary, but a fan is already built into the amplifier, then again I am paying for something I do not need. And if I do not need a 70-volt output distribution system (for multiple speaker installations), it's really a waste of money to pay for an amp that has a built-in transformer for that purpose.

Crown obviously was aware of these pet peeves of sound system installers. The PS-400, as supplied, has unbalanced inputs. But Crown offers two types of balanced-input modules (an active type, PS-MOD A and a transformer type, PS-MOD X) either of which attaches neatly to the rear panel of the unit and offers balanced input connections via XLR or barrier terminal strip connectors. If you do end up with the amp in a tight corner, you can purchase a pair of Crown's PS-DF fans, neatly mounted on brackets that interface easily with the amp via vertical slots at the rear of each heat-sink assembly. And for those setups calling for a 70-volt distribution system, an output matching transformer—UMX-200—is available.

I realize I haven't said anything about the sound quality of the Crown PS-400. Having had a good deal of experience listening to some of Crown's high-fidelity



Crown PS 400. Back panel view.

amplifiers over the years, I suppose I've come to take for granted the clarity, excellent transient response and in-audible distortion and noise levels of their products. The PS-400 is a worthy successor to earlier models in these important respects; and, to repeat, the difference between a Crown “pro” amp and a Crown “hi fi” amp is not one of audible sound quality.

Individual Comment by N.E.: The PS-400 is the higher-powered of two pro amps recently developed by Crown that incorporate what Crown terms its “multi-mode”™ circuit. According to Crown, this circuit uses a three-deep output device configuration designed to provide low distortion at all power levels. It allows the amplifier to move smoothly from Class A operation at low power levels to an A+B at medium levels, and then to AB+B at high levels. In this way, explains Crown, the amplifiers “offer the optimum operating mode for whatever power levels are required at any instant.”

Another interesting circuit aspect of the PS-400 (and its lower-powered version, the PS-200) is the front end, which is based on the Signetics 5532 dual low-noise op-amp. Explains Crown, this section is internally compensated, permitting a simplification of the amp circuitry, with an attendant increase in reliability.

I suppose it's this sort of circuit sophistication, not to mention the two sets of inputs and outputs, and the ample built-in provisions for protection and so on that account for the relatively high price of the PS-400, which of course gets somewhat higher should you decide to purchase any of the optional modules (balanced input, 70-volt output or fans) that may be used with the amp. In this regard, the Crown PS-400 becomes a costlier unit than some others we have tested that offer similar power output levels at no higher distortion.

This particular point, of course, has to remain a matter of personal preference, and very likely one that would be determined largely by available budget for a given installation. What seems more certain, in any event, is the sheer excellence of the PS-400 in terms both of its avowed intended use by professional sound installers and performers for sound-reinforcement applications, and also—because of its utterly clean reproduction—as a reproducing amplifier for critical music listening.

CROWN PS-400 POWER AMPLIFIER: Vital Statistics

PERFORMANCE CHARACTERISTIC	MANUFACTURER'S SPEC	LAB MEASUREMENT
Continuous power for 0.1% THD, 8 ohms, 1 kHz	180 watts	180 watts
4 ohms, 1 kHz	265 watts	277 watts
FTC rated power (20 Hz to 20 kHz)	165 watts	165 watts
THD at rated output		
1 kHz, 8 ohms	0.05%	0.04%
1 kHz, 4 ohms	0.05%	0.043%
20 Hz, 8 ohms	0.05%	0.05%
20 kHz, 8 ohms	0.05%	0.05%
IM distortion, rated output		
SMPTE	0.01%	0.03%
CCIF	NA	0.02%
IHF	NA	0.14%
Frequency response at 1 watt for -1 dB	DC to 100 kHz	DC to 50 kHz
S/N ratio re: 1 watt, "A" wtd, IHF	NA	94 dB
S/N ratio re: rated output, "A" wtd	112 dB	116 dB
Dynamic headroom, IHF	NA	0.83 dB
Damping factor at 50 Hz	400	See text
IHF input sensitivity	NA	145 mV
Input sensitivity re: rated output	1.76 V	1.9 V
Slew rate (volts/microseconds)	16	Confirmed
Power consumption, idling/maximum	40/560 watts	75/740 watts (8 ohms)

CIRCLE 16 ON READER SERVICE CARD

Akai GX-747 Open-Reel Tape Recorder

General Description: The Akai GX-747 is the first open-reel tape recorder we have received that is equipped to handle the newly developed "EE" tape, a high-performance ferric-oxide formulation developed by Maxell and by TDK. Adjustments on the deck permit using this tape as well as "normal" or "standard" tapes.

A two-speed (7½ and 3¾ ips) machine, the new Akai has 10½-inch reel capability plus bi-directional record and play. Six separate heads provide for erase, record and play in both directions of tape travel. The reverse option is activated by attaching a small piece of "sensing tape" to the back surface of the recording tape; tape reversal then is automatic. The quarter-track configuration permits 4-track 2-channel stereo record and play; and 4-track mono record and play. (In quarter-track mono, using a 3600-foot reel of tape in both directions, up to 12 hours of continuous record or play is possible.)

Although the deck is loaded with features, an uncluttered look is achieved by having many of the controls located behind a swing-down "door" which may be recessed into a slot at the bottom. The meters are still clearly visible even when this door is placed over the controls.

The transport is powered by three motors—one AC servo for capstan drive, and two AC eddy-current motors for the reels. Transport buttons are feather-



touch, microcomputer-logic controlled and permit fast-buttoning from any transport mode to any other. The tape path, from one reel to the other, runs through a symmetrically arranged system of tension arms, guides and so on. Between the tension arms are a pitch control (for playback) with a center detent position; the reverse selector (one-way; two-way; continuous play); a memory-reverse indicator; a five-digit real-time tape counter; and a special control panel for use in conjunction with timing and automatic stop options.

Below the left tension arm are the deck's AC power off/on switch; the reel-size selector; and a cue-and-review lever which may be used (together with the rewind or fast-forward buttons) to shuttle a tape during playback to get to a desired spot quickly. Below the

right tension arm are the transport controls for record, pause, reverse at normal speed, forward at normal speed, rewind, stop, and fast-forward. Pressing the record and pause buttons simultaneously puts the deck into standby mode. There's a separate button to mute the incoming signal without stopping the tape.

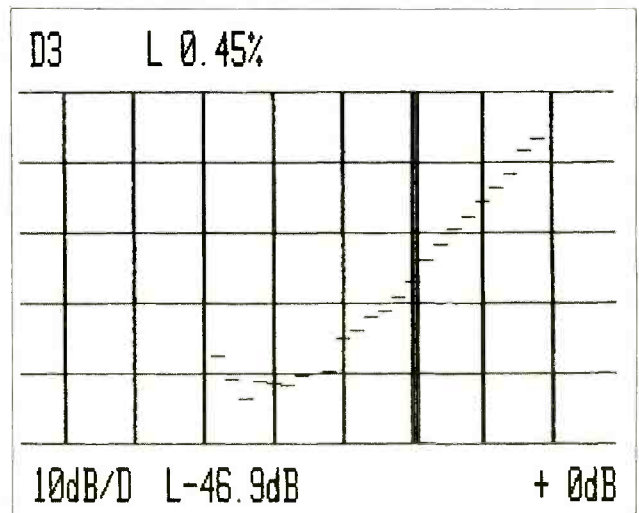
The area that may be hidden behind the swing-down door contains features and controls relating to signal functions. Left and right-channel signal levels are shown on two horizontal bar-graph 24-segment LED scales with peak-hold. Below the meter panel are a stereo headphone output jack; an output level control which adjusts line and headphone outputs; a switch for use with an external timer for unattended record or play; the tape/source monitor selector; tape-speed selector; the normal/EE tape type selector.

To the right of the meters is a bias adjustment. Below it are left and right track selectors. Two pairs of dual-concentric controls handle recording levels for microphone and line inputs. Left and right channel levels for each are independently or simultaneously adjustable, and the arrangement also permits input mixing. The mic jacks are located just below these knobs.

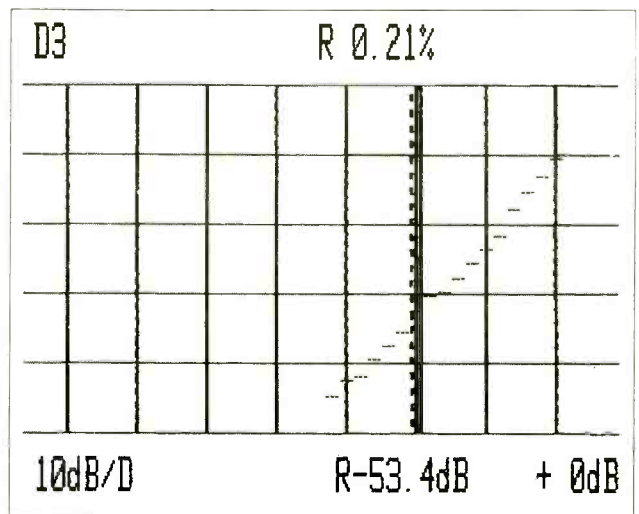
The rear of the deck contains the line in and out signal jacks, the deck's AC power cord and special jacks for optional use with a remote-control unit (Akai model RC-21) and with a memory back-up power supply (MP-515) which will supply power to the timer memory when AC to the deck is turned off. This system can be preset to find the length of time of a section of recorded tape (in either direction) as well as to stop automatically; reverse the tape at a preset time; and to reverse and return to normal forward at preselected times.

Test Results: We tested the Akai GX-747 with both kinds of tape for which it is designed. According to the owner's manual, the reference tape Akai had used for calibrating the GX-747 was Maxell UD for the normal or standard bias setting; the tape they used for the EE setting was Maxell XL-II. These were the tapes then that we used for our tests. (The latter tape is a high-bias formulation that has been available in cassettes for some years, and recently has been offered for open-reel decks.) The open-reel EE tapes correspond to such cassette versions as Maxell XL-II and to TDK's SA. The letters EE themselves stand for extra efficiency.

The deck performed just fine with the UD tape sample, used in the normal bias setting. But the results for the EE tape sample, when we first switched to the EE position, produced distortion figures and signal-to-noise measurements that were not what we would have expected for the new tape. We then found that we could optimize these parameters by increasing the bias via the front-panel bias control, advancing it almost to maximum despite the fact that the owner's manual suggests leaving that adjustment at its midpoint for both these tapes. It is quite possible that our early sample of Maxell EE tape came from a batch that differed somewhat in its



(1A)

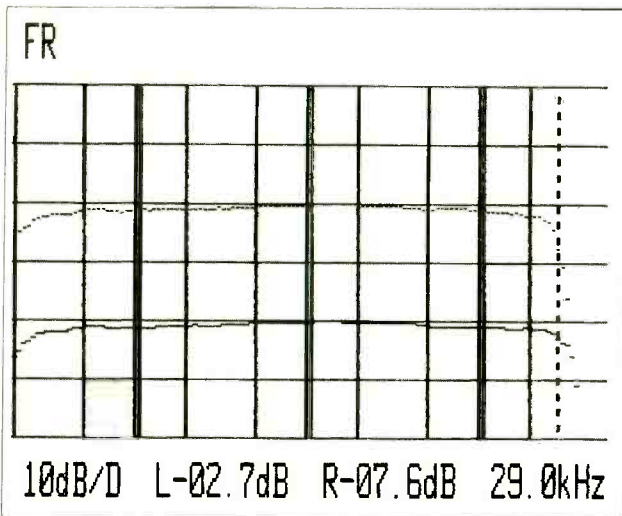


(1B)

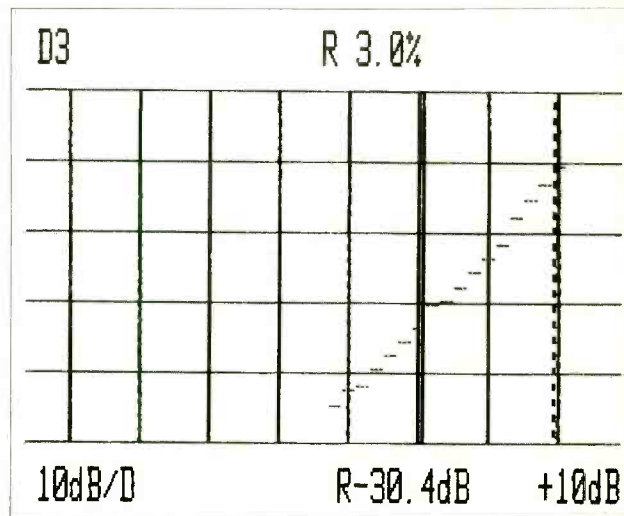
Fig. 1: Akai GX-747: Third-order harmonic distortion, at 0 dB record level, for "EE" tape measured 0.45% (A) until we optimized bias setting for this tape sample, when it dropped to 0.21% (B).

characteristics from the "reference" batch used by Akai when calibrating the deck.

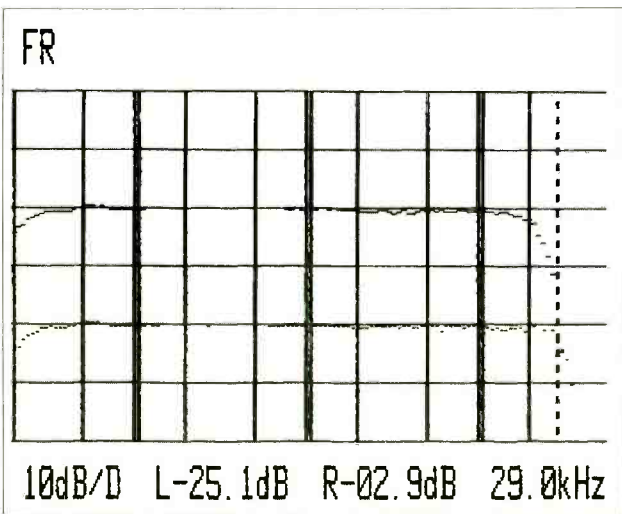
Fig. 1(A) shows the 3rd-order distortion reading obtained at the 7½ ips speed for a 0-dB record level with the bias control set to its midpoint. By advancing the bias, using the front-panel control, we were able to improve that reading by more than double (from 0.45% down to 0.21%, as shown in Fig. 1B). We knew we were on the right course here since earlier frequency response measurements had clearly indicated an "under-bias" condition. That is to say, response at the -20 dB record level had extended way out to 37 kHz and had exhibited a decided peak in the region above 15 kHz at both speeds.



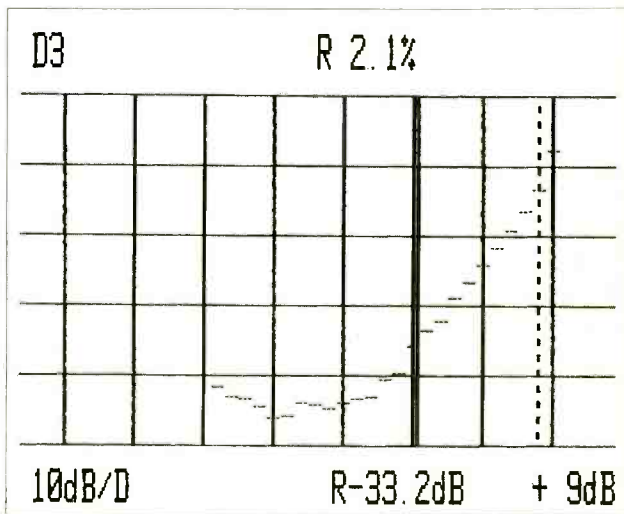
(2A)



(3A)



(2B)



(3B)

Fig. 2: Akai GX-747: In both A and B, upper trace is for 0 dB record level; lower trace, for -20 dB level. 2A shows "EE" tape; 2B, "normal" tape. While frequency response for low-level (-20 dB) recording is the same for EE tape (A) and normal tape (B), at 0 dB record level, response extends further for "EE" tape.

Advancing the bias not only reduced distortion and improved subsequent S/N readings, but also smoothed out the upper end of the response curve.

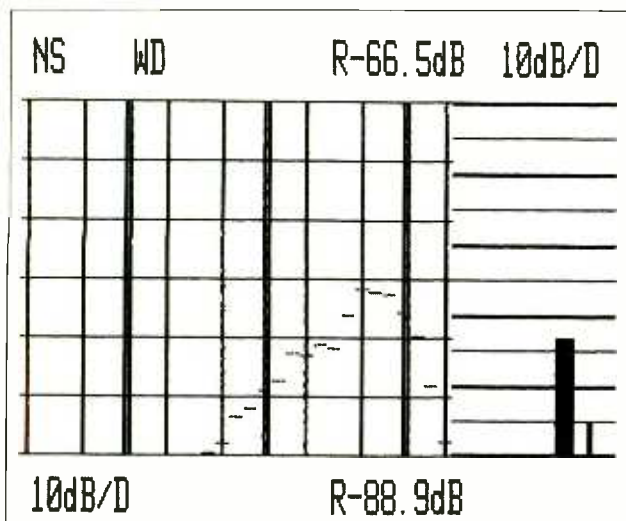
As shown in Fig. 2A, response at the -20 dB record level still extended to about 29 kHz for the -3 dB rolloff, and to well above 20 kHz, even at 0-dB record level. Response for the Maxell UD (normal) tape was about the same when that tape position was selected and the vernier bias control was returned to its nominal midpoint setting (Fig. 2B) indicating that in this instance the reference tape and our own test sample must have been

Fig. 3: Akai GX-747: Once bias was properly adjusted, EE tape exhibited somewhat better headroom (A) than that available with normal tape sample (B). (See text).

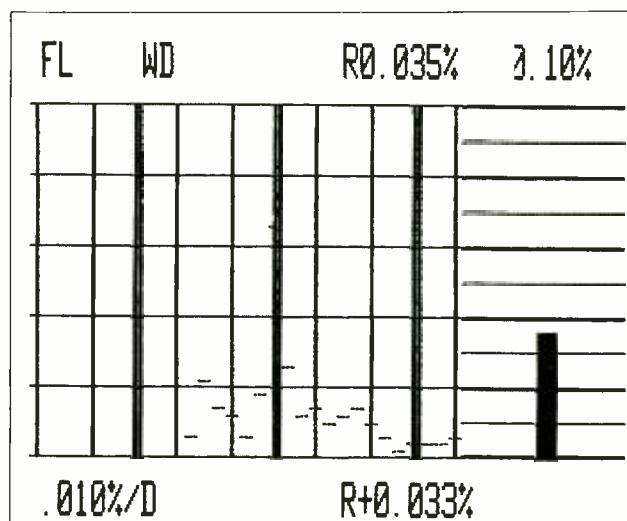
very close in characteristics. All of which demonstrates that a front-panel vernier bias control is a very good thing to have, and to use—no matter how "consistent" you think your tapes may be!

Correctly adjusted, then, the EE tape sample did have somewhat higher headroom than did the UD or normal tape, as shown in the distortion-versus-record level plots of Figs. 3A and 3B.

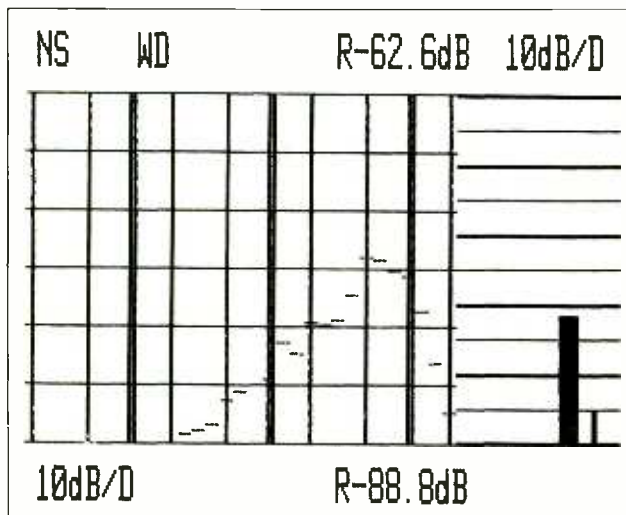
With bias adjusted for the frequency response and headroom characteristics just explained, the most outstanding benefit of the new EE tape, and the Akai deck's capability for using that tape, turns out to be in terms of signal-to-noise ratio or dynamic range. Referred to maximum record level (the 3 percent third-order



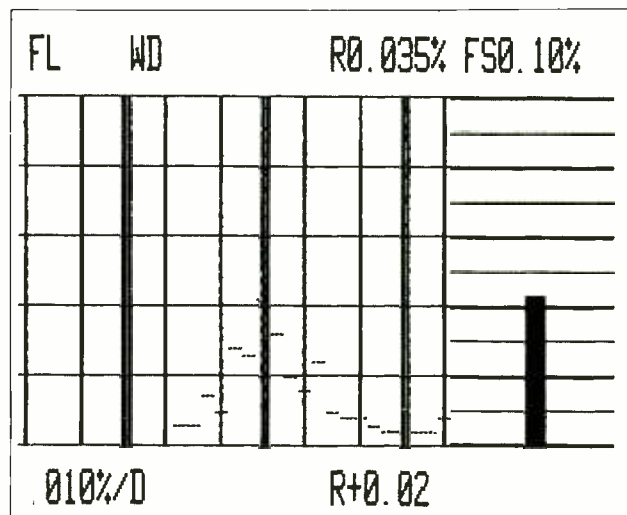
(4A)



(5A)



(4B)



(5B)

Fig. 4: Akai GX-747: Signal-to-noise ratio using EE tape (A) was almost 4 dB better than S/N measured using normal tape. Tests were at 7½ ips speed.

distortion points previously determined), we measured a signal-to-noise ratio of 66.5 dB for the EE sample, which is nearly a 4 dB improvement over the measured 62.6 dB observed for the UD tape sample (see Figs. 4A and 4B).

Wow-and-flutter, at only 0.035 percent WRMS at both speeds was marginally better than spec'd for the 3¾ ips speed, and marginally poorer than the 0.03 percent claimed for the higher speed. It would be quibbling to dwell on this measurement. Interestingly, however, the largest individual component of flutter seemed to occur precisely at 10 kHz at both operating speeds, indicating that it may have arisen from some rotating element in the system that fluctuated at the same rate regardless of tape speed as shown in Fig. 5.

Fig. 5: Akai GX-747: Wow and flutter measured the same at 7½ ips (A) as it did at 3¾ ips (B).

General Info: Dimensions are 19.4 inches high; 17.3 inches wide; 10.1 inches deep. Weight is 51.2 pounds. Price: \$1,250.

Individual Comment by L.F.: In examining the features and performance of Akai's newest open-reel stereo tape deck, I got the feeling that—after several years of dormancy—designers of open reel decks were finally "catching up" with their cassette deck counterparts. Just about all of the unusual features found on the GX-747 have, at one time or another, been encountered by me in the lab while testing state-of-the-art cassette decks. Of course, the most important addition found in the GX-747 is its ability to handle the new EE tape, a high-bias formulation that has been used in cassettes for

several years and which, only recently, has come to open-reel through the combined efforts of a few tape deck manufacturers and leading premium tape manufacturers. And while it took some "unprescribed" adjustment of the front-panel bias control, (see "Test Results"), the end results did confirm that the new EE tape, on this deck, did extend high-end response and did improve S/N and dynamic range.

As for features, the bidirectional R/P capability, the real-time counter, the memory system and programmable options will surely appeal to many serious open-reel enthusiasts. Semi-pro and pro users might have welcomed some form of sel-sync capability even on this two-channel deck, but with six heads to worry about already, having to switch a pair of "record" windings into "playback" circuits may be been too much even for the versatile Akai people.

Individual Comment by N.E.: It is perhaps unwise to generalize, especially since the possibility exists of some discrepancies between whatever tape Akai used for setting up this deck, and the actual samples we tested with. Anyway, the results of our tests show that at 7½ ips, the EE tape extends the high-end response, improves S/N and recording headroom and adds a very

small increase in distortion—at that, not enough to worry about. At the slower speed, the EE tape also extends the high-end response, perhaps even more dramatically than it did at 7½ ips (out to 27 kHz for a -20 dB record level). At the same time, however, headroom is slightly lower, and distortion is higher for the EE tape vis-a-vis the normal-bias tape. Again, however, many a user may feel that 0.54 percent is not too high a "price" to pay for a response that goes as high as this one does. What really concerns me here is the fact that the owner's manual does not contain some word of advice about the possibility of using the bias control in order to reduce distortion and improve S/N, at least for certain tapes.

Beyond this tentative criticism, there is much to admire in the Akai GX-747. Its bidirectional feature could prove a boon for recording or playing long, long works without the need to flip reels, especially when loaded with a full-size NAB reel. The transport works smoothly, and tapes were handled firmly but gently. The back-and-forth memory timing, the fast-buttoning, the cue-and-review feature, and the on-the-panel simple mixing option and so on are sensible embellishments that could enhance one's operation of an open-reel deck which is, on final count, more than competent in its price class.

AKAI GX-747 OPEN REEL TAPE RECORDER: Vital Statistics

PERFORMANCE CHARACTERISTIC	MANUFACTURER'S SPEC	LAB MEASUREMENT
Frequency response, 7½ ips	for 0 VU, ± 3 dB, 25 Hz to 26 kHz	± 3 dB, 25 Hz to 26 kHz with EE tape (at -20 VU, high end to 29 kHz) ± 3 dB, 22 Hz to 21 kHz with std tape (at -20 VU, high end to 29 kHz)
3¾ ips	for 0 VU, ± 3 dB, 25 to 15 kHz	± 3 dB, 25 Hz to 18 kHz with EE tape (at -20 VU, ± 3 dB, 30 Hz to 27 kHz) ± 3 dB, 25 Hz to 11 kHz with std tape (at -20 VU, high end to 17.5 kHz)
THD at 0 VU, 7½ ips	0.04%	0.21%, EE tape 0.16% std tape
3¾ ips	NA	0.54%, EE tape 0.31% std tape
Record level for 3% 3rd-order HD 7½ ips	NA	+ 10 dB, EE tape + 9.5 dB, std tape
3¾ ips		+ 6 dB, EE tape + 7.5 dB, std tape
S/N ratio, 7½ ips	65 dB	66.5 dB, EE tape 62.6 dB, std tape
Line input sensitivity	70 mV	77 mV
Line output level	775 mV	882 mV
Mic input sensitivity	0.25 mV	0.26 mV
Headphone output level	100 mV	108 mV
Wow-and-flutter (WRMS), 7½ ips	0.03%	0.035%
3¾ ips	0.04%	0.035%
Fast-wind time, 3600-ft reel	NA	132 seconds
Speed accuracy, 7½ ips; 3¾ ips	± 0.8; ± 1.0%	adjustable

CIRCLE 19 ON READER SERVICE CARD



GROOVE VIEWS

Reviewed By:

ELLEN ZOE GOLDEN
ROBERT HENSCHEN
NAT HENTOFF
JOE KLEE

POPULAR

MIKE BATT: *Six Days In Berlin*. [Mike Batt, producer; Tom Mueller and Mike Stavrou, engineers; recorded at Hansa Studio Two, Berlin, and Air Studios, Montserrat.] Epic FE 37665.

Performance: **Eclectic makes a comeback**
Recording: **Amazingly versatile**

This is one record where they really let a Batt out of the belfry. Who is Mike Batt, many may still be wont to ask? Well, he's a lesser known British jack-of-all-trades, a composer, arranger, conductor, producer, singer, keyboardist who just last year reached American ears for the first time. That occasion was *Tarot Suite*, a semi-conceptual album with an all-star cast somewhat in the style of the Alan Parsons Project: Rory Gallagher, Colin Blunstone (remember The Zombies?), Roger Chapman, and B.J. Cole.

Tarot Suite was interesting enough with its thematic development and simultaneous pop accessibility. But *Six Days In Berlin* is something else indeed. Batt has come up with a kind of musical superglue that welds an amazing diversity of sounds and styles into a fascinating experience.

Start with your basic rock group, add futuristic keyboard work and vocal effects, mix thoroughly with the Berlin Opera Orchestra, throw in some steel guitar, and you've got an eclectic brew too hot for most to handle, though

others have attempted similar concoctions. There is a consistency unifying the six parts of "days" of Batt's composition, but there is tremendous upheaval within. Not only do the sweeping orchestrations clash against uncompromising guitars and drums, but Batt is not shy about using such unexpected tones as sheep bleating, wood sawing, and ping ponging. And while the seemingly reckless juxtaposition of styles definitely attains a surreal quality, especially in parts "One" and "Two," it is the fusion of these diverse elements into a unified whole which, in the end, proves most powerful.

Technically, good things wait around virtually every turn in this madcap multi-musical adventure. Kudos should be handed out not only to the very hip Berlin Opera Orchestra for their gaming spirit, but also to a potent, rock-jazz-



MIKE BATT: An eclectic brew.

country unit that includes: Kurt Cress (drums); Frank MacDonald (bass); Mats Bjoerklund and Ray Russell (guitars); B.J. Cole (pedal steel guitar); and Mel Collins (sax). Hats off as well to Tom Mueller from Hansa Studios who engineered the guts of *Six Days In Berlin*, and to Mike Stavrou from George Martin's Air Studios where the infrequent but important vocal overdubs took place.

Mike Batt appears in striped pants and checkerboard jacket on the album's cover photo, with a cartoon caption reading, "Bombsville, Dad. Not commercial enough." He finishes up on the back cover by captioning, "Now, maybe people will understand me!"

Neither statement is quite true. There are listeners and consumers who will lap up this better experimental stuff every chance they get, even if they can't totally explain it in the course of an entire record review. R.H.

CHUCK E. WEISS: *The Other Side Of Town*. [Rob Fraboni, Mark Aglietti, Bob Pennetta, Tim Kramer, Mac Rebenack, production coordination; recorded at Shangri-La Recording Studios, Malibu, Ca.] Select SEL 21611

Performance: **Soulful**
Recording: **Soulful**

Chuck E. Weiss, protagonist of Rickie Lee Jones' "Chuck E.'s in Love," not only exists, but he walks through his desperate and colorful world with a crooked smile and an ear for music. On his debut LP, aptly titled *The Other Side Of Town*, Weiss pulls up so many

different musical roots that the only sure thing about him is his backhanded humor (read: insight) and his tight, yet very, very fluid band. Fortunately, those are two highly salable ingredients.

The album's opener, "Luigi's Starlite Lounge," sets the musical canvas for this collection as Weiss babbles over a blues piano drift about the neighborhood bum of his youth and that poor man's very real dreams. Both the humanity and the soothing keyboards successfully introduce the boogie romp of his version of Louis Jordan's "Saturday Night Fish Fry," and then the comforting duet in "Sidekick," where (surprise, surprise) Rickie Lee makes an appearance. (I especially like the way she first floats on the periphery of Weiss' vocal then performs a powerful seduction of her own.)

Weiss isn't always sincere, especially when he takes liberties on songs like "Sparky"—which reminds me of the Doors' "Roadhouse Blues"—and "Juvenile Delinquent"—a strange marriage of "The South's Gonna Do It Again" and "Move It On Over," but most of the time he's right on target. "The Other Side Of Town" is a wonderfully emotive tale that projects a scene of fog and an eerie horn crying out in misery, as it would on the wrong side of the tracks. Weiss' voice is at its best here, showing both feeling and energy, and summing up with a vocal paintbrush the entire Chuck E. Weiss scenario. E.Z.G.

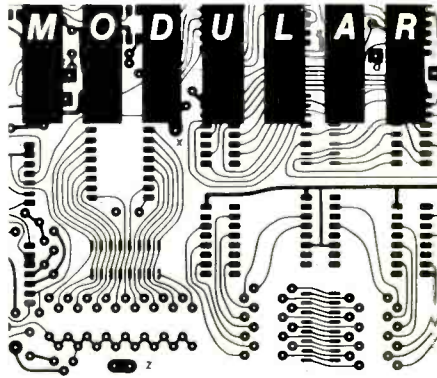
JIMMY DESTRI: *Heart On A Wall*. [Michael Kamen, producer; Robert Clifford, Jimmy Destri, John Davenport, and Jon Smith, engineers; recorded at The Hit Factory, New York, N.Y.] Chrysalis CHR 1368.

Performance: **Darker roots**
Recording: **Rough but artsy edges**

There's never been much doubt why they called the group Blondie. With all due respect to the uniformly dark-haired boys in the band, Debbie Harry has almost completely stolen the show up to this point.

Up to this point. Blondie keyboardist Jimmy Destri, heretofore overshadowed by Chris Stein and Debbie Harry in songwriting stature, emerges with a solo album that grows more impressive with each listening. The music is laced with the kind of meaty, modern hooks you

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might expect, but there is an integrity, depth and darkness to several cuts, and well-executed production to match.

Ironically, the album leads off with its weakest cut, "Bad Dreams," a minimal rock tune of limited appeal. A better overture would have been the infectious, high strung "Numbers Don't Count (On Me)" or another hot little number on side two, "The King of Steam." Along with "Don't Look Around" (compatible with the Stones' "Under My Thumb"), these are songs with considerable mass appeal, driven by Clem Burke's (from Blondie) drums and a dauntless guitar section enlisting the talents of Carlos Alomar, Earl Slick, and Tommy Morrongiello.

Even more interesting, though, are slower, dramatic, power rockers such as "Living In Your Heart" and "Under The Ice." There's almost a touch of Steve Forbert in Destri's unstudied vocals, and his emotionalism clouds the sound on "Under The Ice." Then again, you won't mind missing an occasional enunciation when you get swept up into Destri's New Rock conviction.

That Destri is serious about producing memorable art is born out by the three most experimental tracks on the record. The title piece is slow rock that is roughly reminiscent of John Lennon. "My Little World" is offbeat and a bit foreboding, effectively using an overdubbed child's voice to offset the brooding vocal and synthesizer textures. And for something completely different, side two's opening "Little Metal Drummer" is like some deranged overture to an Italian western—no lead vocals, but there's a puckered up synthesizer whistling the melody line.

Michael Kamen's production, while smudged by some of Destri's admittedly unpolished vocals, is for the most part equal to what must have been an exciting task. There is some strong rock for the '80s on this one, and an intriguingly complex new solo artist ready to step out front for a while. R.H.

JAZZ

LOUIS ARMSTRONG AND SIDNEY BECHET: *Louis Armstrong and Sidney Bechet in New York, 1923-1925.* [Bill Bennett, Martin Williamson and J.R. Taylor, producers; master tapes pre-

pared by Jack Towers; original recordings made in New York, N.Y. between 1923 and 1925.] Smithsonian P2 15790.

SIDNEY BECHET AND WILLIE "BUNK" JOHNSON: *Bechet, Bunk and Boston, 1945.* [Jerry Valburn and Marvin Goldsmith, producers; reissue transfers by Jerry Valburn and Jack Towers; recorded at the Savoy Cafe, Boston, Mass., April 3 and 5, 1945.] Jazz Archives JA-48.

SIDNEY BECHET AND BOB WILBER: *New Orleans Style, Old and New.* [Milt Gabler, producer; reissue engineer not listed; original recordings made in New York, N.Y., Feb. 22, 1947 (Wilber) and April 27, 1950 (Bechet).] Commodore XFL 15774.

BOB WILBER: *Bob Wilber and the Bechet Legacy.* [Debbie Berman, producer; Fred Miller and Harry Munz, engineers; recorded at Bechet's, New York, N.Y., Jan. 22, 1981]. Bodeswell BW 103.

Performances: **The absolute master: early, late, in his prime—and those he taught**
Recordings: **Primitive in the '20's and mid-'40's; better in the '50's and '80's**

Somehow between the covers of these four albums there lies the soul and essence of one of jazz's prime movers, Sidney Bechet. He so dominated his instrument, the soprano saxophone, that he remained its unchallenged master until he expatriated himself to Paris leaving the U.S. scene open for other players to take over.

The earliest recordings here show Bechet in Clarence Williams' Blue Five as early 1923 playing "Wild Cat Blues" and "Kansas City Man Blues." They continue throughout much of the recorded career of Clarence Williams' Blue Five including the halcyon period beginning with Oct. 17, 1924 when Bechet's partner in Williams' recording band was the trumpeter from Fletcher Henderson's Orchestra, Louis Armstrong. Although a number of tracks on the Smithsonian album are devoted to Armstrong in the Henderson band or in small recording groups without Bechet, Sidney Bechet appears on almost half of the recordings in this set and his presence is felt on those on which he

does not play by his influence on his substitutes, Buster Bailey and Don Redman.

The classics are certainly here including Clarence Williams' Blue Five recording of "Mandy Make Up Your Mind" featuring Bechet on Sarousaphone, Armstrong with Henderson's band on "Money Blues" and Armstrong and a group of Henderson alumni backing Perry Bradford in his recording of "I Ain't Gonna Play No Second Fiddle." Examples of Bechet's artistry on soprano saxophone also abound. I'm particularly fond of his work on "Wild Cat Blues" and "Old Fashioned Love."

To be sure much happened in the two decades between 1925 (when the Smithsonian album ends) and 1945 (when the Jazz Archives album begins), including stints with the orchestras of Noble Sissle, James P. Johnson, Duke Ellington, some of which took place at his own club in New York, Club Basha. There were long periods in Europe and then, in 1932, a new band called the New Orleans Feetwarmers featuring Sidney Bechet and legendary New Orleans trumpet Tommy Ladnier. From that point on, Bechet was usually leading a band somewhere or other. The band he led in Boston during the early part of April of 1945 was called Bechet's New Orleans Rhythm Kings and rightly so because of the presence of two giants of Crescent City Jazz: cornetist Willie "Bunk" Johnson and bassist George "Pops" Foster. Both Bunk and Bechet had ego problems and both were possessed of a mercurial personality so it didn't surprise anyone that the band was short lived. They did live long enough to work a few weeks at the Savoy Cafe in Boston where they broadcast regularly over WCOP. Somebody was clever enough to take down two of those broadcasts (selections from April 3rd and April 5th appear on this recording) and also a rehearsal which was either broadcast from the club or recorded by the station for later broadcast. Bechet must have been somewhat unaware that the broadcast or recording was being made because he did not insist on hogging the mic as he did on the airchecks and Bunk comes through with a clarity and drive that belies Nat Hentoff's lamentation in the liner notes that Bunk lacked the punch of a Ladnier. Also the tunes on the rehearsal side are much in keeping with the band's name, including such New Orleans standards as "Willie The Weeper," "High Society"

and "Blue Bells Goodbye," whereas the broadcasts tended to feature well known contemporary swing-era fare such as "Ain't Misbehavin'," "Never No Lament" and "I Found A New Baby." Except for four sides recorded for Blue Note, there is nothing else available of the Bunk and Bechet era so this LP is surely a worthy addition to the repertoire of both artists.

In 1949, Sidney Bechet began making long sojourns to Europe, a scene of his former triumphs with bands such as Noble Sissle's and William Marion Cook. One of his trips back to New York was in 1950. At that time, Milt Gabler got the opportunity to record Bechet for Commodore with a band that was closer to New York Nicksieland Jazz (the type that played at Nick's and Ryan's) than it was to traditional New Orleans, yet Bechet fell right in with the likes of Wild Bill Davison, Wilbur De Paris, Ralph Sutton, Jack Lessberg and George Wetling (a most Condon-style band, except for the absence of Eddie Condon). The band cut five sides for Commodore which have been reissued on CBS/Commodore and include a sizzling version of "The National Emblem March" which is totally unbelievable. The other half of the Commodore LP is filled with the music of one of Bechet's students, Bob Wilber, and his Wildcats from Scarsdale (which wasn't really accurate because pianist Dick Wellstood came from Connecticut). This was *not* a Nicksieland band. This was a New Orleans revival band that listened to the old records and tried to sound—as closely as possible—like them. It was a most wonderful band and it recorded tunes like "Willie The Weeper," "Mabel's Dream" and "Wild Cat Blues" and the New Orleans improvised ensemble feeling was there. It's interesting to note that on this session (2/22/47) Wilber played only clarinet, no soprano as yet.

That was soon to change because 1947 was also the year that Bob Wilber was studying at Professor Bechet's School of Music in Brooklyn. Today Bob Wilber is a well known jazz musician whose eclectic tastes sometimes take him into music far afield from his roots but he still has a band devoted to perpetuating the memory of Sidney Bechet, a band called the Bechet Legacy. Their first recording was made "live" at a new club opened in New York by Bernard Brightman and some of his friends who are jazz devotees. That they are devotees is shown by the fact that

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MASTER LEADERS OF THE JAZZ ENSEMBLE: ART BLAKEY AND GIL EVANS

By Nat Hentoff

For more than 25 years, Art Blakey has been on the road with his Jazz Messengers. Among the scores of illustrious alumni are Woody Shaw, Billy Harper, and Cedar Walton. His current group—yet another new wave of hot, swift swingers—is one of the most exhilarating he's had in a long time. As is made bristlingly vivid in the Paris-recorded *Album of the Year* (Timeless, distributed in the States by Rounder).

The most extraordinary presence in the front line is 20-year-old, New Orleans-born Wynton Marsalis, a trumpet player who sounds like Clifford Brown come back—and then some. Also melodically intriguing and rhythmically invigorating are alto saxophonist Robert Watson (from Kansas City) and tenor saxist Bill Pierce (schooled in Boston).

With Blakey alternately creating brush fires and hurling thunderbolts from the drums, there is no dearth of rhythmic propulsion; but complementing Blakey with incisive skill are pianist James Williams and bassist Charles Fambrough.

The ensemble work can be both fiercely exultant and gracefully limber—as if the horns as well as the notes were dancing. And in solo, each of these young improvisers (and Blakey is perennially young in spirit) has remarkable *presence*, individual presence. The recorded sound is as exhilaratingly vibrant as the musicians. This is triumph all around and ultimately, it's a tribute to the continually jazz-obsessed Art Blakey.

Another perennially influential shaper of ensembles through the jazz decades is Gil Evans—although Gil works primarily as a writer and orchestrator for his groups. Or, as Maggie Hawthorn says in the notes for

Blues In Orbit (Inner City, originally released in Germany on Enja): "He composes on the orchestra, using it to reach for his special patterns, the fabric of sound that defines the Evans vision."

That fabric, continually changing, is one of the most distinctive in all jazz history—from his scores for the Claude Thornhill band to the "Birth of the Cool" sessions with Miles Davis and Gerry Mulligan and his full-scale later collaborations with Miles. And the Evans Mosaic was no less arresting and full of surprises in these 1969-71 sessions with such singular colorists as Billy Harper, Jimmy Knepper, Elvin Jones, Julius Watkins (French horn), and Howard Johnson (tuba).

What makes an Evans ensemble so hypnotic are, among other things, the ceaselessly fascinating play of dynamics, and the sense of being surrounded by a true *collective* voice that is as powerful and as constantly shifting in hues and rhythms as the sea. Also revealing here is how inventively and organically Evans fuses the electronic synthesizer with his orchestra.

The recorded sound is good, but I would have wished for somewhat more spaciousness, in view of all that's going on. In any case, this is going to be a collector's item, like nearly all Evans' sets, which go out of print too fast.

ART BLAKEY AND THE JAZZ MESSENGERS: *Album of the Year*. [Wim Wigt, producer; Philippe Omnes, engineer.] Timeless SJP 155.

GIL EVANS: *Blues In Orbit*. [Sam Gordon, producer; no engineer credit.] Inner City IC 3041.

they named the club after one of their favorite players and even though Sidney himself has passed on and can be heard only on recordings, it's nice that there is a club on Third Avenue called Bechet's. The LP is out on Wilber's own Bodeswell label. There are tunes associated with Bechet, such as Chris Smith's "Down In Honky Tonk Town" which Bechet and Armstrong recorded for Decca in 1943. There are tunes that Sidney Bechet composed such as his most famous hit, "Petit Fleur." There are attempts to recreate the Clarence Williams sides with a veritable transcription of Williams' recording of "I'm A Little Blackbird" and material from the repertoire of the Bechet/Spanier Big Four, such as "China Boy."

So here is Sidney Bechet, pioneer, preacher, practicing musician, pedagogue in all his glory. If you can still find the twofer on Bluebird and the two twelve-inch reissue LPs on Blue Note you just about have the whole picture of one of the great voices of jazz. Although he has left us, we can be grateful that he has also seen fit to leave us much music to learn from and enjoy.

The Commodore and Jazz Archives items are probably available in any store that handles jazz records. The Smithsonian album must be mail ordered from Smithsonian Recordings, P.O. Box 10230, Des Moines, Iowa 50336. Credit card holders may purchase the Smithsonian album by phone order (800) 228-5454, except in Nebraska where the number to call is (800) 642-8777. The Bodeswell recording, if it's not in your local jazz record store, can be mail ordered from Bodeswell Records, Box 624, Brewster, Mass. 02631. J.K.

SARAH VAUGHAN AND THE COUNT BASIE ORCHESTRA: *Send in the Clowns.* [Norman Granz, producer; Dennis Sands and Greg Orloff, engineers; recorded at Group IV Studios, Hollywood, Ca., Feb. 16, Feb. 18 and March 16, 1981.] Pablo Today 2312-130.

Performance: **Slick and sassy singing but Basie's unaccounted for**
Recording: **Slick professional Hollywood job**

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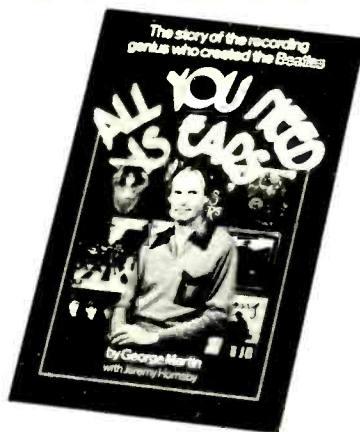
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the head. The famous vibrato, which she got from listening to Billy Eckstine all those years in Earl Hines' band and late with Mr. B's own unit, sometimes gets a little out of control but that even happened to Eckstine now and then. There are only two faults I can find with Sarah Vaughan's singing. One is that her phrasing has become somewhat labored. She no longer produces that seamless stream of sound that she used to. The other is that her improvisational singing (scat or with words), which was one of the most attractive features of the early Sarah Vaughan records on Musicraft and Continental, has become rather a matter of routine. She once flew like Charlie Parker but it seems that when Charlie Parker died that era of Sarah Vaughan died with him. Today she is a very smooth, slick, professional singer playing it rather close to the belt (especially when compared with singers like Ella Fitzgerald, not to mention the completely avant garde outness of Betty Carter). These sides are hip, but not too hip for the room. I long for the kind of fancy flights with which she endowed the final measures of her Continental recording of "Mean To Me" when Parker was there to influence her.

Another thing I miss about the old Sarah Vaughan records is the solo space she always gave to the best players: Dizzy, Bird, Charlie Ventura, all of them. This whole LP goes by with brief solo statements from Kenny Hing on tenor sax (just passable) and Booty Wood on trombone (incredible). Nobody blows on "If You Could See Me Now." In 1946 there was a solo by Freddy Webster on trumpet, if I remember correctly. So here's the whole Basie band—without Basie, that is, and without the bassist and drummer—but with Sarah's own trio, sitting there playing these arrangements which any bunch of studio guys could have cut and even the great Booty Wood only gets one solo. And as I've pointed out before, when Ella's accompanist or Tony Bennett's accompanist takes over for Basie when their respective bosses record with the band, the Count Basie band just ain't the Count Basie band without Basie. Whether it's an old time Basie sub like Nat Pierce or Sarah's pianist, George Gaffney you can always tell that there's something strange.

Yet the band still swings like crazy, largely because of the presence of Freddy Green on guitar who is quite experienced at holding the mice in tow while the cat is away.

J.K.

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