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MODERN RECORDING

SERVING TODAY'S MUSIC/RECORDING-CONSCIOUS SOCIETY

VOL. 3 NO. 10
JULY 1978

Eric Clapton "Live!"

**The Making
of a Record
-- Part II**

**Deeper Inside
A Soundman's
Tool Kit**

LAB REPORTS:

Technics RS-686DS Recorder
Neptune 2710 Graphic EQ
Optonica RT-6501 Recorder

NEW PRODUCTS

RECORD REVIEWS



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You've seen what's new . . . what's louder, slicker, bigger, shinier . . . but have you seen what's better? The MXR Phase 90 makes a small claim on new with its new lower price and new graphics, but even better is that we've added a touch of regeneration for more intensity without sacrificing that classic Phase 90 sound. What this amounts to is that the phaser that set the industry standard is now even more versatile in its performance while maintaining the MXR standard of quality and reliability.

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From input to output, live performance to recording session, Studiomaster offers the ultimate in performance. In doing so we surprised ourselves. We have actually put more logic, convenience and quality into our incredible new 16/4 mixing console than competitors who range thousands of dollars above our price.

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THE FEATURES

A DEEPER LOOK INSIDE A SOUNDMAN'S TOOL KIT

By John Lord

50

In our February 1978 issue, technical editors Jim Ford and Brian Roth gave us—"Inside A Soundman's Tool Kit." The article helped you to tailor your tool kit to fit your needs. It also helped to spur one of our knowledgeable readers to sit down and write an addition, and so . . .

THE MAKING OF A RECORD —Part II

By David Moyssiadis

54

Last month we supplied information on what to do *before* you booked time and went into a studio to record. Continuing (it's too late to turn back now!) we now enter the realm of the recording studio. Part II—of a three-part series— attempts to answer the question: "Now that I'm here, what the hell do I do!?!"

ERIC CLAPTON "LIVE!"

By Peter Weiss

62

Forget the smoke bombs, platform shoes, Halloween costumes and ear-shattering volume levels, and you will probably arrive at a professional concert. *MR* was there to view "Slowhand" play and Tasco reproduce the sound in a no-nonsense manner that should teach us all a bit about music and concert sound reinforcement.

RECORDING KRIS KRISTOFFERSON AND RITA COOLIDGE

By Nina Stern

70

An interview with producer David Anderle and engineer Kent Nebergall gives us solid background on how Kristofferson and Coolidge's talents are properly put onto tape.

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By Len Feldman

Don't let the numbers scare you off. This month's column has some basic information that will help you sift through the rather confusing material on digital recording.

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and Len Feldman

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Cover photo by Ellen M. Gasster

Clapton article photos: Ellen M. Gasster and James Bottomley

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COMING NEXT ISSUE!

The Making of a Record—Part III

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LETTERS TO THE EDITOR

Guarding Against Grounding Problems

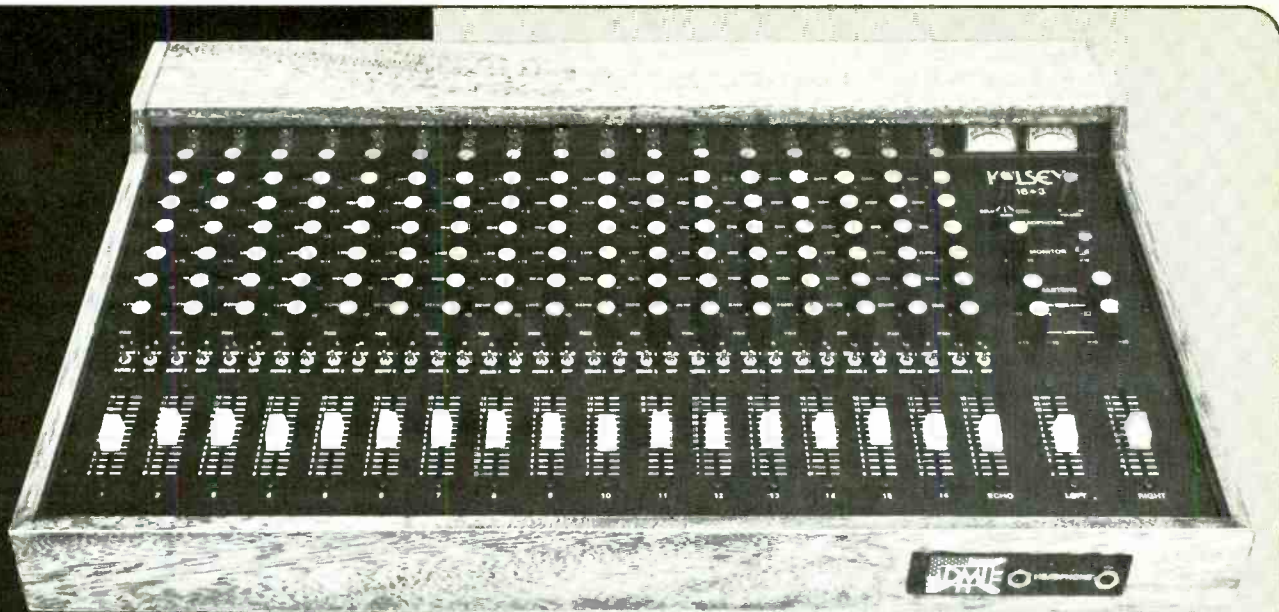
Let me begin by congratulating you on a fine magazine. I read the first few issues, but soon after your magazine became very scarce around here. I recently picked up the April 1978 issue. I just finished reading "Building a Direct Box" by Peter Weiss. This article was very good and explored techniques that may be invaluable to any engineer but I believe a very important detail was overlooked.

Most professional direct boxes also include a ground isolation switch (referring to S_1 in the article) to help eliminate hum and noise created by ground differences between the instrument and the console. When you are using a direct box in a studio, problems with noise rarely occur since the power distribution has already been investigated and carefully planned before any wiring was installed. But direct boxes are not limited to use in the studio alone. Direct boxes can also help reduce the number of mics needed with sound reinforcement setups. The differences in conditions that exist between a club or concert situation and a studio can be troublesome and dangerous. Of all the problems which plague P.A. systems, grounding and AC power is often one of the most obvious and difficult to correct.

Grounding is one of the most confusing problems in electronics. A ground loop is only one of the grounding problems. The best definition of a ground loop is "the inability to provide the same potential at two different ground points." This can be due to the fact that when more than one piece of equipment is used, multiple grounding points are involved. When a system is grounded at different points, a 60 cycle hum and noise in the ground loop are introduced into the signal inputs.

Actually, this problem is a common one with P.A. systems which should be kept in mind whether or not a direct box is used. All preamps, power amps, mixers and monitor system components should be connected at the same point. This does not mean a set of wall outlets on one breaker; this means a single AC distribution point or outlet. Following this rule is the only way you can almost guarantee that hum and light dimmer noise will be at a minimum. All stage equipment, if possible, should also be connected to this point. The only precaution is to make sure the circuit will handle the required power load. If it is necessary to operate the stage equipment from a separate source, make absolutely sure that none of the guitar amps or any other instrument is connected to the P.A. ground. If direct boxes are used, remove the shield connection (*via* the ground lift switch, S_1) at the instrument end of the balanced direct box cable.

AC ground wire contains all types of noise as well as 60 cycle hum because its purpose is to divert them into the central ground. In addition to passing directly from point A to point B (refer to figure one), some noise and hum also split and go into the guitar amplifier. The guitar-amp signal output is connected to the console input with a shielded wire. The undesired current conducted by the shielding is magnetically introduced into the signal being passed into the console and then to point B. Al-



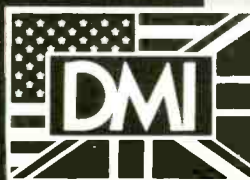
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SPECIFICATIONS:

INPUT

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

OUTPUT

IMPEDANCE: Nominal 600 Ohm unbalanced. **MAX. OUTPUT LEVEL:** 3.8V RMS @ 10K Ohm (+21dBV). **GAIN:** Mike in to line out +60dB. **EQ:** Hi ±15dB @ 3.5 kHz; Low ±15dB @ 35 Hz. **V.U. METERS:** "0 VU" = +4dBm at output of buss amp., switchable from stereo mix to monitor mix. **FREQUENCY RESPONSE:** Mike in to line out ±1dB, 30 Hz - 20kHz. **SIGNAL TO NOISE:** Mike in to any output — typically 70dB. **T.H.D.:** Any output 1kHz any level up to clipping typically less than 0.1 percent. **POWER REQUIREMENTS:** ±15V DC @ ½ Amp.

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

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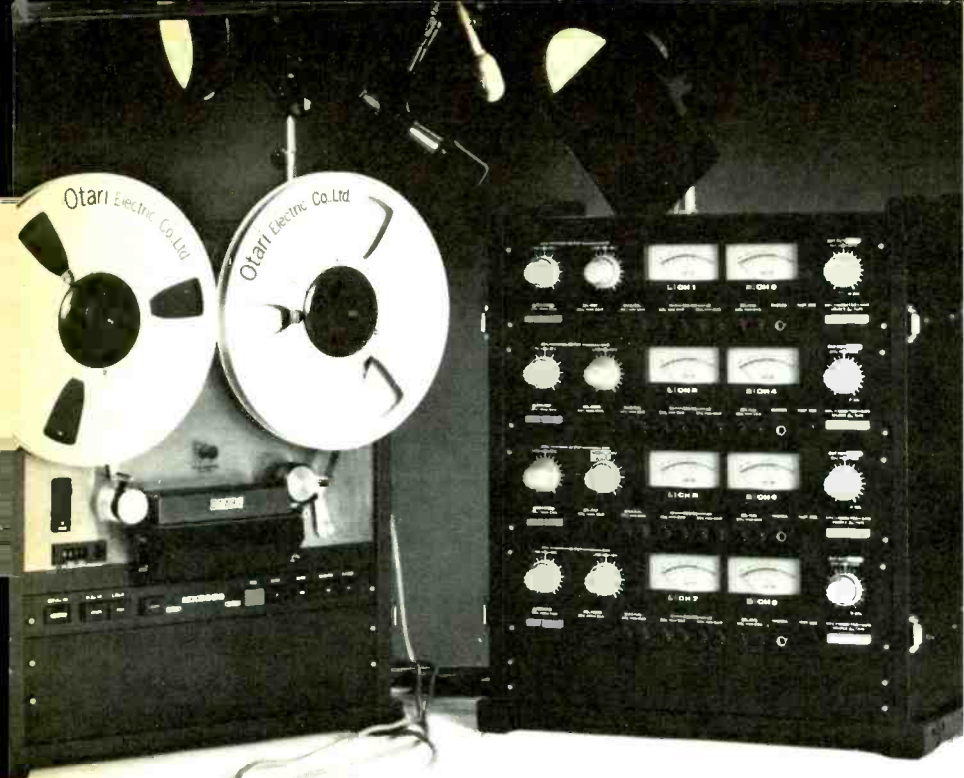
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More features, better performance and reliability than any other half-inch eight track.

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Compare these features:

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See your Otari professional dealer for the full story.

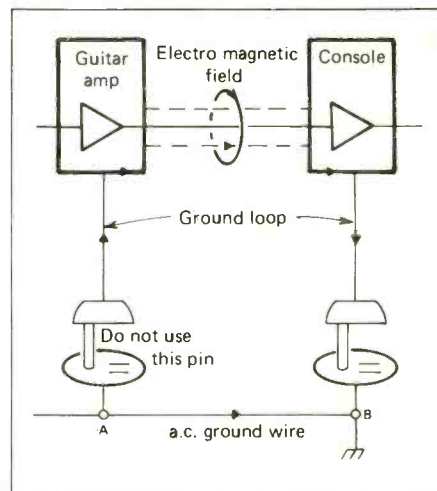
(Incidentally if your requirements demand a one-inch eight track, check out the best-buy MX-7800 with optional synchronous reproduce remote control.)

OTARI

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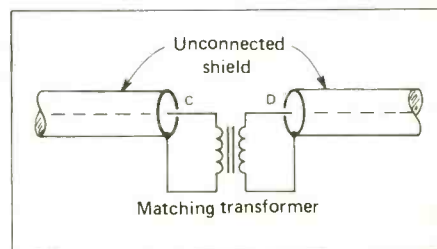
4-29-18 Minami Ogikubo
Suginami-ku, Tokyo 167, Japan
(03) 333-9631 Telex: J26604

though this current is very small, the relative conductivity could be such that the system would oscillate or produce undesired hum.



To correct this problem, remove the ground-lift switch, S_1 , in the lift or disconnect mode when the P.A. and stage equipment are on separate AC sources and have a difference in ground potential. Using the switch in the "on" or connected mode is for when the P.A. and stage equipment are on the same ground potential. Use a VOM (volt-ohm-meter) adjusted to the AC volts range and check for voltage between each microphone and electric guitar (or instrument). If a voltage is measured, use a switchable ground lift adapter on the instrument amplifier power end. The correct procedure is to ground the green wire from the adapter to the AC

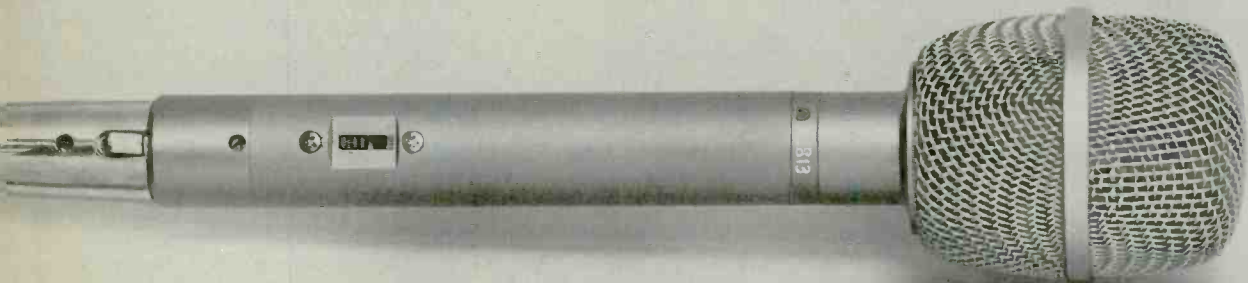
socket and change the plug position until no voltage is measured. Ground loops in the AC system can be both irritating and lethal. A guitar



socket and change the plug position until no voltage is measured.

Ground loops in the AC system can be both irritating and lethal. A guitar

Audio-Technica announces a creative new start toward better sound.



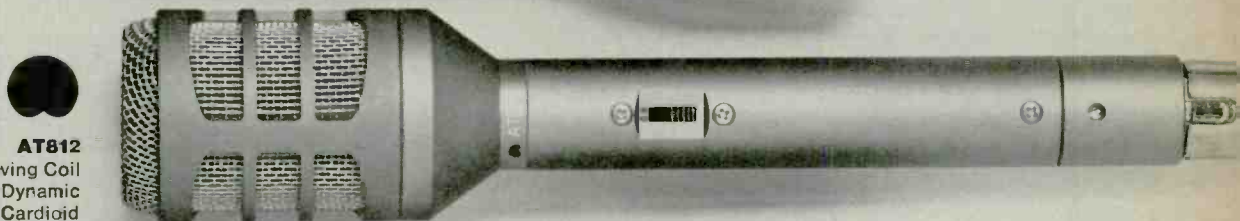
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Every "live" recording has an excitement all its own. You must capture sound that will never be heard exactly the same again. And in some cases the recording is literally a once-in-a-lifetime chance. With no opportunity to remake the tape or disc.

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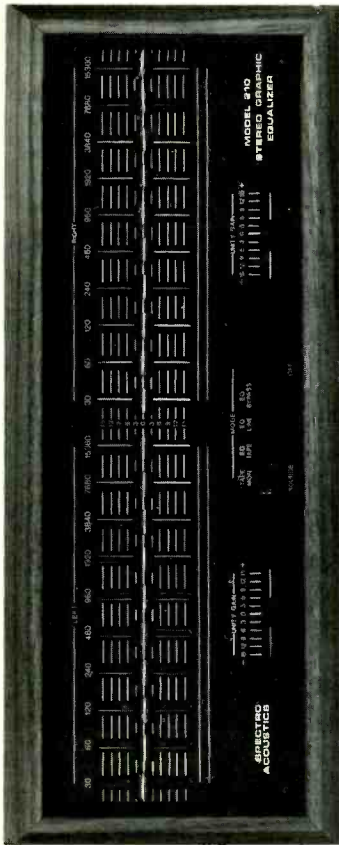
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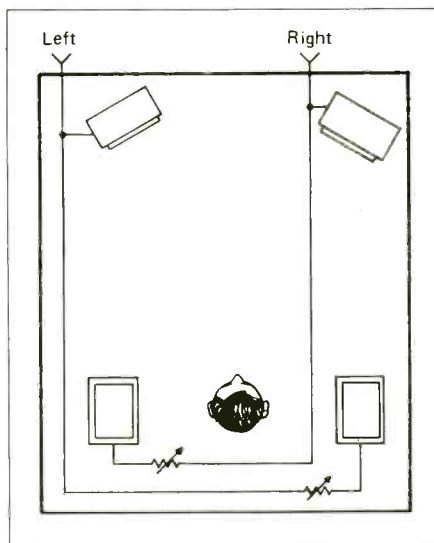
player and vocalist has a tendency to get upset when his bottom lip completes a 100-volt ground loop. When this happens on stage the audience usually attributes the weird faces and spasmodic jerking to "theatrics" or just part of the show, but we know better, don't we?

—Robert L. DeMoss
House Engineer
Dark Star Sound
Framingham, Ma.

Unusually Effective

I always read Norman Eisenberg's comments at the end of *The Product Scene* with interest, and I've noticed several items regarding multi-channel sound, including ideas for providing the effect without a decoder. Along those lines, I really think consumer equipment dealers miss a big opportunity when they fail to sell extra speakers for the back of the room, since it would very much enhance realism.

I've tried the idea mentioned in the column (*MR*, January 1978, page 33) using one extra speaker. However, it's



difficult to find a good place for the listener to sit, except in the very center of the room. Also, the Dynaco Quadaptor which was mentioned, using two extra speakers, only works well with recordings that were made with certain types of miking.

I would like to add to the discussion and recommend the "S-cubed" system, which works with just about any recording, and which allows the listener to sit near the middle of the back wall. Two extra speakers are placed in the back corners, in a rather unusual position: lying on their backs and aimed toward the ceiling. The left back speaker is hooked up in parallel with the *right*

front speaker (which remains in its usual position). The right back is paralleled with the left front. No decoder is used. The crossing of left with right prevents the listener from getting the feeling that the sound is coming from the side walls. A pair of simple resistors or L-pads put in series with each back speaker prevent the back sound from being obtrusive. The difference between the arrival times of the back and front sounds gives a strong feeling of spaciousness, quite equivalent to what a complete quadraphonic system provides, even though the back sounds arrive at the ears *first*. (You probably won't believe this till you try it!)

The back speakers do not have to be of as good quality as those in front, since their output is decreased to the point where the front ones dominate. Overall, the impression should be that of a source of music coming from the front only, but with the room seeming much bigger than it is. (Turning off the back speakers collapses this apparent size.)

As another point of interest, the S-cubed system is now standard in the Buick Electra, Oldsmobile 98, and Cadillac Eldorado. It is not patented, but Ford and Chrysler have not seen the light yet.

—Dan Shanefield
Senior Engineer
Western Electric Co.
Princeton, N.J.

[We forwarded Mr. Shanefield's letter to Norman Eisenberg, who made this reply.]

The setup described is not unknown to us; over the years, Len Feldman and I (and others of course) have experimented with a myriad of possible speaker arrangements in which one, two, or three additional speakers were used in various configurations to enhance a basic two-channel stereo presentation. The "S-cubed" pattern described here will produce the effect you describe, but its perception by individual listeners probably will vary due to purely personal and subjective factors in addition to possible phase variations in two-channel source material. (It is the latter aspect, by the way, that helps trigger the Hafler effect in which a small adapter box is used.)

In using this hookup, one should make certain that the two speaker systems loaded onto the same amplifier output terminals do not drop the impedance to a value too low for that amplifier. On

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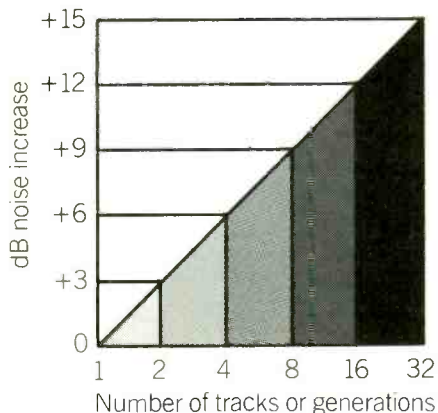
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Because every time you (or your group) want to bounce a track, you're adding at least three dB of tape noise (see chart). So the great artistic result you plan to end up with, might end up sounding like a rainstorm.

Fear not. Help is at hand. It's the new dbx 155 four-channel tape noise reduction system. You can add it for far less money than you ever imagined possible. Here, on one compact chassis, is a complete dbx noise reduction

Additive Noise Chart



system. But the best part is, it will give your tape deck an extra 10 dB of headroom, and reduce tape noise by 30 dB. That means no audible noise whatsoever will be added to your tracks. And, because dbx tape noise reduction operates by linear compression/expansion, you

won't have to get involved with tedious level calibration, either.

All you need do is press the playback buttons to hear noise-free, full dynamic range reproduction of your music.

The new dbx 155 also has user-changeable modular circuit boards, so in the unlikely event that one processor fails, the other channels remain operational. You can even keep a spare on hand.

Visit your dbx professional dealer now, for a demonstration of our new 155 tape noise reduction system. Discover how you can put an end to tape hiss, without putting an end to your bankroll.

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units that actually have provision for running two different speaker systems, the hookup can be made without concern. The L-pad in each added speaker line is still a good idea; be sure to get pads of sufficient power-handling rating with respect to your particular amplifier.

—Norman Eisenberg
Audio Editorial Board
Modern Recording Magazine

Where To Repair

I've recently acquired a Fisher space expander reverb unit that is in need of repair. Can you please assist me in my search for a schematic and spec sheet for this unit?

—Steven Brown
Lindenwood, N.J.

We have received letters such as yours in the past, concerning different pieces of equipment and different manufacturers, but all with basically the same request—help us to repair it ourselves. While we try to oblige with the manufacturer's address, phone, etc., we should advise you that we have found that most manufacturers prefer that you send your piece

back to them for authorized repair. It isn't only the best for your equipment, but it's the safest for you as well. If you want to get in touch with Fisher, you can write them at 21314 Lassen Street, Chatsworth, California 91311. We're sure that they can advise you of the quickest, safest way to get your reverb unit back in working order.

A Logical Addition

In the February 1978 issue you looked at the AB Systems Four-Ten Power Amplifier in the Lab Test section (page 73). From what I read, I became quite interested in the product. Would you please tell me the company's address so that I might get in touch with them? I think their product would be a logical addition to our store.

—Donald S. Johnson
Sound Economics
Minneapolis, Mn.

We agree with you that this product is well worth your time and interest as well as a closer look. You can get in touch with AB Systems by writing to P.O. Box 369, Fair Oaks, California 95628.

Hold On To Your Hats

Hats off to Mr. Peter Weiss for his very informative article "Building A Direct Box" (April 1978). I would like to know if you have any plans at this time to publish an article on how to build a mic splitter. I have obtained prices ranging from \$60.00 to \$100.00 for a 1-in/2-out commercially-built splitter, but I was hoping to save this money by building it myself. If you have no intention at this time to print such a piece, can you at least tell me where I could obtain schematics for this device?

In the meantime, thank you for a great article as well as a consistently informative publication.

—Barry Pelaggi
Brockton, Ma.

It just so happens that there is already an article in the works concerning the design and construction of a mic splitter. Please look for this comprehensive piece by Peter Weiss to appear in an issue coming soon. Meanwhile, you might want to refer 'way back to our November 1977 Talkback column in which Roger Branch of Reflection Sound Studios in North Carolina designed a simple mic splitter for a cost of about \$12.00.

Get the "In-Concert" sound with the S-1600 Mixer... from SHOWCO

Your music will come alive with Showco's new sound control Stereo Mixer Preamp. The S-1600 is a compact, high quality control center designed and engineered by the world famous producers of the Showco concert sound. Its features include four inputs with individual level controls, a master level control and four bands of equalization. The versatile and efficient S-1600 also offers a special balance control which minimizes the possibility of overdriving speakers and power amplifiers. Designed for rack or flush console mounting, Showco's S-1600 is amazingly easy to operate. Also suited for sophisticated home stereo systems, Showco's S-1600 Mixer Preamp allows you the ultimate control of sound!



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What a studio monitor is supposed to do is tell you precisely what's on tape. Because you have to know everything that's there.

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

Write to Hammond Industries Inc., 155 Michael Drive, Syosset, New York 11791 or call (516) 364-1900.

MODELS:

DN27: 1/3 octave mono, with bypass switch & gain control. **\$749**

DN22: 11 band, stereo, with high & low pass filters, separate gain controls & bypass switches. **\$799**



SPECIFICATIONS:

INPUT IMPEDANCE: Unbalanced, 10K ohms nominal. OUTPUT IMPEDANCE: Unbalanced, less than 10 ohms, short circuit protected. OPERATING LEVEL: -20 dBm to +24 dBm; input protection 60V RMS. CENTER FREQUENCY ACCURACY: $\pm 2\%$. CALIBRATION ACCURACY: ± 0.5 dB. FREQUENCY RESPONSE (CONTROLS FLAT): ± 0.5 dB : 20Hz to 20kHz. OUTPUT CLIPPING POINT: +22 dBm into 600 ohms load. DISTORTION: Less than 0.01% ... 1kHz at +4 dBm into a 600 ohms load; less than 0.05% ... 20Hz to 20kHz at +18 dBm into a 600 ohm load. EQUIVALENT INPUT NOISE: Less than -90 dBm unweighted, 20Hz to 20kHz.

Furthering Your Education

I have read and enjoyed *Modern Recording* for many months now. I have just recently graduated from SUNY at Plattsburgh and I'm looking into a recording career. I would like to find out if there are any graduate/undergraduate programs offered in the recording sciences at any colleges or universities in the U.S. If so, can you pass this information along to me? Also are there very many noncredit courses offered either by the universities or private studios?

Thanks for all your help.

—Andrew Jacobs
Plattsburgh, N.Y.

As we predicted in both the February and April 1978 issues, accredited programs are springing up all over the nation which offer courses in music theory, recording techniques, management for the recording industry and some even include courses on handling legal problems as well. As of this writing, the schools that we know of that offer a degree program include Middle Tennessee State University, Murfreesboro, Tennessee, (B.S.); Belmont College, Nashville, Tennessee, (B.B.A.); University of Miami School of Music, Coral Gables, Florida (Bachelor of Music, Master of Music); University of Wisconsin, Oshkosh, Wisconsin, (Bachelor of Music); Memphis State University, Memphis, Tennessee, (B.S.). We do not pretend that this is a complete listing, but it should give you some idea of where to look for more information.

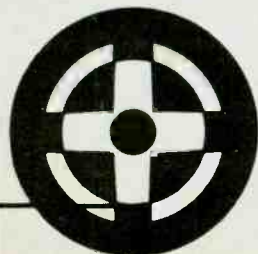
In addition, many universities are offering courses under the auspices of their music or business departments that might be taken in addition to another course of study.

Each of these programs approach recording from a different angle (music, business, engineering) so your particular interests or specialities might largely affect your choice of a school.

For more information on a network of non-credit courses offered nationwide in professional studios, write to the Recording Institute of America, 15 Columbus Circle, New York, N.Y. 10023 or call 212-582-0400.

Dedicated And Determined

I just finished reading the April 1978 issue of *MR*. After reading James F. Rupert's "Confessions Of An Audio Addict" (page 22), I felt compelled to confess that I'm one of those guys "out there" who's mad enough to take a crack at building a basement studio. After a



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To get a superb performance, you need a precision machine.

To command a great performance, a cassette shell and cassette tape must be engineered to the most rigorous standards.

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Precision Molded Cassette Shells—are made by continuously monitored injection molding that virtually assures a mirror-image parallel match. That's insurance against signal overlap or channel loss in record or playback from A to B sides. Further insurance: high impact styrene that resists temperature extremes and sudden stress.



Five-Screw Assembly—for practically guaranteed warp-free mating of the cassette halves. Then nothing—no dust or tape snags—can come between the tape and a perfect performance.

An Ingenious Bubble Surface Liner Sheet—commands the tape to follow a consistent running angle with gentle, fingertip-embossed cushions. Costly lubricants forestall drag, shedding, friction, edgewear, and annoying squeal. Checks channel loss and dropouts.



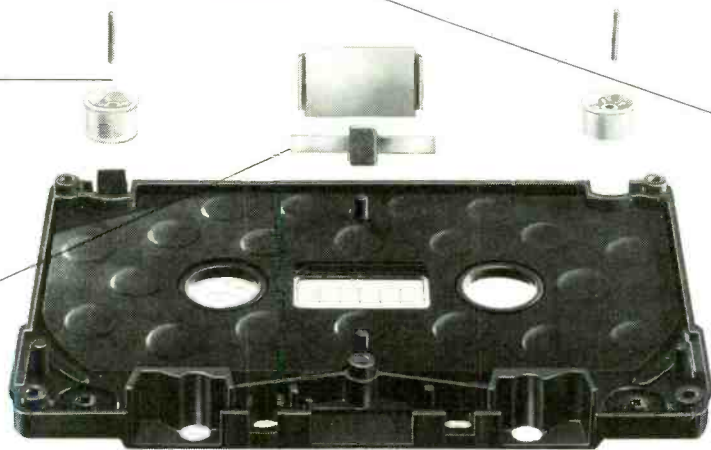
Perfectly Circular Hubs and Double Clamp System—insures there is no deviation from circularity that could result in tape tension variation producing wow and flutter and dropouts. The clamp wedges the tape to the hub with a curvature impeccably matched to the hub's perimeter.

Tapered, Flanged Rollers—direct the tape from the hubs and program it against any up and down movement on its path towards the heads. Stainless steel pins minimize friction and avert wow and flutter, channel loss.



Head Cleaning Leader Tape—knocks off foreign matter that might interfere with superior tape performance, and prepares the heads for...

Resilient Pressure Pad and Holding System—spring-mounted felt helps maintain tape contact at dead center on the head gap. Elegant interlocking pins moor the spring to the shell, and resist lateral slipping.



Our famous SA and AD Tape Performance—two of the finest tapes money can procure are securely housed inside our cassette shells. SA (Super Avilyn) is the tape most deck manufacturers use as their reference for the High (CrO₂) bias position. And the new Normal bias AD, the tape with a hot high end, is perfect for any type of music, in any deck. And that extra lift is perfect for noise reduction tracking.

TDK Cassettes—despite all we put into them, we don't ask you to put out a lot for them. Visit your TDK dealer and discover how inexpensive it is to fight dropouts, level variation, channel loss, jamming, and other problems that interfere with musical enjoyment. Our full lifetime warranty* is your assurance that our machine is the

machine for your machine. TDK Electronics Corp., Garden City, N.Y. 11530. Canada: Superior Electronics Ind., Ltd.

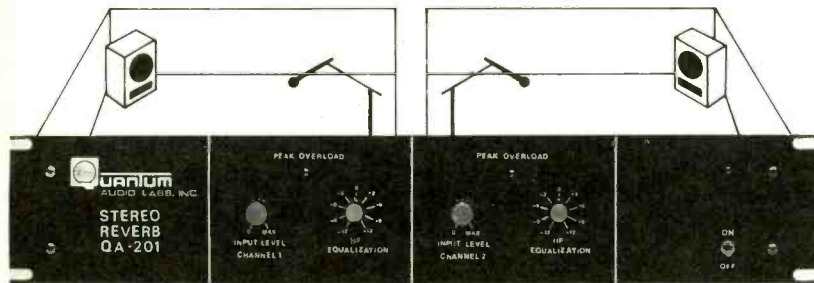


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The machine for your machine.

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- Compressor/Limiter plus 3-stage Overload Detection keeps the sound natural by avoiding "spring noise."
- Individual Channel High Frequency Equalization useful for modifying the sound of the chamber.
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M2/V • mono 2-way • continuously variable crossover points 100 Hz to 10,000 Hz • separate L.F. & H.F. level controls • variable L.F. filter • variable H.F. phase inversion control • gain control • balanced or unbalanced lines • stack for stereo 2-way or mono 3-way • THD below .01%.

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CIRCLE 76 ON READER SERVICE CARD

bit of background, you will see why I must really be mad!

By playing drums in various groups and doing many two-track recordings on a Sony TC-650 during the mid-sixties and early seventies, I put myself through three years of college and two years of university and graduated with a degree in electrical engineering. All during this time I dreamed of the day that I would be able to open my very own studio as a sideline. At the age of thirty, I finally married the girl that had waited so patiently through all those long years of club dates and we just recently purchased a home (with a basement, naturally) in my home town. Now for my madness!

My basement (actually, I don't think I've really noticed the rest of the house yet), originally had a cement floor with only a six foot, nine inch ceiling—not too desirable for a recording studio. So, putting some basic engineering principles to work, I built a seventy-foot long enclosed ramp out of 2 x 4s, which runs from my basement window out over the edge of my property to the Ottawa river that runs behind my home. A little buggy with a trap door (affectionately called "The Rock Eater," capable of carrying 200 pounds of basement at a time with the use of a few pulleys and ropes along with some arm muscles) provides the most simple and cheapest method of discarding the basement debris. The real madness began when we discovered that under the floor was a foundation of solid rock! Over a three month period we (myself, ten musicians and about thirty cases of beer) have put out over fifteen tons of rocks and before we're finished, we'll have put out over sixty tons of rock! The finished room will have a nine-foot ceiling and over 100 square feet of studio space. A beautiful set of JBL 4343s are anxiously waiting in my living room until they can move into their proper place in the control room.

Patience, determination, and persistence are the key words to building a studio—my way! Hopefully, in a year's time, I'll be able to write you about all the demo tapes I'm doing for all those musicians that helped, as well as other local groups.

I've been a subscriber to *MR* since its inception in October 1975 when I was taking the 10-week RIA course in Montreal, Quebec. Your magazine has been a great source of inspiration through all this. Due to small computer error, I find my subscription is paid up to 1984 so that's at least one expense I

TWO FOR THE ROAD

THE UNI-SYNC DUAL PROFESSIONAL POWER AMPLIFIER MODEL 100



The Trouper Series met the challenge of combining roadability with top performance, on the road or off, UNI-SYNC delivers sound. Designed in the same tradition, comes the MODEL 100 Professional Power Amplifier with these exclusive features:

Two Amplifiers: Not just a stereo amplifier, but actually two amplifiers in one chassis, which means accurate bass response, greater dynamics and elimination of the crosstalk distortion phenomenon.

Design: Greater efficiency due to technically superior transformer and heat sink designs.

Size: Smallest dual 100 watt professional power amplifier on the market - a 3½ inch package.

True modular construction: road tested interlocking PC board assemblies eliminate inconsistencies in performance, and serviceability problems found in hand-wired products.

Connections: Balanced bridging XLR and ¼ inch phone inputs; both may be used bal-

anced or unbalanced. Outputs are 5-way Banana Binding Posts. Mono operation switch.

Specifications: 8 ohm power outputs; 100 watts average continuous power per channel; power band 20Hz to 20kHz. Total Harmonic Distortion: .02%. Intermodulation Distortion: Less than .004% @ rated output. Frequency Response: -3Db 1Hz and 100kHz. Fully complimentary output.

Protection Features: On/off transient speaker protection circuitry for DC offset; SOA limiting circuitry; Independent Thermal Shutdown; and Available Power Monitor, provides accurate LED indication of amplifier status.

UNI-SYNC has made significant strides in the design and packaging of the MODEL 100 and companion power amplifiers. We invite you to take an inside look at the MODEL 100, see your local dealer or write for a free brochure.

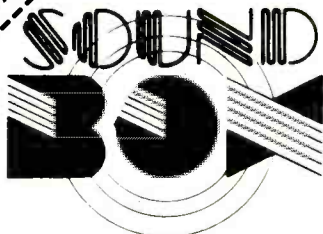


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CIRCLE 71 ON READER SERVICE CARD

don't have to worry about at this time.

Keep up the great work you do in making the once-only-big-guys' world of recording accessible to us little guys!

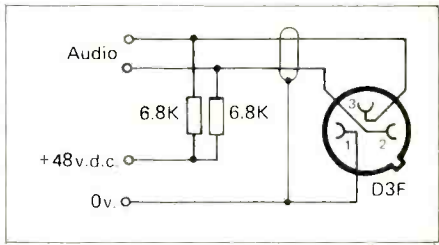
And to all the rest of those guys out there who are still dreaming about the day when they can build their very own studios—get out your hydraulic breakers and keep digging until you've made it a reality.

—Ron Brault
Hawkesbury, Ontario, Canada

Ron, we get a lot of letters every month concerning the construction of home studios—far too many to print them all here. We made room for yours, however, because you have gone to such extremes to accomplish your goal. We wish you a lot of luck and give you a lot of credit. It's good to meet a man who's so determined and dedicated that he won't let a mere sixty tons of rocks stand in his way. It's people like you that keep us going!

The Correct Circuit

The schematic that appeared with the April 1978 Talkback "Pursuing Phantom Powering" (page 28) underwent some unscheduled alterations when it was redone in camera-ready form. It should have appeared as it does below.



Our apologies to both Steve Krampf of the Express Sound Company who took the time to submit a correctly depicted circuit with his response, and to Steve Temmer of Gotham Audio who assisted with the sketch. Kudos go to our sharp-eyed readership who pointed this error out to us. —Ed.

Operating A Proper P.A.

I picked up your February 1978 issue and was greatly pleased to find your magazine as informative as it is. I am new to this scene (by scene, I mean the formalized businesslike presentation of material regarding sound recording and reinforcement) but I have been involved with bands for five years.

Since reading your publication, I have taken a great interest in learning how to operate a well-reinforced sound

A Tip from the Experts



STAINLESS
STEEL TIP

SIMPLIFIED
SOLDERING
CONNECTION

DUAL STRAIN
RELIEFS:

- CLAMP

- BRASS
THREADING



For years, everybody thought that connectors were about as basic as you could get—so nobody improved them. Then along came Whirlwind. We recognized the musicians' needs for high-quality, rugged and noiseless cords that *lived up* to their guarantees, and so we started designing our own cords, having them manufactured by Belden, and selling them to you.

Now our designers have recognized another need in connectors that no one has bothered to think about before — 1/4" phone plugs. We went beyond the "standard," constructing a plug that exceeds the positive contact properties of the "military" or "computer" plug, by using a new, stainless-steel diamond-shaped tip, and then designed a tougher strain relief system and outer shell, to make the plug virtually indestructible.

We call it the Tip. It's a phone plug that's designed from scratch to combine the most secure strain re-

lief available with a reliable contact-making diamond-shaped tip.

The Tip looks just like a "military" plug, with a high-impact, shatterproof black housing, and brass body—but its stainless steel tip is an instant giveaway. A double strain-relief system and simplified soldering arrangement complete the picture, to provide you with the most secure phone plug there is.

The Tip—sure it's not big; but we got big by caring about the little things. Only at authorized Whirlwind dealers.

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When Jerry Garcia, Bob Weir, Steve Miller, Billy Cobham and George Benson all use the AD 230 Delay... You know it's good!

AD 230 AD 220

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| Continuously variable delay up to 600 milliseconds | Continuously variable delay up to 500 milliseconds |
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| LED ladder-type VU meters for input and delay levels | Input sensitivity and output level controls |
| High/low impedance with either 1/4" or 3-pin connectors | 19" rack mount cabinet |

And you can bet that these experienced electronic pioneers know how to judge a delay line. The Ibanez Analog Delay with Multi-Flanger does what no other analog device of its kind has been able to do - beat the digital delays at their own game *and* at a price that almost any band can afford. It's unbelievably quiet, features selective bandwidth, and has the most versatile range of controls of any comparable device.

You can get double-tracking, slapback echo, long delay, flanging, automatic vibrato, reverb, and most any other time delay effect possible. Ask about it at your Ibanez dealer today.



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CIRCLE 73 ON READER SERVICE CARD

system properly. I have worked with quite a few systems ranging from a Shure Channel Master with six columns to a Peavey 1200 stereo board with 800 watts of Heil power and all the usual EQ, Space Echo, monitor systems and Shure mics. What I do now is all self-taught with a lot of trial and error thrown in for good measure. Any information or guidance that you could give me on how to attain some proper training in how to make a good P.A. system function to its fullest capacity would be greatly appreciated.

I live in the greater New Orleans area and have no idea as to whom I should talk to for information. Thanks again for turning me on to the right way of doing things!

—Darryl Geraci
New Orleans, La.

Don't put down all that on-the-job training you've acquired! Even if you didn't start out knowing all the angles, we're sure you've learned many "dos and don'ts" in the past years. But you're quite right to assume that there is more to operating a system to its fullest capacity than meets the eye. Read all you can regarding "live" sound reinforcement and try to talk to the engineers on staff at the recording studios near you. If you have a friend who's known MR longer than you have, ask him for the early copies that contained "P.A. Primer" by Jim Ford and Brian Roth. It contained a lot of the basics you're interested in now. Knowing the system you're working with is also invaluable. Make sure that you realize all the possible ways to use it and here, too, read all you can on the system with which you're working.

Replacement Parts

It was brought to our attention recently by a reader who was following Peter Weiss's instructions for building a direct box (see his article on page 48 of the April 1978 MR) that one of the transformers recommended in the Parts List on page 52 is no longer manufactured. The transformer needed is a multiple primary/multiple secondary audio line-to-line transformer. Peter suggests in place of the no-longer-available ADC-11-4F transformer, the use of the Stancor #A-4407 or the #A-4350 or the comparable unit made by Thordarson, the 20A07. Peter also advises that you be sure to use 500-ohm sections in both the primary and secondary.





Custom specifications packaged to go.

Everyone in the recording and sound reinforcement business knows who the leader has been in mixing consoles. Their 16/4 desk was a great idea with the basic features a serious pro needed. Its only drawbacks were weight and size.

Let us introduce ourselves. We are Studiomaster, the maker of the most dramatic 16/4 mixing console you can find on the market today. We don't settle for basic features only.

The specifications. On each input channel our 16/4 board has five equalization controls. An input gain control. Peak overload indicators. 0/-30db padding. 2 echo sends and foldback (monitor) level faders... and our output is as interesting as our input.

We have 1kHz line-up oscillators. Line output level faders. Individual channel master panning, foldback, and monitoring controls. Both echo returns with 3-position routing capabilities.

And our exclusive mix-down feature... a remix switch that converts the first four input channels to stereo mix-down

channels automatically from the same board. Imagine the patch cord and second mixer confusion that can be overcome. Did we say custom specifications?

The package. Our 16/4 mixer in its Anvil flight case is less than 90 pounds (by itself less than 50 lbs.) yet it has all the features of mixers much larger, much heavier, and much more expensive. The Studiomaster 16/4 could truly be your answer to the age-old portability and performance problem of getting custom specs packaged to go.

For a free brochure on Studiomaster products please write to STUDIOMASTER, P.O. Box 221, Rowlett, Texas 75088; or call toll free 800-854-3428. In Canada contact RMS, 2271 Kingston Road, Scarborough, Ontario MIN-1T8; or call 416-264-2340.



STUDIOMASTER MIXING CONSOLES 16/4 & 12/2B

Pictured is the Studiomaster 16/4 mixer. Also available is a 12/2B model with the same great features though in a considerably lesser priced stereo version.

TALK BACK

Is Old Tape Safe?

I recently came across some twelve-year-old, 6.35 mm home recording tapes. Will this tape cause any damage if I play them on my recorder?

—J. Ray
Coventry, R.I.

If your tapes are of a quality brand, I see no reason why normal use on your recorder should cause any damage, as long as they are in reasonable condition after twelve years. Most ¼-inch audio tapes, at that time, used vinyl chloride or acetate for both the basefilm and the oxide binder, and were generally quite durable and clean running even by today's standards. After twelve years, however, temperature and humidity can cause vinyls and acetates to grow brittle and create shedding of the oxide coating causing debris. This being the case, I recommend you inspect the tapes in the following manner prior to pressing them into full service:

Fast wind each of the tapes onto a blank reel.

Note evidence of sticking at the unwind.

Is there excessive wandering of the tape in the guides?

Look for debris and oxide dust on the guides and below the tape path (these parts should be cleaned prior to rewind).

The worst potential for damaging your recorder comes in the form of headwear resulting from debris generated by aging of the vinyl or acetate ingredients, and guide grooving caused by edge debris and poor slit edge. If noticeable debris is found, I would not advise general use for these tapes. If there are recordings on the tapes which you value, it is best to try re-recording onto a more recent vintage premium tape, and throw the aged one away. Tape which sticks in the unwind process has likely lost larger chunks of coating, rendering either existing or future recordings virtually useless. If the tape wanders in the tape path, edge damage or non-linear slit is usually indicated, and either will cause

the intermittent loss of high frequency signal as the recorded track wanders off the reproduce track position. If you find your old tapes to be in good condition after inspection, feel free to use them with confidence.

As an interesting side note, if your tapes were recorded twelve years ago, they will replay on a modern tape deck with a wider frequency response than they did on a twelve-year-old recorder, and so may sound better than they originally did. Count on the noise being higher than today's tapes, however. If the tapes are blank, or you intend recording again on them, results may not be so good as the large oxide particles used in the mid-sixties had lots of output at long wavelengths, but were seriously lacking in short wavelength output due to the oxide, and comparatively rough surfaces (spacing losses) of tapes made then. Additionally, most of today's recorders will seriously overbias the older tapes and the equalizations built into the electronics are made to handle substantially more short wavelength output than the old tapes possess, thus further compounding the high frequency replay problem.

—Frederick J. Sischka, II
Manager, Audio Development
Memorex Corporation
Santa Clara, Ca.

How Nova Tames The Elements

Recently, I attended an Earth, Wind and Fire concert at the Capitol Center in Washington D.C. I would like to know the name of the sound company currently on tour with the group, as well as a little about their equipment.

What type of speaker cabinet design is used within the system? What is the overall frequency response of the system? What are the components incorporated within the system (meaning what type of speakers are used for the low frequencies, the mids and what

types of drivers are used for the high frequencies)?

What types of power amps are being used within the system?

What sort of mixing console was used? It it a custom piece?

Also, could you give me some insight as to why sound companies are now "flying" P.A. systems as opposed to the conventional method of stacking the speaker columns on opposite sides of the stage? What are the relative advantages and disadvantages of both methods?

—Tony Bullock
Baltimore, Md.

As you no doubt surmised, the sound reinforcement system that you were so impressed with was designed specifically for Earth, Wind and Fire. The company responsible for this fine piece of engineering was Nova Sound Research of Beverly Hills, California, the company that also performs technical magic for Little Feat (among others). George Massenburg of Nova was happy to hear of your expression of interest and herewith are his answers to your questions.

All the speaker cabinets used were damped infinite baffles. For bass frequencies, Nova used 30-cubic-foot infinite baffles with 15" Electro-Voice woofers. Low- to mid-range cabinets were 4-cubic-foot infinite baffles with Cetec 12" woofers. For the mid-range, Altec 288-8G drivers on an Altec 511 horn were used. JBL 2420s were used for the high frequencies and the super-high frequencies were taken care of by either Heil experimental drivers or JBL 2405s. The flat frequency response of the system is 25-19,000 Hz, with the Heil's response running up as high as 30,000 Hz.

The amplification system is a five-way electronically crossed system. Modified Spectra-Sonic power amps with a ferro resonant power supply were used for the top four bands, with BGW 1000s used on the bottom band.

The board used was, to quote George, a "highly modified" Midas with 36-in/10-out. Their customization of it took the form of replacing every integrated circuit in the board!

The entire system is equalized with Sontec parametrics. It features a custom 14-channel active crossover with two modes of gain control to offer optimum power amp and transducer protection.

As for the reasoning behind "flying" rather than "stacking" speakers, George offers this explanation. Their speaker system is simply so big that in the interests of keeping the stage clear it is necessary to get the speakers up and off the floor. An infinite baffle is, for design purposes, the least efficient but it does offer the most presence and the best transient response.

Should you require further information, you can write to George care of Nova Sound Research, 9615 Brighton Way, Suite 228, Beverly Hills, Ca. 90210 or call him at 213-274-0756.

Something Old, Something New

I've come across some old Ampex tapes and would appreciate some information.

First, I got hold of some half-inch Ampex 736 tape used for recording some kind of military tests and frequency broadcasts. The speed used was 30 ips, and a voice track identified dates in May and August, 1967. The 10½-inch reels had Ampex etched in the aluminum and a sticker reading "Ampex 736." One plastic bag had the number 272722, which may or may not have been the lot number.

Not seeing any "track streaks" on the tape, I assume it's seen minimal usage. If it is indeed 736, what use and quality was that formula intended for? How does it compare to the current 456 formula? Keeping in mind the rigors of an 8-track session with many overdubs, could you please outline the pros and cons (if any) of using this "old" tape?

At the same time, I came upon some half-inch Ampex 164 color video tape recorded at 7½ ips. The recording face being out and the reel a spindle fitting, I transferred it to a hub reel with the recording surface in. What I assume was the synchronization track really gave the VU meter a workout!

The owners feared that the age of the tape (1973) and use to date would make it prone to drop-outs; but that audio only might be less demanding.

Bearing in mind my intended use, is it possible to use this tape?

Also, 736 being thinner than 456, and

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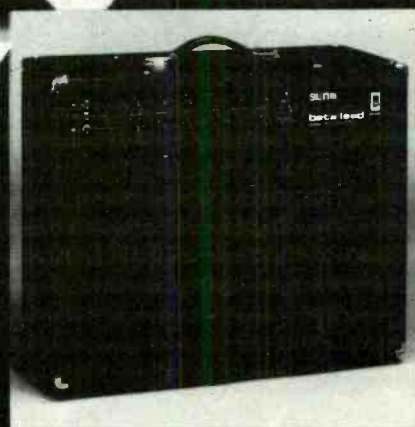
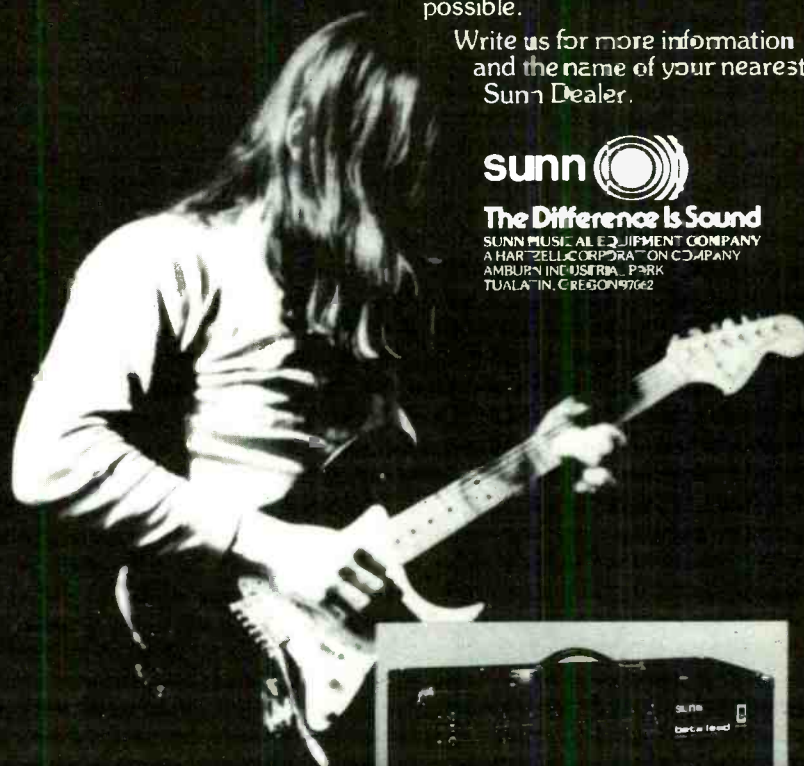
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CIRCLE 64 ON READER SERVICE CARD

164 thinner than 736, is print-through a crucial factor?

Provided empty cartridges are available, and it's the same stuff, is it worth saving for home A-V systems like Betamax?

—Ward C. Camp
Georgetown, Md.

George Aarnes of Ampex's Magnetic Tape Division has some good—and some not so good—news for you. Ampex 736 was produced to federal specifications and is an A-oxide formula tape. It was designated by the number WT0070 and intended for mid-range instrumental applications. It was discontinued in 1970 and is equal in quality to any high-quality audio tape.

Ampex 736 has excellent (low) head wear and an extremely durable binder. It exhibits good shortwave response. Ampex 736 will give you wide frequency response throughout the audio spectrum. 456, which is 1½ mils thick, exhibits excellent print-through characteristics. However, 736, which is 1 mil thick, has comparable print-through characteristics.

However, Ampex 736 doesn't compare very well to the newer 456, which is, of course, the ultimate Ampex recording tape to date. It suffers in terms of

low-frequencies and its dynamic range is not as good as that of the 456.

As far as the 164 tape goes, it was formulated to EIAJ (Electronic Industries Association of Japan) specifications and standardized the ½-inch open-reel video tape field. However, you're correct in assuming that the audio portion is suitable to your needs. Do not attempt to utilize it in home video system cassettes. It will cause head wear and could possibly clog up the works of your video recorder.

Summing Up Slapback

[The following unsolicited reply was prompted by the Talkback "Some Questions Answered" which appeared in the March 1978 issue on page 14. Since Mr. Bowley explored one part of that question in greater detail, we thought we would pass his information on to you.]

In the Talkback section of the March 1978 issue of *Modern Recording*, a reader asked for an explanation of "slapback" echo. The response generally described a tape loop, with no differentiation between the repetitive decaying echo normally generated by

such a system, and the specific generation of the unique "slapback" effect.

The most common application of a tape loop is to create a regenerative process of recirculating the output of a tape playback head back into the input for re-recording, thus creating a number of distinct repeating and decaying "bounces" of the original sound. The speed of the echoes is determined by the spacing between the record and playback head and the speed of the tape itself, and the intensity of the repeats (and hence the rate of decay) is set by the gain of the feedback loop. This repetitive effect was used extensively in the 1950s by recording artists Les Paul and Mary Ford.

On the contrary, a "slapback" echo is normally considered to be a single repeat (or sometimes two), a discrete one-time percussive type effect (hence the word "slap"). Nowadays, this single repeat is best produced by a digital delay, but it can also be easily achieved by using the tape loop process described above, with the exception that the single repeat is picked off the playback head and mixed, one time, with the original sound, and not recirculated through the recording process.

Slapback echo is used to create a num-



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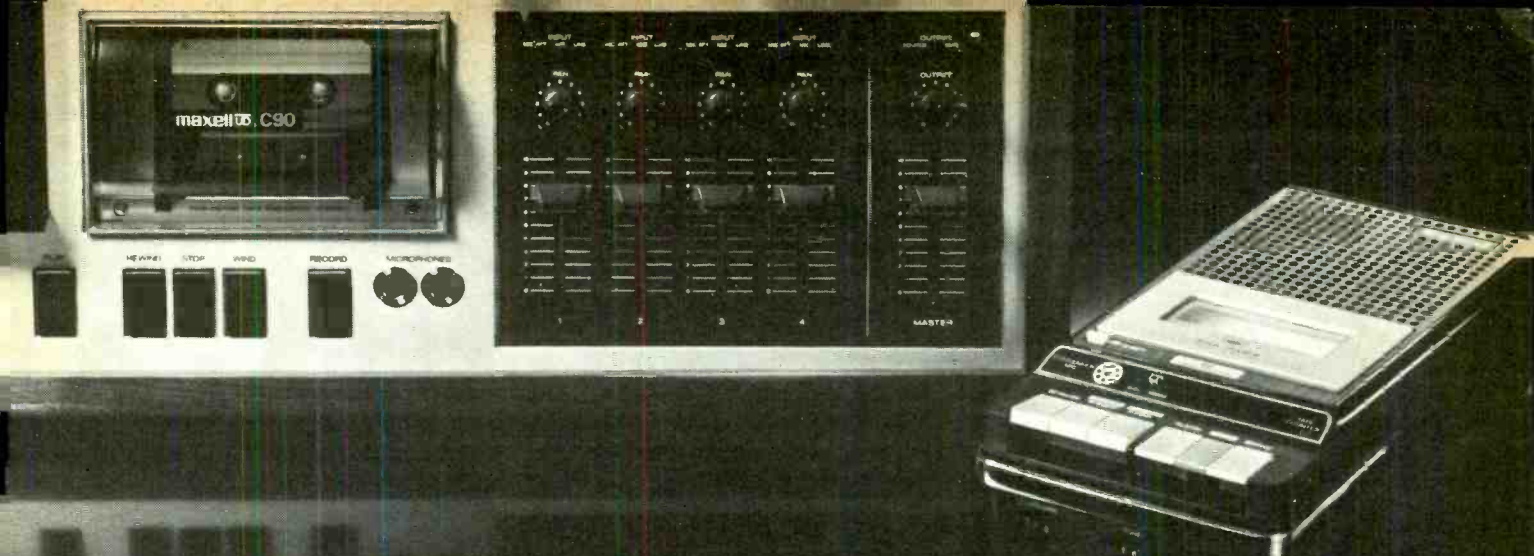
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ber of effects and, when used in different configurations, is called different things. If the original and delayed sound are separated in time by less than 40 milliseconds (ms) or so, and fed to different stereo channels, a feeling of ambience or "pseudo-stereo" effect can be created. If the two sounds are separated more than 50 ms, each sound becomes distinct and discernible and becomes a "slapback" echo. Vocal or instrumental doubling is another form of "slapback," depending on the millisecond separation and application in the recording process.

An excellent current example of the use of slapback echo can be found on the recent Grammy Award winning album *Chester and Lester* (RCA APL1-1167) where slapback echo was added to most of Les Paul's guitar tracks. It is particularly prevalent on cuts such as "Moonglow," "Birth of the Blues" and "Deed I Do," and slowing the record down makes it stand out even more. Listen carefully as Les picks a string and the sound bounces back *once*. That's slapback echo.

I hope this will help to clarify the nature of slapback for the interested reader.

—George Bowley
President
Sync Records
Springfield, Va.

Amplifying Information

When the output signal from a mixer or outboard unit (crossover, EQ) is fed into a multiple of amps, what happens to the voltage and load that the sending unit "sees"? In other words, if in one situation, where the unit is fed into one amp, it is putting out approximately 1 volt and the input Z of the amp is 10K, what happens when the same unit is "Y"-ed or split 3 to 4 ways into several power amps, each having an input Z of 10K?

How can a power amp or other device that is in the chain between mixer and amp be calibrated to match (more closely) the mixer or preceding unit's signal? In other words, if a mixer puts out 1.75 volts at zero VU and the amp is spec'd at 1 volt for full power output, can or should one or the other be internally trimmed to match the other?

—Paul Lazzaro
Waterbury, Ct.

Before we can determine what happens to the output signal of an audio source when loaded by several power



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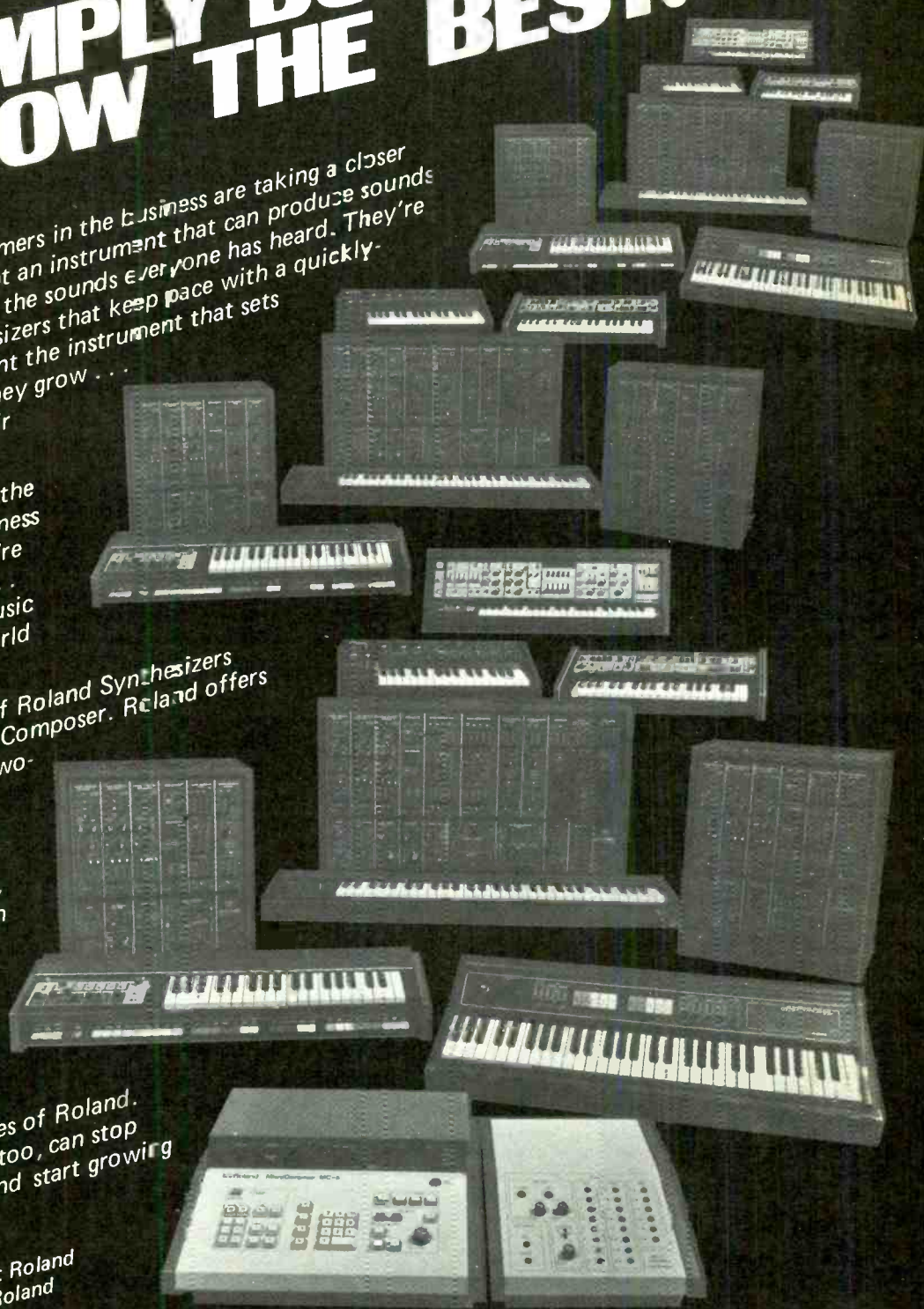
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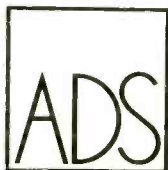


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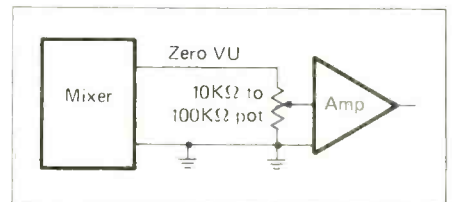
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amplifiers, we must know the output impedance of the driving source as well as the combined input impedances of the amps. Most mixers, EQs, crossovers, limiters, etc., have low output impedances, generally 100 to 600 ohms. If each power amp has an input impedance of 10k ohms, then two Y-ed together would give a combined input impedance of 5k ohms; (3 amps would give 3.3k ohms, 4 amps 2.5k ohms, 5 amps 2k ohms and so on).

As the combined input impedance of the power amps drops, so does the output voltage of the driving source. If a mixer with a 600 ohm output impedance delivers 1 volt to one power amp with a 10k ohm input impedance, the same mixer feeding four amps Y-ed together would deliver 0.8 volts, a loss of about 2 dB. If ten of these amplifiers were fed by the mixer, its output would see a 1k ohm load and the signal would now drop to 0.62 volts, about a 4 dB loss. A general rule for minimizing loading effects, is to maintain input impedances that are ten or more times the output impedances driving them.

In answer to your second question, it is usually most convenient to run mixers and most other audio gear at their designed zero VU level, since their best signal-to-noise ratio and adequate headroom are maintained at this level. However, if this level is in excess of the amplifier sensitivity, it is best to attenuate the signal after the mixer. If the amp does not have an input level control to attenuate the signal, you can insert one as shown in the diagram below at the amplifier.



Adjust the pot so that at zero VU mixer output, the level going into the amp is about 6 dB below clipping level (half the amplifier's rated sensitivity) to allow adequate headroom for peaks.

—Jim Warwick
Vice President and
David Tkachuk
Sound Engineer
Capron Lighting and Sound
Needham Heights, Ma.

Readers To The Rescue

[Every now and then we ask our readers for suggestions and possible solutions to

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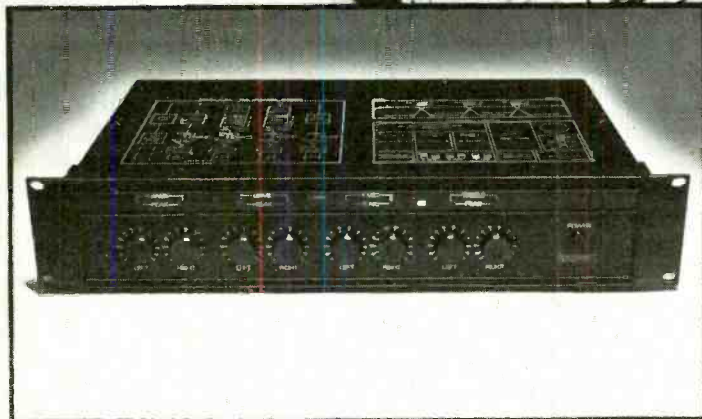
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specific problems. When, in the May 1978 Talkback question "Out Of Luck Listener" we solicited help, the response was gratifying. Readers from New York to California were happy to supply alternatives to accomplish Mark Carbone's original goal. The following are a sampling of the letters we received. (In case you missed the original piece, it appeared on page 16 of the May issue.)—Ed.]

In reference to reader Mark Carbone's problem as described in the May 1978 Talkback column, I am enclosing a diagram and a parts list which will allow two stereo headphone outputs (four signals) to be switched between either channel or headphone output.

The parts he will need are as follows:

four switches Spst, (slide or toggle), two stereo phone plugs (3 circuit), one stereo phone chassis jack (3 circuit), one small box, two grommets, and the usual miscellany, including mounting hardware for the switches, and labels.

The 10-ohm resistors (1 watt rating) isolate the tape deck's output amplifiers from themselves and ground. There will be a 3 to 6 dB loss through the resistors (assuming 8 ohm phones are used).

I am not familiar with the output configuration of the Dokorder 1180's headphone amplifiers. It may be necessary to use a higher (50-100 ohm) isolation resistor in each line.

—Mitch Ravitz
Technical Director
Empire Scientific Corp.
Garden City, N. Y.

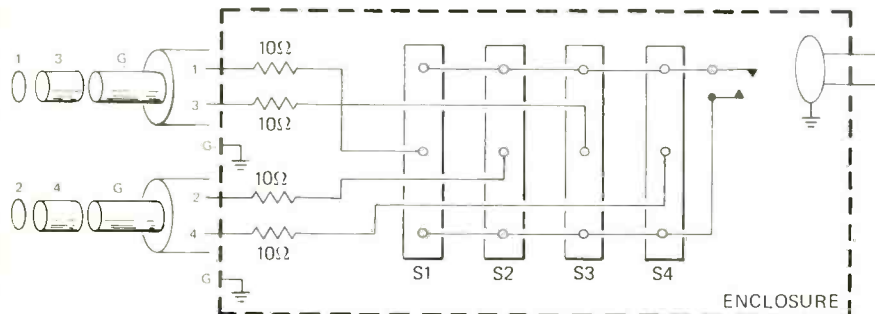
I have a suggestion for the "out of luck listener" in your May issue. Dokorder 1140s are good machines, and the group at Dokorder in Lawndale, California are good guys but they do go by the book (which is fine in most cases). However, you're really not entirely out of luck in this instance.

If you're a youngster, chances are you're on a limited budget. Here's a fix that's clean and cheap. Purchase an SPL-1 mixer and monitor it through your Sansui 9090. You'll get 1 and 2, and 3 and 4 just the way you want them (stereo respectively). The unit will also handle a cassette for transfers nicely, too. We use channels A and B for the four-channel and C for the cassettes. By the way, you should be able to get this through a discount house near you. I know it's possible here in Seattle to buy one for \$25.00 or less.

However, you will still need a mix-down unit if you want to cross tracks left to right.

—Rod Baxter
Seattle, Wa.

I read with interest Mark Carbone's problem in obtaining a stereo mix through his headphones with his Dokorder 1140 (see "Out Of Luck Lis-



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3rd PRIZE—Worth over \$2686. 2 S12-2 E-V 2-way Stage Spkrs, 1 CP120 TAPCO Power Amp, 1 2200 TAPCO Stereo Graphic Equalizer, 1 6201 TAPCO Stereo Mixer, 1 ANVIL Rack-Mount Case, 2 AKG Mic Stands, 3 D2000E AKG Card Dyn Mics, 1 PL77 E-V Card Cond Mic, 2 PL91 E-V Card Dyn Mics, 1 K140 AKG Headphones.

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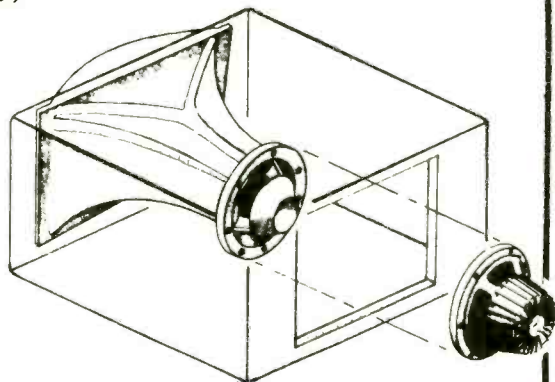
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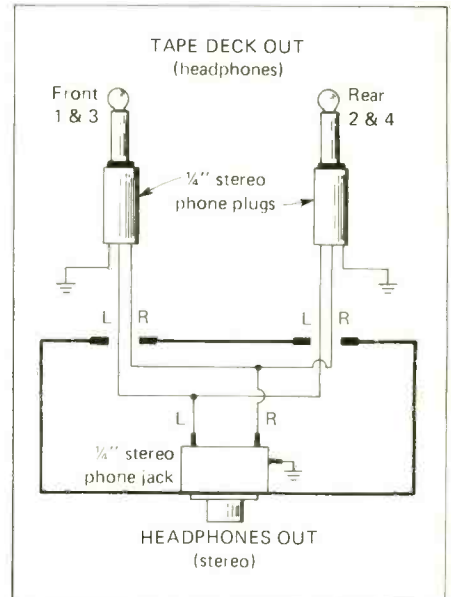
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tener," Talkback, May 1978, page 16). I had the same problem with my Dokorder 7140 but the small junction box I built quickly remedied the situation. (Refer to Figure 1.)



The leads from the two stereo phone plugs are simply paralleled to the output jack. (A good solid ground everywhere really helps.) I am sure there is somebody out there who will say there is a mismatch of impedances somewhere, and that this system is no good, but I have been quite happy listening to all four channels in stereo for the past two years.

—Mark Leffler
Niagara Falls, N.Y.

Mark Carbone's problem with his four-track headphones (to get channels one and two on the left and three and four on the right, as described in the May 1978 Talkback column), can be solved in the following manner.

Get two identical stereo earphone extension cords. For this purpose, we'll say that the tip is red and the ring is black. Cut one in half, and strip about three inches of the outside insulation from each cut end. Then strip the two red wires, wind them together and solder, taping each one separately for insulation. Cut the other extension cord the same way but this time strip the black cord, wind and tape together, and then do the same with the shields as you did before.

Now, connect the remaining cords red to black and black to red. This will give the left channel tracks 1 and 2, and the right channel tracks 3 and 4.

It would obviously be better to use a



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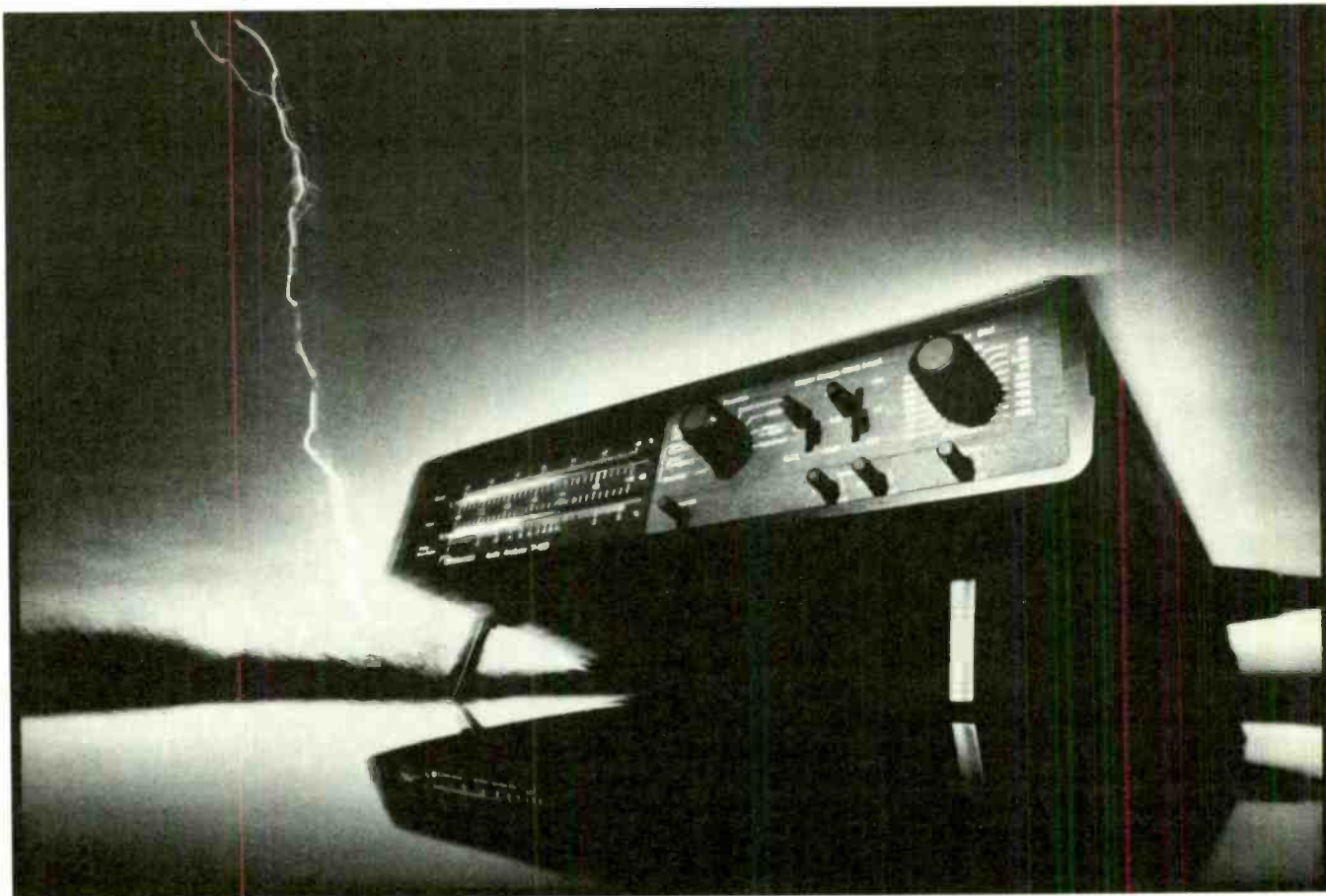


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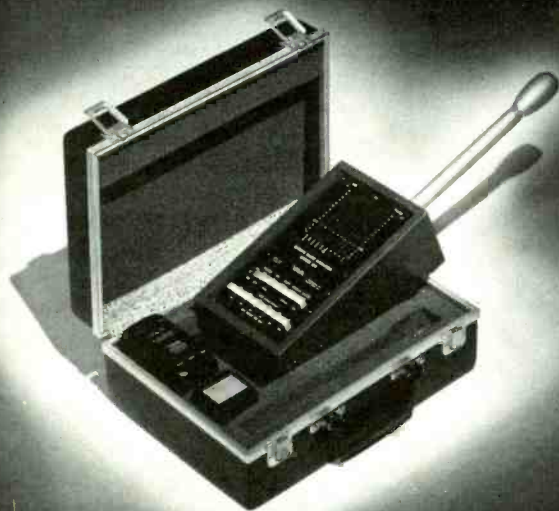
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junction box, soldering terminals, jacks, etc., especially for a permanent device, but the above will work, although it may be frowned upon by the pros.

It does seem to me, however, that the whole thing could be avoided by figuring out the tracks in advance, and putting what you want in the left channel on 1 and 2. Obviously, four channel head phones are needed.

I have also made up a tape that has proved to be very handy in testing my four-channel. On channel four, make about 30 seconds of even clicks, at an even, fairly slow rate of speed. This can be done with a metronome or by hand, with a coin on the table, etc.

Once you have done this, put that channel into sync, and speak the word "one" into the number one channel, in rhythm with the clicks i.e. one, two, three, four, etc. Do the same with channel two (one, two, three, four) and channel three (one, two, three, four). Now take channel four out of sync, put it into record, and add the word "four" in the open spot, erasing the clicks. It's easier to do than I've made it sound and it's very handy to have around.

—Gordon Jenkins
 Malibu, Ca.

In order to get a stereo headphone mix from your 4-channel deck equipped with two separate stereo phone outputs, you may follow this procedure. It will require the TEAC AX-20 mixdown panel and three stereo cables with various terminations. Two cables (call them type-A) will have a male stereo phone plug on one end and two RCA/phono plugs on the other. The third cable (type-B) will have two RCA/phono plugs on one end and a female stereo phone jack on the other. Type-A will go from the tape deck to the AX-20 and type-B will come from the AX-20 to your headphones. In case the level is too weak you may take the AX-20 output directly to your receiver for monitoring. The switches on the TEAC AX-20 enable you to assign its four inputs (from the deck) to either the left, right or both of its output channels.

—Roy Kamin,
 Sales and
 Claude Schnell,
 Consumer Relations
 TEAC Corp. of America
 Montebello, Ca.

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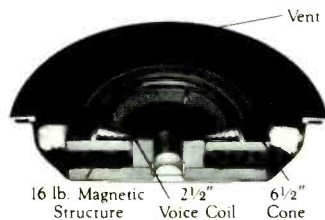
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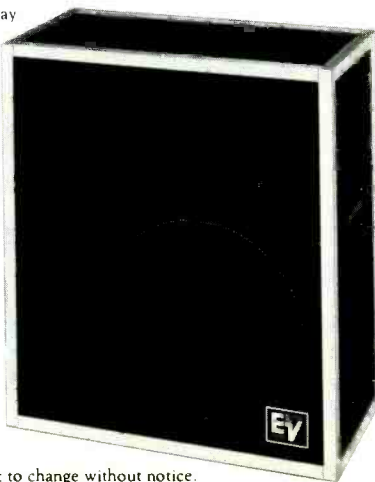
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it has become the subject of some rather heated debate. Hence, the following questions regarding its proper application.

Given a noise gate and a compressor that are to be used together, does the compressor precede or follow the noise gate and why?

I have been told that a noise gate can be used to control feedback in a sound reinforcement system. If this is so, how is this done and can it be accomplished with a basic MXR Noise Gate/Line Driver?

—Philip Adler
Soundsallright, Ltd.
Tenafly, N.J.

As with most signal processing devices, the placement of the noise gate depends on the desired effect. Briefly, a noise gate consists of a sensing circuit that monitors the input signal and an electronic switch that, when activated, will allow the input signal to pass through to the output. The sensing circuit will activate the switch only if the input signal exceeds the level set by the threshold control. The one requirement for proper operation is that the level of unwanted signal (noise) must be lower than that of the desired signal to allow the threshold level to be set between these two levels.

Normally, the noise gate would follow a compressor, limiter, or gain device thereby gating off the residual noise of the compressor along with the amplified source noise. The noise gate should also follow any devices with high residual noise such as echo, delay and special effect units.

When using a great deal of compression of limiting, the situation may arise where the noise is amplified to a level where it competes with the musical information, at which point it would be difficult to set the threshold control on the noise gate for proper operation. In this case a better choice might be to insert the noise gate before the compressor to gate off the source noise before it is amplified.

By placing the noise gate directly after a microphone or pick-up and adjusting the threshold control to gate off background information and noise, feedback in a P.A. situation may be reduced by automatically shutting off the microphone or pickup whenever it is not being used. When applied to a drum miking situation, the noise gate can help to isolate each percussive source, allowing a very tight drum mix even in reverberant environments. The MXR Noise Gate/Line Driver, besides per-



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forming in the above applications, can also act as an interface between high impedance sources (piezoelectric pickups, contact mics) and low impedance inputs of succeeding equipment. This impedance transformation is always present whether the noise gate function is in or out. The devices' two output jacks provide a convenient point for direct tapping.

—Richard Neatroun
Chief Engineer
MXR Innovations, Inc.
Rochester, N.Y.

Changing Amplifier Power Requirements

In Jim Ford and Brian Roth's "P.A. Primer" which was printed in its entirety in the 1978 Winter Buyer's Guide, it was noted (on page 113) that a 3 dB boost at any frequency would require twice the amplifier power. I had always assumed that all tone controls simply modified boost/cut contours and the change in dB was not related to sound pressure level.

Are they really saying that a 3 dB treble or bass boost doubles amplifier requirements, and, if so, is the reverse true—that cutting by 3 dB halves power needs?

Also, would cutting bass by 3 dB make an equivalent change in a loudness contour, without altering it in any other way? According to the article this should cut amplifier power requirements in half while retaining the benefits of the loudness switch on the amplifier. Am I confused or are they referring to a phenomenon unique to sound reinforcement and not applicable to playback systems?

—Edward Baumann
Santa Ana Heights, Ca.

Yes, we really are saying that using an equalizer to boost and cut different frequency bands actually changes the requirements for power. If you are boosting, it also means that the speaker must be capable of handling the increased power from the amplifier. It might help to consider the equalizer as a volume control that works only in certain frequency bands. When you turn up the volume (or tone control) on your mixer, the power amplifier and speakers must be capable of handling the resultant required voltage output. If the amplifier is not capable of the voltage swing, the top of the musical wave form will be cut off (clipping). This results in a squared off wave form and

this type of signal is more likely to destroy woofers and high frequency horn drivers.

The loudness control on most hi-fi amplifiers is a type of equalizer. It is designed to boost the low frequencies and the high frequencies when the amplifier is being used at low sound volumes. Our hearing is less sensitive at low sound volumes in the low and high frequencies region. The loudness control when activated is supposed to compensate for our hearing deficiency. At high volumes our hearing is more equal at low, mid, and high frequencies and the equalization of a "loudness control" is not needed. A good way to blow up your speaker system is to be playing your system at a high volume and switch in the loudness control. This would be the same thing as turning up the bass and treble equalizer by about 6 dB (4 times power).

Finally, the laws of physics do not change depending on the type of sound system. Hi-fi systems, studio monitoring systems, and large concert sound systems all follow the same rules.

—Jim Ford
Contributing Editor
Modern Recording Magazine



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method, AESJ, Vol. 25, No. 4.

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A GREAT AMP. UPGRADED.

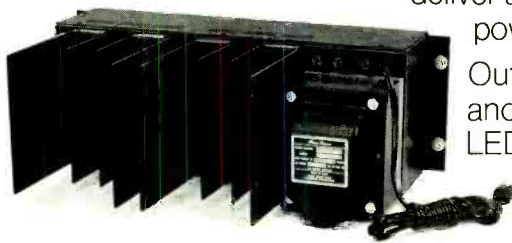
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From the FET inputs with low noise/low distortion circuitry, to the individual sensitivity controls, the increased performance and efficiency enables the Phase 400 Series Two to deliver a sonic clarity second to none in medium power applications.



Outside, the smooth, professional styling of the gold anodized front panel includes an exclusive 32-segment LED display that's capable of instantaneous indication of output activity. It incorporates a special 4-segment LED clipping indicator that warns of hazardous overloads.

Even under the most demanding conditions, a large extruded aluminum heat sink assembly maintains adequate cooling for the 400 Series Two. Other built-in protection systems include electronic energy limiters that prevent the possibility of damage to the speakers or amplifier from overloads. And independent fusing of the power supply for the prevention of any potentially damaging effects caused by short circuits.

There's only so much we can tell you in this ad. To fully appreciate the 400 Series Two, we recommend a visit to your authorized Phase Linear dealer.

SPECIFICATIONS: OUTPUT POWER: 210 WATTS, MIN RMS PER CHANNEL 20Hz-20kHz INTO 8 OHMS, WITH NO MORE THAN 0.09% TOTAL HARMONIC DISTORTION, CONTINUOUS POWER per channel at 1000Hz with no more than 0.09% TOTAL HARMONIC DISTORTION 8 ohms—260 watts, 4 ohms—360 watts, INTERMODULATION DISTORTION: 0.09% Max (60Hz: 7kHz—4:1), DAMPING FACTOR: 1000:1 Min, RESIDUAL NOISE: 120uV (IHF"A"), SIGNAL TO NOISE RATIO: 110dB (IHF"A"), WEIGHT: 35 lbs. (16 kgs), DIMENSIONS: 19" x 7" x 10" (48.3cm x 17.8cm x 25.4cm). Optionally available in E.I.A. standard rack-mount configuration. OPTIONAL ACCESSORIES: Solid Oak or Walnut side panels.



Phase Linear
THE POWERFUL DIFFERENCE

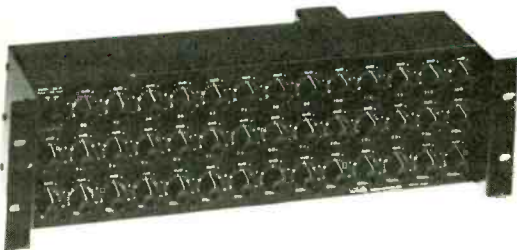
Phase Linear Corporation/20121 - 48th Avenue West/Lynnwood, Washington 98036
Made in U.S.A. Distributed in Canada by H. Roy Gray Ltd. and in Australia by Megasound Pty. Ltd.

CIRCLE 88 ON READER SERVICE CARD

THE **PRODUCT** SCENE

By Norman Eisenberg

ONE-SIXTH OCTAVE BAND EQ



Forty-two knobs (count 'em!) adorn the front panel of the new model 4300 equalizer from White Instruments, Inc. of Austin, Texas. The device features one-sixth octave resolution from 40 Hz through 894 Hz, and one-third octave resolution from 1 kHz through 16 kHz. The mil-spec rotary controls provide an adjustment range of ± 10 dB. Optional plug-in low-level crossover networks permit either bi-amp or tri-amp outputs to power amplifiers. According to White, rooms that previously had been tuned with one-third octave EQ devices, show a "smoothing" or "tightening-up" of the low-frequency response when handled by the model 4300 equalizer.

CIRCLE 18 ON READER SERVICE CARD

STYLISH RACKS

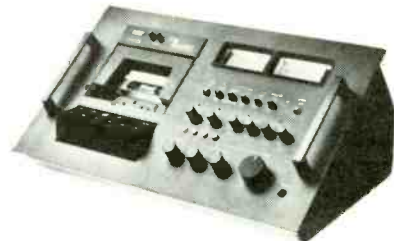
Equipment racks with the look of "expensive wood furniture at very reasonable prices" have been announced by Ruslang Corp. of Bridgeport, Ct. Designed to hold standard 19-inch wide units, the racks come in different colors as well as in wood-grain finish. Fourteen different heights (from 21 to 70 inches, in increments of $3\frac{1}{2}$ inches) are available. Racks taller than 70 inches can be custom-ordered from the manufacturer. The racks come assembled on casters.

CIRCLE 19 ON READER SERVICE CARD

AUDIO ANALYZER; UPDATED RECORDER



New from Nakamichi is its model T-100 Audio Analyzer, which—conceived originally as a tool for the serious tape-recordist—also may be used to test other audio equipment. It combines the functions of an oscillator (20 Hz to 20 kHz), pink-noise generator, a VTVM, distortion analyzer and a wow-and-flutter meter. It also provides signal readouts of average VU or peak levels. Compact and weighing only nine pounds, the T-100 is supplied with carrying case and shoulder strap. Price is \$800.



Nakamichi also has updated its model 600 cassette recorder (which, when we reviewed it back in Oct/Nov 1976, we called the best two-headed cassette deck we had yet tested). The new 600 II has a head that extends response out to 20 kHz. It also now has user-adjustable bias fine-tune with built-in 10-kHz oscillator; stereo headphone output; updated r/p electronics to complement the "Super-head;" revised record-level calibration controls; and a transparent dust cover. New price is \$655 in brushed aluminum, or \$680 in matte black.

CIRCLE 20 ON READER SERVICE CARD

NEW DBX NOISE REDUCER

A professional-format four-track tape noise reduction system—the model 155—has been announced by dbx, Inc. Priced “under \$500,” the new 155 is designed to eliminate audible tape hiss, thereby permitting multiple track “bouncing and mixing without audible noise build up.” It does so, says the company, by providing 30 dB of noise reduction over the entire audio spectrum at all levels. It also, says dbx, permits an extra 10 dB of recording level headroom which is accomplished by retrievable compression—the music’s dynamic range is halved at the input, then expanded by a mirror-image ratio of 1:2 at the output. Each channel of the model 155 is completely switchable from the front panel to record (encode), play (decode), and bypass functions, permitting either four-channel switchable or two-channel simultaneous operation. The front panel also contains record and play level adjustments. The model 155 features user-changeable circuit boards. Rack-mount kits are available.

CIRCLE 21 ON READER SERVICE CARD

FINANCE PLAN FOR TASCAM BUYERS

TEAC has instituted a finance plan to permit buyers to purchase Tascam equipment on credit. The prospective buyer fills out an application that, in addition to the usual credit information, asks him or her to list agent or personal manager, union card number and past, present and future bookings. According to a spokesman for the plan, which is called “FinanceAmerica,” “this will allow our branches to verify the information supplied and more accurately gauge the real total income of the potential customer.” One section of the application is devoted to the studio operator who is not a professional musician but a technician who obtains Tascam equipment for recording performers for a fee. “This individual,” says TEAC, “most likely derives a greater portion of his gross income from this operation,” and so “he will have to supply either a W-2 or an audited financial statement.”

The plan requires a down payment of ten percent for a purchase up to \$6000; twenty percent over that. Terms range from 36 to 60 months. Borrowing rate is a ten percent add-on in states permitted by law; as close as possible to ten percent elsewhere.

CIRCLE 22 ON READER SERVICE CARD

XLR CONNECTORS



Neutrik is the brand-name of new Swiss-made audio XLR connectors now marketed in the U.S. by Philips Audio Video Systems Corp. Available in modules and kits, Neutrik connectors feature two innovations. First, a one-piece three-pronged threaded $\frac{3}{8}$ -inch (9.5 mm) deep collet clamp made of heat-treated Polyolefin plastic will accept cables from 4.5 to 7.0 mm in diameter. Serrated at a right angle to the inserted cable, the collet firmly grips the cable as the threaded black flexible strain relief bushing is hand tightened. Second, components are interchangeable, to facilitate the assembling of connectors with combinations for in-line pads or filters (with or without switch component), for balanced-low to unbalanced-high impedance conversion, female connectors with switch, etc.

Connector housings are made of a tough alloy; inserts are made of fiberglass reinforced hi-temp hard plastic. Connectors are offered in both matte nickel finish with silver-plated contacts, and in black finish with gold-plated contacts. Additional info is available from Philips.

CIRCLE 23 ON READER SERVICE CARD

ECHO EFFECTS MODULE

From HH Electronics via its U.S. distributor Audiomarketing, Ltd. comes news of the CCD Echo Effects Module for use with HH’s Stereo 8 and Stereo 12 mixers. Effects provided include echo, reverb, flanging, vibrato and phasing. The module’s echo select consists of four basic delay times on pushbuttons which may be used individually or in any of fifteen combinations. The first button produces a very fast single repeat known as ADT (automatic double tracking). Other features include variable delay control, vibrato and vibrato speed control, repeat and repeat volume.

CIRCLE 24 ON READER SERVICE CARD

MONO POWER AMP



Designed to be both rugged and compact, the QSC model 3.6 power amplifier is offered by Quilter Sound Co. of Costa Mesa, California for use in sound reinforcement, P.A., musical instrument and disco applications. The unit is spec'd to deliver 150 watts RMS into 4 ohms at 1% clipping. At power levels of 140 watts and below, typical distortion is listed as 0.25% THD and 0.25% IM. Power bandwidth covers the 20 Hz to 20 kHz range. The amp uses complementary paired epitaxial power transistors in what is described as a "highly-refined and simplified circuit" that is claimed to provide the kind of desirable response characteristics and reliability without " 'add-on' circuits often required in more complicated designs" Weighing just sixteen pounds, the amp is priced at \$278.

CIRCLE 25 ON READER SERVICE CARD

INTERSOUND INTRODUCES . . .

Two new devices have been announced by Intersound, Inc. of Boulder, Colorado. One is the Mini-Six Mixer, whose six inputs can accept mic or line levels. Master high and low EQ with master output level controls are provided in addition to an aux-

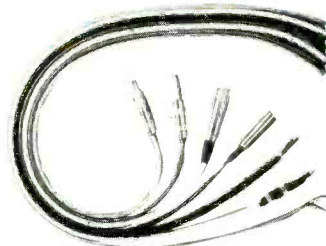


iliary line input for stacking. Available in both balanced and unbalanced versions, the Mini-Six is rack-mountable and is said to be ideal for sound installations, studio and stage mixing or submixing applications.

Also from Intersound is news of its new R100 series Equalizer-Reverb system. Line and reverb signals can be routed through, or can by-pass the four-band equalizer which features center-variable frequency control for precise signal contouring. The R100 has separate gain controls for input, line, reverb, and output signals. The Equalizer-Reverb system too is rack-mountable.

CIRCLE 26 ON READER SERVICE CARD

CABLE ASSEMBLIES



The SA-191 series cable assemblies offered by Sound Applications, Ltd. of Mount Kisco, N.Y. are described as a professional line of preassembled audio cable available in a choice of seven colors and two thicknesses. Configurations include microphone cables, guitar cords, patch cords, headphone cables and adaptors. Assemblies all use Switchcraft connectors. Speaker cable and multi-cable assemblies also are available. Describing the SA-191 series, Sound Applications states that the cable jacket is a modified polyurethane that combines the advantages of rubber and vinyl to make it resistant to abrasions and solvents. Inner conductors are made up of forty-five strands of tinned cadmium bronze for an optimum combination of strength and flexibility. Shielding is a combination of braided, tinned copper wire and a conductive fabric tape wrap.

CIRCLE 27 ON READER SERVICE CARD

NEW BASF CASSETTE

Third in its "Professional" series is the Pro-III ferrichrome cassette from BASF. Says the company: "The influx of tape hardware featuring the ferrichrome switch position now justifies marketing ferrichrome cassettes in this country. In Europe they have been steady sellers."

The Professional III is described as a two-layered tape that combines the properties of high-quality gamma ferric-oxide and regular chromium-dioxide. Its thicker bottom layer of iron oxide is claimed to be superb for recording low and mid-range frequencies, while the thin upper coating of chrome picks up the shorter wavelengths (high frequencies) with extremely little tape hiss. Pro-III is said to offer a significant gain in dynamic range over BASF's normal chrome and conventional ferric-oxide products, and it can be used "effectively at 'normal' bias and EQ settings."

CIRCLE 28 ON READER SERVICE CARD

TIME DELAY PROCESSOR



Designed specifically for recording studios and entertainers is a new audio time delay processor called "Prime Time" from Lexicon, Inc. of Waltham, Ma. The device combines digital audio delays, VCO time base processing, and complete mixing facilities in a single package with self-contained power supply. The mixer section allows use with an outboard reverb unit or other signal processor. An echo return mix is achieved by combining the two internal delays, input, and an auxiliary return which, says Lexicon, allows highly flexible and convenient echo sub-mix processing, thus freeing channels on the master console. Delays also can be recirculated via a second mixing bus to create reverb effects. Several special effects also are provided, such as Doppler pitch shift, natural double and triple tracking, flanging and vibrato. A delay multiplier control provides extended delays up to 2 seconds, which—with a repeat/hold control—allows a rhythm track to be repeated indefinitely with no degradation of the original audio signal. For performance use, major dynamic functions may be remote-controlled by the entertainer's foot-pedal. Two independently adjustable delay outputs and separate digital displays are featured. Dynamic range of the device is spec'd in excess of 90 dB; THD is listed as less than 0.1% at all delay settings. Weighing nine pounds and occupying 3½ inches of panel space, the system is claimed to be designed for reliable operation under the rigors of road use in sound systems. Price is \$1485; the optional memory extension is \$175.

CIRCLE 29 ON READER SERVICE CARD

IT SAYS HERE . . .

Among the many pieces of audio literature to cross my desk this month are a few items worth bringing to your attention.

One is a new book on microphones written by Martin Clifford (*Microphones—How They Work and How to Use Them*, Tab Books, paperback, \$5.95). The book pulls together a lot of information previously available in bits and pieces all over the

map. The subject is generally practical, and takes the reader from fundamentals through more advanced areas, including mic characteristics and generous sections on using mics for recording different kinds of material. The illustrations are unusually good. I'd say this book can be read with profit by the beginner in recording as well as by the more experienced activist who may not be quite sure of many things regarding microphones. If you can't find it locally, it can be ordered by mail for the price from Asphar Electronic Sales, P.O. Box 629, Mt. Vernon, N.Y. 10551.

CIRCLE 30 ON READER SERVICE CARD

Also just released is the Consumer Electronics 1978 Annual Review published by the Electronic Industries Association. This booklet, which has been issued annually for 15 years, now has 46 pages crammed with the kind of inside info you can quote to your friends and sound like a real "mavin." For instance, did you know that last year—while U.S. imports of video tape equipment declined as compared to the previous year—our imports of audio tape gear increased? Or that the total U.S. market for tape equipment has pulled ahead of other audio components and is now second only to color TV receivers? If you write to the E.I.A. Consumer Electronics Group at 2001 Eye Street, N.W., Washington, D.C. 20006 you probably can get up to five free copies of the Review. To order six to twenty-four copies, send .50 cents per copy; for 25 to 99 copies, the cost is .25 cents each; 100 or more copies .15 cents each.

CIRCLE 31 ON READER SERVICE CARD

A new "house organ"—and one of the neatest jobs of its type I have ever seen—is the publication called *Input* issued by ESS, Inc. This one is free for the asking. Naturally it leans heavily in the direction of ESS products, but it also contains some material of wider interest.

CIRCLE 32 ON READER SERVICE CARD

Finally there are two new pieces from Tandberg (Tandberg of America, Inc.) One is "An Update Report on the Scandinavian Alternative" which, in addition to promoting Tandberg, also contains some basic audio information. The other is a "Newsletter" which, again, talks a lot about Tandberg's products but which also includes some fairly heavy technical stuff such as a provocative piece on head configurations in cassette recorders.

CIRCLE 33 ON READER SERVICE CARD



MUSICAL

NEWSIGNALS

MIXING CONSOLES

From Peavey Electronics comes news of the Mark 2 series of mixers. 8, 12, 16 and 24-input versions are offered as is a special seven-channel rack-mount configuration. All inputs and outputs in the Mark 2 series are transformer balanced, and the outputs are capable of an undistorted +20 dBm output. The input channels feature variable input attenuation, LED overload indicator, pre-EQ monitor send, 4-band equalizers, effects send, fader and panpot. The output section of the unit includes the stereo mix buses (submixes) and a master, mono mix which is the sum of the two stereo channels, LED ladder displays for main and sum outputs and a selectable stereo headphone output.

CIRCLE 12 ON READER SERVICE CARD

Quantum Audio Labs has introduced their versatile QM-8A, an eight-input console suitable for recording, mixdown and sound reinforcement applications. Each input channel fea-

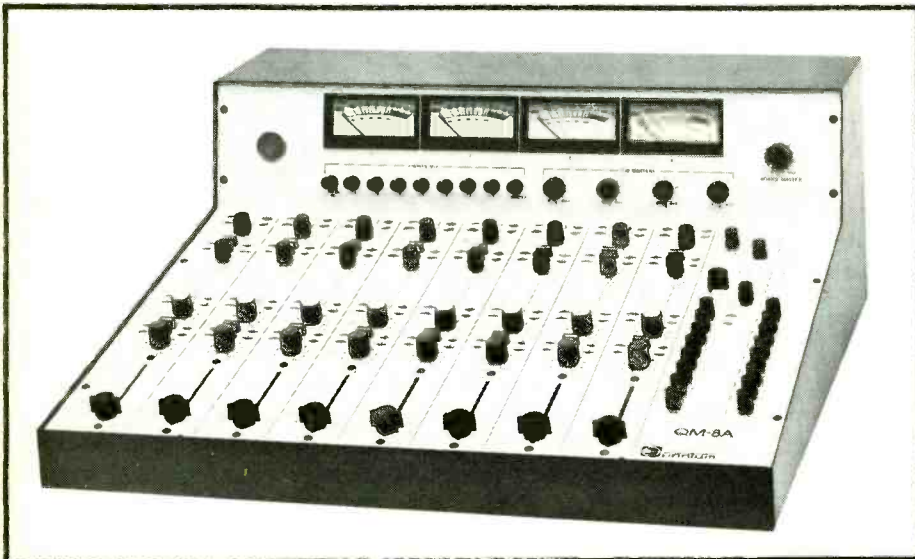
tures a mic/line switch, 15 dB pad, ± 12 dB bass and treble equalizers each with a choice of two corner frequencies, assign switches for the four submix buses, panpot and echo send control with assign switches for the two echo buses. A monitor mix section provides level controls and panpots for mixing either the eight line inputs (for 8-track tape playback) or the four submix buses into a stereo or quad monitor mix. Another section provides controls to mix the eight line inputs into a totally independent headphone cue output. Also included in the QM-8A's design are echo return and talkback facilities, four sub-master level controls, a quad master attenuator, four large illuminated VU meters and provision for input-channel patching via a pair of multi-pin connectors on the back panel.

CIRCLE 13 ON READER SERVICE CARD

SOUND REINFORCEMENT

A new name in America among professional speaker manufacturers is ATC, manufactured in England by

Acoustic Transducer Co. Ltd., and distributed here by Forsythe Audio Systems. The ATC PA75 Series comprises four different 12-inch bass drivers, each optimized for a particular application. All four models feature an extra-heavy, six-spoke cast frame to which the heavy magnet structure is attached with bolts and epoxy resins for maximum strength and rigidity. All models use a 75mm (2.95 inch) edgewound copper voice coil epoxy-bonded to a high-temperature bobbin for a power handling rating of 125 or 150 watts RMS depending on the model. The Standard model has a light paper cone, PVC-impregnated surround and a metal center dome for highest efficiency and a slight mid-range peak; the Standard LS model has a slightly heavier cone and uses a viscous-damped linen surround for flatter and more extended frequency response but 2 dB less efficiency. The Bass LC model has an impregnated linen surround and treated paper center dome plus a long-throw voice coil and magnet structure for extended low-frequency response and high output capability; the Studio Bass model, on the other hand, is optimized for extended low-bass response in studio monitor systems, boasting usable response to 25 Hz (given a proper enclosure) thanks to a special cone design with high-compliance butyl rubber surround and long-throw voice coil. Forsythe also has its own line of low-frequency speaker enclosures including the BA series of ducted-port cabinets and the SR series of exponential bass horns. The SR-115 and SR-215 are front-loaded horn cabinets with additional reflex loading, and are designed to accommodate one or two 15-inch drivers respectively. The 3 dB-down points for the two models are 80 Hz for the SR-115 and 60 Hz for the SR-215. Both designs maintain generally flat re-



sponse (depending on the actual driver used) beyond 1000 Hz to allow use in systems with bass crossover points as high as 800 Hz. The BA series of ducted port bass cabinets are unique in that they have interchangeable ducts allowing the enclosure's characteristics to be optimized for the particular model of driver being used. Three models are available: the BA-121 is a 2.3 cubic foot enclosure for a single 12-inch driver, the BA-151 is a 4.2 cu.ft. box for a single 15-inch speaker, and the BA-181 is an 11.7 cu.ft. cabinet for a single 18-inch driver. All Forsythe cabinets are built from 11-ply birch plywood finished with a two-component polyurethane coating and are equipped with protective steel corners. Recessed handles are standard on the BA series and an option on SR series cabinets. Wheels are optional on all models.

CIRCLE 11 ON READER SERVICE CARD

MUSICAL INSTRUMENTS

Over the last year, Guild Guitars has updated its line of electric guitars and basses. The two latest additions to the line are the S-300 solid-body electric and the B-302 bass guitar. All of the new Guild instruments share the same unique, contoured body shape which was designed for greater comfort during long periods of playing in either standing or sitting positions.



The B-302 bass guitar is a new, double-pickup version of the single-pickup B-301 bass which was the first of the new generation of Guild electrics. Both models are long-scale (34-inch scale) basses with a gently curved fingerboard and wide frets, or are available fretless at no extra cost. The newly-designed pickups have dual pole pieces for maximum output and the solid brass bridge/tailpiece is individually adjustable for precise intonation. The Guild S-300 is Guild's new solid-body electric model and features a 24-fret neck with wide frets and a curved fingerboard with inlaid dot position markers. Hardware on the S-300 is top-notch, including Schaller tuning machines, an Adjusto-Matic bridge and a solid brass tailpiece. The electronics include separate volume and tone controls for each pickup, a pickup selector switch and a phase switch for complete control of the instrument's sound, and everything is accessible through a removable back panel. For pickups, the S-300 features a pair of powerful Guild dual humbuckers, or a special version, the S-300D, is available using DiMarzio PAF and Super Distortion pickups. Both versions of the S-300 come in a choice of five solid colors or a sunburst finish.

CIRCLE 10 ON READER SERVICE CARD

MUSICAL INSTRUMENT ACCESSORIES

One of the most useful accessories for the synthesizer player is the sequencer, and a new twenty-step analog sequencer was recently announced by Wasatch Music Systems, which is designed for use with ARP, Moog or any other patchable synthesizer without modification. The WMS-1020A arranges its twenty steps into two channels of ten steps each which can be used sequentially for a two-parameter sequence of up to twenty steps in length, or simultaneously for a two-parameter sequence of up to ten steps. Each channel has two outputs, one an ascending positive voltage and the other a descending negative voltage. Stepping is controlled by an external clock (with provision for either positive or negative trigger pulses), or the unit's own voltage-controlled clock. Pushbuttons are provided for manual step and reset, and another switch activates a random step mode to simulate "sample and hold" effects. A step over-ride or "hold" switch is

also provided as are switches to preset the sequence length from one to twenty steps. Extra-bright LEDs indicate row and channel for ease in following the sequence as it plays.

CIRCLE 9 ON READER SERVICE CARD

New from Musitronics Corp. is the Mu-tron Vol-Wah Pedal, an AC-powered volume/wah-wah device. The Mu-tron unit differs from other wah-wahs in its use of a scientifically-



designed photo-optical control device rather than a potentiometer which will eventually get noisy and wear out. The physical design of the pedal is also the result of much careful development so that it has the proper "feel" and so that it will not loosen up with heavy usage and lose that feel. The volume and wah-wah functions are controlled by separate footswitches with LED status indicators, so that the effects may be used separately or in combination for a wide range of musical effects.

CIRCLE 8 ON READER SERVICE CARD

Interfax has introduced a unique accessory that could literally be a life-saver for electric guitarists and bass players. The Interfax ST2 Ground Fault Analyzer is a simple-to-use device which indicates shock potentials or dangerous voltages caused by improper grounds or electrical faults in amplification systems. Almost all guitarists have had at least one experience of getting a mild or not-so-mild shock when touching their guitar strings and some other piece of metal, such as a microphone, at the same

time. These shocks are usually caused by a ground fault, or difference in ground potential which can be cured by reversing the AC plug or flipping the amp's polarity switch, but certain electrical malfunctions, particularly in tube amplifiers, can cause dangerous or lethal voltages to exist between the amplifier ground and external grounds. The Interfax ST2 indicates



both the non-dangerous but annoying and the dangerous type of ground faults. Another very useful product from Interfax is their model AS2, a direct box. The AS2 can be connected between instrument and amplifier or to the output of the amp, and its two low impedance outputs may be connected to any PA system, tape recorder or other amplifier. In addition, each of the outputs has its own volume control to match its level to the sensitivity of the amp or PA input that it is connected to.

CIRCLE 14 ON READER SERVICE CARD

Ibanez has taken a big step in the electronics field with the introduction of its model AD-230 Analog Delay and Multi-Flanger. In the past, analog delay circuitry has generally been used for short delay applications where continuously variable delay times are needed, as in flangers, while longer

delay times have been the realm of digital techniques. The new Ibanez unit changes this pattern by using analog circuitry to produce both a flanging effect and long delays up to 600 milliseconds at a lower cost than digital time processors. The AD-230 is a professional style unit designed for rack mounting. Like other flangers, the Multi-Flanger section of the AD-230 is a short delay line whose delay time is varied by an LFO sweep, in this case over a 1 ms to 13 ms range. In addition to the usual speed and width controls for the LFO sweep oscillator, the unit provides controls for delay time, delay level and regeneration for comprehensive control of the sound. The analog delay section produces a delay which is continuously variable from 10 ms to 600 ms in four ranges with maximum delays of 75, 150, 300 and 600 ms. The delay range switch automatically changes the frequency bandwidth of the unit as there is an inevitable tradeoff between increasing delay time and decreasing bandwidth in all but the most expensive studio delay devices. The AD-230 has both high-impedance unbalanced and low-impedance, transformer-balanced inputs which are connected via 1/4-inch jacks and 3-pin XLR connectors respectively.

CIRCLE 15 ON READER SERVICE CARD

A new wah-wah pedal that is not just another wah-wah is among the recent new products from Electro-Harmonix. The new unit is called the Talking Pedal Speech Synthesizer, and is the result of extensive research into the patterns of resonances in spoken vowels. By using carefully-designed, critically-resonant filter circuits, the Talking Pedal creates a full range of round, vowel-like tones as the pedal is swept. By using the pedal and varying the picking style it is possible to

simulate actual speech patterns with a guitar or bass guitar. For more conventional effects, the Talking Pedal also includes a Big Muff-type fuzz-sustainer. Also new from Electro-Harmonix is the Echoflanger, a multi-effect analog delay device. The Echoflanger has four basic operation modes: filter Matrix, which generates a comb filter for chime-like sounds which can be swept manually; Flange, which automatically sweeps the comb filter as in a conventional flanger; Slapback, which generates a single, short echo, variable from 10 to 75 milliseconds; and Chorus, which combines echo and flanging for instrument-doubling effects. The unit incorporates a compressor/expander system for improved signal-to-noise ratio, and a noise-gate for even quieter operation. Two outputs are provided, a direct (non-effect) output and an effect output which carries a mix of normal and processed signals determined by a blend switch. The Electro-Harmonix Echoflanger is AC powered for reliability and has an LED pilot light.

CIRCLE 16 ON READER SERVICE CARD



Moog Music has announced two new electronic products which should be of interest to guitarists, keyboardists, and anyone who uses a PA system as well as synthesizer players. The two units are both equalizers, one a 10-band graphic unit, the other a parametric type. Both models are designed for rack mounting and come complete with handles. Electronically, both units feature a Drive control to match the input sensitivity for maximum signal-to-noise without overload, and low impedance outputs to drive most any other piece of electronics even through very long cables. The new Moog equalizers also feature a bypass status switch and a jack for connecting an optional external bypass footswitch.

CIRCLE 17 ON READER SERVICE CARD



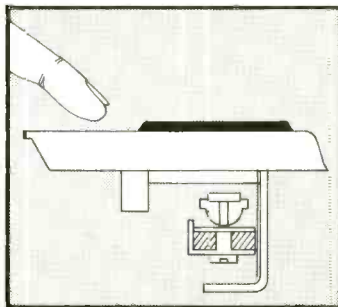
It feels what you play, so you can play what you feel!

Feel the keyboard that feels your fingers. The Multimoog. It's a new synthesizer for the composer in you. And a new keyboard for the performer in you. And each key lets you touch a new dimension you've never felt from a keyboard before — expression.

Keys on most conventional keyboards are like on-off switches. When a key reaches bottom, the sound just sits there. So there's no room for expressing the sounds of a stretched guitar string, a bending saxophone reed, or a soaring violin vibrato.

But now you can put feeling into your performance with the Multimoog's force sensitive keyboard. You can actually guide the sound with the force of your fingers. Create vibratos, trills, or sample and hold. The keys actually feel how much expression you want to give.

While your right hand's playing what it takes two hands to play on other synthesizers, your left



Keys perform like standard keyboard until they meet force sensor mechanism.

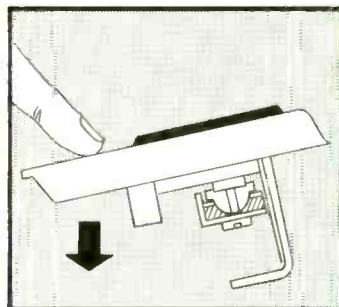
can add a third hand to the sound. Move the music several directions by moving the modulation wheel. Or slide the pitch with the slide of your finger on the ribbon controller.

With all this action at your fingertips, you could almost forget there's a fully variable synthesizer in front of you. Multimoog lets you conduct your sound with two audio oscillators plus a low frequency oscillator, fully variable wave shaping, a long 3½ octave keyboard, single or multiple triggering. And more. Not to mention that famous fat Moog sound.

And thanks to Moog's philosophy, the music is never a side effect of the sound effects. The entire layout reads like a musical composition. With

controls you can get your hands on. After all, sound isn't music unless you can play it.

Stop turning the notes on and off, and start playing them. Touch the sound of the Multimoog at your nearest Moog dealer. And discover just how good music can feel.



Force sensor mechanism translates amount of pressure into amount of expression.



Write for more information.

multimoog

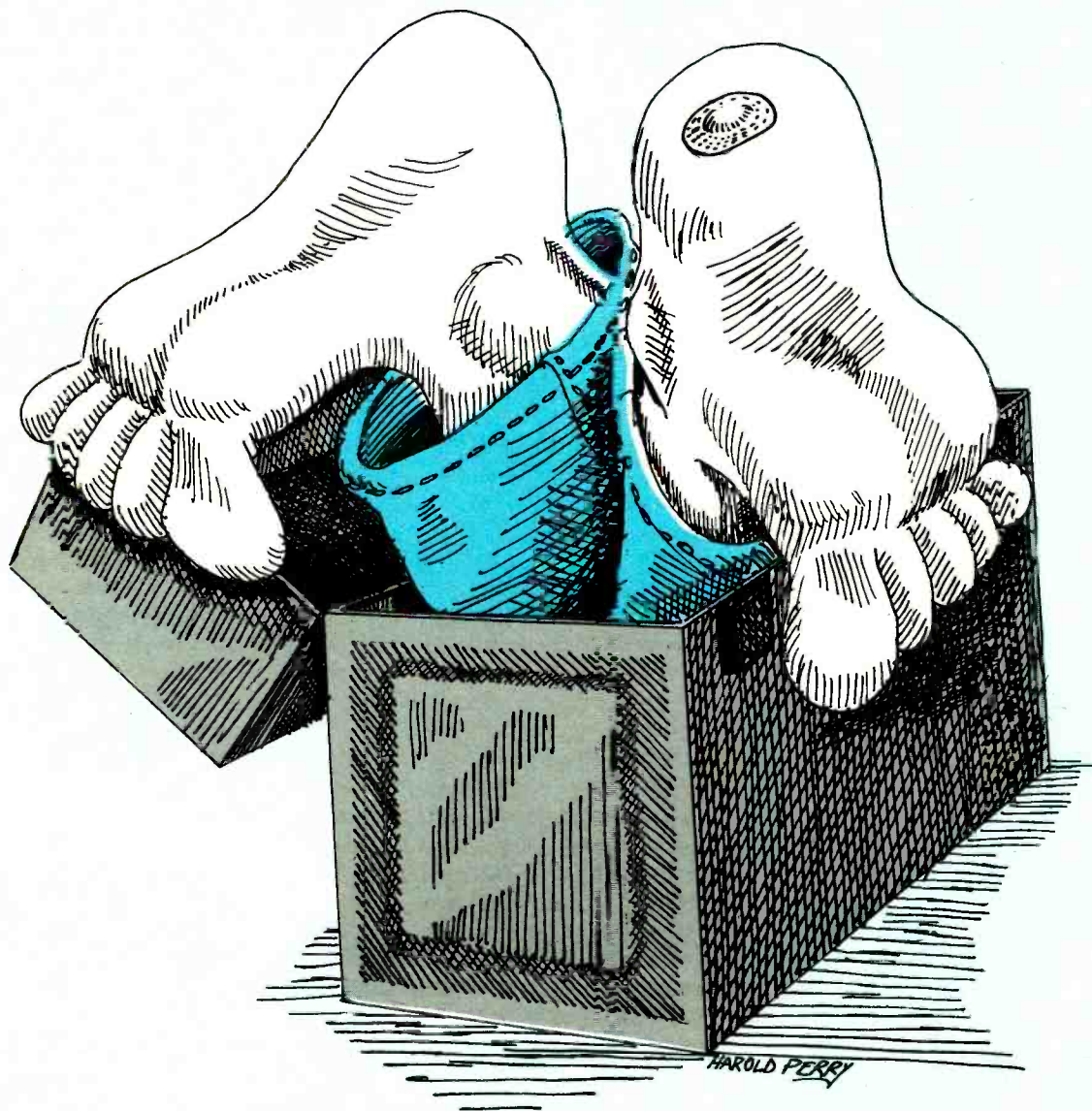
Norlin

For additional information, please write:
Norlin Music, Advertising Dept. MR-3
7373 N. Cicero Avenue, Lincolnwood, Illinois 60646
1 Nantucket Boulevard, Scarborough, Ontario Canada

CIRCLE 83 ON READER SERVICE CARD

Another quality product from Norlin

A DEEPER LOOK INSIDE



A SOUNDMAN'S TOOLKIT

BY JOHN LORD

In the February 1978 issue, MR's technical editors Jim Ford and Brian Roth gave us a look "Inside A Soundman's Tool Kit." The article described what tools a well-equipped soundman should be carrying at all times, and it spurred many readers to write and remark about their own tool problems and equipment-failure remedies. One of those letters resulted in the following piece, which should be considered an addition to the original feature. Our thanks to its author John Lord who took the time to help out our other readers with his insights.

Fixable Problems

Before buying tool one there's a basic question you should ask yourself: "What can go wrong on a gig that I can reasonably hope to repair well enough to be able to go on with the show?" No two people will have the same answer to this question, and obviously, you only need tools to do the jobs you're capable of doing. For example, I once selected a brand-new recording outfit for some scientists who were going overseas to do research. The recorder worked fine when they left and failed the second day in the field—thousands of miles from the nearest factory service. A passing tourist offered to take the thing apart, and they let him. He repaired it, despite the fact that the fault was complex, both electronically and mechanically; the circuit diagram in the manual did not describe the circuit actually in the machine; the design of the machine put a premium on miniaturization rather than ease of service; and he had almost no tools. As it turned out, he was a Ph.D. in electronics and the head honcho in charge of servicing for a very large electronics firm.

On the other hand, if you don't know a transistor from a flashlight battery, rackfuls of test equipment won't help you cure your noisy amp. Real-life examples of this can be found in lots of equipment-outruns-understanding studios all over the world, and maybe that's not bad, that's how you learn. But the point is that if you can't utilize a particular piece of equipment, save your money.

Leaving aside personal differences, then, what fixable problems do we all have in common? I think they come down to this: the wear and tear of transportation makes equipment fall apart. Physically. Literally. Pieces come off, internally and externally, and dealing with that is the first thing

your tool kit should be able to do.

That means we are talking about fasteners. Brian Roth and Jim Ford rightly stressed the importance of giving your gear a physical exam so that you'll have tools to fit all your fasteners. If your amps are held together with Scrulox screws and you find yourself up the proverbial creek, the proverbial paddle you'll be without is a Scrulox screwdriver. Get nutdrivers to fit all the nuts in your equipment.

But don't stop at the tools. Carry spares for every nut, machine screw and wood screw that could conceivably come loose, and most of those that couldn't. Airplanes in particular have a nasty habit of vibrating nuts off and screws loose, and a corollary of Murphy's Law states that any fastener that comes loose will get lost.

So you need to make a fastener inventory of your equipment. For example, the cable clamps on Cannon connectors are held on by $\frac{1}{16}$ -inch fillister head 4-40 machine screws. A supply of these enables you to replace them as soon as they disappear, which can sometimes save having to rewire the whole connector.

Actually, you don't need to carry every size you might need. Built into solderless terminal crimping pliers are bolt cutters for all the machine screw sizes commonly used in U.S.-made electronic gear. If you have a pair of these, you can stock only overlong screws in each of the thread sizes, and trim them to length as the need arises.

However, in many cases there's no help for carrying the right part. How to size the fasteners now on your equipment? One way is with the Screw Chek'r (available from the Brookstone Company, Peterborough, N.H. 13458), a plate with threaded holes in Unified Thread sizes up through $\frac{1}{8}$ ". [Brookstone Co. informs us that the cost of the "Screw Chek'r" is approximately \$5.65.] This will identify everything except such items as the knurled chrome rings on switches. However, if your equipment came with a little sticker saying ISO, all the fasteners are metric and you better be paying close attention because you sure won't be able to get metric machine screws in East Mobeetie at 7 p.m. on a Friday night. There is also a metric Screw Chek'r with the ISO sizes. Finding metric machine screws locally, or maybe I should say regionally, is becomingly less difficult but still is something of a hassle. Do it before you have to do it.

While you are taking all these screws out to find out what size they are, a few thoughts. First, before you blindly unscrew a machine screw from a panel, know what's on the other side. Many times manufacturers will seal critical screws, e.g., alignment screws on head nests, with brightly colored dots of glypt. These tell the service department who has been naughty and performed unauthorized repairs, but they also keep the screw from unscrewing. Don't mess with screwheads so marked. Also, while you're examining these screws, you might consider what provisions the manufacturer made to keep them from unscrewing, and how you could improve on his ideas.

Lockwashers, let's consider them. These come in two basic varieties. Toothed lockwashers have their inner, outer, or both circumferences covered with many little radial teeth, slightly twisted out of the plane of the washer. In principle, these work by biting into a part that might rotate (the head of the screw or the nut) and a part that can't rotate (a panel). If neither the nut or the screw can rotate, the combination can't come loose. Putting a toothed lockwasher between two parts that *can* rotate, like a nut and a washer, is not so good; nor is putting them where the teeth won't be compressed, such as an internal tooth lockwasher under the relieved head of a binding head screw. And if tooth lockwashers start to fail, they will fail, since the biting into the opposing surfaces ends when compression is lost.

An alternative type of lockwasher is the helical one-turn spring. As the name implies, this is really a spring which is compressed as the screw and nut are tightened. The pressure of the spring forces the threads of the nut and screw into closer contact, increasing friction and thus preventing the undoing of the fastener. For the most part, these are used with larger bolts. To be effective, they have to be between two non-compressible surfaces—not wood, certainly.

Instead of lockwashers, it is often preferable to use locknuts, nuts with fiber or plastic inserts which aren't threaded (or are threaded too small) and bear against the screw. No matter how many turns these are loosened, they won't come off. If a particular nut and screw persist in loosening, try one of these.

Finally, the chemical solution to the disappearing fasteners: "Loc-tite." Loc-tite is a company which produces

a line of glue-like substances which you dot on clean (meaning degreased) threads just before tightening the nut onto them. There are two versions—"Stud'N'Bearing Mount," which must be intended for tanks and is too powerful for electronic gear, the screws will twist off before the nut will come off; and "Lock'N'Seal," which is what you want. Good stuff. Be sure, however, that when you go to loosen a nut sealed with Loc-tite you use a screwdriver that fits the screwhead slot exactly. Otherwise, you will chew up the screw.

In addition to replacement fasteners, you need various other means of keeping things all together. Such as a handful of double-headed nails, about six penny. (Incidentally, it's no good leaving out stuff because "that's the stagehands' business." If the act can't go on and you could have prevented it, well . . .) Pop rivets, both aluminum and steel, are very valuable because they enable you to fasten something to a hole in sheet metal when you don't have access to both sides of the sheet. This can save having to open up a cabinet when all you want to do is replace a handle. In all probability a lot of your equipment is pop-riveted together already; see your hardware dealer for a demo.

Finally, you need glue. Not greasy-kid-stuff white glue. Real glue. At least two kinds are needed. First, a cyanoacrylate "instant glue." This stuff is very expensive (about a dollar a gram), colorless, and about the consistency of water. Put a drop on something, press it to something else—sixty seconds later they're stuck for good. The disadvantages of "instant glue" are: first, it doesn't keep, although refrigeration helps, so even if you don't use it you need to replace your tube, say, every six months; second, it only bonds non-porous, smooth, contacting surfaces; third, it is very dangerous, because it'll bond your eyeballs closed just as fast as it'll replace the name-plate on an amp. Treat it with respect. It is awfully hard to play anything with your fingers stuck together. For minor mishaps, there is a product called "Bond-solv" which will release you. A companion product, called Bond-fix, is good for pre-treating hard-to-glue surfaces, like some plastics. A cleaning agent for preparing surfaces to be glued is needed in any case; a little tin, not bottle, of acetone is effective.

For surfaces that are porous or don't mate closely, you need a two-compo-

nent epoxy. Epoxies on the market vary a lot in quality, and you need one that is rather rapid setting. Devcon's 5-minute is O.K.; again, it won't keep forever. Epoxies have to be mixed, generally one part hardener to one part resin, so you should also have some little unwaxed paper cups and popsicle sticks. Stir thoroughly before application. If the components are not uniformly mixed, parts of the joint will be loathsomely sticky for weeks.

So now you have a compartmented plastic box full of replacement fasteners, some tins of nails, a riveter and rivets, and paraphernalia for gluing. This should enable you to repair most of the physical damage equipment suffers as a result of transportation. Let us now look at the innards of the gear more closely.

It is possible for gear to suffer a blow that fractures a circuit board. These fractures may be only hair line cracks that aren't immediately obvious, and the fault they create may be intermittent. But a crack should be suspected if you know the equipment was dropped and especially if you know the boards are, say, phenolic instead of glass-epoxy. One way of repairing such cracks is to use Circuit-Stik running foil lead. This is a thin strip (different widths are available) of copper foil with a self adhesive backing. Stick pieces an inch long or so over all the leads crossing the crack, then solder each end of the piece of Circuit-Stik to the foil of the board. Try not to get solder on the Circuit-Stik at the point where it crosses the crack; you want to leave the foil as flexible as possible along that line since for sure the board will continue flexing at that point. This repair is quicker than making wire jumpers and doesn't change the realization of the circuit in the least, as jumpers in the odd case might.

And now a few remarks on tools, supplementing Brian and Jim's. In place of their candidate for a wire stripper, which will cost you a few strands on every stranded wire you strip, I would vote for the plastic-blade type—if you can afford it—or the Tel-Vac many-little-fingers type. A good source for such stuff is Jensen Tools (1230 South Priest Drive, Tempe, AZ. 85281) which issues a most informative tool catalog, available on request. It lists, for example, fifteen distinct wire-strippers, all very high-quality tools.

I would also vote against the soldering sponge proposed by Brian and Jim,

simply because it will cool off any iron small enough for PC board work so much that work will be slowed down. Instead, try a Re-Tip cartridge. You insert the cruddy tip and pull it out clean. I don't know how it works, maybe it gives off gases that'll kill you young, but it works and the iron comes out hot.

In addition to tools and fastening materials, you will also need spare parts. Here again the problem is to carry only parts you can reasonably expect to make use of, and this depends on your own skills. It also depends on what equipment you have and how you use it, since that determines what components will be failure-prone. Maybe you keep losing output transistors on one amp; obviously you would want to carry extras (and keep a record of what circumstances precede failure, so you can do more than treat the symptom). Certain simple modifications to equipment can sometimes make servicing a lot easier (socketing the ICs) or less frequent (adding a GE MOV-varistor across the AC in).

Finally, it's no good having the equipment A-OK if the people aren't. Although the subject of safety grounding is too complicated to go into here [See Lothar A. Krause, "And Now A Word About Grounding Problems," *MR*, May '78, pg. 36], one tool you need is a three-prong circuit tester, a cheap device whose three lights indicate if you have a ground on the power line. Lighting up the electric guitar player with 110 volt AC is the kind of effect groups aren't looking for. The tool kit is also a good place to keep supplies to treat not-so-major mishaps. Keep: aspirin; Maalox or another tummy remedy; Kaopectate and a box of band-aids, especially the big patch dressings. Such a first-aid kit hardly meets OSHA regulations, but it'll help, and most important it'll be there when you need it.

So bundle all this stuff together in one substantial box—doesn't have to be your standard hardware store toolbox, which doesn't ship too well. A Fiberbilt Adaptacase, an old Salvation Army suitcase, or a custom Zero Halliburton are all probably better choices. Anyway, pack up the kit with the tools, the fasteners, the spare parts and manuals, the first-aid supplies. Latch it up (tape it with filament tape if the latches don't look too good) and trundle it along for many a mile. Here's hoping you never, never have a reason to open it.



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The Making of a Record -part II

by David Moyssiadis





Last month in Part I of "The Making of a Record" we spoke about what preparations are required before taking the plunge and actually heading in to a studio to record. Some of these preparations included having (or quickly acquiring) the following: a song; an arrangement; musicians; a studio; a mastering house; a plating and pressing plant; labels; promotion; and distribution. (The article had to assume that you already had a certain amount of money and were prepared—albeit as little as possible—to shell out the necessary amounts.)

Getting Along

The big day arrives. Everyone's excited. This is the big time; a real recording studio. Keep your head and don't be dazzled. Maintain your purpose clearly at the top of your thoughts as you learn the ropes of studio recording.

The first thing you must do to get every bit of value out of your recording dollar is to show up on time and make sure the whole crew arrives with you. If you *must* be late at least call and explain to the studio. It won't lower your bill any but it shows you care. In the days before mandatory deposit requirements a studio would get a silly call about four days after a no-show and the nerd on the other end of the line would say something like: "Uh... I didn't make my session the other day." What's new? The clock starts whether you're there or not.

When you finally get there, if you have any doubts about anything, even if you don't know where square one is, confide in your engineer. He'll be more than happy to extend his duties and responsibilities to guiding you through the session. Let him know you would appreciate his ideas and advice, whether you use them or not. Every single mixer I have known has his heart and soul in his work (corny as that sounds). I only came across one guy who regarded it as just another job—a means of earning a living. He lasted three months and is selling insurance now, but even he did his best.

So get a good honest relationship going with your engineer. He's a more-than-willing team member and it would be dumb to waste his talents. The enthusiasm is free so use it. Mixers see all kinds of phoniness and insincerity daily and can spot those undesirable qualities even in the next

studio, so don't come on like King Fertilizer or you'll blow it. You simply can't fake it. A mixer hears the words "RCA is really interested in this thing; we're gonna sign up next week" at least once a month. *Bull!* If RCA were interested you'd have front money, your budget would be three times bigger and you'd be signed by now. They wouldn't chance giving you a whole week to make a better deal with CBS, WB, Atlantic, Arista or ABC. When the engineer raises his eyebrows and says, "Gee that's great," he really means, "Who are you trying to kid?"

As long as we're talking about getting along with a mixer, there's one thing that really puts a guy on the spot . . . and it's painful. *Everyone* asks, "What do you think of it?" Well, first, if it's good nothing has to be said. Second, if it stinks and you don't know it you will never be convinced of that fact. Besides he's a mixer not an A&R man; you're asking him something outside his domain. If he knew whether or not your record was going to be a hit he *would* be an A&R man. A mixer would rather take a cold shower in January than be hit with that one question.

There are ways to get constructive criticism out of him (within his capacity), and that help will come out during the session if you let it. Believe it. If you give the signals that you're open to criticism during the session your mixer will do his level best to correct any possible shortcoming. Don't forget, once his hands are on the project his name is on it too and he wants it to be as good as you do. Just don't be offended if he has something to say. He's working in *your* best interests.

The only thing to watch out for is the frustrated producer *disguised* as an engineer. This cat thinks it's his act and believes you brought the song in for his benefit. If he's aggressive about the tune once he gets it on his VU meters and a strange, far-away glowing leer glosses over his eyes, watch out. A purebred mixer will be more reserved if he feels you're heading in the wrong direction. He won't force the issue but rather will use gentle persuasion. And if you don't go for it, he will drop the point. The distinction is that a good mixer will help you try to achieve *your* goals, not make the tune over to his liking.

The Studio

Now you're in the studio and every-

thing is set up (mics, etc.). Don't try to tell the engineer how to do his job. If you want fifteen mics on the drum kit and he only has five don't badger him. He knows his room and his mics best. Don't force him to use more mics than he wants to. Contrary to popular opinion the more mics you use in the same room at the same time the worse the sound gets, because of phase problems, spill and all that technical mumbo jumbo. But that's another story. A good recording engineer will use as few mics as he can get away with while still picking up everything. I have often gotten a much better and more natural drum sound using three mics than I ever got with ten (assuming of course that I got my choice of mics). So don't be impressed by the chrome forest around the drummer. Besides, if the drummer ever had to go potty he'd never make it.

Also you will note that in the control room there are scads of little magical boxes that can turn any sound into any other sound. The common trait (and downfall) of most beginners is that like a kid in a candy store they want to try everything. That's called overproducing, and it will predestine all your records to being stored in your attic—except for the one your mother bought. The stuff (the magical boxes) is there for a reason, but it was never intended to be used all on one record. Pick and choose judiciously, don't overdo it if you must use the special effects department. If your mixer hears something he will select the effect he feels is proper and let you hear it for your approval or rejection. By all means tell him what you want to achieve, what kind of sound you are looking for, either straight or effect, but don't insist on using things just "because they are there." That only worked for Sir Edmund Hillary. Stated another way, the wise producer knows what not to use.

Effects aside, listen to the basic mix and then work on EQ. Equalization and echo will never put a flat note back in tune. All they can do is give you an embellished flat note with echo. Shocking as it may seem the recording is made in front of the mic, although that is not so true a statement now as it was in the past. If your drummer has just graduated from high school and thinks that the drum key is only used to replace heads with don't expect the engineer to make him sound like Bill Cobham.

Make sure you have the sound in the

studio pretty close to what you want before you squawk about it in the control room. But before you even get to that point you will have discovered a horrifying phenomenon about studio life.

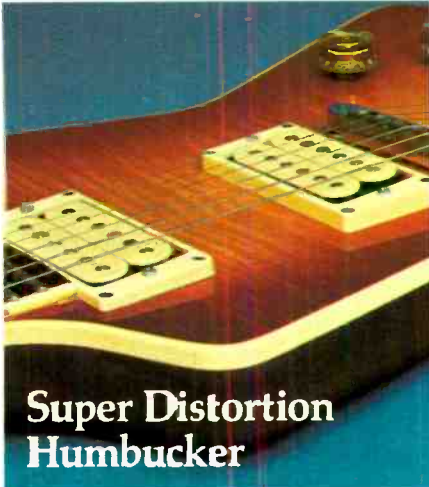
Nowhere can one perform nearly so well as he does on stage, and nothing sounds "right" or the way it does on stage. Why? Well recording studios have a demon under contract whose sole job is to get inside everyone's head and make him silly. Actually, the reason is that suddenly the music is under close scrutiny whereas a stage performance is for fun, a little more wild and less exacting as the whole package is presented. Compounding that fact is that all the warm bodies from the audience are gone; you are in a strange soundproof box with a lot of cold cruel hardware in front of you which will pick up every mistake and magnify it—a rather sterile atmosphere in which to perform.

There is no feedback, no empathy, no appreciation, only criticism: "Your E-string is a hair flat"; "gimme more feel in the release"; "lay into that drum fill a lot more"; "sounds great, let's do it once more." Then to top it off no one can hear anyone else in the room, or so they say. The conga player can't hear the drummer stationed inches away from him. The piano player can't hear the bass, etc. Earphones are supposed to solve that problem, but then no one hears enough of himself. (Funny, many years ago no one used earphones and they had whole orchestras in the same room and everyone heard each other.)

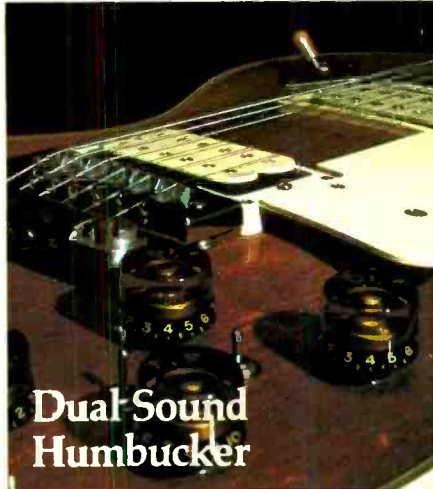
Next thing you know you're only ready to get a balance and the clock shows an elapsed time of an hour and a half. All of this really happens in spite of everyone's best efforts to speed things along. It seems that the only thing that moves fast is the hour hand on the clock. True it's a curse that can't be ignored (unless you have unlimited green stuff), but paying attention to the clock works against you. You can't put a time limit on being creative, but in this dollar-oriented world that is exactly what you've got to do. Unfortunately, every glance at the clock chisels away at your creative efficiency. You just have to learn to live with it.

Just about this time another problem will start to work on you. After discovering that you've just spent about \$200-\$300 and have accomplished zilch for your efforts you begin to get edgy. Watch out for this. The

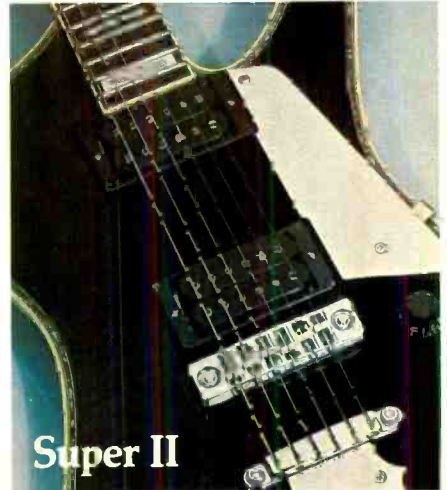
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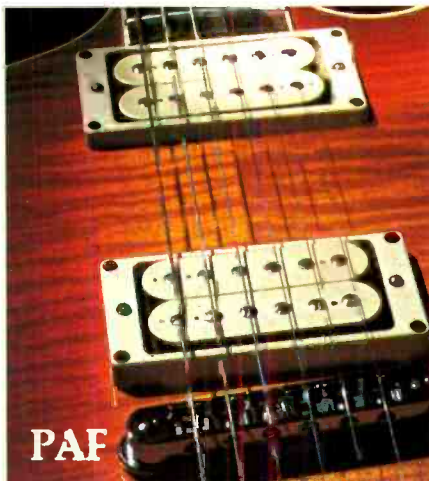
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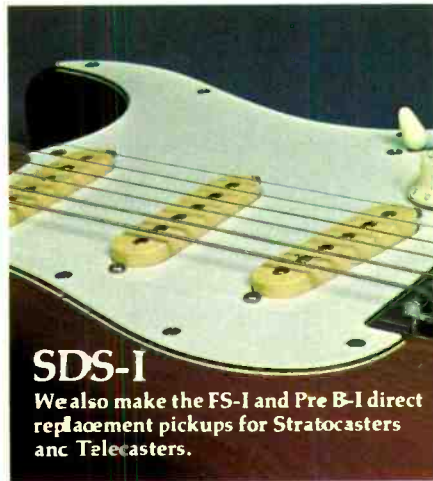
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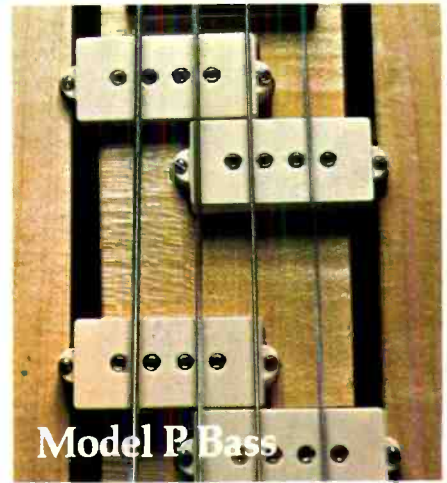
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last thing you should do is take it out on the musicians and lay into them for goofing around. Remember that they are fighting their own battles out in the studio. Adding to their headaches will only create resentment, which at best will slow you down and at worst will make everyone go on a bummer. Then nothing works. You can't get performance out of a bunch of seething musicians. So be careful. Staying in a good mood under all that pressure is a tenuous proposition so don't upset the balance. Still, be firm and if they *are* goofing off straighten them out.

At this point it's time to get down to business and begin to draw on all that preparation you were supposed to have done. By now you have probably found out about the clinkers in the arrangement and you have to work them out. Although it will take a little trial and error don't start experimenting or redoing the whole arrangement. Stick with what you came in with and just change the bad parts.

One important point that should be made is that you must have decent equipment and by that we mean not so much expensive as in good working order. If the amp has a speaker with a tear in it or it has a buzz or hum you better get it fixed before you drag it into a studio. Even if you might get by with it in a club you will find that whatever malady has beset your amp will become the solo on your record in the studio.

It is entirely possible that an amp in good working order will develop a strange buzz in the studio. This will be a result of a grounding problem. Do all the things you usually do to undo the buzz and if it's still there the engineer will undoubtedly be out to correct the problem in short order. For emergencies be sure to bring an assortment of goodies with you such as a supply of fuses, extra patch cords and extra guitar strings, among other things. Studios do not stock such items.

Drum Hassles

When it comes to the drum kit there is often some sort of hassle. Drummers for obvious reasons want to use their own drum set. If the drummer is upset about using the studio set perhaps an explanation is in order as to why he should try to use it first. It is a lot easier to use the kit that is already set up and miked, but more important the set in the studio is tuned and the sound has been worked on "to perfec-

tion." It might be well worth trying to get used to the studio set before lugging in your own set. Aside from the time it takes to tear down the other set and install and mic your set, you may discover that your set just doesn't sound as it should on tape. Also, the engineer may have to do all kinds of "unnatural" things to it to get it to sound "natural." Which will put you right back where you started—the feel will be all off.

The drum set is strange to record. As often as not if it sounds good in the studio it will sound lousy in the control room and if it sounds terrible in the studio it may sound quite good in the control room. In any event always check with the studio before going in as to what is available in the way of instruments and what the studio prefers to do with regard to musicians bringing their own. Some studios don't care which instruments (their own or outside) the musicians use, some prefer that their own (the studio's) are used and some insist that the musicians bring all their own instruments.

Procedural Preferences

Now then, when all the headaches are taken care of it is time to begin recording and laying down tracks. Each mixer has his own way of going about this. Some guys like to make everything sound almost like the final mix on the multi-track. Others just want to get it on the tape first and then worry about the effects later. Both procedures have merit. The more you do in the multi-track the less you have to do during the mixdown. But once you do it on the multi-track you're stuck with it. My preference is to lay the tracks down flat and dry, i.e., no echo and little or no EQ. This way you retain full flexibility and all the versatility that you paid for with a multi-track. You can go any way from there. If you added too much echo on the recording there is no kind of sponge to soak it up during the mix. If you went too far with EQ, many equalizers can not undo what they've already done. If you phased or flanged and now decide it doesn't make it, tough luck. So unless you're absolutely positive about what you want, save it for the mix.

This is the time to tell the engineer what you will be overdubbing so that he can plan on how many and which tracks to use. This is important for two reasons. One was explained in

Part I [June 1978 issue] and the other is the configuration of the track layout. For technical reasons certain tracks on most multi-track machines can not be "bounced," should that become necessary, and that is the same as running out of tracks. Other than that it makes little difference what goes where. That would be a purely personal preference of the particular mixer you're working with. If the mixer wants the bass on track one and you want it on track five let the studio guy have his way, unless you have a very good reason.

Fix It Now

We now are at a crucial stage of the recording. Whatever you record at this point you will have to live with, so make sure you have what you want on tape before the musicians go home. If a take that you think is the good one has a flaw in it it will be a lot less expensive to get one more good take before anyone leaves. After they go home it will really cost to get them back, especially if they are hired studio cats.

Now, the above relates mainly in terms of *musical* perfection. However, if the recording is for some reason flawed don't be thrilled if the recording engineer cops out with the overused, "We can fix it in the mix." That statement is usually inspired by a combination of laziness and procrastination. Every once in a while a very surprised and embarrassed engineer will discover much too late that the something *can't* be fixed in the mix, then *you* have to pay the price. But at the very least it will be an extra annoyance which will rob attention from the normal mix procedures which usually require every ounce of concentration the human brain can manage. All you have to do to drive that point home is to look at the console, some of them have a field of better than *four thousand* separate controls. At that point it is questionable as to whether the recording engineer is controlling the board or the board is playing games with the recording engineer. So get everything down in the recording that should be there while still keeping your options open.

(And again, let the engineer do his thing. If something doesn't look right to you, ask about it. No matter how much faith you have in the mixer he's not infallible. But don't make a nuisance of yourself.)

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bread) that you are tempted to spend all night in the studio. Usually you are limited by the schedule and the next client. But if you are "open-ended" (last session that night) you can easily go several hours (or days) past your allotted time. If the studio has the time and you have the bread that's usually OK, but don't forget the poor engineer. You may have gotten up at 2 P.M. that day and are bright-eyed and bushy-tailed at 4 A.M. the next morning whereas your engineer may have awakened at 8 A.M. two days prior and been in the studio ever since. He has every right to fall asleep on you if you push too far. I remember one fine Monday morning I kissed my wife goodbye and told her I'd be home for dinner around six. I was home for dinner around six . . . on Wednesday. Needless to say I did not find dinner waiting for me—just a frying pan! So you may be fresh when you walk into a studio but the engineer may be dragging already.

Next Stop: Overdubbing

Suppose you've got your tracks on tape, the next step is the overdubbing, where you add to the basic tracks all the embellishments that will make the record what you want it to be. This is often the easiest and therefore the most tedious task. This is the part where you and everyone else will hear the song a thousand times over and over. If everyone still likes the song after this point it might even be a hit. All this usually involves is to play the multi-track back into a set of earphones (which are placed on some musician's head) located in the studio and keep recording takes of that musician's instrument on an open track until everyone is satisfied with the track and the performance. This is done for each instrument or group of instruments until the tune is complete with vocals.

How one goes about all of the above is again an individual matter. Some engineers may want to put several different instruments on different tracks at the same time. Others may want to go one at a time. Or maybe you have a preference dictated by circumstance or the great god \$. Once the song is complete with all the instruments on the tape it is time to mix.

Here again it is up to the individual mixer to determine how he wants to go about this task. He has developed his methods over years of experience and

knows what is the most efficient use of his talents. Now more than ever it is his domain. There should be no musicians in at this time, just you and the mixer. Why? Well invariably you will see the bass player whisper something in the mixer's ear, a few moments later you will hear the bass get louder. Then you will see the organ player go over to the mixer and whisper something in his ear. A moment later the organ will get louder. In about five minutes the lead guitarist will elbow his way to the mixer and . . . That's why you keep the musicians out at mixdown time. Even if you lie to them they will quickly find out that each track is individually controllable, and that anyone can solo just by moving a fader up.

There is a certain bass player/producer who has a running joke with me. At the mixdown I bring up just the bass track—nothing else—and then ask how he likes the mix. His reply is, "Great, just gimme a little more bass though." Obviously he is aware of the powerful tendency for a producer to overemphasize the instrument he plays and can even find humor in that weakness. But watch out for that urge if you play an instrument.

Again at this time it is possible to be overwhelmed by an irresistible compulsion to use every special-effects device in the house. This is the time to make with the effects but again too much of a good thing . . . After your mixdown engineer has gotten a basic mix give him a direction to go in and see what he does. Usually he will come pretty close to the mark if he's worth anything, and you will not need to sit on his shoulders. If the arrangement is what it should be the mix should be little problem at all, and will only require minor adjustments. If on the other hand the mixer *can't* do anything with the tracks—and he wasn't hired by the studio only yesterday—you may have a bad arrangement or an over-produced mess. Both of which make for an impossible mix. With a bad arrangement no matter what you or the mixer does, *everything* sounds as if it's buried in the mix. An over-produced record exhibits the same problem or just sounds too busy—too much to listen to. But assuming that you have done all the right things the mix will come fairly easy. You will walk out with a Master Tape. Now your headaches begin. Talk to you next month.



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ERIC CLAPTON



“LIVE”

Monday evening, April 3, 1978, was the date set for Eric Clapton's only New York area appearance of his most recent United States tour. That same afternoon, after identifying ourselves to the proper authorities, *MR's* photographer and this writer were led to the main arena floor of the Nassau Coliseum in Uniondale, New York. There, the Tasco Sound Ltd. crew was setting up the stage monitors, house

system and lighting for the evening's performance.

We entered the huge oval-shaped hall from a gate behind the standard riser-type stage which had been set up two hours earlier. Almost all of the equipment was already in place, and power, audio and lighting control connections were being made. At first, from a distance, the on-stage scene seemed pretty typical of pre-concert

set-ups; typical, at least, of similar scenes witnessed by me in the past. However, it gradually became clear that this operation was different. In contrast to the usual "fussin' & cussin'" which occurs when roadies, sound reinforcement people and union house staff attempt to work together, the loud conversations ricocheting back and forth across *this* stage were strictly business, mixed with some

LAPTON



VE"

By Peter Weiss

good-natured joking around. There were no traces of tension or hostility, no clashes of authorities, responsibilities or egos. Also, practically every variety of British-accented speech was audible, and this effect, coupled with the crew's efficiency and attention to duty gave the overall impression that what was going on was not in preparation for a concert, but rather for some military operation. One could almost

have imagined Field Marshall Montgomery's ghost riding through the arena in a Land Rover, inspecting the completed work.

The air of military efficiency was no accident. Keith Bradley, Tasco's mastermind on the scene, explained that there were "no rookies" on either his nine-man crew or Eric Clapton's three-man road crew. Bradley went on to praise the courtesy and efficiency of

the Coliseum house staff, and the facilities at the Coliseum. Other aids to efficiency included strict adherence to prescribed set-up and check-out procedures, and equipment selected for overall good quality and "roadability." Although it will be explored in more detail later in this report, the Tasco/Bradley approach to sound reinforcement can be characterized simply by stating the fact that it took a



Stage left of the Coliseum, showing the keyboards and keyboard amps.

twelve-man crew four and one half hours to completely unload two fully loaded tractor-trailers, and to have all the equipment set up, checked out and working. This writer has seen situations in which it took that long simply to figure out where to put the stuff.

The Equipment

Since a sound reinforcement system runs on electricity, the most logical way to present a description of the Eric Clapton/Tasco touring system is to start with the source of AC power. This is taken from the main 220 VAC house supply. A Variac is used to step this voltage up to 240 VAC. Power amplifiers, mixing boards and auxiliary equipment are wired for 240 VAC supply because the system travels in Europe as well as in the U.S. This method of tapping the main house AC supply was found to be a necessity when it was discovered that in certain European performance locations the voltages at sockets on opposite sides of the stage differed by as much as twenty volts. By centralizing the AC supply and grounding in this manner, grounding and equal-loading problems are avoided. [See L.A. Krause, "And Now A Word About Grounding Problems," *MR*, May '78, p. 36.]

The 240 VAC line from the Variac is split up into three separate feeds. One branch leads to a step-down transformer which provides 110 VAC for the instrument amps and electric keyboards. The other two branches are

sent to two eight-receptacle plug boxes, one each stage left and right. The supply cable and plug boxes mate by means of Legrand quick-change connectors. These connectors, which Tasco uses for all of its touring systems, have large, easy-to-grip, molded, high-impact plastic outer cases, with spring-loaded flaps that automatically cover the business end when connections are taken apart. The AC plug boxes and the power amps are provided with non-standard AC sockets and plugs in order to prevent inadvertent misconnections. Each individual power cable is color and number coded to match the portion of the system to which it belongs. This color and number coding is carried through the entire system, on all power and audio cables and on each separate piece of equipment.

Audio

Bradley's choice of microphones for the Clapton band is as follows: Vocals, Shure SM-56 & 58; Instrument amps and Leslies, Shure SM-57; bass amp, AKG D-12; Accordion, AKG C-451; Bass drum and tom-toms, Sennheiser MD-421; Overhead (drums), Shure SM-7. In addition to the microphones used for instrument amplifiers, Tasco custom active direct boxes are used on guitars and bass, and passive transformer-type direct boxes are used for keyboards.

The inputs from the stage which are required for stage monitor mixing are

split off by means of passive mic splitter boxes and sent to the monitor mixing board. The mixer used for this purpose is a 15×4×1 Mavis Engineering product, designed and built specifically and exclusively for Tasco.

BGW 750A power amplifiers drive the two 12-inch Celestion Power Cell drivers (a Tasco exclusive) in each floor monitor wedge. High frequencies are handled by Crown DC-300As feeding JBL 2305/2470 horn/driver combinations. The JBL components are mounted on top of the wedge enclosures. In addition to floor monitor wedges, the monitor system includes three large stacks of speakers, each consisting of (from the bottom up) two JBL 4560 enclosures housing two Gauss 5840 drivers each, and a JBL 2395/2482 combination with a slat-type acoustic lens. One stack is located behind the drummer, and the other two are placed facing each other, cross-fire style, one at each side of the front of the stage. During a conversation at the Coliseum, Bradley mentioned that these "side fill" monitors sometimes cause minor difficulties due to leakage from them into the vocal mics. The leakage tends to give the vocals a nasal quality during quiet spots in the music, or when performers are speaking to the audience between numbers. The remedy for this problem is a call on the talkback line to Doc Double, the man in charge of monitor mixing for the Clapton tour, and a veteran of tours with The Who and other acts.

It was during the discussion of

monitor leakage that the subject of anti-feedback measures was raised. Surprisingly, no special devices for anti-feedback are employed in either the monitor or house systems. Prevention of feedback is accomplished by monitor speaker placement and careful control of levels. There are two graphic equalizers in a rack next to Double's mixing board, but according to Bradley and Double they are not used.

The house speaker system is a very impressive array of drivers, horns and enclosures. Each half (stage left and right) of the house system consists of: six JBL 4550 enclosures each housing two Gauss 5840 bass drivers and four JBL 4560s each containing one JBL 2220B speakers for lower midrange; four JBL 4560s each containing one JBL 2220B, plus four Martin radial cabinets each driven by two 12-inch cone-type drivers for lower midrange; two JBL double 2356/2482 units for upper midrange; a combination of twelve JBL 2350/2482s, two 2395/2482s (acoustic lens), six Emilar radiators and eight JBL 2345/2420s (hi-range radial design) for the system's high frequencies.

The power amplifiers feeding the bass section are BGW 750As, and Crown DC-300As drive the remainder of the system.

Bradley explained that the components had been selected in order that the entire system be easily tuneable to meet the requirements of a wide variety of performance locations. Bradley tunes the system by listening to a pre-

recorded music tape and adjusting the two-channel, four-way active crossovers located in a rack beside the house mixer boards. These crossovers are also custom designed and built exclusively for Tasco by Mavis Engineering. The features of these crossovers include four VU meters per channel, to monitor the levels of the four outputs per channel. Each output channel is provided with an individual level control. The three crossover frequencies (bass to lo-mid, lo-mid to hi-mid, hi-mid to high) are selectable by means of three 10-position rotary switches per channel.

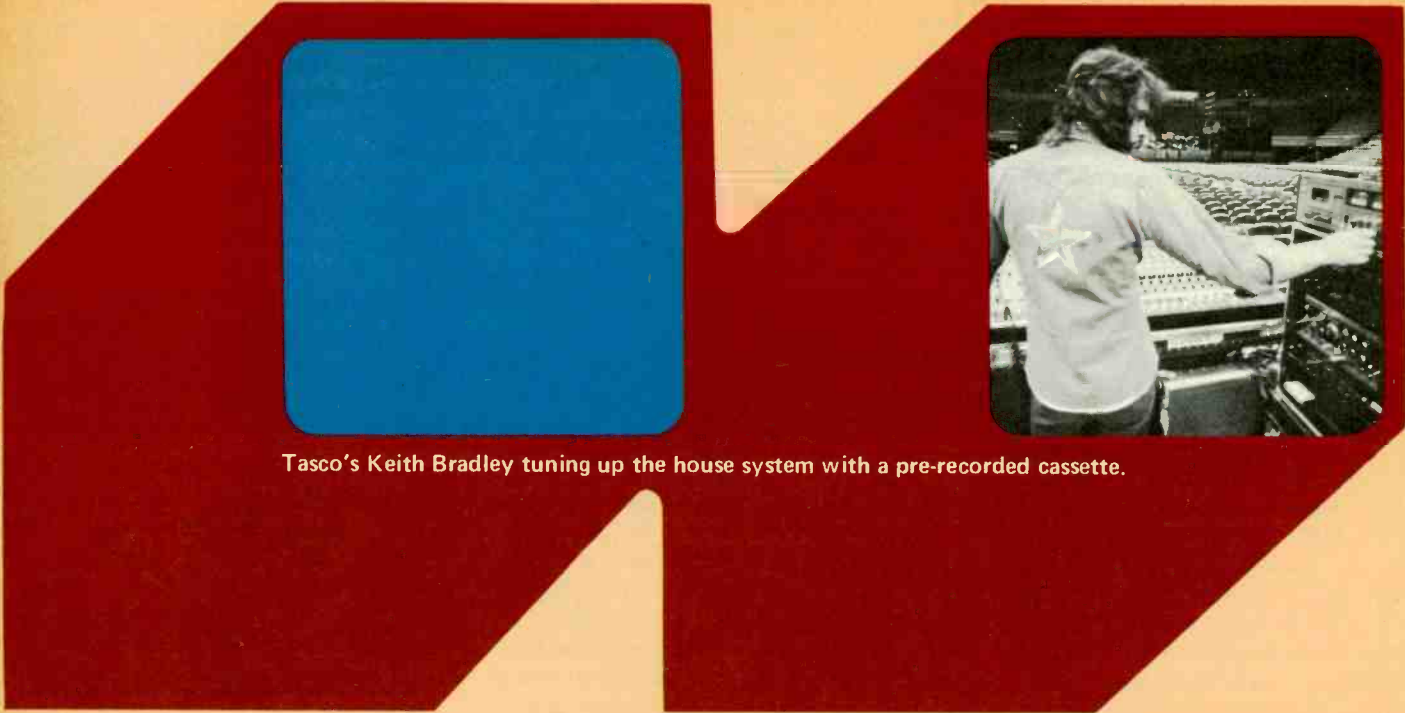
The two crossover channels receive their inputs from a pair of Mavis 15×4×1 custom mixing consoles identical to the one used for the monitoring system. A fourth console is carried as a spare, or for occasional use as a third house mixer. The designation 15×4×1 refers to the fifteen inputs, four grouping buses, and one output channel available per mixer. The grouping buses or submasters allow the console operator to divide control of inputs into groups according to musical type. For example, all vocals might be selected to one group, bass and drums to another, etc. In the case of vocals, the individual faders would be used to set the relative levels of the different vocals, while the group level control would effect all the vocals at once, preserving the internal balance between vocal elements. The grouping buses are each provided with level controls and VU meters.

The Mavis consoles also provide fifteen VU meters to monitor the outputs of the 15-input modules. Continuously variable attenuator pads on each input prevent overloading the inputs to the preamps. Occasionally, instead of padding, additional level is required to overcome level loss due to overlong cable runs. Since such level loss has occasionally been a problem in the past, Tasco crews in the field are anxiously awaiting delivery of a new active splitter box. This device will not only provide multiple outputs for each microphone input, but will also pack enough gain to overcome any conceivable level loss problems. Bradley reported that a prototype of this device, built by Mavis, fed the Tasco monitor and house mixers, the Rolling Stones' recording van console and three independent broadcast feeds, with plenty of level for everybody, good clean signal, and no grounding problems.

Also on the list of expectations is a new model Mavis input module. It is basically the same as the current version, except that the equalizer section has been modified. The present 3-frequency equalizers have switch-selectable high, low and midrange frequencies and continuously variable amounts of boost or cut. The new equalizers will be 4-frequency types (low, lo-mid, hi-mid, high) with the lo-mid and hi-mid frequency selections made parametrically. This will allow stepless, continuous frequency selection over these portions of the audio spectrum. The high and low frequen-

An upstage view of the Musicman guitar amps and the Leslie speakers.





Tasco's Keith Bradley tuning up the house system with a pre-recorded cassette.

cies will be switch-selectable, and all frequency ranges will have continuously variable boost or cut. The division of the audio spectrum into four bands is more compatible with the 4-way crossovers, and when the new modules are installed the result will be a remarkably flexible and tuneable system.

Special Effects and Lighting

Perhaps the reader has noticed that in the description of the system thus far there has been no mention of special effects devices, audio, visual, or any other variety. The reason for the omission is that such devices are very scarce in the Clapton touring system. There is an Instant Phaser sharing Bradley's auxiliary rack with the crossovers and a Roland RE-201 tape-loop echo device, but neither the phaser nor the echo unit was used during the Coliseum concert. If a band member requires a special effect, foot switches and pedals for each instrument are on stage to provide wah-wah, delay, selection of Leslie or regular amp (available for keyboards and both guitars), and regulation of Leslie rotational speed.

The lighting for the tour is fairly conventional, with a crank-up Jiffy stand holding two horizontal arrays of colored gel lighting units twelve to fifteen feet above the stage. In addition, there are two "trees" placed at the front corners of the stage which hold units for fill and spot lighting.

During the concert, there were two follow spots in the balcony that were

occasionally used for dramatic effect, but generally the light cues consisted of color and intensity changes paced with the music. It was evident that the primary focus of an Eric Clapton concert is the musical performance, and from the crowd's reaction that Monday night, Clapton fans would not have it any other way.

Musical Instruments and Amplifiers

Since musical performance is the main concern, the Clapton road organization concentrates considerable effort on maintaining all of the musical instruments and accessories in excellent working order. Clapton's two Fender Stratocaster guitars have been customized and modified. The pick-ups are custom designed and built, and the pick-up selector switches have had the detents and springs removed in order to provide positive, no-backfire pick-up selection.

In addition to the two Strats, there is a Martin D-35 equipped with a Helpinstill 2-way pick-up. The Helpinstill was selected because it mounts (by means of a non-marring adhesive strip) onto the body of the guitar, between the bridge and hole, out of the way of the guitarist's fingers or picks, rather than across the hole. The Helpinstill derives its signal both from string vibrations and guitar-body vibrations. The resulting tone is excellent, although the sensitivity of the pick-up to guitar-body vibrations can produce feedback or leakage problems.

The electrical instruments on stage are connected to their respective amplifiers by lengths of Belden 8410 single-connector shielded cable terminated in British-made "Telephone Brand" phone jacks. These jacks are for heavy-duty use and have internal strain relief that stands up to the abuses likely to occur on long road tours.

The Tasco Approach

In the introductory paragraphs a half-joking reference was made to the military-like approach that the Tasco crew, headed by Keith Bradley, exhibited toward the concert situation they faced. Considering the subject seriously, one is led to the conclusion that such a disciplined approach is necessary in order to avoid time- and energy-consuming pitfalls and breakdowns. The equipment, methods and procedures used in setting up and operating the Clapton touring system were developed by Tasco with the help of input from experienced operational people like Bradley.

Another hedge against confusion during set-up time is the strict policy of permitting no on-the-spot jury-rigged additions or modifications to any portion of the system. If any modifications are to be made, they must conform to the same high standards set in constructing the entire system. A Tasco crew on tour has facilities for performing quality work of limited extent on touring equipment. Tasco maintains offices and

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equipment stock internationally, so that a crew on tour can have what it needs in the way of logistic support at all times.

Keith Bradley is responsible for executing the Tasco policies, and in general, for the entire technical side of Eric Clapton's U.S. tour. During a far-ranging discussion prior to the Coliseum concert, he described some of the problems he had encountered on the Clapton tour up to that date. All of these difficulties concerned the particular performance locations, and not any equipment or personnel. The problems, in almost every instance, were caused by overly-reverberant halls. Bradley's comments indicated that fighting against a reverberant sound almost equal in intensity across the spectrum to the sound from the house system is fighting a losing battle. Another sound-wrecker is the type of hall that produces a delay time before the first echo that causes any sound coming from the system to become garbled and indistinct. Not only does this last problem annoy the audience and sound reinforcement system operators, but it makes it extremely difficult for the performers to use the stage monitors at lower than brain-frying levels.

With all of these acoustically-generated problems, it was not surprising to hear Bradley speak about outdoor concerts in a very positive sense. However, even these reverberation-free situations present difficulties

for sound reinforcement. According to Bradley, the location of the house-system mixer is much more crucial in an outdoor environment than in a hall or coliseum. The reason for this is that in an indoor location the sound field does not change appreciably from place to place. Outdoors, however, the sound field can be very different for different listening locations. The mixer, therefore, must be located in a spot that provides the average audience "ear view" of the stage and reinforcement system. Since outdoor audiences tend to cover large areas, it is necessary for the mixer in charge to locate himself towards the rear of the audience. Ideally, personnel located at various spots in the audience area, and in touch with the mixer by means of talkback lines, can report on the quality of the mix reaching their individual areas. In this manner, a sound quality which sounds reasonably good over a wide area can be obtained. The obstacle to placing the house mixer console at the rear of a large outdoor audience is generally the level loss due to increased cable length. Fixed pre-amplification at the stage, such as will be provided by Tasco's active mic splitter box, is a sure remedy.

An additional problem that Bradley mentioned in these discussions concerned stage monitoring; specifically the overall "feel" that the band members experience on stage. This quality varies considerably from location to location, depending on overall

location acoustics and stage position within the locations. An attempt by Tasco to minimize the effects of these variations will take the form of a portable shell. The purpose of the shell will be to "standardize" the acoustics, at least in the stage area, making stage monitoring more comfortable for band members, and for monitor mixer Doc Double.

The Results

As previously mentioned, the focus of an Eric Clapton concert is the fine musicianship of the performers, not any contrived stage effects. Therefore, it is the job of the sound reinforcement system and crew to deliver the performance from the stage to the audience with as little alteration as possible. For the most part, the Tasco system and crew met this requirement flawlessly. There was some slight difficulty with the bass portion of the spectrum, but this was due to the peculiarities of the acoustics in the Coliseum. Also, at first there seemed to be an absence of high-frequency signal, but this was corrected before the end of the first number.

Watching Bradley and Double operate during the concert provided an affirmation of the overall impression of relaxed professionalism gained during the set-up period. The entire Clapton-Tasco-Bradley operation was a textbook example of efficiency and professionalism, supported by equipment of first quality.



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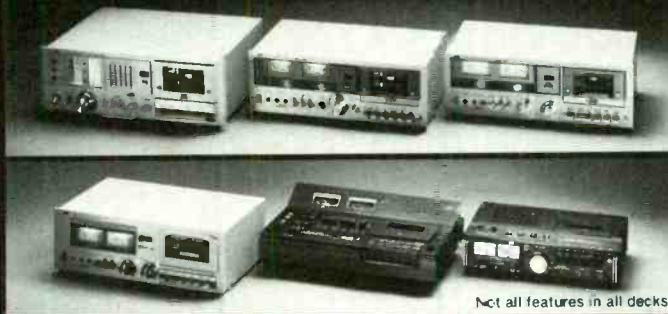
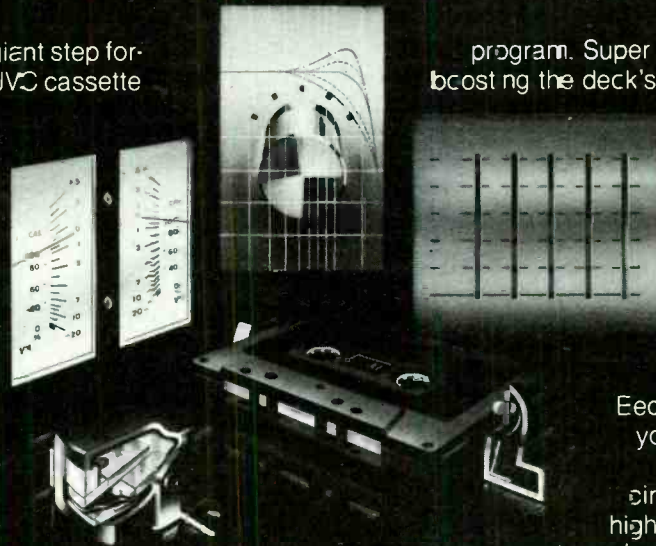
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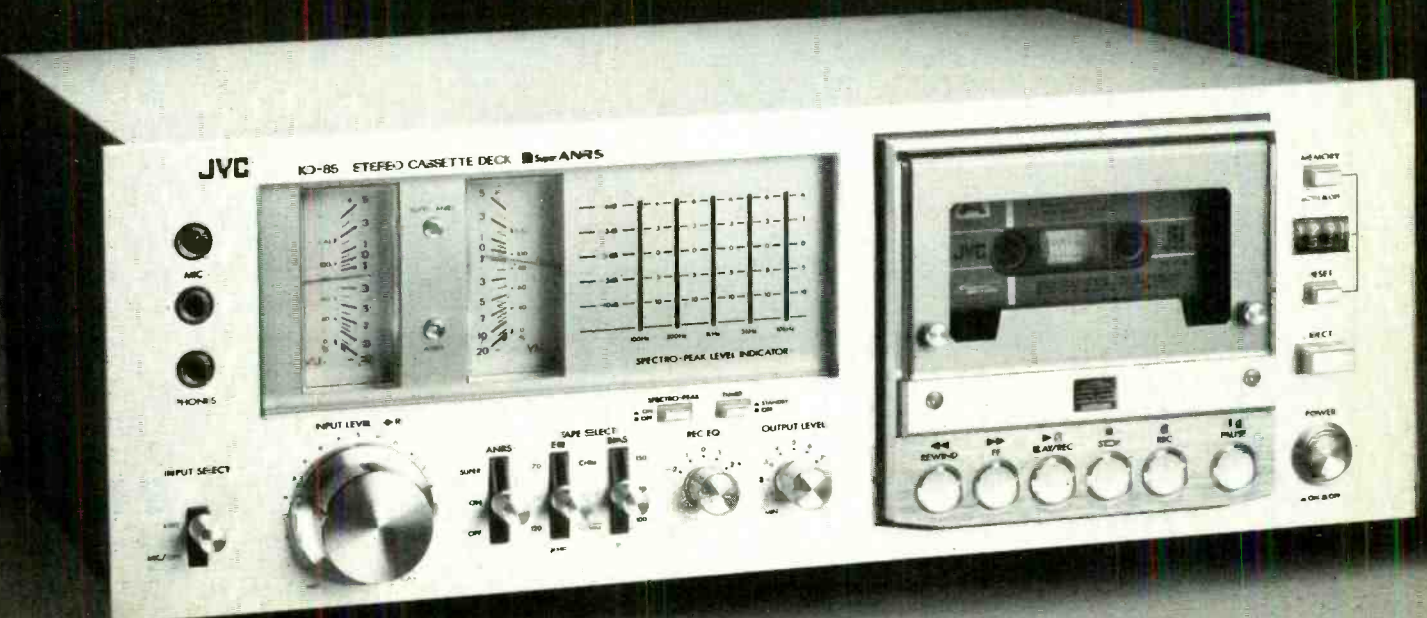
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RECORDING



**Kris
Kristofferson
&**

**Rita
Coolidge**
By Nina Stern

**An Interview With Producer David Anderle
and Engineer Kent Nebergall**

David Anderle produced his first album, Judy Collins' critically acclaimed *Who Knows Where the Time Goes*, for Elektra Records in 1969. He has worn many hats in the music business, having run his own management company, his own record production company, set up the west coast office of Elektra Records and served there as head of A & R,

and most recently, been affiliated with A & M Records as director of talent development while continuing to produce. Anderle has produced each of Rita Coolidge's solo albums and both of Kris Kristofferson and Rita Coolidge's duet albums for A & M, and also produces Kristofferson's solo LPs for CBS/Monument, his only outside work at this time.

M.R.: When did you become involved with A & M?

D.A.: After I left Elektra, I started my own independent record production company, Willow Productions, basically because of two people I'd met. One was Rita Coolidge, who at the time was singing background during the Delaney and Bonnie days, and the other was Mark Benno. They were the first two artists.

M.R.: You've produced all of Rita's solo albums?

D.A.: Yes. During that time, I did a Scott MacKenzie album for Ode Records and an album with Rick Roberts after he left the Burrito Bros. But mainly it was Rita.

M.R.: So you brought Rita to A&M?

D.A.: Yes. My association with A & M, on an independent production level, started around 1970. I think in 1971, I had lunch with Jerry Moss and he asked me if I would come to work for A & M, but also maintain my position as an independent. I was unsure of what he wanted. Finally, I said, "Look, what do you want me to do?" He said, "Well, I would just like to have the 'street David Anderle.' You're always out there and I'd like to have you represent us wherever you go, yet maintain your position as an independent." I said, "You've got it, fine." I did a few more outside productions, but as time went on it got harder and harder for me to make records for another company. Everything here at A & M was good—real good. I had gone to school with Herb Alpert, so it was like things locking in again. Now the only act I'm doing outside of A & M is Kristofferson, whom I met through Rita, of course.

M.R.: As an artist, Rita seems to have a very broad appeal . . . she does that old Peggy Lee song, "Fever." I've never heard a contemporary singer do that.

D.A.: See, that's how I got interested in Rita. She came to my attention when I was doing the Delaney and Bonnie album at Elektra, because my office was right across the hall from the studio. Every once in a while, Bonnie and Rita would come in to relax or be away from what was going on at the

studio. One time I walked in and the two of them were singing old songs—old 40's and 50's songs, trading licks, as it were. It used to kill me about both of them. Rita's faves have always been Sam Cooke and Peggy Lee.

M.R.: In her albums, there's always a little something for everyone. Blues, rock 'n' roll, country. Also, the individual musician's performances are highlighted on her and Kris' records.

D.A.: Well, that's part of my philosophy. In making a record, I don't want anybody involved in the entire process who's not interested in what's going on, including a second engineer. I don't want them around. If there's a second who has been assigned to my session and he's not into what's going on, I'll ask him to leave. I need everybody's energy to make a record. I most especially need the musicians' energies. I have always tried to get musicians who are not only tops, but who really dig what's coming down. Since I'm not a musician, I must ask them to give me an awful lot. I become more of an editor than an arranger. Consequently, it seems natural to me that if they're giving up all that [energy] and it's helping form and shape the music, then they've got to be heard in the final product.

M.R.: Isn't that a change that's occurred in recording in the last few years? The musicians are becoming more important as individual performers, so that it's no longer an individual solo performer out there in front?

D.A.: Yes. Somebody has claimed that two things happened on the *Who Knows Where the Time Goes* album for the first time. I don't know for sure because I haven't researched it, but they said it was the first time that credits for musicians were given song by song. I never even thought of doing it otherwise. I was so knocked out by everybody—since it was my first album—I just thought everyone deserved that credit for being so sensational. Also, it was said that that album in a way was the first time what you're talking about occurred. Where the singer, the song and the musicians became one at a session. Where it didn't sound like a band that had been

performed. Jim Gordon told me—he was drumming on it—that it was the first time he had played at a session where he actually saw the singer. He had been so used to playing tracks in the studios.

I'm sure it had happened in Nashville . . . I think that's the way country music's been made forever. But from a pop point of view, *Who Knows* . . . may have been the first album to do that. And I've never changed. That's how I learned, so I've just stuck to it. Every album I've made with an artist like Rita I've done that way. It just seems real natural. And I don't think I'll ever change—I don't know how to make those other kinds of records.

M.R.: So, you've always tried to recreate the "live" sound on your albums?

D.A.: Yes. I've never really gotten into "production" records as such. Every once in while, I'll do something that has a kind of flair to it, but basically the body of my work is involved with getting that kind ["live"] of a sound. Almost everybody I work with does it "live" when we're recording. Most of the vocals on the things I'm doing are either totally "live" or they're touched up. Once in while, we might overdub the vocals. But it will always be real close. Everybody has to sing when we're recording the track.

M.R.: What about concept LPs? Do you think the trend is leading away from concept albums?

D.A.: Every album I've ever done I've thought was a concept due to the fact that we've tried to keep it organic. I always felt that *Who Knows* . . . was a certain kind of concept. The concept being "live" performance of songs that weren't dissimilar to each other. Even to the point of trying to figure out a beginning, middle and an end to the album—trying to program the album as a "live" performance.

M.R.: You've just completed work on a Cory Wells album, a new solo for Rita, one for Kris and a duet album [Kris & Rita]. When were those projects recorded?

D.A.: I did Cory Wells' album, Kris' solo album, Rita's solo album and the

duet album basically all at the same time. From October ['77] till a week ago [March '78]. Not because I planned it that way, but because that's the way things turned out. We cut the duet tracks in three days, we cut the tracks for Rita's album in a week. Then a week later we cut Kris' whole album in three days.

M.R.: That's a short period of time.

D.A.: Too short, in a way. I mean, I think it came out well. Because another thing happens; you get a real nice sense of spontaneity and freshness I think which makes for a very "live"-sounding performance. But again, that's not because we sat down and planned to do it that way—it was the performance.

M.R.: Which studio did you record the duet album in?

D.A.: Sunset Sound [Hollywood, California?]

M.R.: Was the mixing done there too?

D.A.: All mixing has been done at Sunset Sound since *Lady's Not For Sale*. And all of Kris' albums.

M.R.: And, the release dates of the albums? When are they due out?

D.A.: The duet album has been released in Europe; it's not going to be released here for a couple of months. Her solo album is scheduled for May 12. Kris' solo album came out a month ago.

M.R.: And the players on the album? Do they use the same musicians they tour with?

D.A.: Kris uses his band in the studio, except for the bass player. For Rita—on the other hand—I only use Mike Utley on keyboards and Sammy Creason on drums from the original band. I have made most of her albums that way, with studio people. I hate to say studio musicians, but I guess that's for lack of a better term.

M.R.: And the duet album?

D.A.: It's their band, basically, Mike Utley and Donnie Fritts on keyboards, Sammy Creason on drums, Steven Bruton and Jerry McGee on guitars, and Dennis Belfield on bass, the only one not in their road band. Terry Paul, the fellow who plays bass with them on the road, does a lot of singing. That's it, basically. There are horns on two of the songs, and the horn section obviously does not play with the band, but the horn parts were written by Mike Utley.

M.R.: What about arranging the material?

D.A.: Well, it depends. On Kris'



Producer extraordinaire David Anderle putting some finishing touches on a take.

album, it's Kris and the band. It's a real organic situation. On the duet album, the same thing prevails. There are a couple of tunes that have strings that Gene Page did for us, but they were done after the fact. On Rita's albums, five cuts on *Anytime . . . Anywhere* and all the arrangements on the new album were done by Booker T. Jones, with Mike Utley on some of the tracks.

M.R.: And choosing the songs for the duet albums? It must have been a collaboration.

D.A.: Absolutely. They were still on the road when it was getting close to the time for them to start thinking about it. It was the end of an extremely arduous tour. I had heard from somebody that Kris said, "David is selecting the material." I went through some incredible periods of time, trying to find songs for them to do. Of all the things I got in, there were about fifteen or seventeen songs I selected. I put them on a cassette and mailed it out to them. I was getting a kind of passive feeling from Kris at this time and I wanted to spark them into thinking about the work which was coming up.

M.R.: Was he working on a film

then?

D.A.: I believe he was working on *Convoy . . .* and Rita was going through her first thing with a hit. Anyway, he rejected everything I sent out! But that was fine, because what it did was to spur him into getting it together, which was just what needed to happen. The whole process with Kris and Rita has always been totally wide open—whoever comes up with it, gets it.

So, what happened was they got back to town, time came for them to start thinking seriously about the duet album, and Kris really came up with the material. A lot of it is his songs, two of them are Billy Swan's songs, one is a Steven Bruton song, there's a Donnie Fritts song—they're in the band [Bruton and Fritts]. There's almost the entire album. Three of the songs are from T-Bone Burnett, who's a friend of theirs. The only real outside song is "I Fought the Law," the old Bobby Fuller song. Kris felt we should cut it as a hit, as an AM single if we could pull it off. So we did.

M.R.: Any difficulties you encounter working on a duet album with them as opposed to solo LPs?

D.A.: It's a little difficult, only in

terms of trying to meld the two styles together. Yet somehow when Kris and Rita get together, a unique magic occurs, it's something you can't really sit down and point out, there's no way to plan on it. The nature of the material tends to be country, not real country but kinda bends towards it. Simple songs, love songs; obviously we try to choose songs that have something to do with them, personally. Or them as two human beings together that have something about which two other human beings together would say, "God, that's the way *we* feel about it." There's a lot of things I can do with Rita a little bit trickier than I can do with Kris. When they're together, I kind of go to a more simplistic approach. And go for the magic of when they are together.

M.R.: Do their singing styles change when they're together? Like, they create a new sound?

D.A.: I think they have become really supportive vocally of each other. Kris is singing better now than he's ever sung. A lot of people credit that to Rita, but at the same time, I've seen some things come down between them where I'd also give him the credit for her singing better.

M.R.: And what about their voices, when you're recording them?

D.A.: There's something that happens when Rita sings, like there's a top and a bottom to her voice. Rita has a very clean sound, you can close your eyes and almost see her voice. And she's got that beautiful smoky underside to it, too. Particularly on ballads, I've tried to maintain the airy quality in her voice. Kris has that same strong underside to his voice—he too has a lot of air. When Kris sings, it's important to hear that sound that continues on after he's finished a word. So I guess what I'm saying is their voices in terms of recording are not that dissimilar. They both have that quality. If we can just get the right song and record it the right way, it sounds phenomenal.

M.R.: Do you have the "hits" pegged for the duet album?

D.A.: Well, I think the most obvious is "I Fought the Law," because it's a terrific version, but to me I think the big ones are the ballads.

M.R.: Are those old songs?

D.A.: A couple of them are old Kristofferson songs, but they're not old like "Higher and Higher." There's a couple of exquisite ballads, and a great love song. A couple of funny

ones—we try to do a lot of humor if we possibly can.

M.R.: Do you think Kris' recording career has suffered because of his film career, or is he getting back more into his music?

D.A.: Well, I think he's back into his music more than he was in the last few years, but I don't know what it has to do with because I've only been with him so much . . . it's real hard for me to pinpoint it. I mean I could say the movies had something to do with it [hurt his music], for sure, because I know how much time the movies took up. Kris is a real devoted human being. When he gets into something, he really gets into it. He doesn't play with anything.

M.R.: They're both very dedicated to their work.

D.A.: Of all the people I've known, I've always put myself into the top ten of maniacal workers—people who are total maniacs when it comes to work, but sometimes I have to sit back and look at the two of them and shake my head in awe. The area that they cover is absolutely staggering. I can't believe they are still on their feet. Especially now with the pressure they're under with the success.

M.R.: As far as choosing the singles, do you as the record company pick them or do you just wait to see what seems popular after the album comes out?

D.A.: Well, in the past, with Rita, we "shotgunned" the lot. We'd done that thing the record companies do more now than ever before, and I think it's extremely dangerous. That is, "Let's put out the album and wait for the consensus." There is no consensus! The Northeast wants what it likes, the South wants what it likes, the West . . . it always comes down to that. So instead of dealing with ten selections, you're dealing with five—and that's real dangerous. You don't get any consensus, you don't get any one thing. We had done that with every Rita Coolidge album until *Anytime . . . Anywhere*. We'd just put it out and wait for the radio people to tell us. But the radio people aren't going to tell, really. What happened this last time, Jerry Moss said, from the time I played those tracks in his office, "Higher and Higher" is going to be the single." So we released the album, and we released the single. This way, if it doesn't happen then you can always try with another one. But I think if



Engineer Kent Nebergall working with the performers in Sunset Sound.

you have a feeling about a song, then it's safe to do it that way.

M.R.: You'd never approached it that way before?

D.A.: I remember, when I was working with the Ozark Mountain Daredevils, on their second album, the first song we put out didn't do anything—and the second single was "Jackie Blue." But, yes, I'd never been involved with something where we came up with the first single till "Higher and Higher."

M.R.: How do you deal with that side of the business—where you have to

live with a "live" act, the costs would be astronomical. When Rita started off seven years ago, I went to Jerry Moss and asked him for \$100,000 to put a band together and buy her a year because I knew she'd make money. Well, we got that and her career was begun. Nowadays \$100,000 may get you out of L.A. The burden on the record company is so huge they say, "Come on, where is it, where is it?"

M.R.: But the commercial side of the business is a necessary evil?

D.A.: That's just as much part of it as the other, sometimes it pays for the

"You now can do four more acts that don't sell 150,000 albums." It's okay, I think it's fine. I support that. I couldn't be the one producing them, but it has to be done that way. There have to be the guys who make the big bucks. The thing that kills me is when the big bucks don't filter down. That drives me crazy.

M.R.: Do you consider yourself a maverick producer?

D.A.: Oh yes, I always have. I'm still waiting for a door to open and somebody to say, "Ah, we've caught you." I still have that sense of awe with the fact that somebody actually is putting up money for me to work. Less now because I make a lot of money for them, but I came in through the back door, and I'm totally not a musician. I've never even wanted to play an instrument. I've never even wanted to be on stage.

M.R.: You don't seem to like the limelight much.

D.A.: I don't like it at all. I guess I'm real strong for my artists that way. I love the song business. I really do love it. I love the agony of wondering if it's good enough. I love it when it happens and I love the fact that right now, somebody out there in the Midwest is playing Rita Coolidge and they're having a great time. That just knocks me out. I'll never meet them, they'll never meet me.

I remember when I first started, I'd go to people's houses and see one of my albums, and I'd go, "Goddamn, what an up!" I try to also tell people that when we're working in the studios. I try to keep that feeling there, as opposed to making the big bucks. Like, let's not think, "Boy, this is going to knock Dylan out!" F---, Dylan, man let's think about Joe Blow out there who's going to write a letter saying, "Last night I was listening to your album with my girlfriend and we're going to get married."

The people I work with have that same basic sense of responsibility. We talk about the burdens we have to face—having to have a single, having to make money. Like the thought of someone saying to Jackson Browne at some point, "If you don't have a single, you can't make a record." I mean, come on, that's not fair at all.

M.R.: So, what's the bottom line for you and your artists?

D.A.: I always feel, with people like Rita or Jackson or Randy Newman or Kris, if they just get the chance to be heard, there's enough people out there.



Kris Kristofferson and Rita Coolidge sharing a break during a recent session.

come up with a certain number of sure-fire hit tunes per album. How much of a burden is that?

D.A.: Well, everybody's very singles-conscious. Everyone I talk to, even with Kris' new album, they say, "What's the single? When can we get the single out?" It's like it takes care of business for everybody—nobody has to work. All the work is done for you if you get the single. But what a burden it is on the promotion departments . . . on the producer. You have to think that way. And you can't sur-

other. Even at Elektra Records we used to tell Holzman [Elektra's former president] that it's okay to have certain kinds of acts because if you do it right, one act pays for another. There are certain acts that should be allowed to make records. How do you allow for people to just make their records? Somebody has to pay—you have to make money to spend money. I think it's okay for some totally commercial-sounding act to pay for somebody else. If they can make all that money and give it to the record label, and say,

Like Rita said, "I just want to make enough money to be allowed to go in one more time and make one more record." That's all I want out of life—I just want to pay back the guy who put up the money and go in one more time. It's fun doing it. And that's all I want.

Interview with Engineer Kent Nebergall

The first session that Kent Nebergall ever sat in on was, as he puts it, "ironically at Sunset Sound, an album of Rita's. I had called Bruce Botnick—an engineer I really admired—and he invited me down to the studio one night to listen in. That was seven years ago..."

M.R.: Which albums have you worked on with David?

K.N.: I recorded one of the tracks and mixed the entire *Anytime . . . Anywhere* album. I did all of Kris' last album, *Easter Island*, did the entire duet album and did all of Rita's new album. I also recorded all the tracks on Kris' previous album, which was mixed by someone else. Up until last year, I was doing a lot of overdubbing. Some guys do it real fast, but I wanted to wait so I could absorb as much as I could.

M.R.: Do you prefer working with performers who have one type of sound?

K.N.: I really like all styles of music. What I want, and what's been happening with David, is to work with one producer. With David, lots of times I'll start to make a move, like adding more bass, and I look to see that as I move the bass up he's getting ready to tell me to do just that. We've been together so long, our minds are locked in together. There's hardly ever a session we go into where he says anything to me about the sound . . . and if there is, I'm happy to change it. That's the way I go into a session, too, with a band. The very first thing I do is set up the whole session, and I tell the band that when they come back to hear a playback, if there's anything they don't like, then tell me about it. I'm no prima donna, we're all here to make a good-sounding record. I've worked with a lot of engineers who'll take the attitude—"That's the way the bass is going to sound, and if you don't like it, that's tough." But that's not where I'm at.

M.R.: What's the equipment at Sunset Sound?

K.N.: For our monitors, we have all

JBL. I prefer JBL components. I like to work with the API equalizers. The boards at Sunset are all custom-made, 32-in and 24-out. We use a fader called a Penny-Giles. I like small, compact boards; I've never really worked on a computerized board, but I've seen them and I prefer the compact ones. Any kind of effect or gadgetry I can do at the boards at Sunset with a couple of patch cords and a small outboard. I don't like a thousand knobs that are there to impress clients . . . at Sunset, everything is right within reach.

The room we record in is a real "true" room. We hardly have to add anything when we go to master. David and I both have worked at Sunset for so long, that I can walk in there and in ten minutes I've set up a good basic sound that I can work with.

M.R.: How many recording rooms is Sunset equipped with?

K.N.: They have two and they're building a third right now which is an exact replica of the mix-down room which we used for all the albums I've mentioned. The reason for the third room is that the studio David and I like to use to both record and mix in is preferred by most people. So they recreated it specifically for people to mix in, with a small room next to it for overdubs and other last minute things. The little room is actually big enough for albums where there are a few players, one or two instruments at a time.

M.R.: Recording the duet album took about three days; how long did you spend on the mixdown?

K.N.: From my point of view, I work totally by emotion. If I've recorded it, I've kept the end product in mind—so I can pretty well go right for the sound I want. It takes about fifteen minutes to put the sound together and then I work out what should be pushed or pulled, where to ride the vocals, which David helps a lot on too. I think the longest we ever spent on a mix is about two and a half hours for one song. I've seen people spend eight or ten or twelve hours on a song, but for me, I lose that emotional buildup.

M.R.: What tape machines did you use?

K.N.: At Sunset we have an Ampex and an MCI . . . a brand new Ampex I really like the sound of, but I find it's not real fast on punching-in for overdubbings. With the MCI, I find you can punch-in right on top of the vocal. The 3M's the same.

Most of the tracks were recorded on

an older model Ampex but I requested the MCI for overdubs. I also like the MCI because it has a computer dial up so I can mark up my lyric sheet for each chorus and verse. Ampex also has one on their newer models. They're all good, actually.

M.R.: On the duet album, how did you set up the musicians in preparation for recording?

K.N.: At Sunset, in studio One, there's a long room, with a low ceiling. As you're looking through the window from the control room, to the left there's a little isolated vocal booth which is where I put Kris and Rita. They both sang at the same time. In the very back of the room there's another isolated room that's a lot bigger. That's where I put the acoustic guitars for "live" recording. If you put the acoustic guitars in the main room with a drummer like Sammy Creason, who plays real hard, it's going to leak into the acoustic guitars, which can cause problems when you go to mix it down.

I'll set it up as if there are no acoustic guitars. Looking out from the control room, to the left, directly next to the wall, I'll have the drum kit with baffles all around it, then a real long baffle in front and then the bass player, then one electric guitar, another electric guitar. As you're looking at the drum kit, the piano will be to the left, pushed away from the drums at an angle so that there's not too much leakage. I totally baffle the piano off, plus it has its own cover. I stick the mics in through two little holes in the cover, then I put blankets on top of that as well. I position the Wurlitzer and the Fender Rhodes and the organ so you have kind of a square. The effect of this is that the entire band can have eye contact with Kris and Rita. The only drawback is that the two acoustic guitarists can't see, but they can hear at least with the headphones.

M.R.: So that's your basic set up; what about miking?

K.N.: We really don't change miking from song to song. The only thing that really changes will be the level. Obviously, when they're playing a ballad it'll get much softer, so I have to push the faders up to get more level, or when they rock and roll I'll have to pull them back, but I hardly ever change the mics. Once I get the sound I like, it pretty much stays the same.

M.R.: What [mics] do you use for Rita's vocals?

K.N.: I find the old Neumann tube mics, the U47s—now “out of print”—are the finest for vocals. We’ve used them on Rita for six years, although we changed on her new solo album to an old Telefunken 251. That’s one thing at Sunset—they have a lot of really old, out-of-print microphones, and I like the sound of tube microphones a lot. The limiters I use are old 176 UREIs that are tubes. I like the warmth of them. On tom-tom’s I use Sennheiser 421s, because they’ll take any kind of level you can throw at them, they’re good, directional and they’ll take a lot of punch. I use two overhead mics, which are Sony C37As with power supplies. I’ll use a Shure mic on the snares—an SM57—and an AKG 451 on the high-hat. I also use a little windscreen for the high-hat which will cut out the air without disturbing the sound it makes. For the bass drum, it varies. Sometimes I’ll use an old Altec 633, which is better known as the “Salt Shaker,” or I’ll use a Sony 22P or Sennheiser 421. One of those three, depending on the bass drum. I’ll have all three there so if I don’t like the sound I can alternate till I find the one I like best.

M.R.: Are the guitars recorded direct or are they miked?

K.N.: I usually mic them. I haven’t worked with the kind of bands that you might go direct, like the Doobie Bros. . . . Don Landee is one of my favorite engineers. He does a lot of direct. I will always take the bass direct, guitars I alternate. Sometimes I’ll use U47s on them, sometimes 57s . . . it’s the difference between a \$1000 mic and a \$90 mic, and they both sound good. On the piano I use Neumann M49s, another old, out-of-print mic. For the vocals, for Kris I used the Telefunken 251 and for Rita the U47s. So, as you can see, outside of the Sennheiser 421s which I use on the tom-tom’s, and the snare mic and the high-hat mic, most all of them are mics which you can’t get anymore. For the acoustics, I’ll either use a Neumann KM84—sometimes I mic from the inside—or I’ll use an AKG 451 from the outside. If I’m doing overdubs, sometimes I’ll use two mics. I’ll mic from about a foot away, both pointing towards the sound hole but from different directions so you don’t get the sound coming straight out.

M.R.: Do you do much overdubbing on your albums?

K.N.: On the duet album there’s not a whole lot of overdubbing. We used to

do a lot of it, but when you get a band like Kris and Rita’s, where they’ve been touring so much together, they’ve got the songs down. You usually get most of everything “live.” There might be a few errors here or there, and we’ll overdub those, but not too much at all. Then of course there’s the sweetening—the strings and horns or whatever—and those sections are all overdubs.

Rita is incredible on vocals, almost all her vocals are “live;” we’ll have to do just a few little things to patch them up. Kris is getting really good, a lot of his stuff is “live,” too. So there’ll be hardly any overdubbing as far as the tracking dates go. Lead guitar solos we almost always overdub, ‘cause you don’t want to take the risk of blowing it (if they’re doing it “live”) and having it leak into the drums. I find the most tedious part of it all is the overdubbing; I like overdubbing to an extent because I’m real fast, but for me the fun part is cutting the tracks and mixing. Overdubbing can really wear you out . . . with Kris and Rita, though, there’s really a minimal amount of it.

M.R.: How do you achieve with Rita that vocal effect that’s becoming her trademark as a singer? Do you use a lot of echo?

K.N.: A lot of that is the echo chamber at the studio we work in. Also I’ll put a certain type of EQ on the return of the echo to brighten it up a little, to take a little of the low end out of it, but 80% of it is Rita. She’s an incredible singer, and the U47 tube mic and tube limiter are all part of it. But it’s mostly her.

She’s such a good singer, I don’t use a whole lot of limiting on her at all. She stays pretty much right in one place, knows when to back up or when to lean forward.

M.R.: What about EQ settings?

K.N.: On Rita, I hardly do anything—maybe +2 at 7, +2 at 5 and -2 at 50. I walk in and I can pre-EQ her before she’s even in the room, just through working with her so many times.

M.R.: And Kris?

K.N.: It’s pretty much the same, because I’ve worked with him a lot, too. He moves around more, so I have to limit him more, but he’s getting a lot better as far as being aware of the microphones. I don’t have too much trouble with either one of them. Like, when I mix the album, there’s only a couple of places where—usually on the

choruses when the background vocals come in—sometimes I’ll have to ride his vocal up a bit to keep him just a little ahead of the backgrounds, because he never likes to be out too much in front. Or maybe there’ll be a word that he’s softened up on and dropped back, and David’ll want to hear it so I have to boost it up. But Kris has gotten real good in the studio.

M.R.: Any songs you’re particularly excited about on the album?

K.N.: Yeah. It’s one David and I both like a lot called “Silver Mantus.” It’s like an Oriental song, with just Kris and Rita doing six vocals—two leads and two, two-part harmonies from each of them. It’s a real vocal extravaganza, a very special song, and “I Fought the Law.”

M.R.: What about the interaction between the musicians, Kris and Rita, David and yourself while you’re actually cutting?

K.N.: Kris has a lot to say about the whole thing. He usually communicates with Mike Utley, who helps with a lot of the arranging on most of Kris’ stuff and the duet stuff. David listens to them, and then steps in and gives his opinion as well. They’ll go through it maybe three or four times before we’ll get it down on tape, then the whole band will come in and listen to it, and then they’ll work out the bugs. But we usually have them within ten takes, it doesn’t take too long.

David is the best I’ve ever seen at letting the artist work it out; he’s all for the artist. He’ll only step in if there’s something he can’t stand. And they’ll always come to him after they’ve worked it out to ask what he thinks. He’ll tell them—“It sounds good, but are you guys sure about the ending,” or “It’s a little bit shaky still.” Things like that. But he gives them a lot of freedom, which many producers don’t do.

M.R.: What about your plans for the future?

K.N.: You might say it’s been my dream or hope to have a producer-engineer team, like Don Landee and Ted Templeman. There’ve been a couple of times when David didn’t show up, and I went ahead and mixed the song, and he liked it . . . I know what he wants now and I know what I’m doing. I guess my goal is to be a freelance engineer, and I would like to continue with David for as long as he keeps going, because he and I get along and work very well together.





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Ambient Sound

BY LEN FELDMAN

Digital Audio Taping—Pro and Con

Some months ago, in this column, I talked about the coming of digital audio recording on tape and discs. In that first mention of this new technology (which some call PCM recording, for pulse code modulation) I described, in very general terms, some of the anticipated advantages of digital recording. As with all new and revolutionary technologies, my information was supplied largely by those manufacturers and engineering departments which had been hard at work developing various digital recording systems. Since then, much more information has become available regarding this subject and so this month I would like to take a second look at digital audio tape recording, explain how it works and also suggest that this new recording format does not yet promise the audio utopia that early press releases suggested.

Binary Coded Audio Signals

Whatever the differences between the many systems of digital recording that are springing up (and we'll look at those in a moment), there are a few things that all the systems share in common. They all start by translating continuous, or analog waveforms into a series of numbers. Each number represents the instantaneous amplitude level of the familiar continuous audio signal. It should be obvious that the more times one samples a waveform and denotes its instantaneous amplitude, the more closely the series of sampling numbers will approximate the actual waveform shape. For example, a simple sine wave could be sampled only twice—once for its positive peak, the other for its most negative value. Thus, such a wave could be represented by +1 and -1. It is also clear that if such a rudimentary representation of a sine wave were used, it could also "stand for" a triangular-shaped wave, a square wave, or any peak-to-peak waveform that may have positive and negative values but may also undergo an infinite number of wiggles and variations between those peaks. So, to reduce distortion (or, putting it another way, to insure accuracy of digital representation of *any* waveform), we have to sample that waveform at as many points as possible.

Furthermore, we need a large quantity of numbers

to describe its instantaneous amplitude if we hope to cover a wide range of audio levels (dynamic range). The dynamic range of a digital recording system is directly related to the number of "bits" used in each sampling of the audio waveform. It can be shown that for each "bit" we add to the system, we pick up 6 dB of dynamic range. Thus, a 16-bit system (now proposed for professional recording applications) would afford a theoretical dynamic range of 96 dB! Furthermore, since the number of bits used in any system determines the quantity of numbers available to describe the instantaneous amplitude of the signal we are trying to digitally encode, a 16-bit system would give us 2^{16} levels of amplitude (2 multiplied by itself sixteen times, or 2 to the 16th power). That adds up to 65,536 available levels or numbers! Even a 12-bit system (proposed for home recorders) would yield a dynamic range of 72 dB (better than most cassette decks using Dolby and equal to the best of what's around in open-reel analog tape recorders) and 4096 available levels with which to describe the instantaneous level of the waveform.

It would appear from this that even in a 12-bit system, an error of one level (say, number 4095 is mistakenly used to describe a sample of the waveform that really is at 4096 level) would result in "distortion" of only 1/4096 or 0.024%! That's several orders of magnitude lower than we normally get from even the best analog recorders using high-quality tape.

But wait a minute! What if we are trying to represent a very *low* amplitude signal—one that perhaps needs to be represented by the number "10" in our available 4096 numbers. Now, an error of one number represents a distortion of 1/10, or 10%. In other words, in a digital system distortion actually gets worse as signal levels get lower. That's just opposite to what happens in an analog taping system where distortion increases rapidly only as signal amplitudes become great and approach the saturation level of the tape (or the signal-handling limits of the associated electronics). That means that to keep the distortion at reasonably low levels, the recording engineer has to stay well above the "zero" end of his available number scale. But if he does that aren't we giving up some of that newly acquired 72 dB of dynamic range?

How About Compatibility

Already, there is evidence that we are headed for an incompatible situation in the world of digital tape recording. Some manufacturers are offering 12-bit coding and encoding systems, while others are talking about 13-bit and 14-bit systems for home use and, as we have already mentioned, the professional segment of the industry favors a 16-bit encoding and decoding system. While it is not too important that professional master tapes be compatible with home playing systems (after all, half-inch tape and one-inch or two-inch master tapes now used in studio work can't be played on home machines either), it would be chaotic if tapes produced on one home machine could not be played on another consumer-type digital tape machine.

Besides needing a universal standard for the number of "bits" used in home digital tape recorders, we should have a standard regarding the number of times per second that the waveform is sampled and translated to this number-code. Theory tells us that the signal sampling rate should be at least twice as great as the highest frequency we are trying to record. So, if we want full frequency response out to 20,000 Hz, that means a sampling rate of 40,000 per second. Yet, earliest prototypes of home digital recorders have used 40 kHz, 45 kHz and other sampling rates, while in the professional area, 50 kHz sampling seems to be the rate favored.

In this instance, at least, some semblance of order seems to be happening. The AES (Audio Engineering Society) has formed a standards committee which has already succeeded in establishing a standard sampling rate of a little higher than 44 kHz for use in all consumer digital audio tape decks. The reason for the odd, non-rounded-off sampling rate number has to do with the fact that many of the proposed home digital tape decks are designed to interface with home VTR transport systems. (For example, Sony has announced an attachment for their popular Betamax video tape recorder.) Accordingly, a sampling number had to be chosen which was directly related to the video line-repetition rate of standard TV systems around the world. The choice of 44 kHz-plus takes account of these different systems and results in a maximum timing error of only 3-seconds per hour in the worst case.

Software, Editing and Other Problems

The tape that will be used for digital audio recording has requirements which differ substantially from those of the tapes we now consider to be top-grade. While tape saturation (or maximum magnetization level) is of importance to us in analog tape recording it will be of little concern to the digital tape recordist. Remember, what we are recording is nothing more than a series of "on and off" pulses. The tape is either magnetized (for "on" pulse) or non-magnetized (for a binary "zero," or "off" state). So, while the dynamic range of the recording may be impressive, the dynamic

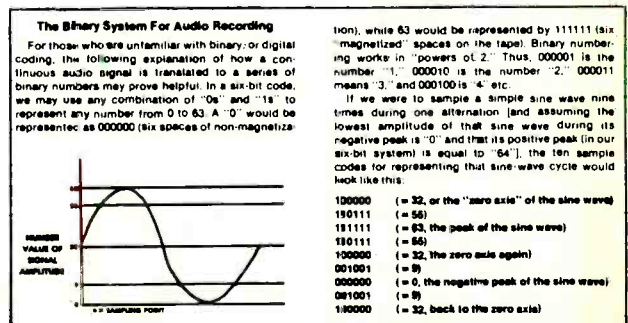
range requirements of the tape itself are minimal.

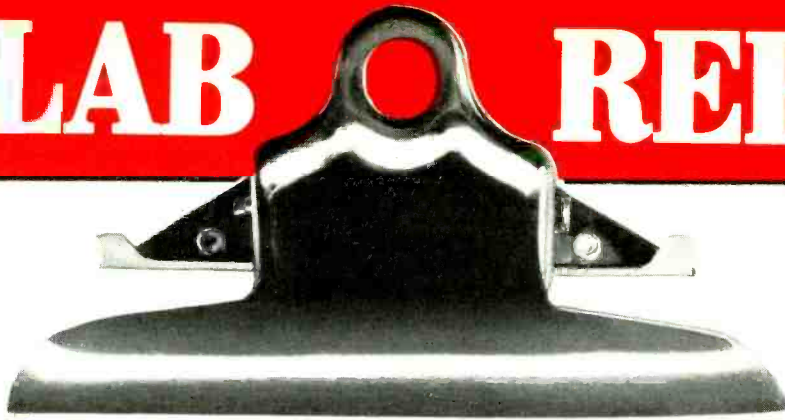
What is of great importance as far as the tape software is concerned is magnetic particle density and uniformity of particle coating. If the 44 kHz-plus sampling rate becomes standard and if a 12-bit system is used, that means that 12 times 44,000 pulses per second must be recorded onto the tape. That corresponds to a bandwidth of at least 528,000 Hz, or better than half a megahertz! (At the moment, 45 ips seems to be an acceptable tape speed for handling such high-frequency pulse rates).

In analog tape recording, a brief drop-out results in an equally brief interruption of recorded audio signal that is often undetectable by the listener. In the case of digital tape recording, such a drop-out would be interpreted as a "change" in the bit code which could result in a completely different waveform being reconstituted when the signals are passed through the digital-to-analog converter during the playback process.

Since even the very best grade of computer tape (or video tape) will exhibit some drop-outs, manufacturers have devised various back-up systems which involve a certain amount of redundancy or repetition of the bit-code either on another track of the tape or displaced in time and interleaved on the main recording track. In this way, if one set of pulses "drops out" for a brief period, the other set of redundant pulses fills in the gap. Clearly, this sort of arrangement (which may vary from manufacturer to manufacturer) does not lend itself to simple, razor-blade splicing and editing. In addition, because some of the error-correcting systems are extremely sophisticated and are of a proprietary nature, their developers are less likely to want to disclose them, making standardization of error-correction even more difficult to achieve.

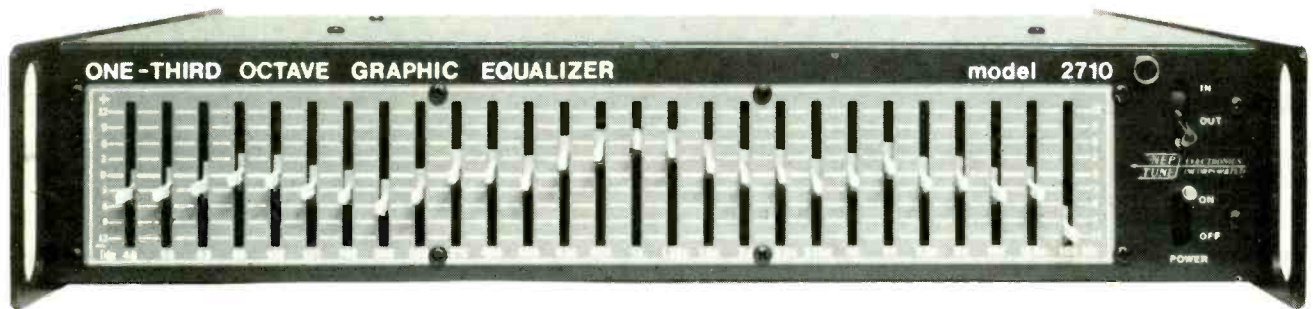
I have no doubt that the age of digital recording, for both professional and home tape recording is coming, and I am not trying to down-grade this remarkable technological achievement. What I am suggesting is that the initial enthusiasm voiced by the general press and even by the technical audio journals may be a bit one-sided. There are still a great many problems to be solved before we can all discard our excellent multi-track analog systems in recording studios and our up-graded stereo cassette and open-reel decks that we use at home.





NORMAN EISENBERG AND LEN FELDMAN

Neptune Electronics Model 2710 Graphic Equalizer



General Description: The Model 2710 from Neptune Electronics Inc. is a monophonic graphic equalizer that divides the audio spectrum into twenty-seven one-third-octave bands. Each frequency segment is controlled by a slider that provides up to ± 12 dB of adjustment in standard ISO steps with center frequencies at 40, 50, 63, 80, 100, 125, 160, 200, 250, 315, 400, 500, 630, 800, 1 K, 1.25 K, 1.6 K, 2 K, 2.5 K, 3.15 K, 4 K, 5 K, 6.3 K, 8 K, 10 K, 12.5 K, and 16 K Hz. The device is offered for use in room equalization of sound reinforcement and of playback systems, as well as in broadcasting and recording applications.

The twenty-seven sliders occupy most of the front panel along with a switch for EQ in and out, and the power on/off switch. The basic unit is 17 inches wide but it is supplied with attachable "ears" that make it suitable for standard rack mounting. The rear contains two sets of inputs and outputs. One set consists of standard D3F and D3M microphone connectors (balanced line in and out); the other connectors are standard $\frac{1}{4}$ -inch phone plugs (unbalanced line in and out). The rear also contains a fuse-holder and the unit's line cord which is terminated in a three-prong grounding plug.

Through its use of narrow-band (high Q) filters, the model 2710 is designed to peak frequencies quite sharply. However, if in actual use the sharp peaking of a given third-octave segment with respect to adjacent bands results in "ringing," the curve on either side of the boosted segment can be "shaped" for a smoother response, unless of course the ringing effect is deliberately being sought for a particular purpose. The instructions supplied with the device recommend using a Real Time Analyzer with it to achieve really accurate room equalization.

Test Results: MR's measurements of the Neptune model 2710 indicate a very well-designed and conservatively rated device that more than meets its published specifications, and appears eminently capable of performing its intended functions. Frequency response exceeded the claimed range; frequency centers were all confirmed; frequency tolerance was checked as within ± 2 percent; signal-to-noise was a jot better than claimed; maximum output available was higher than claimed.

To get some idea, graphically, of the precise adjustment capability of the model 2710, we photographed

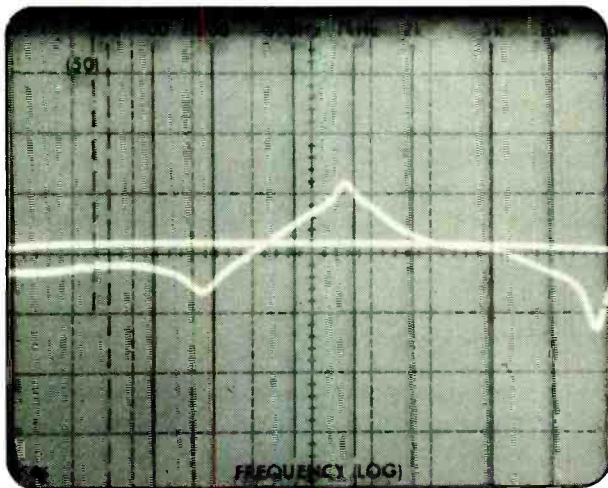


Fig. 1: Neptune 2710: Response curve resulting from control settings shown in front panel view.

the front panel with the sliders purposely set to a rather complex "correction curve." The resultant response curve, obtained by sweeping frequencies from 20 Hz to 20 kHz on our spectrum analyzer is displayed in the 'scope photo of Fig. 1, and it can be seen readily how this curve closely follows the settings of the individual sliders.

Figure 2 shows a composite response series, photographed from the face of a storage 'scope in which the range of each slider was individually plotted. Each vertical division in this photo (as in the photo of Fig. 1) represents 10 dB of change in amplitude.

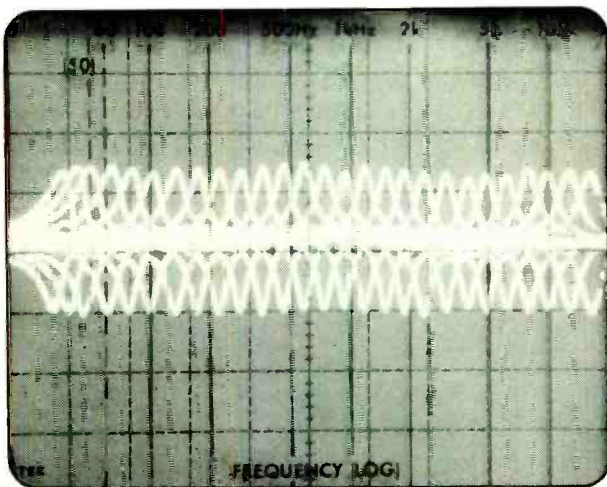
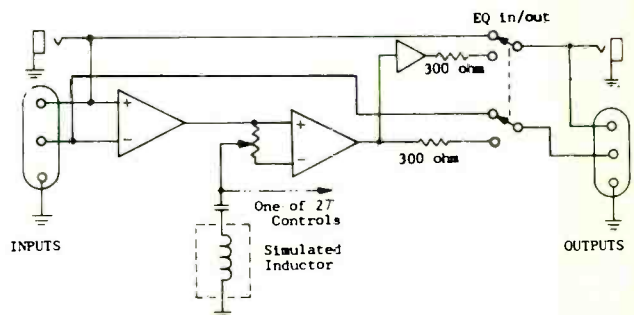


Fig. 2: Neptune 2710: One-third-octave control range of each of the 27 controls. Vertical divisions correspond to 10 dB each.

General Info: Unit is 17 inches wide but may be fitted with "ears" (supplied) for standard 19-inch rack-mount width. Height is 3½ inches. Depth is 11½ inches. Weight is eight pounds. Price is \$329.

Individual Comment by L.F.: Anyone who has followed the development of graphic equalizers (professional as well as home sound products) is aware that the more segments of frequency control available, the more closely the operator can produce an optimum overall sound system response with respect to a given environment. The one-third octave approach is regarded as the ideal, since it has been shown that subjectively the human ear finds it difficult (or impossible) to discern amplitude deviations from flat response that are narrower than one-third octave.

Why then haven't more one-third octave equalizers been produced and marketed? You guessed it—cost is prohibitive, since we are talking about anywhere from twenty-four to twenty-seven separate filter circuits, as



Neptune 2710: Simplified block diagram.

opposed to the usual ten or twelve (for an octave-by-octave equalizer), or even the five-band system often sold for consumer use. Apparently and happily, Neptune Electronics has managed to break the price barrier with this neatly designed unit which uses simulated inductor high-Q ("gyrator") circuits and associated op-amps for each of its twenty-seven filters. The Q of the filters has been adjusted so that a 12-dB boost at any center frequency results in a 3-dB boost at either adjacent center frequency.

As Neptune points out in its brief owner's manual, "The value of 1/3 octave equalization is not so much the ability to boost or attenuate any specific frequency as the ability to shape the room equalization curve accurately"—and, we might add, smoothly, to prevent ringing.

Individual Comment by N.E.: You would of course need a separate model 2710 for each sound channel in a multi-channel system since the unit is a

mono, not a stereo, device. The "double" cost of a pair of 2710s is still very much in the ball park for professional grade one-third octave EQ. The only reservations that came up during our use of this device were its absence of a master level control, and the lack of a definite physical indication (such as a detent) for the zero-dB settings on the sliders. Of course, the former criticism can be answered in terms of adjusting signal levels elsewhere in the signal path to accommodate the

preferred operating levels of the 2710 so that optimum levels (with respect to S/N and dynamic range) can be found. As for the second criticism, one can decide to carefully "eyeball" the zero-dB points in return for the low price being asked for legitimate one-third octave EQ that introduces negligible distortion, does not degrade the S/N of the rest of the sound system, and affords a measure of control that permits really sophisticated graphic EQ.

NEPTUNE ELECTRONICS MODEL 2710 GRAPHIC EQUALIZER: Vital Statistics

PERFORMANCE CHARACTERISTIC	MANUFACTURER'S SPEC	LAB MEASUREMENT
Frequency response	± 1 dB, 20 Hz to 20 kHz	± 1 dB, 8 Hz to 27 kHz
Frequency centers	40, 50, 63, 80, 100, 125, 160, 200, 250, 315, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3150, 4000, 5000, 6300, 8000, 10,000, 12,500, 16,000	all confirmed (see Fig. 2)
Frequency tolerance	$\pm 3\%$ of center frequency	$\pm 2\%$ (worst case)
Range of control	± 12 dB, ± 1.5 dB/band	± 12 dB, ± 1 dB
Signal-to-noise	80 dB (all EQ levers at 0 dB)	82 dB re: 1 V output (87 dB "A" weighted)
Maximum output before clipping	8.5 V rms, 25 V peak-to-peak unbalanced; 5 V rms, balanced	9.6 V rms, unbalanced
Filter bandwidth	$\frac{1}{3}$ octave at 3 dB points with 6 dB boost or cut	confirmed
Input	Balanced: D3F mic connector Unbalanced: $\frac{1}{4}$ inch phone jack	confirmed
Output	600-ohm balanced: D3M connector Unbalanced: $\frac{1}{4}$ -inch phone jack	confirmed
Harmonic distortion	NA	for 1 V output: 0.008% at 1 kHz 0.070% at 20 Hz 0.100% at 20 kHz

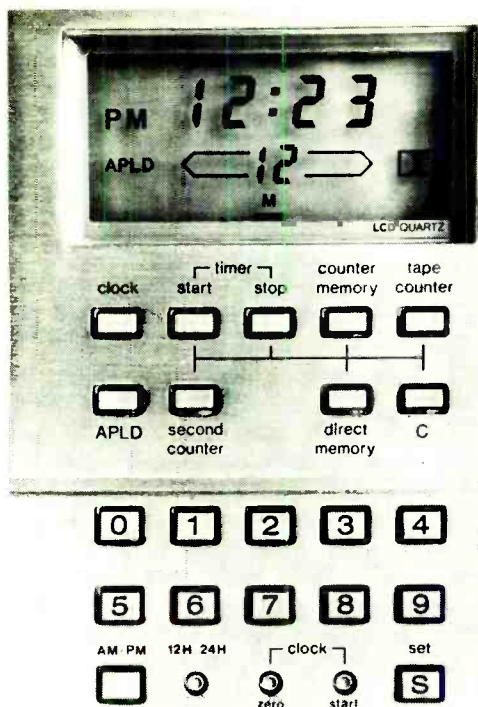
CIRCLE 1 ON READER SERVICE CARD

Optonica RT-6501 Cassette Recorder



General Description: Unique among cassette recorders, the Optonica RT-6501 incorporates, in addition to the usual features, an elaborate and versatile digital selection and control system that includes a digital clock (that may be used for showing time in a

12-hour display or in a 24-hour display), digital readout in minutes and seconds of tape time, the automatic program locate device (known as APLD and enabling the user to locate and advance to or return to a given program or selection on a recorded cassette via the



Optonica RT-6501: Close-up view of keyboard and LCD display.

fast-wind or rewind modes), recording or playback—start and stop—by timer-controlled operation (via the built-in quartz clock) and more. All the options are digitally displayed according to what controls are activated, and the system can store programmed instructions and display different information at the press of a button. For instance, when the recorder is started, the time-of-day indication is replaced by tape counter information. However, pressing a button restores the clock. Pressing another button shows elapsed tape time. Pressing other buttons shows automatic times for start and stop.

The APLD feature, which is also displayed digitally, operates on the basis of “blank spaces” (no recorded signal areas) on a tape to locate desired selections. After selecting the appropriate number (of blank spaces), the APLD is activated by pressing fast-wind or rewind simultaneously with the play key. While the cassette tape is being moved to the desired spot, other information still may be read on the digital display as desired. When the selected portion is reached, the fast-wind (or rewind) function is deactivated and normal play takes over.

The digital display and its various control buttons occupy the center portion of the Optonica's front panel. The display screen itself shows the various numerical data as well as direction of tape movement, the APLD function and indications of various counter and timer options. The machine's Dolby indicator also is on this display. One group of buttons below the display handles the timer, clock, APLD and counter operations. Another group of buttons, numbered 0 through 9, selects the APLD spacing function. Addi-

tional buttons are used for adjusting the clock, and to “set” certain programmed instructions.

Left and right of this area, the Optonica looks more like a conventional front-loading cassette recorder. The cassette compartment is behind a transparent door. Below it are the transport keys: “editor” (which may be used in recording to defeat the incoming signal while the tape continues moving); pause; record; rewind (which also doubles as the reverse mode APLD key); play; fast-forward (also serving as the forward APLD key); stop; eject. The machine's power switch, left of the cassette compartment, has three positions. In “stand-by,” the tape recorder itself is turned off but the built-in quartz clock is operative. In the “on” position, the recorder transport and circuitry are alive. In the “auto” position, the recorder may be operated automatically in conjunction with the built-in timer.

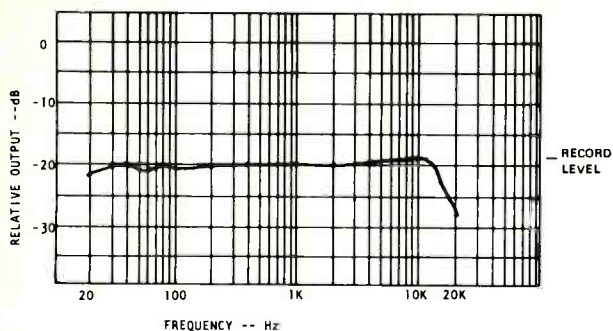
Over at the left are the two VU meters calibrated from -20 to +5. Below and centered between them are two indicators—one shows recording mode and the other is a recording peak level indicator which serves both channels. Jacks to the right of the meters accommodate left- and right-channel microphone inputs and a stereo headphone output. Below the meters are the buttons for the memory rewind, the Dolby system, two-position bias (high or low) and two-position equalization (70 msec. and 120 msec.). There also is a button to illuminate the display panel, if desired, when the recorder itself is not on.

Microphone and line input level controls are dual-concentric types (separate on each channel). Input mixing of line and mic is possible. The output level control is a single knob for both channels at once.

The rear of the recorder contains stereo line input and output jacks, the power cord and a convenience AC outlet, switched. There also is a battery compartment for inserting two size AA cells which power the clock in the event of power failure in the AC line.

The readout panel uses a liquid crystal display (LCD) system. The recorder uses two heads (erase and combined record/play). A single servo motor, with a PLL frequency generator as a control circuit, drives the transport. The owner's manual is unusually large for a cassette recorder, most of it being devoted to explaining the intricacies of using the various features and the LCD panel. However, adequate instruction for normal cassette operation is also given, including a very comprehensive list of tapes by brand and type with recommended bias and EQ switch positions.

Test Results: In *MR's* tests the Optonica RT-6501 did extremely well in wow and flutter, and amazingly well in signal-to-noise. Distortion was quite low even at 0 VU record levels, and the recorder has ample headroom (even beyond the point where the peak LED comes on) before the nominal 3% THD level is reached. Response struck us as about a “high average” for the price-class of this machine, going better than specified with normal tape, and a bit below spec for chrome tape. Other measured characteristics all were “within the ball park” for this class of machine.



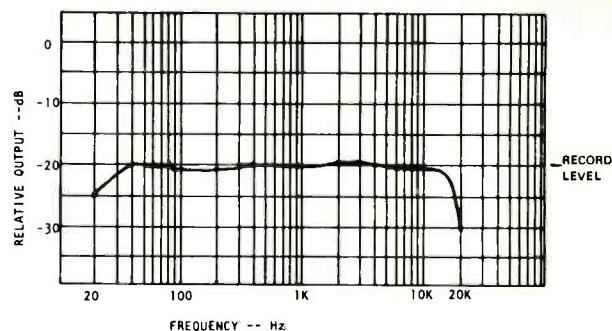
Optonica RT-6501: Record/play response using TDK AD C-90 cassette.

As for the roster of "computerized" features contained in the RT-6501, they are without precedent in our experience, and they all worked as claimed. The APLD allows the user to start (and stop) a recorded cassette at any desired portion, assuming of course there are a few seconds of "space" between programs on the tape. Recording and playback can be present for time and can be accomplished automatically. For estimating tape lengths, the LCD can provide a readout of minutes and seconds, as well as conventional tape-counting numbers. A given section of a tape can be "instructed" for replay. An external audio component, connected to the AC outlet of the Optonica, can be turned on or off automatically. The list of specific options is detailed in the manual which anyone contemplating this unit ought to read beforehand since it will afford an idea of what the device can do as well as what is involved in doing it.

General Info: Unit is 17 $\frac{3}{8}$ inches wide; 5 $\frac{11}{16}$ inches high; 14 $\frac{1}{16}$ inches deep. Supplied in metal case with walnut-finished wood side panels. Weight is twenty pounds. Price is \$360.

Individual Comment by L.F.: I was prepared for a disappointing experience when I first examined the Optonica RT-6501, and mentally tried to figure out how so many "computerized" features could be incorporated in a stereo cassette recorder at its price. Surely, I thought, we must be dealing with a minimally performing unit in which a lot of money has been spent for fancy microprocessor functions such as a clock, digital tape counter, automatic program locating devices and much more. That, I mused, would necessarily leave little left for the more fundamental construction and design of this impressive-looking unit.

Well, I was only partially correct. The RT-6501 performs as well as (and in some respects better than) other units in its general price range, and it does have all those "computerized" features besides. I still wish Optonica would come up with a machine having superior basic performance (perhaps one with three-head operation and monitoring), and no doubt they will do so in the future. Such a machine would probably cost considerably more, but if the RT-6501 is any indication, the "ultimate" microprocessor-controlled



Optonica RT-6501: Record/play response using TDK SA C-90 cassette.

cassette deck—whether it comes from Optonica or some other source—need not be prohibitively priced compared with ordinary decks that do not contain the LCD readouts and logic-control functions of this innovative unit.

If one expects to make full use of the many control features available, it would be a good idea to read the owner's manual carefully. Actually, about two-thirds of the 35-page manual is devoted to explaining the controls and displays of this unusual deck.

What makes it less than the "ultimate" performer is its frequency response capability. Not that the response is all that bad. Using TDK AD tape, we obtained a -3 dB roll off at 20 Hz and 15 kHz. With TDK SA tape, the -3 dB roll offs were at 30 Hz and 16 kHz. However, a little more expenditure on the heads, and possibly the incorporation of a three-head configuration could no doubt bring the response up to the quality level of the rest of the machine, which is quite high.

If nothing else, the RT-6501 gives us some idea of the uses to which the new microprocessors can be applied in everyday home audio products. While the number of functions which can be controlled by that front panel keyboard is very great indeed, I suspect that most *MR* readers will still judge the RT-6501 on the basis of its performance as a recording machine. While good in that area for its price, its ultimate performance is not so exciting as are its programming features and its many faceted LCD options.

Individual Comment by N.E.: Aside from being a competent cassette recorder in the two-head class, the Optonica RT-6501 is a tour-de-force example of "computerized" control features and options. This aspect of the unit has no effect on actual audio quality but it certainly makes the unit a one-of-a-kind device to operate. There is something to be said for getting an accurate digital clock along with one's cassette machine, plus the convenience of being able to program it to start its own recording—such as a particular radio program you don't want to miss while you're out (or asleep), plus several other microprocessor-controlled options. I'd say this particular model probably will appeal to a definite segment of the cassette recorder market while, by the same token, it

probably will scare off some who may be confounded by that front panel and the long instructions.

Strictly as a cassette recorder, the RT-6501 gives a good account of itself for a two-head machine. Response, while not the widest we have ever measured,

is still very good, especially with chrome tape. That 68 dB of S/N ratio is really outstanding, and the unit has plenty of headroom with either kind of tape we used in our tests. Wow and flutter too are quite low. Rewind time is a little on the slow side.

OPTONICA RT-6501 CASSETTE RECORDER: Vital Statistics

PERFORMANCE CHARACTERISTIC	MANUFACTURER'S SPEC	LAB MEASUREMENT
Frequency response, normal tape	± 3 dB, 30 Hz to 13 kHz	± 3 dB, 20 Hz to 15 kHz
chrome tape	± 3 dB, 30 Hz to 17 kHz	± 3 dB, 30 Hz to 16 kHz
Wow & flutter (WRMS)	0.058%	0.048%
S/N, normal tape, w/o Dolby	NA	57 dB
w/Dolby	NA	67 dB
S/N, chrome, w/o Dolby	58 dB	59 dB
w/Dolby	68 dB	68 dB
THD at 0 VU, normal tape	NA	0.8%
chrome	NA	0.9%
Record level for 3% THD, normal tape	NA	+9 dB
chrome	NA	+8 dB
Fast-wind time, C-60	NA	95 seconds
Input sensitivity, mic	0.2 mV	0.2 mV
line	50 mV	48 mV
Output level, line	775 mV	750 mV
headphones	89 mV (8 ohms)	86 mV (8 ohms)
Power consumption	16 watts	14 watts

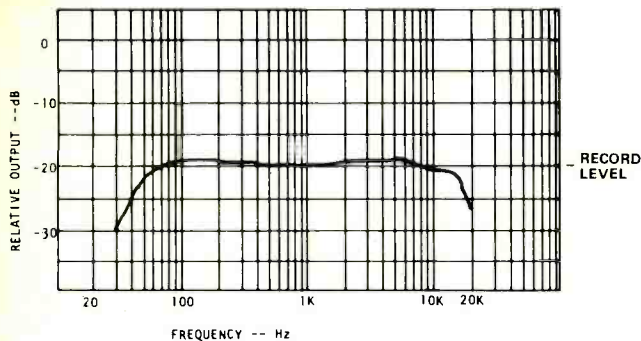
CIRCLE 4 ON READER SERVICE CARD

Technics RS-686DS Portable Cassette Recorder



General Description: Unusually compact and light in weight, the RS-686DS from Technics by Panasonic is a full-fledged stereo cassette recorder that may

be operated from its own internal battery supply (six "C" cells), or from vehicular 12-volt power supplies via an adaptor, or from normal AC line power via another



Technics RS-686DS: Record/play response using TDK AD C-60 cassette.

adaptor. Both adaptors are supplied with the recorder. For actual portable use, the recorder may be carried over the shoulder by means of an adjustable belt fitted with a shoulder pad. The belt, also supplied with the recorder, attaches to posts on the unit's housing.

While basically a two-head unit (erase and combined record/play), the RS-686DS also features a third monitor head that provides a monophonic signal of relatively limited response for direct on-the-spot checking of recordings. Battery condition may be checked on the right-channel VU meter. In addition to normal stereo outputs for line and headphones, the recorder has a built-in speaker for mono playback if desired. There also is an 8-ohm mono output for driving a single earphone. Separate bias and EQ switches permit a choice of recording tape; the owner's manual lists several brands and types with recommended switch positions. There are two positions of bias (high and low) and two positions of EQ (70 and 120 msec.). The meters have peak-level indicators. Dolby noise-reduction is included. Input mixing is not.

As might be expected on a compact recorder with as many features as this, everything is fairly close. With the recorder placed on its large side, the narrow front panel contains: the tape counter and reset button; the input selector; the bias and EQ selectors; the Dolby switch; a mic attenuator switch; a limiter switch; a low-cut filter switch; the monitor switch; a master recording level control; separate left- and right-channel recording level controls; the two meters; a meter-light button; and the battery check button. "Secondary" transport controls also are found on this panel—these include the eject button; a lever for rewind or fast-forward; a tape-end indicator (which flashes near the end of a tape); and the recording indicator lamp. The large keys for record, play and pause are along part of the upper edge of the panel and are activated by pressure from the top (the larger surface of the case). This surface also contains the stop button and, a bit farther back, the cassette well itself.

The left side of the unit contains the built-in speaker, a headphones jack, the 8-ohm output monitor jack, a

speaker volume control, and an input jack for external DC power (9 volts) from one of the adapters.

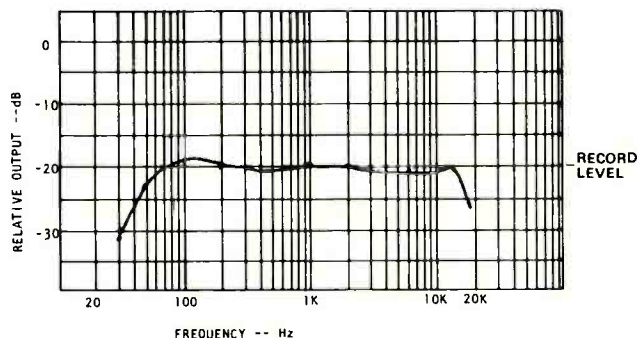
The right side of the recorder contains the line input and output jacks, and the mic input jacks. Playback volume via the line-out jacks must be adjusted on external equipment.

In addition to the features mentioned, the RS-686DS has a "silent stop" which cuts off power to the motor when the tape reaches its end but which does not release the operational control buttons. In this way, the noise of mechanical sounds is avoided. The tape-end indicator (which flashes just before the end of the tape) will come on steadily. To release the transport mechanism now, the stop button may be pressed. Access to the capstan and pressure roller is easily managed by lifting the cassette well cover. The head assembly becomes accessible by pressing the machine's play button.

The transport employs a single FG servo controlled DC motor. Estimated battery life using alkaline cells is about four hours with continuous recording.

Test Results: In *MR's* tests, the Technics RS-686DS did better with normal tape than with chrome. The former tape made the -3 dB points at 45 Hz and at 14.5 kHz (a little better than specs). The latter tape made the -3 dB marks at 50 Hz (on spec) and at 14.5 kHz (below spec). Signal-to-noise with either tape was very good with slightly better readings evident for normal tape. Distortion was distinctly lower with normal tape.

The Dolby system worked very well, adding about 10 dB of S/N improvement when switched in for recording. The mic attenuator provided 20 dB of attenuation. The end-tape indicator and the silent-stop features were judged good operating conveniences—the former especially useful for recording in situations where the rotating tape spools might not be readily visible, the latter a thoughtful addition for use in "live" recording situations (especially when other recorders also are used). The owner's manual was judged to be very good.



Technics RS-686DS: Record/play response using TDK SA C-60 cassette.

General Info: Dimensions are 3 by 9¼ by 7⅞ inches. Weight is six pounds, three ounces without batteries; add about ten ounces for batteries. Supplied with carrying strap, car power supply adaptor and line AC adaptor.

Individual Comment by N.E.: Technics obviously takes the term "portable" seriously since the model RS-686DS boasts what might be called a very favorable "format-to-features" ratio. That is to say, the size and weight of the recorder are minimal in view of all that has been crammed into this recorder. I suppose this accounts for the price of the unit which is obviously higher than some other worthy portables but, also, if you look in the other direction, still not the highest we know of. The unit is a snap to tote around, and it offers just about every feature found on some non-portable recorders. There's no input mixing and no output level control line, but there's the built-in mono amp/speaker and the third monitor head (more of a "verifier" than a full-response reproducer). Performance in general is a jot below the better AC-only cassette decks but it still is competent enough to merit serious consideration by the recordist-on-the-move who wants something really small and light and worthwhile.

Individual Comment by L.F.: I was truly amazed at how much electronics and cassette recording capability have been built into this under-seven-pound mighty midget. In addition to its features, I note that the signal-to-noise level, especially with Dolby on, compares nicely with the best home units.

The wow and flutter measurement (0.08% WRMS) speaks for itself—compare that with most home machines.

Of course, three-way operation (internal battery, 12-volt car system or 120-volt AC line) and this kind of performance doesn't come cheap, especially when everything has to be scaled down to this unit's degree of portability. But one thing we really liked was the fact that both the car adaptor and the home voltage adaptor are included in the price. There is nothing so frustrating as buying a "bargain" piece of electronics only to discover that to really avail yourself of all its potential you have to spend additional dollars for "optional accessories." With the Technics RS-686DS you get it all with the first purchase.

Incidentally, the separate left- and right-channel record level controls that augment the master control are by no means a needless frill. Technics probably assumed (correctly, in my view) that users will be doing a lot of "live" recording with the unit (otherwise, why not simply settle for a home-bound recorder?) and since not everyone may own perfectly balanced and identical microphones, this added degree of flexibility is welcome. That applies also to the mic attenuator, in case you end up using mics having widely differing sensitivities. Speaking of mics, the succinct comments about mic types and uses in the owner's manual (also "pocket sized") is worth something too. At \$600, the price is high, but to a serious recordist who can use and appreciate this unit's many features, price may be of secondary importance. After all, when's the last time you checked out the going price of a "professional" and portable Nagra?

TECHNICS RS-686DS PORTABLE CASSETTE RECORDER: Vital Statistics

PERFORMANCE CHARACTERISTIC	MANUFACTURER'S SPEC	LAB MEASUREMENT
Frequency response, normal tape	± 3 dB, 50 Hz to 14 kHz	± 3 dB, 45 Hz to 14.5 kHz
CrO ₂ tape	± 3 dB, 50 Hz to 16 kHz	± 3 dB, 50 Hz to 14.5 kHz
Wow & flutter (WRMS)	0.07%	0.08%
S/N, normal tape w/o Dolby	56 dB	55.5 dB
w/Dolby	66 dB	65 dB
S/N, chrome tape w/o Dolby	NA	55 dB
w/Dolby	NA	64 dB
Mic input sensitivity	0.25mV	.022mV
Line input sensitivity	60 mV	50 mV
Line output level	420 mV	400 mV
Headphone output level	65 mV (8 ohms)	64 mV (8 ohms)
THD at 0 VU, normal/chrome	NA/NA	1.1%/1.7%
Record level for 3% THD normal/chrome	NA	+ 6/ + 4
Response, monitor head	NA	± 3 dB, 60 Hz to 6 kHz
Fast-wind time, C-60	70 seconds	80 seconds
Power consumption	12 watts	8 watts

CIRCLE 6 ON READER SERVICE CARD



Tapco 6001R Mixer

By Jim Ford
and Brian Roth

General Description: For several years now, Tapco has been known for manufacturing reasonably priced mixers for the sound reinforcement market. The model 6001R represents one of their latest offerings. It is a six-input, mono output mixer with the following facilities on each input:

- A) Rotary-type volume control.
- B) Low-frequency shelving equalizer control.
- C) High-frequency shelving equalizer control.
- D) Effects (reverb) level pot that is connected after the volume pot.
- E) Monitor level control pot: connected pre-fader.

Although quite basic, these controls should provide most all of the needed input functions necessary for a small- to medium-sized sound system.

The microphone preamplifiers' gain is varied by the channel volume controls in a manner referred to by Tapco as "AutoPad®." Thus, for strong input levels, the operator can attenuate the channel level (via the volume control) which will reduce the mic preamp gain and thus minimize the chance of front-end overload and clipping. A separate mic preamp gain "trim" control is not required with this arrangement.

The input and output connectors are located at the rear of the mixer. There are two jacks provided for each input. A Switchcraft D3F 3-pin "cannon-type" connector provides a balanced, transformer isolated input for low-impedance microphones. A quarter-inch phone jack allows high impedance microphones (or conceivably line level signals from tape decks, etc.) to be accommodated. Inserting a plug into the high-impedance input jack disables the low-impedance input.

All remaining connectors on the rear are quarter-inch phone jacks and these include:

- A) Two high-level (line) outputs for the main house mix.
- B) A low-level (guitar level) output from the house mix.
- C) High- and low-level inputs and outputs for the "effects" send and return. This allows external echo and effects devices to be patched in.
- D) A monitor mix output.
- E) Footswitch jack to disable the internal reverb.
- F) "Stacking" jacks that allow ganging the main, monitor and effects buses with another mixer to add more inputs.

On the front panel, the master section provides the usual master pots for the main and monitor outputs. Separate controls are provided for varying the internal reverb return level as well as the external effects return.

A "Mic EQ" switch causes a moderate high-frequen-



cy boost in the main output. This is supposed to help compensate for deficient high-end response in smaller P.A. speakers and inexpensive microphones.

A power switch and power indicator light round out the front panel. The fuse is located at the rear.

The housing of the 6001R is perhaps the most interesting aspect of the mixer. Tapco is utilizing a molded structure foam case that is claimed to be seven times stronger than steel. Yet, the structural foam is much lighter than a steel cabinet of equivalent strength.

Since the housing is non-metallic, we were concerned by the apparent lack of shielding against noise and RF fields. We were very pleased to find (via an ohmmeter test) that the interior of the case was sprayed with a conductive coating. The front panel and connector plate are of standard metal construction.

The mixer is capable of operation either in a rack or free-standing. Angle brackets on each side provide the necessary rack-mounting hardware; these can be totally removed or they can be installed in such a fashion as to not protrude from the sides for those situations not requiring rack mounting.

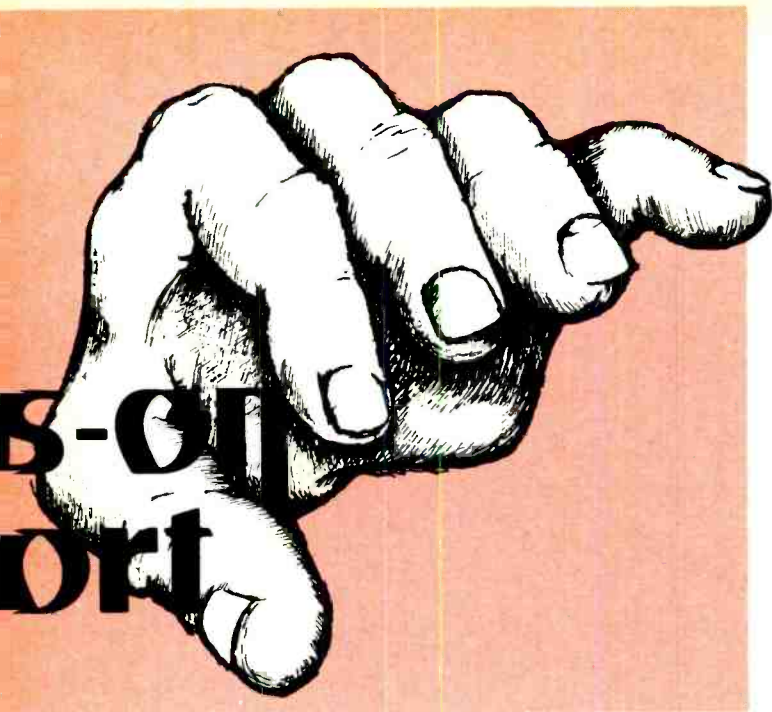
We were happy to find that the mixer will fit into a standard rack panel space (12¼") and that the mounting screw holes were on standard centers.

Additionally, the case is designed so that the rear connectors are recessed and consequently additional rack space is not required to accommodate the input and output plugs.

For those not using a rack, the 6001R will sit very nicely on a tabletop with the controls inclined toward the operator.

All in all, the packaging is probably the most intelligently designed that we have ever encountered, particularly in a mixer in this price category.

Field Test: As is our usual policy, we began our evaluation in our listening room. Using master tapes as well as direct-disc records for program sources and



JBL 4315 and 4343 monitors for playback, we experimented with the various controls.

Our preamplifier is capable of producing around 1/2 to 1 volt nominal output and we found that the high-impedance inputs were capable of handling this level with no problem. This is a nice characteristic for the mixer to have since it means that just about any type of program source level can be dealt with effectively. We did not note that it was necessary to operate the input level controls at a fairly low setting but we did not hear any evidence of overloading.

With these full bandwidth program sources, we could not detect any significant differences between signals routed through the 6001R and a straight wire. After more listening, we began to hear some frequency response differences between the 6001R and the wire, but these were eliminated by slight adjustments of the EQ controls. In fact, we found that a number of the EQ knobs themselves may have been installed in such a fashion as to give non-flat electrical response when set for 0 dB of boost or cut. We reinstalled the knobs (they are of the slip-on variety) to give the flattest perceived frequency response when set mechanically "flat."

Next, we set up the mixer for a three-piece rock band. Three inputs were for drums, two were allocated for vocals, and one was utilized for miking the guitar amplifier.

We had earlier missed having a VU meter, so we brought one along and plugged it into one of the high-level output jacks so we could monitor the house send level. Apparently, it was not possible for Tapco to include some type of metering due to the low price of the unit. It is not at all difficult for the user to rig an outboard meter as we did, and thus we would highly recommend this to prospective users.

The band was fairly loud, and consequently we found it necessary to operate the input-level pots at low settings. In fact, with the pair of Sony ECM-33 condenser microphones on the drums, we could just barely open

up the level controls. The adjustment of the drum microphone levels tended to be rather critical, apparently due to the characteristics of the controls at low settings. We feel as if the 6001R has too much gain since we never operated any level control any higher than about 1/3 open, typically much lower.

In spite of the high gain characteristics, we did not hear any signs of input overload, thus indicating that the AutoPad® circuitry worked pretty much as advertised. Naturally, in a club situation and with horn-type loudspeakers, it is often difficult to pinpoint the source of any sonic deficiencies. However, at no time could we attribute any distortion or coloring to the 6001R.

We experimented with the equalizers and noted that the treble control apparently had a relatively low turn-over frequency and thus affected too much of the upper midrange response. The bass control was fairly good sounding, albeit a bit "boomy" at high settings.

We were not particularly excited by the sound of the built-in reverb, although it was adequate for vocals when used in small amounts. The sound of the reverb is typical of most all self-contained mixers, so we cannot be overly critical since we haven't heard *any* built-in reverb that was studio quality.

In our situation, we could not detect any noise generated by the mixer. It appeared to be a very quiet performer.

We found that having both high- and low-level effects send and return jacks was very handy. The low-level jacks are designed for interfacing with guitar-type accessories and these levels worked quite nicely with a tape echo designed for guitar applications.

The pre-channel fader monitor mix controls were a welcome feature since they allowed the stage foldback mix to be totally independent of the house mix.

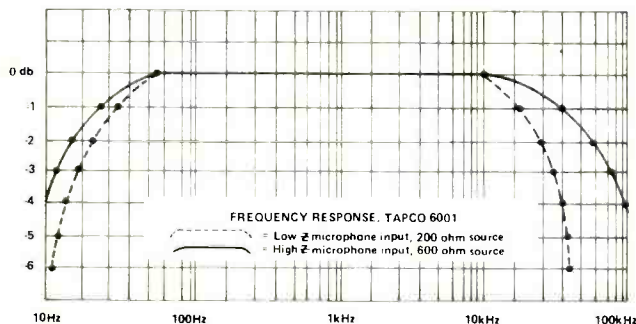
We tried the "Mic EQ" switch and found that it would brighten the sound somewhat without significantly affecting the midrange. However, we had some problems getting the switch itself to stay latched in the "On" position.

Overall, everyone was quite satisfied with the 6001R. In fact, even the band became interested in obtaining one since it did what they required and had a reasonable price tag!

Lab Test: Back on the bench, the Tapco 6001R was a very respectable mixer. At normal settings, noise and distortion levels were all quite low. We were particularly pleased to find that the circuitry had a high enough slew rate to produce over 10 volts RMS output with very low distortion at 20 kHz. This is one of the few mixers we have ever evaluated that did not have major slew-rate problems.

While still on the slew-rate characteristics, note the maximum permissible input level figures in the table. The main limitation at low frequencies appeared to be due to input transformer overload. At 20 kHz and high input levels, we found the input sine wave signal being turned into a triangle wave as in a classic slew-rate limited situation. Yet, under lower input signal condi-

tions there was no problem. So, we contacted Tapco and found that the slew rate of the input circuitry was comparatively low, but the output circuitry had a high slew rate. This, coupled with the fact that the input stages are designed to operate at about a -10 dB nominal level (with 10 dB or so of "make-up" gain in the "faster" output stage) means that less expensive circuitry can be used in the six-input amplifiers and yet low distortion at high frequencies and high output levels can be maintained. Although not textbook perfect, this arrangement is quite cost effective and more "high fidelity" than the usual circuit configurations using inexpensive op-amp integrated circuits throughout.



Square wave response through the low-impedance inputs was very good with only a small amount of overshoot with a 200-ohm signal generator impedance.

We measured the maximum gain of the 6001R and found it to be in excess of 80 dB from the low Z mic into the main out. This could be lowered somewhat to give more control range with strong input levels.

We examined the interior of the mixer and the method of construction was very good. Each input has its own circuit card that is attached to the front panel by the various pots. The power supply and program bus connections are made via plug-in connectors on each card and ribbon cable. The microphone inputs are hard-wired to the cards. The quality of the electronic components was adequate.

We felt that Tapco could have improved on the method of supporting the front panel while attempting to work on the unit; the panel had no means of support while opened. Otherwise, the interior access of the mixer was excellent.

Throughout the field test and lab test we were impressed by the "feel" of the various pots on the mixer. These pots (made by Alps) have been proven over the years to be reliable, and their mechanical design is excellent as far as their action is concerned.

Other than the excessive gain, we were hard pressed to find any significant problems with the 6001R, either in actual use or under testing.

Conclusions: Compared to some mixers we have evaluated in the past, the 6001R offered only the bare bones basic control features. Of course, the price is much, much lower than that of some of the other models. However, in spite of its outward simplicity, we

couldn't find much that couldn't be done with the 6001R. It won't generate, say, eight separate monitor mixers or a quad house feed, but these capabilities tend to be somewhat bogus anyway, particularly for a budget-conscious band with a small- to moderately-sized sound system.

With the inclusion of some outboard 15 or 20 dB pads (to give more control range) and a small VU meter circuit, the 6001R monaural mixer should give complete flexibility and immaculate audio performance for a *very* reasonable price.

Signal To Noise, Main Outputs, 20 Hz - 20 kHz Unweighted, 0 dB = +4 dBv (1.25 volts RMS)

Master Volume Off	-94 dB
Master Volume at low end of "normal" range	-88 dB
Master Volume at high end of "normal" range	-75 dB
Microphone Preamp set for 40 dB gain, master at middle of "normal" range	-81 dB
Microphone Preamp set for 60 dB gain	-69 dB
Equivalent input noise, 200-ohm source	-125 dBv*

*We are now using the term dBv to replace the misused term dBm. Our measuring methods remain the same. See December 1977 *Recording Engineer/Producer* magazine, pages 19-26 for an in-depth discussion on noise measurements.

Total Harmonic Distortion vs. Frequency

Low Z microphone input, -40 dBv input level

Frequency	THD at +4 dBv Output (1.25 volts RMS)	THD at +20 dBv Output (7.75 volts RMS)
20 Hz	.1%	.15%
1 kHz	.025%	.02%
20 kHz	.025%	.02%

High Z microphone input, 1 volt input level

Frequency	+4 dBv output (1.25 volts RMS)	+20 dBv output (7.75 volts RMS)
20 Hz	.1%	.15%
1 kHz	.007%	.006%
20 kHz	.02%	.025%

Intermodulation Distortion

Test signal—60 Hz and 7 kHz mixed 4:1

Microphone input, -40 dBv equivalent level

+4 dBv (1.25 volts RMS) output	.02%
+20 dBv (7.75 volts RMS) output	.015%

Maximum Input Levels

Low Z Microphone Input—Voltages are RMS

20 Hz	-4.6 dBv (4.5 volts)
1 kHz	+1.75 dBv (.9 volts)
20 kHz	-6.5 dBv (.37 volts)

High Z Inputs

In excess of 8 volts RMS at all frequency (test oscillator output limit)

Maximum Output Levels Before Clipping

Frequency	High Impedance Load	
	600-Ohm Load	600-Ohm Load
20 Hz	10.5 volts (+22.6 dBv)	6.8 volts (18.8 dBm)
1 kHz	10.6 volts (+22.75 dBv)	6.8 volts (18.8 dBm)
20 kHz	10.6 volts (+22.75 dBv)	6.8 volts (18.8 dBm)



“The Sansui AU-717 is a superb amplifier. We like it with no ifs, ands, or buts.” (Julian Hirsch) It offers “as much circuitry sophistication and control flexibility as any two-piece amplifying system.”

(Len Feldman)



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“The preamplifier section of the AU-717 has very impressive specifications for frequency response, equalization accuracy, and noise levels ... The AU-717 has dual power supplies, including separate power transformers, for its two channels ... [and] exceptionally comprehensive tape-recording and monitoring facilities Good human engineering separates this unit from some otherwise fine products “The Sansui AU-717 is a superb amplifier. We like it with



Julian D. Hirsch, Contributing Editor, Stereo Review

no ifs, ands, or buts.” [Reprinted in part from Julian Hirsch’s test report in **Stereo Review**, February, 1978.]

“One clear advantage of DC design is apparent. Even at the low 20Hz extreme, the amplifier delivers a full 92 watts — the same value obtained for midfrequency



Leonard Feldman, Contributing Editor Radio-Electronics

power — compared with its 85 watt rating into 8 ohms....

“The equalization characteristic of the preamplifier was one of the most precise we have ever measured, with the deviation from

the standard RIAA playback curve never exceeding more than 0.1dB.....

“Sansui claims that this unit has reduced transient intermodulation distortion — a direct result of the DC design, and, indeed, the model AU-717 delivered sound as transparent and clean as any we have heard from an integrated amplifier....

“... worth serious consideration — even by those who prefer separate amplifiers and preamplifiers.” [Reprinted in part from Len Feldman’s test report in **Radio-Electronics**, January, 1978.]

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GROOVE VIEWS

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

POPULAR

LITTLE FEAT: *Waiting For Columbus*.

[Little Feat, producers; George Massenburg, Andy Block, Warren Dewey engineers; recorded "live" in the U.S. by an uncredited mobile unit.] Warner Bros. 2BS 3140.

Performance: **Good**
Recording: **Also good**

Unless you're a Little Feat cultie, you'll be surprised (if not downright shocked as I was) to find out that this specially priced, double "live" set is their seventh album. Warner Brothers has done little to make this band that comes out of Los Angeles with a sound straight out of Macon, Georgia a household word. I'm sure such artists as Debby Boone, Fleetwood Mac and George Benson pay a lot of bills along Warner Blvd., but the lack of attention and press paid Little Feat borders on neglect. Helping them out on this effort

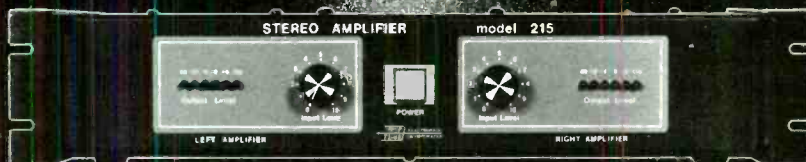
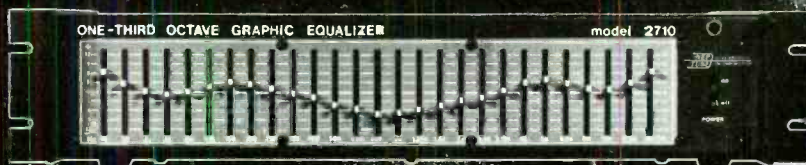
are Warner Brothers escapees, the Tower of Power horn section and, for one disappointing solo, ex-Stone Mick Taylor.

The track, "Mercenary Territory," opens with organ, bass, guitar, drums, horns, and vocals, all centered. In fact, everything on this tune is centered with the exception of a slightly "wah-wahed" electric guitar left and an electric piano countering right with a couple of "plunk plunks" in the beginning and end of the tune. The Tower of Power horns add a great deal of feeling on a few nice chord



LITTLE FEAT: Beginning to pay

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changes. I've always been a sucker for a good baritone sax, and Steve Kupka plays to my weakness. Separations are good, although uniform for the most part, and the vocal is fairly audible all the way through. At times, the horn section lacks the overall roundness and evenness of a studio section, but then again keep in mind this is a "live" recording. As such, it's quite clean and consistent and an excellent reproduction of their "live" sound.

I hope this LP garners them some sales and airplay for they must owe Warner Brothers for their last six outings. Warner Brothers owes them for all seven. G.P.

were for him an era of jousting with Father Time. The comparison to Satchel Paige, a great black pitcher who was admitted to the major leagues a long time past his prime, is frighteningly relevant.

There is simply nothing on this record that stands out. No, I'm not being sacrilegious; volumes have been and should continue to be written on his formidable accomplishments. Yet the tired phrasing, lack of fire and spark plus the sense of ersatz ballsiness immediately reaffirm some sad facts. Waters is getting old; his band is a mixture of old sods suffering with similarly diminished abilities, and young whites with theat-



MUDDY WATERS: Battling Father Time

MUDDY WATERS: *I'm Ready*. [Johnny Winter, producer; Dave Still, engineer, recorded at The Schoolhouse, Westport, Ct.] Blue Sky JZ 34928.

Performance: **Workmanlike**
Recording: **Ditto**

What a pity it is that it took Johnny Winter to turn the masses on to Muddy Waters. Waters was making great music when Johnny was just a baby, yet the hordes of cursory, ignorant ethnomusicologists weaned on Clapton, Bloomfield, etc., have only just discovered Muddy in the last few years which

rical, as opposed to heartfelt, approaches to the music.

Many of these songs are intimately familiar. Two of them, "I'm Ready" and "I'm Your Hoochie Coochie Man," have previously been recorded by ex-Waters' bassist Willie Dixon, and several other selections have long been part of Waters' repertoire.

It would be a tedious exercise in borderline triviality to graphically annotate the plentiful measures of bleating harp and stinging guitar herein for save for a faded legend, there is nothing here to differentiate this from a hundred other blues records. R.S.

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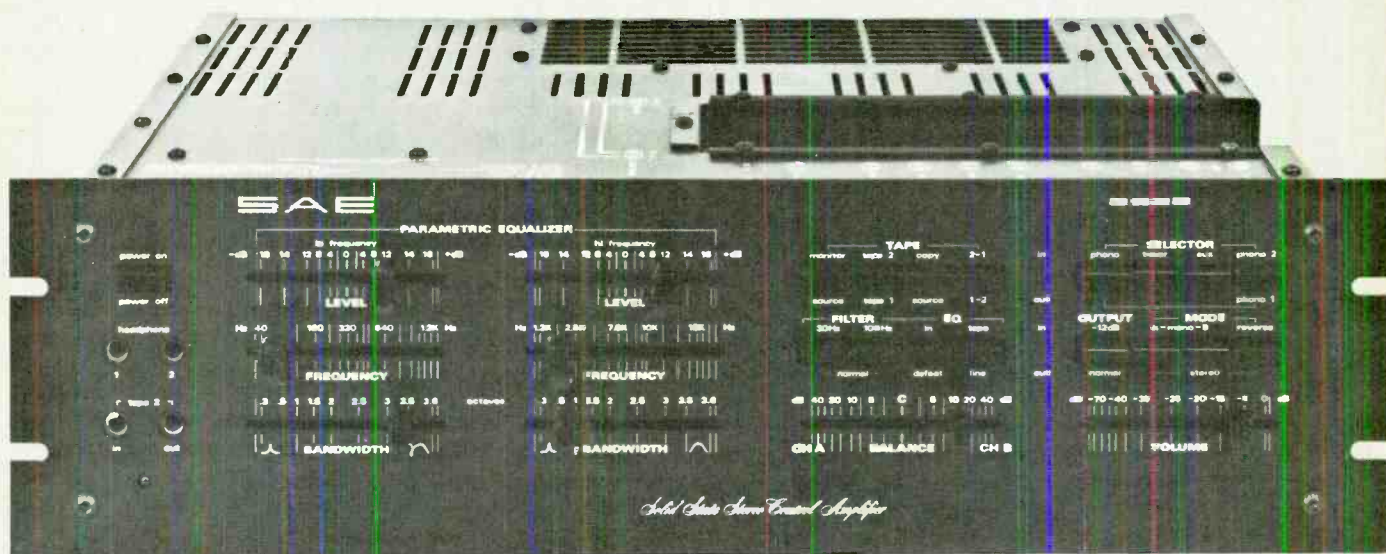
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JOURNEY: An overnight improvement

JOURNEY: *Infinity*. [Roy Thomas Baker, producer; Geoffrey Workman, engineer; recorded at His Master's Wheels, San Francisco and Cherokee Studios, Los Angeles, Ca.] Columbia JC 34912.

Performance: **Polished, sophisticated Journey**

Recording: **Queen-esque**

This is the first album I've come across produced by Roy Thomas Baker since he severed ties with Queen. While Queen has produced themselves the last two times out, they have retained Mike Stone as engineer, a hold over from their Baker days. As to who can claim credit for their multi-multi-tracked stretched vocals is a chicken-or-the-egg-question. It's their trademark, yet it originated with their relationship with Baker.

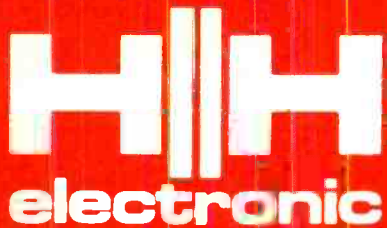
So, how does any of this affect Journey? It's impossible to judge Baker's influence on them as the band has also added Steve Perry as lead vocalist. While his voice is not on a par

with Freddie Mercury's, it is more versatile than that of Gregg Rolie. Yes, Baker does toy with stretched vocals and chorus effects, but not as extensively as with Queen. Yes, he has altered the sound of Neil Schoen's guitar, which now often approaches the Brian May sound. Yes, he does get that distinct drum sound synonymous with Queen. In summation—is Journey a carbon copy? Amazingly enough—no. Baker has a distinct, original style which in all fairness I believe Queen adopted as a foundation upon which to build. Alan Parson's work with Ambrosia is another example of this, for in both cases the producer became so involved that the group became more of an outlet for the producer's ideas rather than remaining an entity in itself. The overnight improvement in terms of polish and sophistication on the part of Journey must be seen as the most vital contribution by Baker.

"Lights," the opening track of the LP, is just one of the many strong cuts which

compose *Infinity*. An acoustic piano, slightly backed off to the right in the mix, with distorting arpeggiated electric guitar open the track. The famous Baker drum sound emerges center introducing the vocal which is nice and dry. After one verse, a reedy Hammond backs up the center play. After the second, a short vocal harmony in the "ooh-aah" fashion finishes the line. This opens the door for the guitar to kick in some treble and take over the festivities. Vocals from this point on become more predominant, with the lead exchanging lines with the chorus, all centered to the point where, after the guitar solo replaces the vocal in the center, the chorus becomes one lead voice. The tune ends on a vocal descent, making for a great, layed-back ballad featuring vocals that no one thought that Journey had in them.

To me, this album is a rebirth for Journey and another successful outing for Baker. A good deal anyway you look at it. G.P.

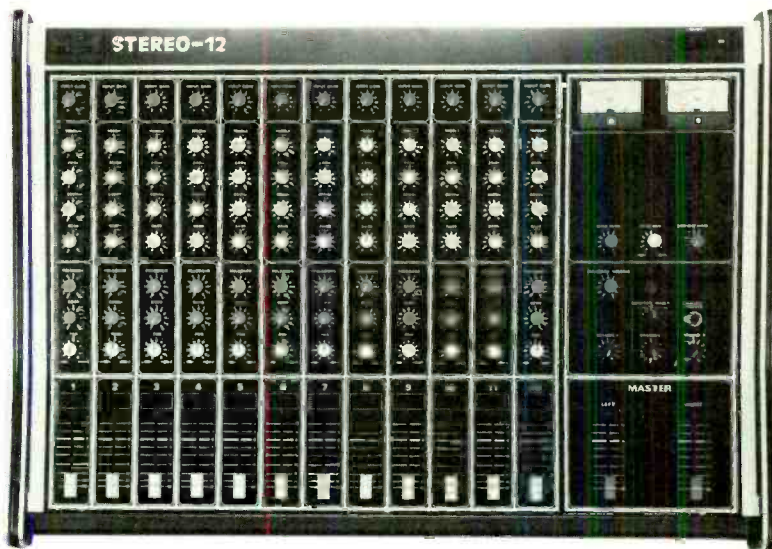


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MANFRED MANN'S EARTH BAND: Adding another success to their record

MANFRED MANN'S EARTH BAND: *Watch*. [Manfred Mann, Earth Band, producers; Laurence Latham, Rich Walton, engineers; recorded at The Work House, Old Kent Road, London, England.] Warner Bros. BSK 3157.

Performance: **Best ever**
Recording: **Steady**

This composite of studio and "live" tracks took eight months to make, three months of rehearsals and five months in Manfred's own studio, The Work House. Sufficient material for an album and a half was recorded to allow leeway in choosing tracks. For a man who dreads recording with a passion, Manfred Mann has a long track record of making good records. That score doesn't suffer any setbacks with the release of *Watch*, either. A band that prefers to look outside their number for materials, Mann & Co. nonetheless came up with two

winners on this outing—"Drowning on Dry Land" and "Chicago Institute." Midway through the second track I knew this was their best effort to date. Happily, the remaining cuts didn't prove me wrong.

Side one contains no keyboard solos from Manfred, who contents himself with playing Mellotron power chords. In contrast, he solos extensively on side two on a Hammond synthesizer, his favorite instrument ("it's more soulful"). Impossible to select just one track for review, I chose "Drowning On Dry Land" for its intriguing title. It opens with acoustic guitars left and right and an echoed lead vocal, center. Next, phased synthesizer strings are centered. A combined male/female choir (Mann is also one of the few bands who consistently utilize a female chorus instead of band members for the vocal tracks) emerges on the chorus as do bass and drums, also centered. Electric

guitar takes over midway through the song, simply laying down chord changes but also serving as a turning point for what's to come. This gives way to keyboard strings, which in turn set the stage for the electric guitar solo. The rhythm electric guitar moves right, with the acoustic guitar dropping out altogether. The song stretches into a good instrumental break, with the choir putting in an appearance towards the end, as the song winds down in volume and drive. Finally, it's lead vocalist Chris Hamlet Thompson triple echo tracking the lead vocal line to a fade-away ending, which is representative of most of the studio numbers.

Lyrical strong, musically dominant, this new album is, well, take your pick: exciting, excellent, superior, etc. G.P.

THE OUTLAWS: *Bring It Back Alive*.

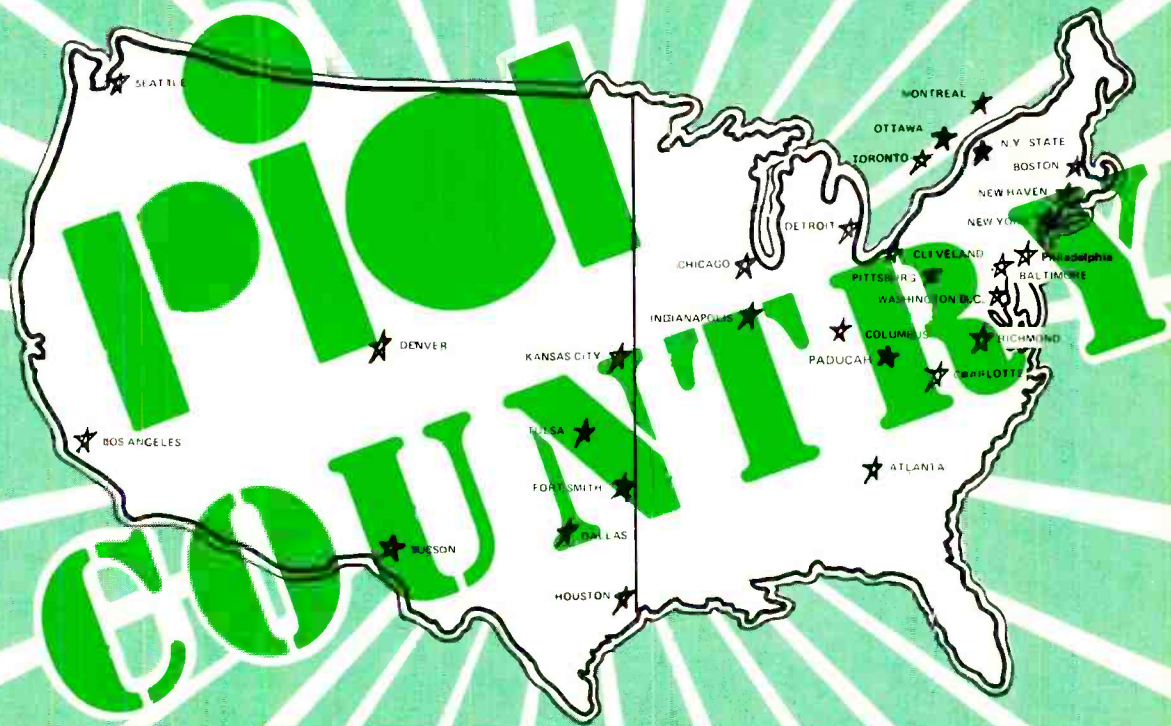
[Allan Blazek, producer and engineer; recorded on location at Aragon Ballroom, Chicago, Ill.; Santa Monica Civic Center, Los Angeles, Ca.; University of California, San Diego, Ca.; Bicentennial Park, Miami, Fl.; mixed at Bayshore Recording Studios, Coconut Grove, Fl.] Arista AL8300.

Performance: **Powerful**
Recording: **You can almost smell the smoke**

If you've ever been to a Tampa, Florida bar, then you know the only way to extricate yourself from one of those recurring brawls is to talk as loud and fast as possible. Apparently Tampa natives, the Outlaws, have learned their lesson well because on their first "live" album and their fourth as a group, *Bring It Back Alive*, they play their way through four sides of kick-ass Southern rock like shot glasses were going out of style.

The Outlaws' music isn't simply heavy metal, however. While songs like "Freeborn Man" start with the screech of feedback, they are based on the kind of chord changes that the three lead guitars of Hughie Thomasson, Billy Jones, and Freddie Salem can solo off of while alternately moving from the fast-paced to bluesy, melodic interludes. The two drummers, David Dix and Monte Yoho, lend apt support in the process without taking advantage of the situation to overwhelm the vocals. Their drumming, recorded sharp and clean, adds as much fill as it does backbone. And Harvey Dalton Arnold

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THE OUTLAWS: High energy level

on bass bounces right along, undemanding yet always crucial.

More than any other Southern rock band, the Outlaws are believers in the power of the lead guitar. The Atlanta Rhythm Section is into a softer groove with more highly developed melodic lines. Groups like Sea Level are moving into jazz. Song after song on *Bring It Back Alive* is a testament to the freshness and vitality of tight, precise guitar playing and its ability to mesmerize an audience. The harmonies that were so fully explored on the Outlaws' last album, *Hurry Sundown*, are downplayed here for the sake of the jams. All of the songs on *Bring It Back Alive* with the exception of "I Hope You Don't Mind" have appeared on earlier Outlaws albums, and recording the group at four different concert locations hasn't affected the continuity of the album set.

Current Outlaw producer Allan Blazek earned his musical wings engineering and mixing albums for the Eagles and the Elvin Bishop Group, both essentially guitar bands. Taking his cues from Eagles super-producer Bill Szymczyk, Blazek shows an intuitive feel for mixing electric guitars hot

with plenty of bite. In the mix, he has placed drums to either side, bass in center, with the three guitars left, center, and right. There isn't a lot of fancy studio technique. Blazek is the type of producer who thrives on the long marathon sessions encountered on these four-sided "live" albums, and it is to his credit that the high energy level is maintained from the beginning to the end of *Bring It Back Alive*. S.S.

NIGEL OLSSON: Nigel Olsson. [Paul Davis, Nigel Olsson, Curt Becher, producers; Kevin Beamish, Ed Seay, engineers; basic tracks recorded at Crystal Sound, Hollywood, Ca.; vocals and overdubs at Web IV, Atlanta, Ga.] Columbia 35048.

Performance: **Surprisingly talented**
Recording: **Good**

I never really gave Nigel Olsson much thought. To me, he was just a drummer who was with Elton John from the beginning and was sacked due to the usual misconceived notion that doing away with the back-up band is the

solution to staving off a staling sound. After the split, Olsson released a few records that seemed to do little more than cash in on his notoriety.

This time out, he has put his best foot forward. With one exception, he has had a hand in the writing of all the material. While it's not stupendous, it is surprisingly good. Some comparisons to both Elton's musical style and studio sound can be made. Acoustic piano and vocal are the focal points here with very lavish strings as a mainstay. The back-up chorus sound so closely identified with Elton's early period is also employed here.

"Rainy Day," the opening tune, is a full-fledged production number. As soon as you put the needle to the groove, vocal chorus, bass, acoustic piano and the deep drum sound Nigel developed with Elton all come at you from the center, with solo guitar backed off right. The drums could have used more definition in the mix, however. As the vocal starts, the chorus drops out and the guitar turns hot and chunky, although here, too, it could have been punched up a tad. Female back-up comes and goes beginning with the fourth line. As the



NIGEL OLSSON: Earlier flights paid off

song goes through its various changes for the first time, you find yourself going through the memory drawer and finding Boz Scaggs/Beach Boys/Elton comparisons. As the chorus is sung, the lead guitar moves from right to center, then back again upon the resurrection of the verse. No solos come into play and the song eventually fades out. Good single potential with this one.

In summation, in the making of this album, Nigel Olsson has gone from being a name session musician to an artist of solo capabilities. He has shown that all that went before was the test of wings before solo flight. The confidence, the knowledge and, above all, the music, is now there. G.P.

PETER BROWN: *Fantasy Love Affair*. [Cory Wade, producer; Gary Vandy, Pat Powers, Marcos Tobal, engineers; recorded at Studio Center Sound Recordings, Inc., Miami, FL, Sound Mixers Studios, Inc., N.Y., N.Y.] Drive 104.

Performance: **Disco oriented, although classy**
 Recording: **Okay**

Newcomer Peter Brown appears to be quite versatile: he not only plays most of the instruments featured here but he has a good set of pipes. The only disappointing aspect is that apparently he didn't set his sights high enough and settled for disco. Some of you may argue that some disco music has intrinsic value or merit—I agree—but still, repetition is repetition. Actually, two of the eight cuts are really to blame, the others being good candidates for cross-over material.

"Fantasy Love Affair" opens the LP with vocal center, acoustic piano back

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of center, high hat right, synthesized strings center, synthesized bass left of center and flat snare drum left. The guitar is centered, as are the double- and triple-tracked chorus. Aided only by a guitarist, Brown is a great one man band. Other than the two previously mentioned lacklustre tracks, this LP was rather tastefully conceived and carried out. If you occasionally like slick, up-tempo Barry Manilow types, check this one out. G.P.

BOBBY WOMACK: Pieces. [Don Davis, producer; Gregg Hamm, Mike Iacopelli, Gerry Estes, Zoli Johnson, engineers; recorded at ABC Studios, Los Angeles, Ca.] Columbia JC 35083.

Performance: **A miss**
Recording: **Too many engineers**

I never really made a study of Bobby Womack's career, but I do remember distinct style changes with each album he did for United Artists—blues one album, country the next, etc. This time out on Columbia, he takes another crack at it—discoed soul. Everything—from material to arrangements to production to performance—ranges from only average to bland.

"Is This The Thanks I Get" is the only cut that comes close to resembling an honest attempt. Drums are echoed center, acoustic piano tinkles center and there, too, you'll find the bass, as well as a few horns. Electric guitar is left in the mix. The echoed vocal is also centered. Horns back the vocal and are



BOBBY WOMACK: A piece is missing

given too much presence for my taste. The female back-up is centered. Buried somewhere in the horns is what sounds like vibes, although they only emerge for a random note that due to an ill-conceived arrangement you can only pick up in headphones. Add to that the annoying fact that the horns do nothing but clutter up the track with a nondescript arrangement. The rhythm section doesn't change from the outset

nor are any solos taken. I think the echo was added to the vocal to give it some extra kick in presence to be heard above the din. All of this could have been avoided if the horn part had been rewritten to accommodate the lead vocal as the integral part of the mix that it is.

Should Leber-Krebs continue to manage Bobby Womack, next time around I'd offer the following pieces of advice: 1) get some good material, perhaps one or two honest-to-God soul tunes from the early sixties; 2) get a producer with a proven track record, and have him apply his successful principles in a new area; 3) get some new studio talent and a competent arranger and 4) then proceed with extreme caution. G.P.

RICK DANKO: Rick Danko. [Rick Danko, Rob Fraboni, producers; Jeremy Zatkun, engineer; recorded at the Village Recorder and Shangri-La Studios, New York City, N.Y.] Arista AB 4141.

Performance: **Brilliant fun**
Recording: **Where's the bass?**

When Rick Danko was in the Band, I often thought that his talents, as well as the abilities of his cohorts, were grossly overrated by a trendy rock press that fell for their rural superficialities and adequate harmonics. What a paradox then, that it has taken a solo effort such as this to spotlight Rick's vast songwriting flair.

None of these songs are humorous *per*



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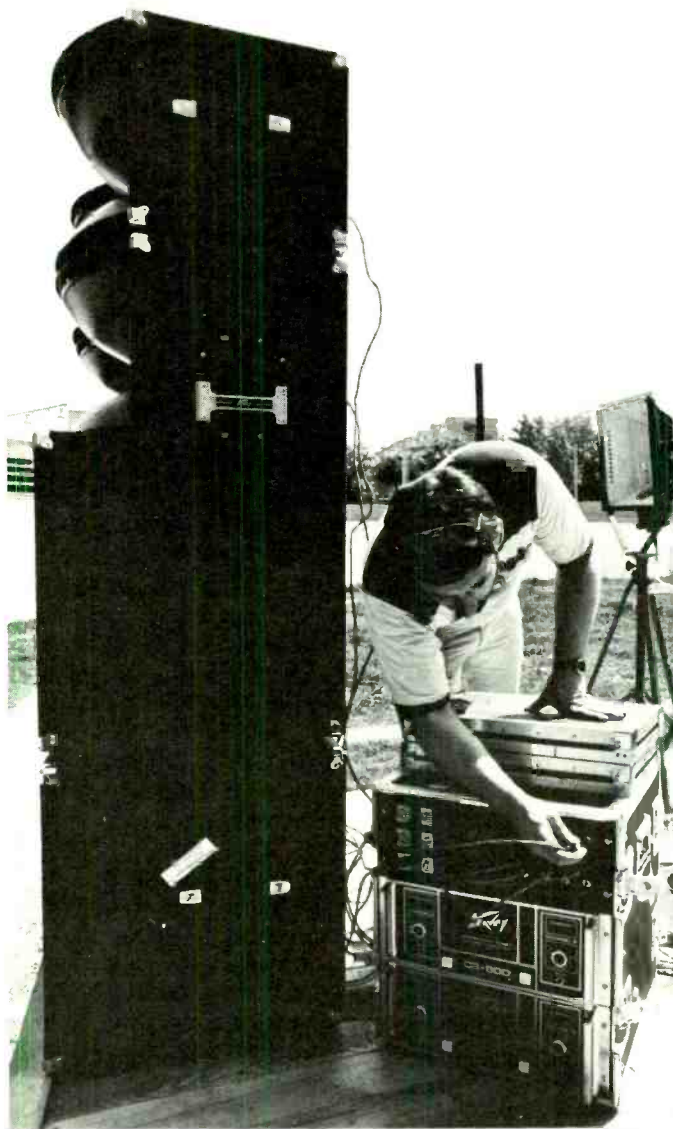
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Gary Mullen
Dirt Band sound man

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BRIAN AUGER and JULIE TIPPETTS: Knitting together a strong joint effort

se, yet in their latently sardonic sarcasm, coupled with clean, supremely appropriate instrumentation, we have one of the best rock albums of the past several years. Many of the songs seem to stress Danko's rather jaded view of women, from "What A Town," with its thinly veiled anatomical references to the distaff sampling available in the described burg, to the funny, unexpected twists of "Java Blues," on past the choral infused, non-mushy yet sentimental "Sweet Romance," to the satirically relevant "Small Town Talk."

Loads of stars parade through these tracks. The likes of Rolling Stone lead guitarist Ronnie Wood, Eric Clapton, Doug Sahm, America member Gerry Beckley, as well as many former members of the Band are heard, all issuing tasty profiles. The only fault is the occasional interruption of rhythmic propulsion, a blemish which would not exist if the bass of Tim Drummond was not periodically buried in the mix.

R.S.

BRIAN AUGER AND JULIE TIPPETTS:

Encore. [Brian Auger, producer; Seth Dworkin, Joe Tuzen, engineers; recorded at Different Fur Studios, San Francisco, Ca.] Warner Bros. BSK 3153.

Performance: **Great!**
Recording: **Quite stable**

The reunion of Brian Auger and Julie (nee Driscoll) Tippetts (of the birth of jazz-rock and Trinity fame) was long in the coming. But, happily, this strong joint effort proves it was well worth the wait. Brian Auger's Oblivion Express met an untimely demise due to the lack of foresight on the part of RCA in marketing and promotion, which unfortunately also marréd their first and only album for Warner Brothers. A man always ahead of his time in his musical ideas and refusal to compromise quality for quantity, there can never be any question of his contributions to music. Auger simply has never made a bad album. Of how many other artists can the same be said?

For her part, Julie hasn't been sitting around knitting either. In the intervening nine years she's been working in the medium of free voice with groups like Ovary Lodge, Voice and a fifty-piece free-form orchestra called Centipede. She also released two solo albums.

In an album laced with gems, Al Jarreau's "Spirit" gets the royal treatment. Opening with Rhodes, bass, drums and guitar center, everything gives way to Ms. Tippetts' vocal, sung in a voice that simply makes the heavens open. Auger's shimmering Rhodes arpeggios add the perfect counterpoint. When he takes his solo, switching to Hammond, he continues to comp on the Rhodes with his left hand. While the

rest of the mix remains constant, Julie's voice drops out and the Hammond fills the subsequent void. The bass is slightly subdued throughout the track, while the guitar continually drops in and out of the mix. As the song nears its end, Julie gets an assist from herself, double-tracked in the chorus. Brian then reverts to the Hammond to move this jazz mood to its fade-out conclusion.

There is a noticeable difference in Auger's playing and producing between this recording and the previous release. Of the nine selections offered, only two are Auger originals. The tunes are also shorter (primarily in the three to four minute range), since they are structured around the vocal verses rather than a series of blowing solos. This album also marks a return to the Trinity sound of organ and piano. Synthesizer work is relegated to just one tune, one which also features Auger's lead vocal for the first time on record since 1974. All in all, a most tasteful work.

I'm hoping this is a lengthy union—and that this album gets its deserved positive label reaction. G.P.

WARREN ZEVON: *Excitable Boy*.

[Jackson Browne, Waddy Wachtel, producers; Greg Ladanyi with Dennis Kirk, engineers; recorded and mixed at the Sound Factory, Los Angeles, Ca.] Asylum 6E-118.

Performance: **A one-two punch**
Recording: **Crisp**

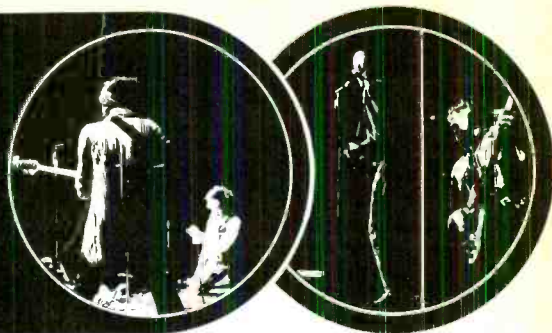
While Jackson Browne's *Running On Empty* is one of the few "live" albums to successfully capture the excitement of a concert without sacrificing studio-quality sound, Warren Zevon's *Excitable Boy*, co-produced by Browne and guitarist Waddy Wachtel, is one of the few studio albums to zero in on the immediacy and thrill of a concert. By recording *Excitable Boy* at only one studio, the normally interchangeable session players have been shaped into a single working unit with Warren Zevon, the Ernest Hemingway of rock, securely at the helm.

Zevon's first album from the early seventies, *Wanted Dead or Alive*, was uneven and obscure, an early parody of the Los Angeles singer/songwriter. But it displayed a flair for the dramatic. His 1976 release, *Warren Zevon* (also produced by Jackson Browne) was more to the point, a fine collection of songs of which three, "Hasten Down The Wind," "Carmelita," and "Poor Poor Pitiful

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Me,” ended up on Linda Ronstadt albums. The production of *Warren Zevon* was cloudy, however, and its pairing with Zevon’s gravelly voice confined many of the songs to simple lyrical statements rather than potent musical commentaries on contemporary life.

On *Excitable Boy*, production, voice, and songs are evenly matched. The juxtaposition of Waddy Wachtel’s guitars and Warren’s piano—notably on “Excitable Boy” and “Johnny Strikes Up The Band”—form the real rhythm section here with an everchanging amount of reverb, echo, and sustain on each. Nevertheless, bass guitar, bass drum, and snare provide the sock that is lacking in the production’s one real flaw, an under-mixed hi-hat. The volume of the piano is fairly constant in the mix, though, while the guitars shift in volume, effects, and even in numbers in the middle of a song.

But Zevon’s voice is the real hero with its command of the lyrics totally intact and its a-melodic character compensated for by recording it clear, full, and present. Indeed, don’t be shocked if you start sprouting hair in the most unlikely places after listening to “Werewolves Of London” several times. Jackson Browne may claim he is run-



WARREN ZEVON: Hemingway of rock?

ning around on empty these days, but Warren Zevon is definitely filling up on premium—and he’s taking the pump with him. S.S.



TONY BENNETT AND BILL EVANS: *Together Again*. [Helen Keane, producer; Don Cody, engineer; recorded at

Columbia Studios, San Francisco, Ca., Sept. 27 to 30, 1976.] Improv 7117.

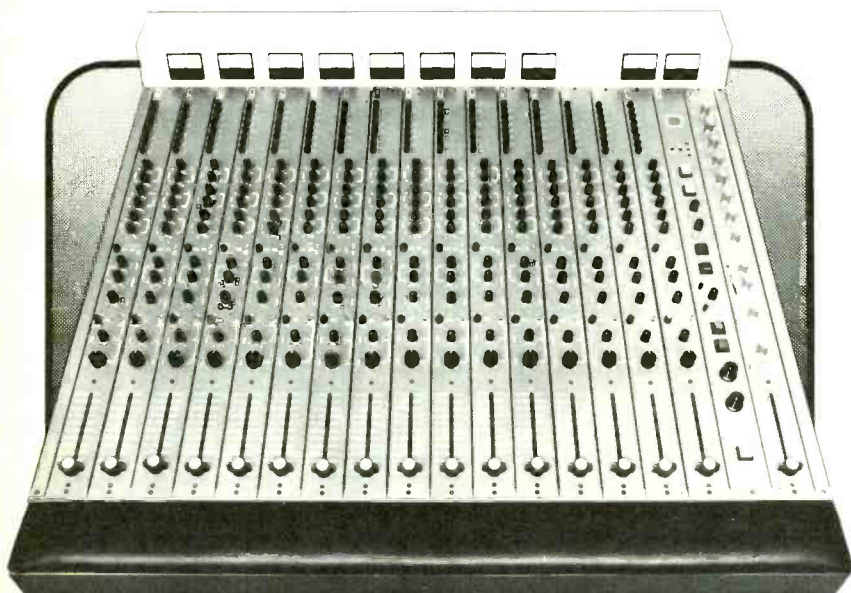
TONY BENNETT AND THE RUBY BRAFF/GEORGE BARNES QUARTET: *More Great Rodgers and Hart*. [Producer unlisted; Frank Laico, engineer; recording place and date unlisted.] Improv 7120.

Performance: **Everybody’s doin’ their own thing and doin’ it well**

Recording: **Exquisite, with Tony and Bill; a bit out of focus with Tony and Ruby**

So Tony Bennett isn’t really a jazz singer. He’s a Las Vegas show room type belter, and one of the better ones at that. But on his day off he likes to let his hair down and work out with some good jazz men. He’s worked with Count Basie, Duke Ellington and Woody Herman’s Orchestras and for a while Bobby Hackett was part of Tony’s troupe. Now that he has his own record company he can do a lot more of what he likes on records and these two are fine examples of that. Actually both are volume two. There was a previous Rodgers and Hart album with Braff and Barnes (I think it was on MGM) and this is also the second Bennett/Evans album, the first was on Fantasy. Each has its strong points. Bill Evans’ introspective cerebral style lends itself better to ballads than jump tunes. Bill is aware of this and Tony seems to be aware of this also so we have an album made up mostly of ballads, but some admittedly rare and pretty ones such as Leonard Bernstein’s “Lucky To Be Me,” Thad Jones’ “A Child is Born” with lyrics by Alec Wilder and Bill Evans’ own “Two Lonely People.” It makes for a record of more or less one texture that may or may not hold your interest all the way through, but broken up and interspersed with some brighter material it works marvelously.

As far as repertoire goes you can’t argue with Rodgers and Hart and this album includes quite a few of their best numbers such as “There’s A Small Hotel,” “You Took Advantage Of Me,” and “I’ve Got Five Dollars.” But the problem here is not so much one of repertoire but of an embarrassment of riches. There are two excellent singers on this recording—one, Bennett, with his voice and the other, Braff, with his horn. However, Tony out there singing the lyrics doesn’t leave much for Ruby to do but play with the wraps on, taste-



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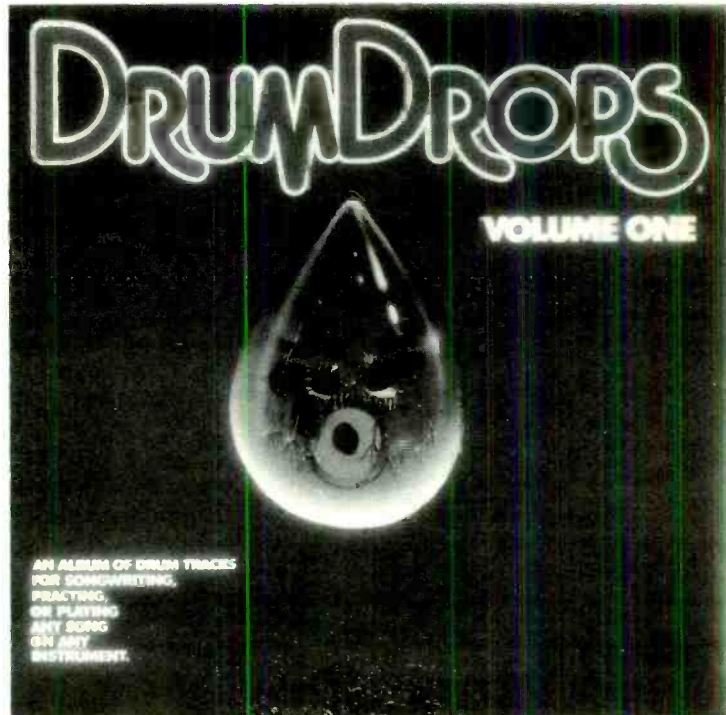
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**Voice Into Horn,
Instrument Into Voice**

By Nat Hentoff

You may not know his name, but you've heard diverse results of his innovative notion—more than twenty years ago—of taking improvised jazz instrumental solos and adding aptly swinging lyrics to them. *The Main Man*, as his Inner City album is called, is Eddie Jefferson; and among his musical progeny were King Pleasure and Lambert, Hendricks and Ross.

Jefferson didn't just write these idiomatically hot lyrics; he also helped create a singing style that made them sound wholly in blowing context. Like any legitimate jazz singer, Jefferson sang like a horn, but often his voice was a horn. I don't mean he directly imitated a trumpet or trombone, but rather, Jefferson transformed his voice into an extraordinarily supple and witty instrument. He performed this feat out of sheer will and jazz knowledge because his natural grainy texture and range were not in themselves especially striking. Yet once you hear him, the flavorful, leaping joy of Jefferson's improvisations resonate in the mind for a long, long time.

Although some five Jefferson sets have been available on record in recent years, he is not exactly renowned. *The Main Man* should help remedy that defect in the jazz audience. With crisp, incisive arrangements—mostly by Slide Hampton—and an invigorating ten-piece band, Jefferson finally has an optimally invigorating foundation for his vocal adventures. (Among the resilient sidemen: trumpeter Charles Sullivan, tenor saxophonist Junior Cook, and the formidable Hamiet Bluiett on baritone). The tunes range from "Moody's Mood for Love" (which Jefferson originally wrote for King Pleasure)

to Charlie Parker's "Confirmation" and a rollicking "Exactly Like You." The recording has plenty of presence with a natural-sounding balance between the instrumentalists and the voice that is also a horn.

In contrast with the extroverted partying of Eddie Jefferson, there are the inner dramatics of Paul Bley's *Solo Piano* on Axis. Bley knows the instrument—literally from the inside out, finding and shaping all manner of textures by probing the whole piano's sonic resources. But this is not sterile avant-gardism. At the core of these unfailingly absorbing improvisations is a lyrical player with exceptional melodic clarity and an imagination that abhors the conventional and the predictable.

Tempos change like soft winds on a spring day; space becomes a differently integral part of shifting luminous designs; but always the piano *sings*. Reversing Eddie Jefferson, Bley brings vocal qualities to piano sound and phrasing more successfully than anyone except Bill Evans. Also, though it may not have been Bley's intention, few records in recent months have been more apt companions for after-hours romance.

As for the recording, this is the very best solo piano sound I have ever heard in jazz—full, vital, and exhilaratingly lucid.

EDDIE JEFFERSON: *The Main Man*. [Leon Thomas and Irv Kratka, producers; Elvin Campbell, engineer.] Inner City 1033.

PAUL BLEY: *Solo Piano*. [Paul Bley, producer; David Baker, engineer.] Axis 37 38.53.

fully but not really up to the best he can do. All this seems to highlight the guitar playing of the late George Barnes, punchy and rhythmic enough to keep a piano-less, drummer-less band swinging.

The problem isn't helped by a recording balance that seems to relegate Ruby Braff's cornet to off-there-somewhere-in-the-distance. Bennett and Evans on the other hand have the assistance, and assistance it is indeed, of Evans's manager Helen Keane who (pardon the pun) has as keen an ear as anyone who ever sat in a control room.

So what's on these records is Las Vegas star Tony Bennett indulging himself in a little jazz inspired camaraderie with such fine players as Barnes, Braff and Evans. It works nicely and it's fortunate that Tony is able to call the shots and put out such tasteful recordings as these two, but that's the advantage of being the owner of the label. J.K.

DAVE MCKENNA: *Dave "Fingers" McKenna.* [Hank O'Neal, producer; Fred Miller, engineer; recorded at Downtown Sound, New York City in May, 1977.] Chiaroscuro 165.

Performance: **Intimate, personal and wonderful**
Recording: **Crisp and clean**

Dave McKenna is one of those players who doesn't burst on you in a spectacular razzle dazzle display of technique or outness. Dave just plays nice tunes tastefully and interestingly. Maybe that's why he so often ends up playing piano in saloons around town. He's a lot more interesting than your average piano bar player but he doesn't command your attention. He's the kind of player you might begin by listening to somewhat peripherally until he sneaks something in that makes the listener do a double take and say 'hey what was that!'

It helps to hang out around musicians. They almost universally respect Dave McKenna, especially pianists. Dick Hyman dropped his name in conversation one night as the man who showed him what a modern pianist can do with his left hand. Now that it's considered old hat to stride McKenna has evolved an extremely simple but intelligent solution. The left hand plays a bass line against whatever is going on in the upper extremities. It gives a fullness that allows the pianist the freedom to play solo (sans bass and drum) without locking him into the stride patterns of

early jazz. An interesting comparison can be made with the pianists around who still do stride (such as Dick Wellstood, Dill Jones, etc.) and achieve



DAVE MCKENNA: Breathing new life into old favorites

much the same effect but by using rather different means to get to that end.

McKenna's selections (the liner note admits that they're mostly barroom bal-

lads) include some little-played gems such as "Stumbling" by novelty ragtime pianists Zez Confrey and "Melancholy" which Louis Armstrong and Johnny Dodds recorded in 1927 but what's marvelous about this album is the way McKenna breathes new life into tunes like "Bill Baily" and "Melancholy Baby" that you've heard until you're sick of them and swear you wouldn't want to hear again regardless of who played them. That was until Dave McKenna took them over and made them fresh again. And then there's a version of "Somebody Stole My Gal" which begins as a right hand solo then goes into McKenna's right hand with bass line style and finally ends up in a *tour de force* of stride piano that even Fats Waller would have enjoyed, picking up speed and gathering momentum like a runaway snowball.

Fred Miller's recording captures it all and the piano sound is true—a change on jazz recordings. Hank O'Neal's liner notes get a bit far afield from the subject at hand but Hank's a charming and delightful writer regardless of where his wandering typewriter takes him. J.K.

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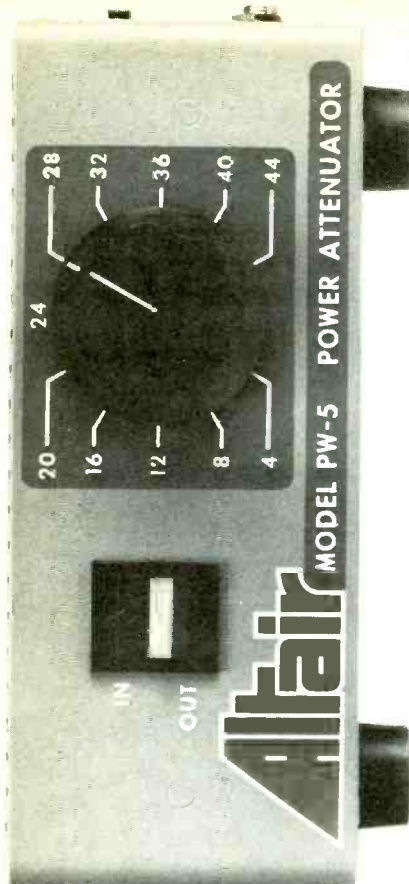
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AURACLE: Impressive first impression

AURACLE: *Glider*. [Teo Macero, James DiPasquale, producers; Phil Schier, engineer; recorded at A&M Studios and The Record Plant, Los Angeles, Ca.] Chrysalis CHR 1172

Performance: **Good, with great potential**
 Recording: **Productive**

This six-piece jazz unit's music caught on quickly, leading to a surprise booking at the Montreaux Jazz Festival. Pretty impressive for the six recent graduates of the Eastman School of Music. While press releases describe them as progressive, I tend to lean more towards the ads proclaiming them more of a crossover. The material overall is on the light, airy side, but with a very tight brass/keyboards/percussion bottom line and sharp arrangements. This is all to the good; however, it is, nonetheless, still somewhat disappointing after reading all the blurbs promising a new progressive group. Progressive jazz to my way of thinking is/way the quartet version of Return To Forever. In comparison, this sound is closer to that of Chuck Mangione. I am glad, however, to see Chrysalis take an interest in jazz, whatever the form.

"Sleazy Listening," the most progressive track on the LP, opens with tenor sax and marimba right, trumpet, bass, drums and Rhodes center. Changes in the mix are rapid. Unison horn section play is centered, while cymbal crescendos are left. The first solo, a frantic

tenor sax, is centered with Rhodes behind with the rest of the brass dropping out. Bongos emerge echoed right, then left, then stereo. The solo ends, as is indicated by slower time changes and a subdued flute and brass arrangement. The tempo picks up again as the Rhodes goes at it, ending with the re-emergence of the introductory brass section riff. The third solo is upper register Rhodes, almost vibe-like. The flute break is then repeated giving way to a short drum work out. As the song goes into its close, what sounds like an xylophone is left, then quickly moves to center and on to the right as the tune ends with everyone playing the same note.

Impressive, but I would have liked to hear a marimba solo rather than the second piano go-round, but then I'm picky. The xylophone ending is most effective. If the rest of the album had the same drive and intensity, I'd be speechless. Good debut, great promise. G.P.

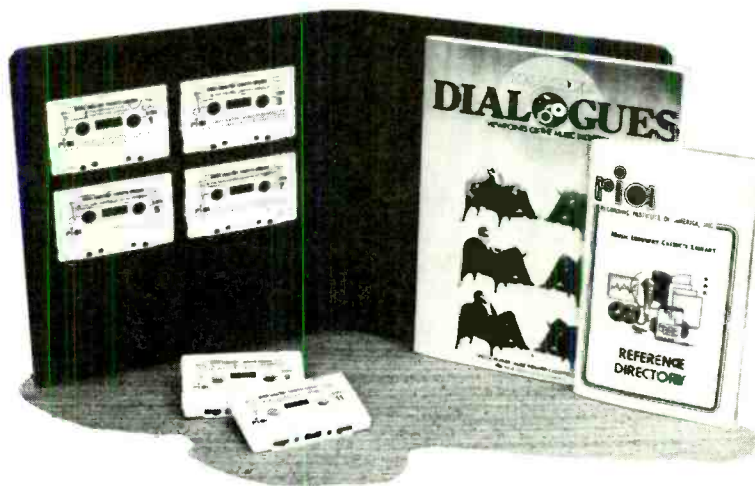
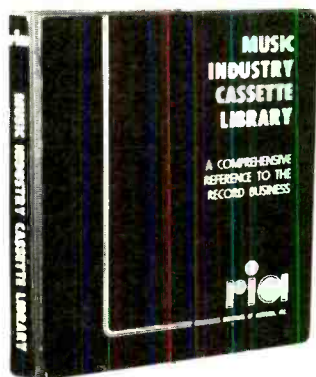
WOODY SHAW: *Rosewood*. [Michael Cuscuna, producer; Maxine Gregg, executive producer; Don Puluse, engineer; recorded December 15, 17 and 19, 1977 at CBS Recording Studios, New York, N.Y.] Columbia 35309.

Performance: **Dynamic and swinging**
 Recording: **For real**

Woody Shaw is generally pigeonholed as an avant garde jazz

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musician. Yet in listening to his playing through the years (this recording included), I hear the pervasive influence of Clifford Brown and Fats Navarro in his playing, Tad Dameron and Gil Evans in his writing and Charlie Parker in his whole being. Woody Shaw may be the new thing but his music comes from the classic era of bebop, although chronologically he is a bit young for that era. He would have been eleven years old when Bird died. But somehow or other the legacy comes down and if Charlie Parker and Woody Shaw never got the chance to blow together it is to be lamented on the part of both players as well as the audience.

For an example of the kind of ballad artistry that Clifford Brown left to the likes of Woody Shaw, Freddie Hubbard and early Miles Davis, listen to Woody on Clint Houston's sensitive "Sunshowers." Of the other members of the group, while all are capable players, I must call special attention to the remarkable bassist, Clint Houston. His solo on Woody's tune "Rahsaan's Run" is one of the high points of the album. Another player worthy of honorable mention is pianist Onaje Allan Gumbs. It's particularly worth noting a quote from Woody's Columbia biography, "I think that when jazz stops swinging, it's not jazz," or as Duke Ellington put it, "it don't mean a thing if it ain't got that swing." The words are different but the thoughts are much the same and in this day of "more cerebral than thou" players it's nice to hear a guy like Woody who wails and moves propulsively along without the usual ploddiness and shoddiness of what has come to be called free-form jazz.

Producers Mike Cuscuna and Maxine Gregg, though working with a different team of technicians have continued in the tradition of their fine sounding recent Dexter Gordon album for Columbia. Both have ears and their credits stretch all the way from Dave Brubeck to Gil Evans—which is a fair distance as far as record producers go. The sound is good and believable as well. If there is any engineering gimmickry here, it's well enough done that it heightens the music without drawing attention to itself.

If I do have an objection to the album it's a familiar one. I find a whole album of new material a bit much to take. Certainly Woody could have come up with a standard or two just to give the listener an old friend he could recognize on the album, but then today's players/composers are so wrapped in their new



WOODY SHAW: No old friends here

thing that sometimes they overlook some standard gems which would contribute a note of friendly familiarity to an album, as well as being musically viable statements for the creative player. J.K.

CLASSICAL

RACHMANINOFF: Piano Concerto No. 3 in D minor, Op. 30. Vladimir Horowitz, piano; New York Philharmonic, Eugene Ormandy cond. [John Pfeiffer, producer; Edwin Begley, engineer; recorded "live" at Carnegie Hall, January 8, 1978.] RCA CRL 1-2633.

Performance: **Unique**
Recording: **Serviceable**



VLADIMIR HOROWITZ: Reflective

I reviewed four Rachmaninoff Thirds in the April *MR*, recommending the Berman/Abbado on Columbia, yet cautioning that this new Horowitz recording was on the way. The Columbia disc is still preferable soundwise. But, as in everything, Horowitz is unique, bringing far more personal insight to the concerto than Berman's excellent but comparatively characterless playing. Anyone who cares about this work at all *must* have this new record.

The "live" concert should not dissuade anyone from buying this important release. A few missed notes and ensemble problems are no worry. But it is perplexing why a producer of Pfeiffer's calibre (he did the superb early-stereo Chicago/Reiner recordings) could not get better results in Carnegie's wonderful acoustical setting. The dry, boxy, thin sound on this record is simply not what an orchestra sounds like from any seat I've had the pleasure to occupy in ten years of concertgoing at Carnegie Hall. Were ambience mics omitted to keep audience noise to a minimum? There are few indications that an audience is present, although just before the end of the second movement (two bars after rehearsal no. 38) an odd noise akin to whispering or CB interference intrudes momentarily. Piano sound is far from attractive, as well. There is marvelous clarity due to Horowitz's sparing use of the pedal, but his tone in *ff* passages—which *Musical America* critic Harris Goldsmith, in his review of this concert, characterized as suggesting "jagged pieces of broken glass"—and the limitations of the recording combine to produce some of the ugliest piano sound on record (e.g., the *cadenza* near the end of the final movement). None of his playing these days is particularly sensuous, but this latter cascade of notes lacks any tonal allure whatsoever.

Since the importance of this release is focused on Horowitz, one expects the piano balance to be forward; and at least the orchestra doesn't appear to be in the back room, as on the pianist's 1951 RCA recording with Reiner (RCA CRM 4-0914). The best-balanced of Horowitz's three recordings is the 1930 one with Albert Coates conducting (Seraphim 60063), but it obviously can't compete sonically; its main drawback, however, is that Horowitz makes even more cuts than the composer's butchery in his own 1939 recording (RCA ARM 3-0296).

This new "live" recording is happily uncut. Some critics, however, find

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Horowitz's three cuts in the 1951 recording the solution in tightening a sprawling work. Those cuts are: Second movement—(1) from five bars after no. 27 to no. 28; (2) from four bars before no. 37 to no. 38. Third movement—(3) from three bars after no. 52 to no. 54. I continue to prefer the Janis/Dorati (Mercury SRI 75068) choice of following the first and third, but not the second, of Horowitz's 1951 cuts.

In his youth, Horowitz tore through this pianistic bramble bush as if possessed. He is still possessed in this, his first concerto performance in 25 years, but now takes time to reflect during his journey. The New York Philharmonic and conductor Eugene Ormandy are always sensitive to his many tempo changes and *rubato*, and RCA's surfaces were okay. S.C.

SHOWS and SOUNDTRACKS

WILLIAMS: *Star Wars; Close Encounters of the Third Kind*. National Philharmonic Orchestra, Charles Gerhardt cond. [George Korngold, producer; K. E. Wilkinson, engineer.] RCA ARL 1-2698.

Performance: **Ideal**
Recording: **Excellent, as usual in this series**

This disc—which consists of suites arranged by composer John Williams (*not* the original soundtrack)—should be self-recommending for most fans of these spectacularly successful films. The conductor, orchestra and recording team have already produced twelve albums for RCA in this "Classic Film Scores" series, most of them indispensable contributions to a genre which is all too often slighted. The sound and performance on these records is uniformly superb, so this is most likely the best way to hear this music.

Williams wrote some of the best music for Boris Karloff's early '60's television series, "Thriller." His work in these recent scores is very eclectic, and many listeners will have fun identifying influences. In the six-movement *Star Wars* suite, the main theme is pure Korngold and the marches out of Rózsa's Bible epics. Otherwise, the borrowings are primarily English—Holst, Walton and Elgar. In the continuous, 21-minute *Close Encounters* suite, the

subterranean opening harks to Ravel's *Piano Concerto for the Left Hand*, followed by a lot of Ligeti (*Atmospheres* and the *Requiem*, both used in Kubrick's *2001*), and after 15 minutes of basically athenatic meandering, the theme for which this score has become so popular wafts into the music, bearing an uncomfortable resemblance to the first five notes of one of Richard Strauss's most beautiful melodies in *Der Rosenkavalier*.

Yes, it's a derivative score. So what? Well, it's just that this long-time film score devotee would have liked to see truly original composers like Bernard Herrmann or Miklós Rózsa receive such acclaim. Williams did his job with flair, but little individuality. S.C.

HERRMANN: *Vertigo* (original soundtrack). Sinfonia of London, Muir Mathieson cond. [No production credits listed.] Mercury SRI 75117.

Performance: **The original**
Recording: **Genuine stereo**

Alfred Hitchcock's *Vertigo* (1958) is undoubtedly among the finest films ever made, and Bernard Herrmann provided a perfect complement. From his first film score in 1940 (*Citizen Kane*) to his last in 1976 (*Taxi Driver*), Herrmann's music is instantly recognizable and unique. Perhaps only Miklós Rózsa has created such a distinctive output for the cinema.

This recording has long been unavailable, but Mercury has made up for its neglect by releasing the score in stereo this time (obtained directly from the film track, as the original release was in mono only and stereo masters could not be located) on its Golden Imports line. Surfaces on my review copy were perfect, and there is considerably more depth in the sound than before.

Herrmann recorded three of the cuts on this disc (Prelude, The Nightmare and Love Music) for London Phase-4 (44126) in a selection of music from Hitchcock thrillers. But the Mercury release is much more important, of course, despite occasionally imprecise playing, simply due to the quantity of music. Until Charles Gerhardt or Elmer Bernstein get around to this score on their respective film score series, this disc should be indispensable for anyone with the vaguest interest in film music. S.C.

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