

**Christmas
Buying Guide**

Audio

THE AUTHORITATIVE MAGAZINE ABOUT HIGH FIDELITY • NOVEMBER 1974 75c®

47425 

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Pioneer's most complete and finest line of receivers ever, presents equally outstanding values starting at \$239.95. Shown here are the SX-535 — \$299.95, SX-636 — \$349.95, SX-737 — \$399.95. All with walnut cabinets.

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INPUTS	SX-1010	SX-939	SX-838
Tape monitor/4-ch. adaptor	3	2	2
Phono	2	2	2
Microphone	2	2	1
Auxiliary	1	1	1
Noise reduction	1	1	1
OUTPUTS			
Speakers	3	3	3
Tape Rec./4-ch. adaptor	3	2	2
Headsets	2	2	1
Noise reduction	1	1	1
4-channel MPX	1	1	1

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when you want something better



SX-535



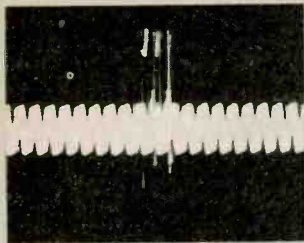
SX-636



SX-737



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Actual, unretouched photo of an oscillograph test.

The oscillograph you see is an actual photo of a high-quality audio system "playing" a fingerprint.

You're hearing fingerprints now through your speaker system. Instead of the sound your precious discs are capable of. And no vacuum record cleaner, brush-arm or treated cloth will remove them. None.

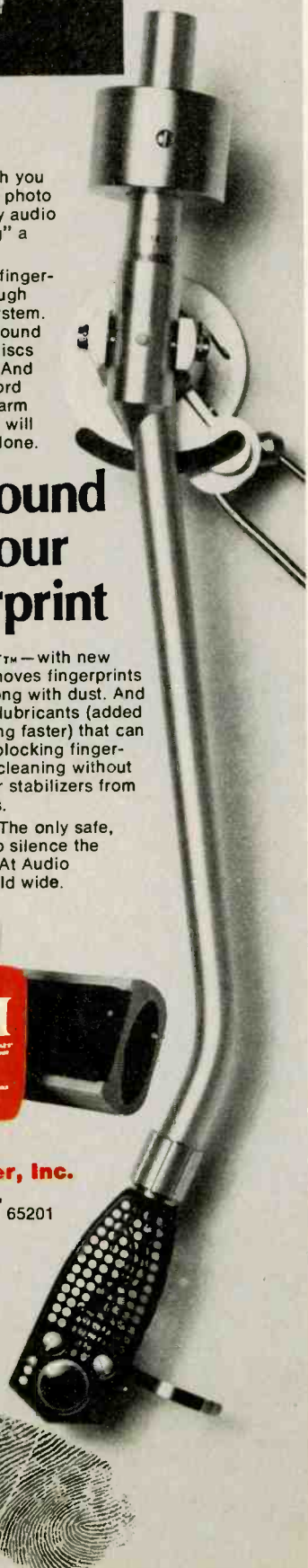
The sound of your fingerprint

But Discwasher™ — with new **du** fluid — removes fingerprints completely. Along with dust. And manufacturing lubricants (added to make pressing faster) that can act like groove-blocking fingerprints. All this cleaning without pulling polymer stabilizers from your vinyl discs.

Discwasher™. The only safe, effective way to silence the printed finger. At Audio specialists world wide.



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Audio

November, 1974

"Successor to **RADIO** Est. 1917"

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AUDIO (title registered U.S. Pat. Off.) is published monthly by North American Publishing Co., Irvin J. Borowsky, President; Frank Nemeyer, and Jay L. Butler, Vice Presidents; R. Kenneth Baxter, Vice President/Production; Nate Rosenblatt, Promotion Director; Mary Claffey, Circulation Director.

RATES—United States only: 1 year for \$7.00, 2 years for \$12.00, 3 years for \$17.00; outside the U.S.: 1 year for \$9.00, 2 years for \$16.00, and 3 years for \$23.00. Printed in U.S.A. at Columbus, Ohio. All rights reserved. Entire contents copyrighted 1974 by North American Publishing Co. Second class postage paid at Philadelphia, Pa. and additional mailing office. Back issues, \$2.00 each.

REGIONAL SALES OFFICES: Jay L. Butler, Publisher and Sanford L. Cahn, Marketing Director, 41 East 42nd St., New York, N.Y. 10017, telephone (212) 687-8924.

Jay MartIn, 15010 Ventura Blvd., Sherman Oaks, California. 91403, telephone (213) 981-7852.

REPRESENTATIVES: Continental Europe: John Ashcraft, 12 Bear St., Leicester-Square, London W.C.2, telephone 930-0525.

For Benelux and Germany. W.J.M. Saunders, Mgr., Herengracht 365. Amsterdam, Holland, telephone 24.09.08.

Japan: Japan Printing News Co., Ltd., No. 13.2 Chome Ginza Higasi, Chuo-ku, Tokyo, telephone 541-5795.

AUDIO Editorial and Publishing Offices, 134 N. 13th St., Philadelphia, Penna. 19107
Postmaster: Send Form 3579 to the above address



BELT DRIVE ISN'T NEW. MULTIPLE PLAY ISN'T NEW. A TURNTABLE THAT COMBINES BOTH IS NEW. READ ALL ABOUT IT.

Back in monophonic times, turntable motors drove platters through a series of wheels called "idlers".

Many automatics and changers still use this system.

In those days, records and playback systems were still relatively unsophisticated, so the distortions an idler drive system created didn't matter much.

Today, however, distortion is a critical problem. With recordings of increased dynamic range, wow, flutter and rumble must be reduced to inconsequential levels.

A belt-drive system is light years ahead of idler drive in that department.

And here the belt is driven by a unique motor found only in B-I-C turntables. It is a 300 RPM, 24-pole motor and it is inherently freer from noise and vibration than the 1800 RPM units with from 2 to 16 poles, which are standard in even the best of the conventional automatics.

The advantage of Programmed Multiple Play

The 980 and 960 are not record changers.

They are belt-drive Programmed Turntables which are engineered to play as many as 6 records at a time.

They have a 2-point record support system which is far less complicated and far more reliable than any umbrella spindle we've ever seen.

But an even more important advantage is this.

An automatic record handling system like the one on a B-I-C turntable can handle a single record, or 6 at a time, perfectly. No false drops. No bouncing and skating a diamond stylus across the grooves. It eliminates human error, and human error is what damages the sidewalls of your record grooves forever.

The simplicity factor

The 980 and 960 have the visibly lower profile of single-play manual instruments. They've been engineered to be simple machines, so they have fewer parts and fewer potential problems.

They abound in innovations. In the tone arm, the cartridge shell, the program panel, the entire system.

We can send you more detailed information if you write to Dept. 11 A, British Industries Co., Westbury, L.I. 11590; or better yet, see them at your local audio specialist.



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This is the 980 with
solid state speed control and strobe.
About \$200. The 960 is identical
except for these two features. About \$150.

Audioclinic

Joseph Giovanelli

Playing Mono Records

Q. Should mono LP reissues purchased since the advent of stereo be played for best results with a mono or stereo stylus? If the monos are cut on a "stereo" cutter, will playing them with a mono stylus cause any damage? If a stereo stylus is the proper one, what kind should be used (i. e., elliptical or conical)?—Louis I. Goldfarb, New York, New York

A. Most discs will play well when used with the newer stylus designs. There are a few monophonic discs which may be a bit noisy, however. These are discs cut with a groove having a different bottom shape than our present V grooves. The bottom of these grooves is wider than the present quarter-mil radius. This means that elliptical styli will work nicely regardless of whether the discs were reissues or were originals. However, some very small conical tips might not fit these older discs, allowing the tip to ride at the bottom of the groove, thereby adding noise.

While it is true that you can play your mono discs very well with today's styli, you still might want to set your receiver's mode switch to "mono." This will cancel out any vertical stylus motion, and thereby reduce noise to some extent. If your entire record collection is mono, you might want to strap your cartridge for mono in accordance with the manufacturer's instructions.

There is no such item as a "stereo stylus" or a "mono stylus." The stylus does not "know the difference." All that has happened over the years is that the art of making stylus tips has improved. We are now able to hear more from our discs than was possible years ago. The result is that many of our older discs sound better now than we had ever heard them. Not only have styli improved, but the cartridges themselves are better.

Generally speaking, therefore, play all discs with the most modern equipment. They will sound their best.

Whether or not a disc is cut with a stereo or a mono cutter makes no difference. Most mono discs are cut these days with stereo cutters, but the final result is that the grooves do not "know the difference." The motion of the cutting stylus will be the same as though the disc was cut with a monophonic cutting system. Therefore, again, there is no problem with the kind of stylus you will use.

Because of the nature of the stereo disc, cartridges had to be made less stiff, especially as regards vertical motion. Again we have a "plus." The decrease in stiffness—or increase in compliance—of the stylus means that we can track at lighter and lighter forces. This enables stylus manufacturers to make the dimensions of the stylus tip smaller and still produce less record wear than was the case with older cartridge and stylus designs. This decreased record wear takes place in the face of the peculiarities of the stereo disc grooves.

Good stylus design was made necessary by the demands of stereo disc recording, but these benefits are all passed along to those who listen only to monophonic disc recordings.

Noise From a Phonograph

Q. My problem is that I hear a noise (something like a scratch) when a record is playing or whenever the cartridge is held above the surface of a moving record. This noise is heard only from the turntable. The receiver works without any problems.—Juan A. Marquez, Gurabo, Puerto Rico

A. It may be that the "noise" you hear when your tone arm is suspended above the moving disc is a result of

static charges on the disc caused by friction with the surrounding air. It also may be that the grounding in the arm is not good. The ground may be alternately connected and disconnected as the arm moves into some positions. This can cause a kind of "scratching" sound to be heard from the speakers.

Bass Response from a Dolby Decoder

Q. Please tell me how to get good bass response when using a Dolby noise reduction unit.—Juan A. Marquez, Gurabo, Puerto Rico

A. Bass response has nothing to do with the use of the Dolby noise reduction system. The use or non-use of one of these Dolby "boxes" will have no effect on bass response. If you have noticed a loss of bass when using your Dolby system, something is wrong with your equipment.

Perhaps the output of the device is feeding into some equipment whose impedance is lower than the unit was designed to "see." Perhaps the input impedance of the device is too low to handle the device being fed into it. Check all this.

If all of this checks "negative," you must then make a frequency response run with the Dolby system. Use a "flat" oscillator or at least have a means of maintaining flat oscillator output. The oscillator must feed in signal at the level you would normally use when operating the Dolby unit. Turn the Dolby decoding portion of the unit off, and make the run. A voltmeter, of course, must be connected to the output of the unit, and should produce a flat frequency response. If it does not, you will either have to make a stage by stage check of the device or return it for servicing.

If you do obtain a "flat" response, switch in the Dolby processing unit. Feed in enough signal to cause the

calibration meter to read at "zero" level at 400 Hz. Make another run. If you now see a loss of bass, you must check the unit again, stage by stage.

Note that there are often two separate input/output circuits on Dolby "boxes." One is used to supply signal to the tape machine, and the other is used when playing back from the machine, supplying signal into the playback system. Check each one for good response. Ignore the high frequency response. This will not be flat WHEN THE DOLBY SYSTEM IS SWITCHED IN, unless you have set your levels high enough to overcome the action of the system.

Insufficient Phonograph Volume

Q. I recently purchased a turntable and cartridge. I own a reasonably small amplifier/tuner. The phonograph will not play through the amplifier with sufficient volume for my pleasure, but my 8-track tape deck works fine.

What can I do about getting more volume?—William A. Pasel, Lexington, Kentucky

A. Because you obtained sufficient volume from your 8-track player, it is obvious that your amplifier can supply enough power to meet your needs. Your problem, therefore, involves your phonograph.

There can be more than one reason for your amplifier not delivering sufficient volume when playing phonograph records. Some amplifiers are not designed to work with magnetic cartridges. These amplifiers must be used with ceramic cartridges. If you attempt to use a magnetic cartridge with such an amplifier, there will be insufficient volume. Sound quality will be raspy and lacking in bass.

If the amplifier is designed to accept a magnetic cartridge, it is likely that the output from your present cartridge is not as high as is required by your equipment. The instruction book for your amplifier should state the minimum amount from a cartridge which will drive the amplifier to full output.

If the cartridge does not produce enough output, either obtain a cartridge which can produce sufficient output or obtain a preamplifier which contains the necessary gain and equalization for magnetic cartridges. The preamplifier must be connected to one of the high level inputs of your amplifier, and not into the magnetic phonograph inputs of your unit.

Such a preamplifier need not be equipped with the tone controls, selector switches, etc., which are found on com-

(Continued on page 84)

Meet the family



The illustration is shown with optional extras.

Our companies have been in the microphone and tape recorder business now for over forty years.

In that time we have built up quite a family . . . professional mixers, tape recorders, microphones, headphones—the lot.

All of these products are made to the same high acoustic and mechanical quality that has set standards throughout the world. For example, if your finances do not quite run to a new Revox tape recorder, try to find a secondhand one—in stock condition it will outperform other makes of new equipment at the same price!

All of our family is described in great detail in a series of technical data sheets and application charts. If you are at all interested in better equipment, we will send you this information. Just mail the attached coupon to: Revox Corporation, 155 Michael Dr., Syosset, New York 11791.

Please tell me where I can see and buy Revox A700
 Revox A77
 Beyer Good used machines*
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 Lamb Headphones
 Mixer

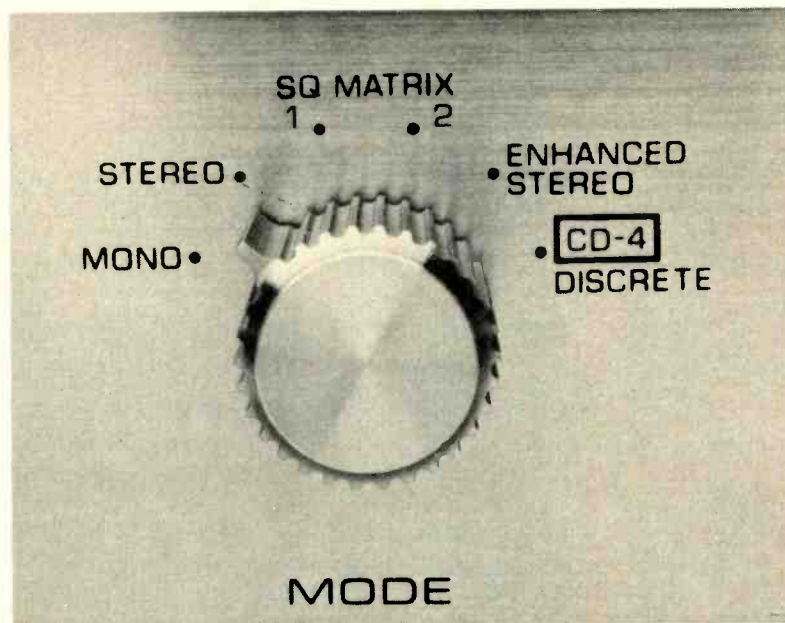
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Address _____

*As and when available from our dealers.

The 800+.

It's six of the best receivers you can buy.



If you'd stop reading this and and go listen, we'd both be ahead of the game. If words could do it you'd be into poetry, not music.

The harman/kardon 800+ gives you both kinds of four channel now. Built-in CD4 now. Built-in SQ now. No waiting. (Anyone who tells you to wait for four channel has a hole in his receiver.) The 800+ will play any four channel record you can buy now. With four separate amplifiers delivering a glorious 22 watts continuous power. Each.

Mono and stereo, of course. Pure stereo. Some four channel systems play stereo like they only half mean it. (They turn off two of their four channels and call it "stereo.") If you're playing stereo on the 800+ you get the whole sound. A simple switch blends the power of four channels into two — more than doubling their quad output. 50 watts continuous power per channel!

Then, two kinds of stereo you've never seen before:

Stereo/Stereo. Listen to your tape deck in the living room. Listen to FM in the bedroom. At the same time.

Enhanced Stereo. An incredible bit of electronic magic that makes your entire stereo library think it's quad. (We know an unnerving number of music buffs who say that enhanced stereo is better than quad. You listen. You decide.)

Six receivers: mono, stereo, stereo/stereo, enhanced stereo, CD4 and SQ.

Words, words, too many words. Go hear the 800+. Listen to it do what it does.

One last word: \$500. The six receivers are yours for \$500. Which figures out to \$83.33 a receiver.

That's music.

The harman/kardon 800+.

Power output: 4 x 22 watts continuous per channel: all channels driven into 8 ohms from 20Hz to 20,000 Hz (Stereo mode 2 x 50 watts RMS)

Harmonic Distortion: Less than 0.5% THD

Frequency Response (AMP):

4Hz to 70,000Hz ± 1.0 dB
Hum & Noise: Better than 85 dB (unweighted)

FM Sensitivity: 2.0 microvolts (IHF)

FM Selectivity: 40 dB

FM Capture Ratio: 2.5 dB

Ultimate S/N Ratio: 70 dB (1000µV)



harman/kardon

High fidelity component systems from \$200 to \$1300.

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Tape Guide

Herman Burstein

Pinning the Needles

Q. I own a Sony professional stereo tape deck, Model TC-355. The only thing which I regret is that I do not have a limiter built into the recorder. I make a great number of piano recordings, and since most of the time I am the pianist, it is hard to be an engineer and run the recorder at the same time. I find it difficult to set the recording volume level, because the soft passages turn out fine during playback, but when I play crescendo, the sound pins the needles of the VU meters. Although the level does exceed the distortion range on the meters, there is no audible distortion during playback due to the quality of the recorder. But I am sure you understand that it does absolutely no good to the meter to have the needle pinned at the peak levels. Therefore I am seeking a solution to the problem, namely how to install a limiter into the tape machine's circuitry, so that the limiter can be turned on or off as needed for certain recordings.—Zoltan Zeisky, Trenton, New Jersey

A. If you want to associate a limiter with your tape recorder, I suggest that you address your question to the manufacturers of such equipment. It seems that a simpler solution might be to recalibrate your VU meters. The fact that you do not get noticeable distortion when the VU meter hits hard all the way right suggests possible miscalibration. Also, let me point out that VU meters (genuine ones, not cheap meters with VU scales) are constructed to take a good deal of overload, so that you really may be doing no harm at all to the meters by pinning them. In a well designed tape machine, signal amplitude is restricted to a range which will not harm a genuine VU meter. Finally, keep in mind that use of a limiter in recording may deleteriously alter the quality of the recorded sound.

With or Without Dolby

Q. I am planning to purchase a tape deck. Will the use of a Dolby unit, such as the Advent Model 101, produce

tapes at 3-3/4 ips that are audibly better than tapes made without the Advent unit?—Dennis M. De Santis, Philadelphia, Pennsylvania

A. All other things being equal, a system that includes the Dolby will produce a better signal-to-noise ratio than the same system without the Dolby. If the tape recorder is of very high quality, the improvement added by the Dolby may tend to be unnoticeable. If the tape recorder is of rather low grade, the Dolby will probably produce considerable improvement. However, an inferior tape recorder with the Dolby will not necessarily come out with as good S/N as a superior machine without the Dolby. In other words, you can't make a silk purse out of a sow's ear.

Dolby Operation

Q. Can you answer the following questions for me? (1) Is there a discernible background noise, or hiss, in a good non-Dolby tape player? Does this noise exceed that of a record player? If so, does the Dolby system reduce this noise noticeably? (2) What is the principle of operation of the Dolby system? Does it require special tape? Added tracks? (3) How would you compare cassettes, cartridges, and open-reel tape for home music systems?—George Jeromson, Sherman Oaks, California

A. A top-quality home tape recorder, without Dolby, can record and play back with virtually no discernible noise at 7½ ips. A few can do so at 3¾ ips as well. On the other hand, if volume is turned up to near-thunderous levels, or if one recorded at much too low a volume, noise does become discernible. I believe that Dolby would perceptibly reduce such noise. On the whole, noise of a really fine tape system compares well with that of a good disc system.

Dolby does not require special tape or added tracks. It requires the input signal to the tape machine to be fed through a "black box" and the output signal from the tape machine to be fed through a complementary "black box." These boxes, containing electronic circuitry,

serve to boost the signal in the noise area (treble range) in the case of input; and to correspondingly decrease the signal in the noise area, and thereby the noise as well, in the case of output. The boxes only act on signals of low magnitude, which is when noise is more discernible; and by confining their action to signals of low magnitude, the boxes avoid overloading the tape system.

I think that in the present state of the art, open-reel tape machines still have some superiority over cassette and cartridge machines. However, the cassette machines have been improving fast and narrowing the margin of performance between them and open-reel units. Cartridge machines do not appear to be improving as fast.

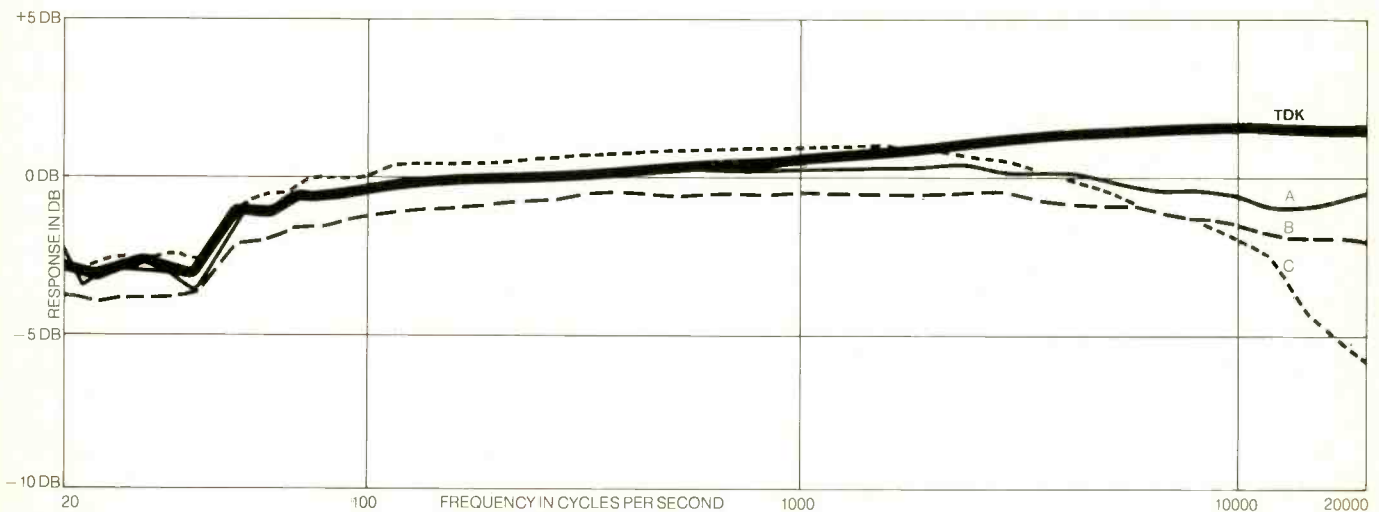
Bias Frequency

Q. Would you please explain the term "bias frequency."—Rick Bacon, Gainesville, Florida

A. Bias frequency is a high frequency signal, usually in the range of 70 kHz to 100 kHz (occasionally to as high as 150 kHz) in high quality tape recorders, that is applied to the tape simultaneously with the audio signal. The magnitude of the bias current is something like 10 times that of the audio current. Usually the bias signal and the audio signal are both fed to the record head. Sometimes, in the crossfield method, the bias is fed to a separate head located exactly opposite the record head, so that bias is applied through the back of the tape. The purpose of bias is twofold: (1) to reduce recorded distortion on the tape; (2) to maximize the amount of audio signal recorded on the tape, thereby resulting in increased signal-to-noise ratio.

If you have a problem or question on tape recording, write to Mr. Herman Burstein at AUDIO, 134 North Thirteenth Street, Philadelphia, Pa. 19107. All letters are answered. Please enclose a stamped, self-addressed envelope.

TDK ED: BEST FREQUENCY RESPONSE. FOR AN EXTRA BUCK.



TDK ED tape was shown to have the best frequency response of four leading cassette tapes tested recently by an independent laboratory. The other three were large-selling popular competitors, retailing for about a dollar less than TDK ED. As you can see, their output tended to fall off noticeably in the high frequencies.

Even a slight loss of high-frequency reproduction can make a difference in clarity and detail to a discriminating ear. That quality of life that music should have just won't be there—the sheen on the violin note, the glitter on the cymbal finale.

Conclusion? If you're serious about the sound of music, try a TDK ED tape next time. It offers you that quality of lifelike brilliance you might otherwise have to buy a ticket to hear. And we think that's worth an extra buck.



Wait till you hear
what you've been missing.

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Dear Editor:

Kudos to Heyser

Dear sir,

Kudos to Richard C. Heyser for his outstanding contributions to the art and science of speaker evaluation, and to Audio for your part in publishing Mr. Heyser's fine, intelligent work. Mr. Heyser has proven what many readers of the audio press have long felt: that many supposedly "subtle" differences in speaker performance can be meaningfully described, if only the reviewer is eloquent enough (and honest enough) to write a candid evaluation.

I also appreciate the technical side of Mr. Heyser's reviews for their consistency and completeness, even in the face of the sometimes less-than-spectacular performance figures derived. Finally we have a reviewer who trusts enough in his readers' competence to tell them the whole story, as he sees it, consistently, unflinchingly.

Please keep those marvelous speaker reviews rolling in!

Dean W. Hoofnagle
Honolulu, Hawaii

Dear sir,

I would like to add my vote of approval for Richard Heyser's loudspeaker reviews in your recent issues. I have followed his writings both in your publication and in the AES journal—I find his evaluation methods useful, technically competent and interesting. His reports represent a step beyond the "golden ear" and "consumer reports" schools of speaker reviewing dispensed by most of the American audio publications.

I am disappointed, however, with the speakers which have been selected for Heyser's tests to date. I realize that some speaker reviews sell more magazines than others, but it seems that several of the units recently reviewed are likely neither "hot" commercial items nor state-of-the-art designs. I can at least commend Heyser for not waxing enthusiastically over these products in his reports. To do so would compromise his credibility.

I imagine that your office has had an ample flood of readers' requests for speaker evaluations of the currently popular products from such firms as JBL, AR, EPI, and so forth.

Personally, I would enjoy seeing reviews of some of the sophisticated transmission-line speakers manufactured by several British firms: IMF, Bowers & Wilkins, Radford-Audionics. My own ears (critical, if not golden) find these products more convincing than the vast majority of domestic brands.

From what appears in the British audio journals, one gets the impression that engineers in the above-mentioned concerns have been directing special attention to some of the same issues singled out as important in Heyser's research: phase constancy, pulse response, stereo imaging and internal reflections. It would be interesting to see if the end-products of these British researchers "graph" well in Heyser's tests.

Julian Vrieslander
Newfield, N.Y.

Japanese Modifications

Dear sir,

In response to Ed Canby's fine reaction to Japanese "modifications" of our Anglo-Saxon linguistic garb, I must say "Well Done!"

Although I am the chief Engineer here at WTON, I do have a college degree in foreign languages. "Audio ETC" from the September edition of Audio actually thrilled me—actually, I guess, because of the frequent slurs one hears these days of Japanese and other Far East use of our language as well as, though decreasingly, their product engineering. I, for one, deeply appreciate their efforts in mastering our extremely difficult tongue, not to mention their great strides in engineering of all types.

Great, really great!!

Paul Swartzendruber,
Chief Engineer
WTON
Staunton, Va.

Education in Audio

Dear sir,

Paul Moverman's article, *Education in Audio*, in the July issue of Audio is well done and highly useful to the industry. And there must be a very active interest among the readership of Audio, judging from the number of

letters I have received following the publication of his article. Thank you for the very generous recommendation of my classes. They are being extremely well received and are a very rewarding activity for me.

The listing of schools at the end of the article lists Synergetic Audio Concepts under "acoustics and/or noise control" whereas it more properly should be listed as a school offering courses in audio engineering. The course is called "Sound Engineering Seminar."

Thank you again.

Don Davis
Synergetic Audio Concepts
P.O. Box 1134
Tustin, CA 92680

Broad View of the Industry

Dear sir,

Thank you for your letter in reference to product information. I am now receiving an ample supply from the manufacturer. I do appreciate your interest in helping me out and would like to thank you for it.

I have been reading Audio for about two years now and the only complaint is that I didn't run across an issue earlier. I subscribe to several audio-oriented magazines and I fully enjoy all of them, but Audio is the only one of them all that seems to have the variety of all of them put together.

I really can't think of any way to improve such a perfect magazine. I suppose you could run a few more of "this" type article or "that" type but I think it would upset the overall balance of the presentation in your magazine. I've found that if I want special information in a particular aspect of audio, there are numerous other publications which do specialize in specifics and they fit the bill nicely. I always come back to Audio though because it offers the broad view of the audio industry and serves as a good starting point to launch any audio-associated endeavor. Great for beginners yet good enough to hold "Old Timers'" interests.

Please, keep up the good work!

Mario A. Davila, Jr.
APO California

Comments on Education

Dear sir,

There is certainly no question that

COMPARE THE NEW ER-139

the smooth electrostatic highs, the extended bass (32 Hz),
the 360° radiation pattern

Many speakers excel in one of these acoustic features; the ER-139 excels in *all* three, yet costs only \$139.90!

Utilizing a new patent by Arthur A. Janszen, one of the world's most respected authorities in high fidelity, the ER-139 employs eight "Constant Q" electrostatic tweeters in a circular array for 360° radiation of high frequencies, plus a highly-refined, downward directed, rear-radiating woofer for like distribution of lows. With a crossover of 2000 Hz, the combination is almost unbelievable... a distortion free, omnidirectional system with a remarkable uniform and smooth frequency and power response across the entire range of human hearing, from 32 Hz to 20,000 Hz!

Listen and you'll hear totally clean, completely uncolored sound. Brilliant, effortless highs... rich, full mid-ranges... dry, resonant bass... incredible clarity and transparency... exactly what the program material supplies. And this system is designed to operate at power input from as low as 15 watts (RMS, both channels combined) all the way up to 100, at eight ohms.

A-B the ER-139 against any speaker on the shelf before you buy or recommend any other speaker. We ask for no more consideration than that. The rest is up to you, your hearing, and your assurance that you know what you like.

a listening comparison note

Exceptional flat response, extreme absence of distortion, and omnidirectional distribution of power work together to produce the totally uncolored sound of the ER-139 Speaker System. However, in your test, coloration can be caused by other factors. To hear the ER-139's at their best, care must be taken not to introduce coloration by improper speaker placement, inadequate associated equipment, or pre-colored program material.

Use a moderately priced amplifier, and a good magnetic cartridge of equally flat response. Find the best room placement for the speaker cabinets (possibly in corner positions) by experimenting. Start about eight inches from the walls and reposition the ER-139's. When the right placement for the room is achieved, you'll

know it! The ER-139 is designed for home use, typically a reflective environment; damped (non-reflective) environments will reduce the multiple reflections of highs and modify the incredible blend that is designed into this system.

Electrostatic Research Company



Box 51, Dept. A., 38 Cabot Street
Beverly, MA 01915

Rush me complete information on the new ER-139 and a list of dealers in my area

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there is a strong and well-justified demand for education in the audio profession today! Since the late '60s, a week has never gone by without someone calling or writing me asking "the big question." And I am delighted to see that Mr. Moverman (*Education in Audio*, AUDIO, July) has emphasized the various job opportunities that are available. Most of the interested individuals have no idea as to what they really want to get into.

There is much that the AES can do to help develop the educational programs privately as well as institutionally. And as of this date, we do have even more AES local chapters than Mr. Moverman indicated. For example, Indianapolis. Yet, I have found that the AES journal is far too esoteric for the beginning student in audio education. My students are exposed to all of the available magazines (including AUDIO) and the AES journal always winds up at the bottom of the pile. Perhaps something could be done about this problem by simply giving some consideration to the needs and interests of the beginning audio engineer. And the AES would be the ideal organization to publish a series of educational pamphlets specifically designed to help the beginning engineer.

As far as institutions of "higher learning" are concerned, I have serious doubts that the proper kind of curriculum can ever be established unless foresighted educators are willing to take a big step and go out and find professional studios (like mine) who are willing to jointly establish practical "work/study" training programs. Due to the nature of our business I am convinced that responsible studios and universities will have to develop joint programs, affording the budding engineer the essential on-the-job experience which a classroom cannot possibly provide.

Many individuals in the industry have argued that each studio likes to train according to their technical facility and style of engineering. In fact, this will always be the case! Yet, speaking as a studio owner, I would love to be spending this on-the-job training time with someone who at least had experienced the pressures of a real life situation and survived. Dr. Ray Dolby has definitely brought up a valid point in the "division of responsibility" in today's studio. And when I hire a new engineer I want to have some indication that he can handle that responsibility!

Again speaking as a studio owner, my comments on the "How to Get a Job" problem are as follows:

1. If you want a job, get out and start selling yourself. If you don't know how, you better find out real fast!

2. The formal resumé sent through the mail is most ineffective! I have a file folder full of these around somewhere. Some evidence of past production efforts, on disc or tape, can be far more impressive, *when presented in person*.

3. In any event, you must have something to sell. You must present yourself to the studio as a person that can be of value, someone that studio cannot do without!

4. When I finally do hire someone it is because of:

A. his potential value to me as presented by his "sales kit";

B. his expertise from past experiences and credentials;

C. his personal character which I can unfortunately gain only from having gotten to know him over a period of time.

With a waiting line outside my studio door it's quite easy for me to be this "fussy." Yet, I do have to be extremely careful before I let a new person in the studio to work with the Ampex and Studer recorders, Neumann mics, etc. Indeed, all studios are quite vulnerable and great caution has to be taken.

Finally, all of us who are concerned about audio education have a full responsibility to discourage all "those" who don't stand a chance to really compete in the marketplace. One of the main purposes of my Recording Studio Seminar is to try to separate "the men from the boys" and we do our best to tell it like it is! This is where colleges often fail, perhaps because they are in education as a profession (\$\$\$). But it's no bite to my salary to tell someone that he's tone deaf, etc. Yet, since our profession does have limited job opportunities we can all work together to encourage talent and discourage the hangers.

Jack W. Gilfoy
President
Gilfoy Sound Studios, Inc.
1130 W. 17th St.
Bloomington, IN 47401

More Ragtime LPs

Dear sir,

The article on ragtime recordings in the June issue of AUDIO was written over a year ago and since that time there have been various additions as well as some people whom I did not credit in the recent article.

Starting with Max Morath, Vanguard

has released a solo LP on SRV 310 of rags by Joplin, Scott, Marshall and Morath. Harmony KH 32421 contains material previously recorded by Columbia with a few items issued on Epic LPs, now out of print and some unissued material. Both of these recordings are on budget labels.

The reverse side of the Harmony issue features Wally Rose playing a doctored piano (thumb tacks in the hammer). This material comes from some Columbia prime movers of ragtime in the 1940s. He recorded for the Good Time Jazz label on GTJ 10034, recently for Blackbird C12007 and airshots from 1946 on Fairmont 102. The GTJ issue is a fine studio recording, the Blackbird needed better editing, and the Fairmont is very enjoyable even with the additional instrumentation.

The Genesis label of Robert Comarge has been one of the leading labels in the area of "Romantic Revival" material and with two entries by pianist John Jensen, they enter ragtime with **Piano Rags of James Scott** (GS 1044) and **Piano Rags of Joe Lamb** (GS 1045). The Scott LP is on a par with the Knocky Parker Audiophile album and the Joe Lamb set competes well with a Golden Crest disc, CRS 4127 by Milton Kaye which features an extra disc with a symposium between Rudi Blesh and Milton Kaye.

Joe Lamb was recorded in 1959 by Sam Charters on Folkways FG 3562. It is interesting to hear as a recorded documentary of a great ragtime composer. However, his pianism at an advanced age was not up to the demands of his music. Either of the recordings already mentioned will suffice as a good introduction to Joe Lamb.

Brian Dykstra, an associate professor of music at the College of Wooster, Wooster, Ohio, issued his own LP of ragtime called **American Beauty**. He plays every piece with assurance and brings out the best in every piece. This is one of my personal favorites and I recommend it highly.

Trebzor Tichenor, the **King of Folk Ragtime**, has a recent release on Dirty Shame 2001, available from Dirty Shame Records, Box 5217, Hannegan Station, St. Louis, MO 63139. He surveys the area of lesser known rags of high quality and assures himself an important place in the annals of outstanding ragtime pianists for his knowledge and talent.

The Red Seal of Victor is an unusual place to find ragtime but an excellent disc of solo and duo ragtime is played by Paul Hersh and David Montgomery on ARL 1-0364. This tradition can be traced back to another duo team of the early Victor years, Victor Arden and

Why you should select your turntable more carefully than any other component.

Every component is important to the total performance of an audio system, but the turntable is critical. It is the only component that physically handles your biggest investment in musical enjoyment: your record collection.

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Not so the turntable. A tonearm that does not allow the stylus to track the grooves lightly, accurately and with perfect balance can turn the stylus into a destructive instrument easily capable of lopping off the sharp contours which carry the high frequencies. When that happens, the clean high notes become fuzzy memories. Permanently. There's just no way to restore a damaged record. Even the best equipment can't replace notes once they're gone.

After considering what your records require for longevity,

you should consider what you require of operating convenience and flexibility. For example, if you don't relish risking your stylus and records by handling the tonearm each time you play a record, you will want an automatic turntable. And if you desire to play two or more records in sequence, you will want a turntable with record changing ability.

All Dual turntables easily fulfill every requirement for record playback and preservation — and every requirement for user convenience.

Which is why the readers of the leading audio and music magazines own more Dual's than any other turntable. It's also why so many audio professionals are quite satisfied with even the lowest-priced Dual.

Please write for our very informative brochures and complete reprints of independent test reports. The more carefully you read them, the more likely you are to select a Dual.

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Phil Ohman. They succeed on all numbers but the two by Jelly Roll Morton and it would take a duo of Bob Greene and Butch Thompson to bring off Jelly Roll's music for four hands of duo-piano.

Another harpsichord disc of ragtime is by E. Power Biggs on Columbia M 32495. This is devoted exclusively to Scott Joplin played on the pedal harpsichord at moderate to fast tempi and is a very entertaining and humorous LP of ragtime.

The Jazz Piano Heritage series of George H. Buck's label has included

some ragtime on their LPs or are devoted exclusively to ragtime, e.g. Donald Ashwander, JCE-71, Bill Bolcom, JCE-72 and Dick Wellstood, JCE-73. The future of this series whets a ragophile's appetite. There is the promise of an LP devoted to William Albright and Eubie Blake. Albright is one of the new composers in the ragtime style like Ashwander and Bolcom. The Blake material will come from recordings made in 1951 by Rudi Blesh, which have never been released.

Herwin Records, P.O. Box 306, Glen Cove, NY 11542, in association with

David Jasen, has started a reissue program of ragtime piano from 78 rpm recordings. The first is 15 different versions of the *Maple Leaf Rag* on Herwin 401 played by Jelly Roll Morton, Earl Hines, Willie Eckstein and others. This record shows that this piece can take any kind of interpretation bestowed upon it. The latest issue is **Piano Ragtime of the Teens, Twenties and Thirties** on Her-402. It is a lot of fun to hear ragtime played by its practitioners. This is to be followed by LPs devoted to ragtime in the 1940s and one to the 1950s.

Another excellent anthology annotated by David Jasen is RBF 22 called **Ragtime Entertainment**. I enjoy El Cotas *Black and White Rag* on the xylophone, James Lent's *The Ragtime Drummer* and Arthur Pryor's *Frozen Bill*.

Orchestrated ragtime is also in evidence on the New England Conservatory Ragtime Ensemble's latest LP on Golden Crest CRS 31031. **The Sting** on MCA-390 from the award-winning movie, and the **The Southland Stingers** on Angel S-36047.

In closing, I would like to mention another favorite of mine, Charlie Rasch. He has a recently released solo LP on CK, AR 3204 featuring a few rags and some jazz-oriented pop tunes from the twenties and thirties. This is available from CK Records, 100 S. 7th St., Ann Arbor, MI 48103.

Charles B. Davis, Jr.
444 Rocky Run Road
Midway Park, NC 28544

Again and Again and Again

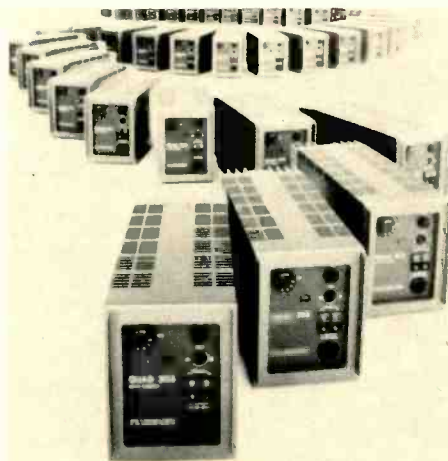
Given the time, the patience, and the money, one can connect* fifty 303 amplifiers nose to tail so that the programme goes through one after the other gradually deteriorating along the way.

Deteriorating? The fact is that apart from a very slight background hiss — akin to a good tape recording — the programme will sound exactly the same at the end as when it started.

*Of course one must fit an attenuator to reduce the signal back to its original level between each amplifier. Send postcard for illustrated leaflet to Dept.(AU) Acoustical Manufacturing Co. Ltd., Huntingdon PE18 7DB. Telephone (0480) 52561.

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Speaker Tests for Non-technical Consumer

Dear sir,

Richard C. Heyser's exhaustive reviews of speaker systems in the pages of *AUDIO* show clearly how judicious use of modern testing methods and equipment can be of value to the non-technical consumer as well as the audio engineer. Some of his data is beyond the average ken, but his presentation has universal appeal in that he consistently relates his subjective commentary to his laboratory findings, and he is prone toward a professional understatement strikingly absent elsewhere. I consider his reviews to be not only precise and informative, but educational — the catalyst I need to get my head into those technical areas which were formerly so intimidating to me. (Necessity breeding invention, I feel one should dig out every available scrap of information before giving irreversible flight to hundreds of dollars.)

Richard L. Price, Jr.

This New Stanton Advertisement was prepared especially for the Journal of College Radio.



Shown above during a daytime session at WCWP are: William J. Mozer . . . Nancy Toran . . . William Epperhart . . . Joel A. Feltman . . . Alan Boritz . . . Phil Lebowitz . . . Michael A. Phillips.

A Prime Training Ground For Broadcast Engineers of the Future Finds a Stanton Cartridge in Every Head

Not many college radio stations are as fortunate as WCWP of the School of the Arts at the C. W. Post Center, Brookville, L.I., in possessing such a magnificent building and studios. But, college radio stations all over the nation, in common with WCWP, prefer Stanton cartridges for all their turntables.

WCWP has become a well known source for radio stations in search of Broadcast Engineers, for here the young trainees learn what they must know in order to qualify for that position in a regular commercial station.

William J. Mozer, Director of WCWP, and an Engineer at WABC (shown directly above standing in the studio) says:

"We have never used anything but Stanton Cartridges on all of our turntables. Currently, we are

outfitted with the 681 EE which meets our needs both in terms of reliability and excellent sound quality in on-the-air playback as well as in our production of transfers. We are looking forward to a future step-up to the new Stanton 681 Triple-E".

Stanton is the choice of a great number of college radio stations, just as it is for the great majority of commercial broadcasters. That is because Stanton cartridges are the Professional Standard and possess outstanding ability to withstand rugged handling without sacrifice of audio quality. Their excellence and reliability assure the highest quality sound with minimum maintenance.

Whether your usage involves Broadcasting or Home entertainment, enjoy professional audio quality with Stanton products.



Write today for further information to Stanton Magnetics, Inc., Terminal Drive, Plainview, N.Y. 11803.

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Audio ETC

Edward Tatnall Canby

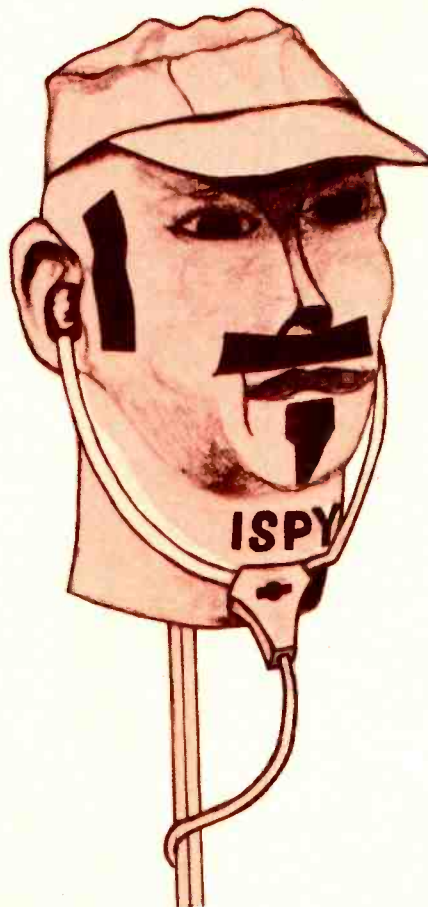
My first thought, on opening up the package, was to name him Yves Z. Dropper, a good German out of Sennheiser, but I soon settled on Ispadore J. Cusp, Ispy for short. I just can't work with a dummy head that doesn't have a proper name.

Ispy came to me with a superbly fine set of plastic ears, but he lacked the other sensory appurtenances—not even a mouth or a single eye. A zombie. So I had to add a semblance of these, plus moustache, sideburns, eyebrows, and a bit of a beard. Try as I would, though, I could not make him look sinister. He seems merely to be musing gently on the extraordinary sounds his microphone ears are hearing. I took a picture of him peering benignly out of a bush to one side of an active lawn party. Some eavesdropper! Worst of all, Ispy was very bald, which to my mind seriously reduced his auditory accuracy, but I had fixed that via a soft cap, bill out front, to simulate the variable sound-diffusers found on normal heads. That ought to do it, I figured.

The things Ispy can hear are indeed extraordinary. Full binaural sound, super hi-fi, taken down via tiny featherweight MKE-2002 Sennheiser microphones, *Druckempfänger* type with battery power supply, mounted stethoscope style on the ends of a featherweight dangling bracket. The mikes fit into the lower ear-lobe cavities via little pegs—Ispy's ear lobes, or, to choice, your own. The playback of choice is via Sennheiser's extraordinary HD-424 "open aire" head phones, also featherweight and very flat, as are the mikes, from maybe 40 Hz to 20 kHz. Compared to my own long-time binaural equipment, this was Rolls Royce, Daimler

and Mercedes rolled into one. Binaurally speaking, I am a Model A man or, lately, VW beetle.

Ispy is all head. He doesn't need a body. Instead, he is equipped with a sort of threaded esophagus with



adapter to fit various supports. You can screw him onto a camera tripod or a microphone stand or even onto his own big black shipping box, bust-style. He is all ears and very poor

complexion—made out of mouse-gray plastic. But such ears he has! They, and he, are all part of Sennheiser's new all-out binaural recording system—everything but the tape recorder. Two channels of sound, picked up by the closest practical simulation of human ears (and head) in the act of listening, the recorded sound reproduced, each channel going *exclusively* to its own ear, via head phones. No loudspeakers. That's binaural recording and reproduction, and as has often been noted in this column by this oldtime binaural enthusiast, it is wholly unlike any other kind of audio, whether mono, stereo or quadraphonic.

The Sennheiser system, painstakingly developed to advance this special recording art towards high-level consumer reproduction, marks the very first time to my knowledge that such a thing has been offered in our industry. (There have been a few even fancier experiments with microphones actually embedded inside artificial ears, but this was hardly production equipment. Also a few binaural discs and the like. But no over-all rational system such as Sennheiser's.)

As old timers will remember, and not a few young listeners, I got into binaural recording long before Sennheiser, as far back as 1952 when one Albert Whyte ("Bert") furnished me with a duplicate of the unique two-channel "binaural" Magnecorder PT-6 which he was then using in his own experiments. It was the very first two-channel recorder, with staggered heads. I went on from there through Uher and Concertone (Japan) and I don't know what-all and I have

(Continued on page 22)

How do Heathkit Receivers stack up with the others? You be the judge.

Compare Heathkit Receiver prices and specifications against the rest of the audio world and we think you'll agree...it's no contest. When you build a Heathkit Receiver, you get more quality, features and performance for your money.



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15 watts per channel* (x2), 0.5% or less total harmonic distortion, 2 μ V FM sensitivity, 60 dB selectivity. **189⁹⁵†**
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Heathkit AR-29 AM/FM Stereo Receiver,
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Heathkit AR-1500A AM/FM Stereo Receiver,
60 watts per channel*, less than 0.25% total harmonic distortion, 1.8 μ V FM sensitivity, 90 dB selectivity. **399⁹⁵†**
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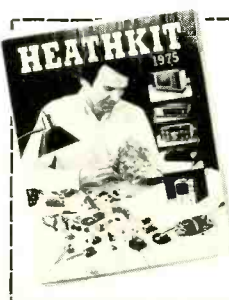
*Power ratings are at 8 ohms, all channels driven. Total harmonic distortion is measured at rated power from 20-20,000 Hz.

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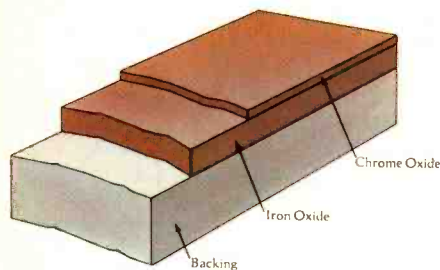
Introducing the Classic Cassette with ferri-chrome.



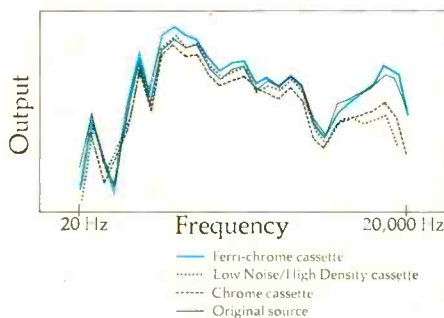
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This ferri-chrome combination gives "Scotch" brand Classic cassettes



fidelity that often deceives the sharpest ear. Included in a variety of test procedures was the use of a Brüel and Kjaer Model 3347 spectrum analyzer. We began with the original play (record) of a broad-spectrum piece of music, first measuring output levels versus frequency from the record, then the Classic cassette recording of the record, and finally, the record recorded on our low noise/high density cassette and on our chrome cassette. Our graph shows the results:



Compatibility is another ferri-chrome bonus. It means Classic cassettes will deliver optimum performance on any quality machine. (On machines with a chrome switch position use the HIGH or NORMAL switch position.)

Along with Classic cassettes, we've also developed an outstanding Classic 8-Track cartridge and Classic open-reel tape. Both with their own special oxide formulation which offers sound brilliance beyond previously unsurpassed "Scotch" brand standards. Super quiet. Utterly responsive.

The Classics — cassette, cartridge, and open-reel tape — are quite simply and clearly the best we've ever made.



Scotch brand. The Master Tape.

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Can you live without a 400 watt amplifier?

Maybe. If you don't mind the loss of quality caused by clipping during the more dramatic passages in your favorite records. Julian Hirsch put it this way: "Anyone using a low-efficiency speaker . . . with an amplifier in the 30 to 50 watt class cannot approach realistic listening levels without severe clipping." If you want to listen at a real-life level without distortion, you need *at least* 400 watts of amplifier power. At \$499, why live with anything less than the Phase Linear 400?

Phase Linear 400

THE POWERFUL DIFFERENCE

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(Continued from page 16)

duly reported on my fascinations from time to time here; but it wasn't until very recently that I found others who were ready to take binaural sound reproduction seriously as an active new medium. In 1972, NCAE ran its Madison seminar on binaural for two-channel public broadcasting, and I was there with many of my own tapes for demo. Now—Sennheiser. And at last, you can go out and buy tops in integrated binaural equipment. Though I must hastily point out that a great proportion of the binaural impact may be achieved with much simpler means.

Now get the picture. As in most of my private putterings, sometimes made public in this column, I worked and still work with the simplest possible equipment, mainly to see how much can be done with how little. I am after basic principles. I like quality the way I like dessert. Gratifying, but not necessarily the first consideration. I very soon established, many years back, that the peculiar binaural listening effect, from two recorded channels, taken down from two ear-spaced microphones, each channel fed exclusively to its own ear via phones, is instantly perceived by anybody even with the most rudimentary equipment—in its essentials, if not to perfection. Perfection, of course, takes a lot more. Like hi-fi. We can hear the news and commercials via transistor pocket radio and get the essential messages all too easily. We can hear the same with *much*, much better quality via hi-fi equipment, grade for grade, and the same with the phenomenon of stereo. You can hear stereo nicely via well spaced 3-in. speakers. You often do, if you get around to your neighbors' places and maybe to Aunt Jemima's (if she has got that far—more likely she is still enjoying her mono). You can enjoy any *music*, the gist of music, minus fi. The meaning, the basic sense, does get through. But hi-fi is better. Hence the entire hi-fi industry!

So Sennheiser's binaural system, with your own choice of tape recorder. First of all it is a superior hi-fi system, the very best, the most ingeniously best, the devilishly superb best way to get every last ounce there is to get out of this recording principle.

But there remains a most interesting little catch to all this, over and beyond the fi. There is more, a lot more—and here we stand at the very threshold of knowledge, where your guess, your calculation, your experiment, is as likely to be as good or as bad as mine, or Sennheiser's.

Having said it before, I'll try merely to recapitulate the binaural experience. It is one of those things that just won't go into words. Ten seconds of listening will tell you all. Because of the unique and total separation of channels achieved by ear-spaced mikes and ear-spaced reproducing phones—not loudspeakers—the binaural playback very closely reproduces the actual sound of two-eared on-the-spot listening. And most notably, the natural heard ambience, the acoustic effect. It is the same with two-channel photography, (unfortunately called stereo, for an endless confusion), which is another and exactly parallel hobby of mine. *You are there!* Two ears. Two eyes. Dual reproductions, exclusively for each eye, or for each ear.

Normal recording, however many channels, is a marvelous thing altogether and who could deny it? But this is *different*, this sound. Startlingly real. Exactly as heard. A voice speaks to your right—you hear it *right there*, in space, off to your right, a sonic ghost! Makes you jump. So real, that the binaural microphone technique is totally unlike that for normal recording. Your dual mikes are placed wherever you hear well. You can listen in the middle of a cocktail party, or in a noisy restaurant, and understand every word that is understandable on the spot; you can follow individual conversations, tuning out others, just as you do in the real-life listening. You can record voices at any distance, and you are never "off-microphone."

There is, some of you will remember, only one minor problem. Nature didn't really intend us to listen in this peculiarly literal fashion, to a sound that is disembodied, out of its environment, minus the proper accompanying signals from your other senses, all of them at once. So things, being literal, go a bit haywire. (Standard recording is so far from literal that, paradoxically, we can play with it for all sorts of useful effects.) Specifically, the binaural reproduction is skittish in its *directionality*. Sounds off to the sides are superbly accurate, and unbelievably real. Sounds in front, and in back, however, are curiously false. Especially in front. It is virtually impossible in many cases—most cases—to "project" a front sound out front where it ought to be, and in fact was at the recording.

Front sounds and back sounds tend to be confused with each other. Front sounds more often than not are heard behind you, or somehow centered in the crown of your head. They simply

will not move out in front where they belong.

So what? Here we enter aesthetics and the experience of listening, as we do in normal stereo/quadrasonic recording. Does it matter—if you were not on hand when the recording was made and do not even know which sounds belong where? Does it matter even if you do know—for a recording is always its own best experience, in its own terms? If it sounds good, why worry? Binaural recordings do sound good, they are absorbing, they grasp your attention unbelievably. So the cocktail-party people are walking around behind you and to one side, when they ought to be in front and to the side. Who cares? There's the philosophical slant.

But some of us perfectionists won't let the matter drop. Scientific curiosity at its best, if frustrating! Why? Why can't we hear out in front when the sound was in front? Untold megahours of research have gone into this problem and much learned theory is the result. But still, we don't hear sounds in front where they ought to be. In particular, Sennheiser has subscribed to the respectable and reasonable set of theories which says that though separation of microphones, by the binaural (ear) distance, does reproduce most of the binaural effect of hearing, the details of front direction that we all hear naturally with our own ears depend on tiny, highly specific details of ear and head configuration, on the ear's highly refined acoustic surround—those lovely convoluted channels and cavities—on the leakage pathways whereby the channels do in fact get around the head itself, notably around in back by the short route, to modify the perceived compound sonic image, both ears' signal combined by the brain computers into one perception.

Thus, we have had much experimentation with artificial heads, and natural heads with mikes in the ears. Thus, the numerous simplified between-the-microphones baffles, long used for binaural recordings, which to my way of thinking are virtually meaningless—they block off some of the right sound from the left, but they are a very poor substitute for the marvelously refined shape of ears and head, you will have to admit. I never could find that they produced any useful improvement at all over no head whatsoever. They could, by a bit. But a real head can do better. Or I spy.

You can understand Sennheiser's characteristically German thoroughness in seeking the real, optimum

(Continued on page 26)

The undistorted truth behind the Avid dividing network.

At Avid, we know there's a lot more to building a really accurate speaker than just a super flat frequency response.

So, after we've done all we can to build the flattest, most linear response into our speakers, we spend a lot of time fussing over a whole bunch of equally important things.

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The role of the dividing network is to send input frequencies to the right driver without introducing any distortion or degrading the transient characteristics of the speaker.

It sounds simple.

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Avid uses only ideal, linear components such as air core coils in its dividing networks. More expensive, of course, but they're distortion free.

The point is, we're a company that is totally and unequivocally committed to just one thing. The design and construction of the clearest, best sounding speaker systems in their price range.

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B&K



JVC



Pioneer

Christmas Buying Guide

Pioneer Turntable

A belt-driven turntable/tonerarm combination, the PL-10 employs a 4-pole synchronous motor for accurate speed rotation. Its 12-inch aluminum platter rotates at precisely 33-1/3 or 45 rpm regardless of line fluctuation. Rumble level is said to be better than 47 dB, while wow and flutter is less than 0.1 percent. Additional features include a statically balanced S-shaped tonearm, anti-skate control, plug-in shell and oil-damped cueing. Low capacitance shielded cables accept any CD-4 cartridge. Price: \$99.95, including base and dust cover.

B & K Scope

Model 1403 is a 100% solid state general purpose unit featuring compactness, light weight and durability. The 'scope has a bandwidth of d.c.

to 2.0 MHz and direct-deflection terminals for viewing waveforms to 150 MHz. Also featured are d.c. amps on both horizontal and vertical axes and a new wide-angle CRT which contributes to reduction of case depth. Specifications: vertical sens., 20 mV/cm; max. input, 600V, peak to peak; input impedance, 1 megohm shunted by 30 pF; cont. var. gain control range, greater than 22 dB; power requirements, 117/234 VAC, 50-60 Hz. Price: \$179.95.

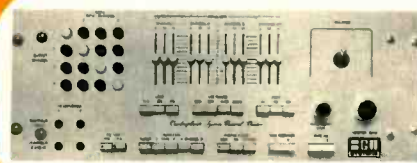
JVC Turntable

The JLB-44 is a high performance, d.c. direct-drive unit designed to complement both stereo and CD 4 systems. Features include a special vibration-free direct-drive motor, an adjustable speed control and a built-in neon strobe indicator. The turntable assembly and low mass,

low friction arm for CD-4 are encased in a resonance-free beechwood base with dust cover. Price: \$349.95.

Altec Speaker

Model 891A, Stonehenge I, is a floor-standing, medium efficiency unit designed for use with amps capable of delivering 25 W continuous/channel. Utilizing a columnar bass reflex enclosure, the 891A features a 12-inch, high compliance low frequency speaker with a 9-pound magnet structure. A front-mounted dividing network offers a continuously variable high frequency attenuation control for adjustment to listening room acoustics. High frequency material is reproduced by a newly designed direct radiator tweeter. Finished on all four sides in teak veneer with a snap-on grille, the system sells for \$329.00



BGW



Gately



Altec



Phillips



Scott

Gately Mixer

The Prokit II mixing system, available wired or in kit form, features slide attenuators and pan pots on all six inputs. Each input is switchable from mic to line. The mic preamp gain is switch selectable and each mic input has a switchable 20-dB pad. Professional VU meters are backed up by LED overload indicators. Optional features include transformer output and +48 V mic powering. \$598.00, kit; \$889.00 wired.

BGW Preamp

The Quadraphonic System Control Center from BGW is designed for true discrete systems from one to four channels, and features 4x4 matrix mode control, which allows any input channel to be assigned to any output channel, three slider-type EQ controls in each channel, four 15-watt head-

phone amps with separate gain control, and optional CD-4 demodulator or matrix decoder. The two four-channel tape recorder facilities include EQ, and there is provision for two phono inputs, as well as one for tuner. High-level frequency response is 20 Hz to 20 kHz ± 0.1 dB, while phono response is ± 0.25 dB from RIAA. Rated THD is 0.02 percent, and IM is 0.006 percent. Price: \$849.00; demodulator/decoder extra.

Scott Receiver

Model R36S produces 30 W/channel from 20 Hz to 20 kHz at less than 0.5 percent distortion. This stereo receiver includes among other features, channel selector, ganged bass, treble and volume controls, channel balance control, mono/stereo, tape monitor facilities, and switching for two sets of stereo speakers. Separate

signal strength and center channel tuning meters are used. FM performance includes IHF sensitivity of $1.9 \mu\text{V}$, capture ratio of 2.5 and mid-band stereo separation of 35 dB minimum. Price: \$329.95.

Phillips HF Generator

PM5324 features pushbutton selection for nine frequency ranges from 100 kHz to 110 MHz and for modulation functions and calibration frequencies. Electronic stabilization provides output amplitudes in five ranges from $5 \mu\text{V}$ rms full scale to 50 mV rms full scale. Output impedance is 75 ohms. In addition to internal AM and FM modulation capabilities and internal wobulation, the unit offers facilities for external modulation inputs, including stereo MPX test signals. Price: \$490.

VERSATILE IS enjoyable



IC150

This IC150 . . . is the finest and most versatile control unit I have ever used. For the first time I can hook all my equipment together at once. I find many semi-pro operations possible with it that I have never before been able to pull off, including a first-class equalization of old tapes via the smooth and distortionless tone controls. I have rescued some of my earliest broadcast tapes by this means, recopying them to sound better than they ever did before.

— Ed Canby, AUDIO

Among the things you can do with an IC150:

Produce your own taped programs! Record from any of seven inputs: 2 phono, 2 tape, 1 tuner, 2 auxiliary (tape player, cassette deck, guitar, microphone, etc.)

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Record two copies of a program at once, and monitor source and tape for each.

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The IC150 performs all these functions and more with lower distortion and noise than any other preamplifier.

This combination of clean sound and versatility cannot be bought anywhere else for less than \$600. But you can buy it for only \$349 at your **Crown** dealer. See him today to make your own comparison. (For independent lab test reports on the IC150, write CROWN, Box 1000, Elkhart, Indiana, 46514.)



CROWN

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(Continued from page 23)

residue of improvement that may be possible via a close simulation of actual hearing via ears and head, no more than a bit of improved accuracy in the spatial location of your binaurally reproduced sounds. The genuine hi-fi attitude! If it can be done, we have to do it.

Well, by God, I've been using Ispy's head and my own head, with those stethoscope-like mikes dangling, for a number of wonderful and fascinating experiments these last weeks, and it has been enormously instructive. Put aside the matter of audio fi, which is, as I say, sheer Rolls Royce/Daimler/Mercedes, straight through the Sennheiser system. Beyond all that, I am happy to report that Sennheiser has in fact cracked one half of the ultimate nut, and has broached the other half. In twenty-plus years of binaural experiment, I have never heard it before. Now you can hear, absolutely clearly, directly, in behind. Amazing. "Testing, testing", says the moving voice. "Now I am off to the right" (and so it is). "Now I am moving around in behind"—and the voice does just that. The speaking person clearly walks right behind you. "Now I am passing right behind, and on to the left." Lo—he does! Absolutely, hair-raisingly realistic.

With plain microphones, omnis, minus head or baffle (and with baffle, too) the binaural front and back are virtually indistinguishable. The voice moves, somehow, from one side right over the crown of your head and off to the other side. No great problem! It sounds perfectly OK and not at all unnatural. Just not out front and not in back. Or maybe, all of the sound vaguely in back. You can even walk yourself straight between your two binaural mikes, right through the middle of the listening "head," and the playback sounds merely as though the person (speaking, of course, as he moves) has approached close-to, then moved away again. No problem in perception or enjoyment. Just a non-correspondence between original and reproduced motions.

So Sennheiser wins hands down on the rear perception, and it clearly is thanks to those microphones, which sit right inside the ear surround (yours or Ispy's) and therefore can make a very clear distinction, as you do in the actual "live" listening, between sounds from the rear that are shaded by the ear flaps and those from the front which are cupped into focus. It cost a lot of money to accomplish this; you will have to line up a

lot of money to try it yourself (along with the hi-fi quality), but now you can hear to the sides, and the back, absolutely as in nature. Amazing . . .

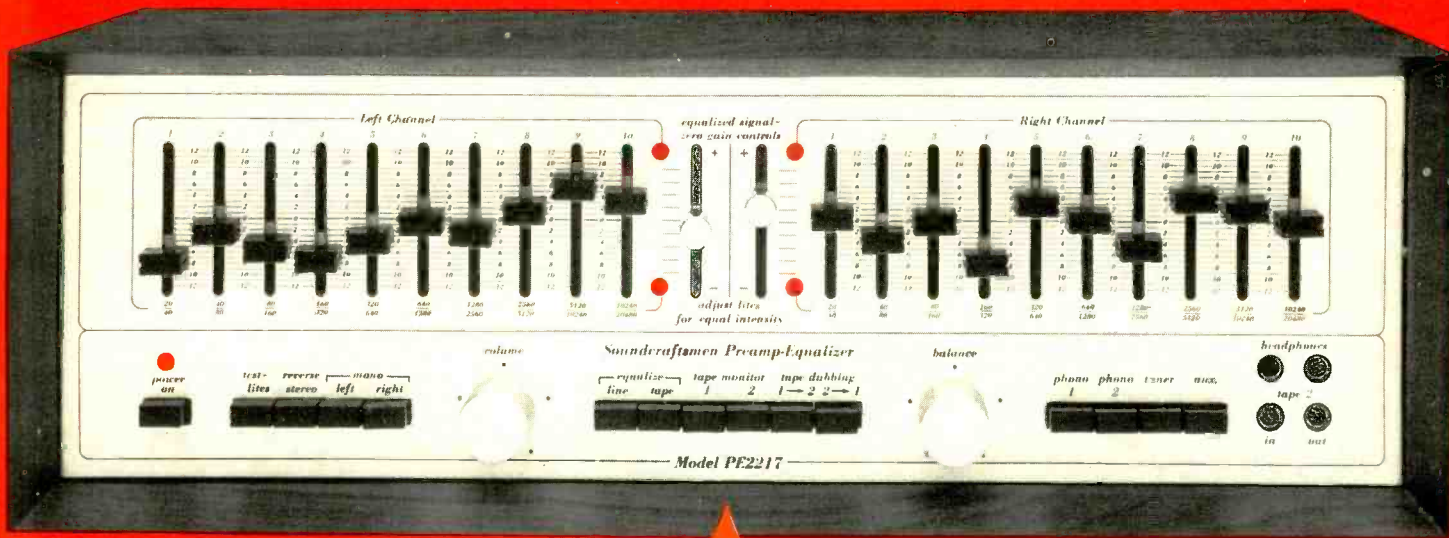
The front? Alas, that mystery is not yet untangled. Yes, for the first time in my life I have managed fleetingly to hear binaural reproduced sounds out in front of me. It took enormous concentration, and it took even more, a playback in the exact same spot as the recording itself—the same acoustics. I recorded via Ispy, walking out in front and around. I then put my head where Ispy's had been, and played back the recording. Yep—with eyes closed tight, violently concentrating, imagining with all my might, I did hear that sound move out in front of me. I visualized it out there. Aha! There is the clue. And there, I think, for all its pains, Sennheiser has not quite got the ultimate message.

Though I managed, other less experienced listeners, one after the other in my trials, were unable to hear any sound out in front, even at the precise recording location only moments after the recording had been made via Ispy. "Now I am straight out in front," the test voice would say, and instead it would appear above, somewhere over the eyes. Crazy. Here, Ispy and Sennheiser and the marvelous mikes failed. Not that it matters, again! Just that nagging urge to know *why*. Why, with all my experience in this kind of listening I could barely make the grade for a moment or two, why I could not myself barely hear in Sennheiser's own 45 rpm demo recordings what Sennheiser says is there—sound all the way around.

I think the German engineers have simply trained themselves to hear the sound where it *must* be, out in front—to grasp the inadequate and/or contradictory clues from the various senses and the mind and make them behave as they should. It can be done.

With Sennheiser binaural sound now a commercial hi-fi reality at the very top and a wide range of lesser equipment around to cope with binaural, too, all the way down to the bottom, the real gist of the binaural listening experience is ready for any pair of ears, and it is fun. Try it. If you have a two-channel recorder, any grade, two microphones, any old sort, and a pair of head phones, any type, you're in business. Forget the head! At least to begin with. Just set up your mikes eight or ten inches apart, anywhere, and record. Then play via the phones. You can always move up to Sennheiser when the urge urges you.

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SPECIFICATIONS

FREQUENCY RESPONSE — Hi-level inputs: $\pm 1/4$ dB, 5 Hz to 100 KHz
 FREQUENCY RESPONSE — Phono inputs: $\pm 1/2$ dB, 20 Hz to 20 KHz (Typ. $\pm 1/4$ dB)
 HARMONIC DISTORTION: less than .05% at 1 volt, (Typ. .01% at 1 volt)
 IM DISTORTION: less than .05% at 1 volt, (Typ. .01% at 1 volt)
 SIGNAL-TO-NOISE — Hi-level inputs: 100 dB below full output
 SIGNAL-TO-NOISE — Phono inputs: 84dB below a 10mv input
 SIGNAL-TO-NOISE — Equalizer section: 90dB below a 1 volt input
 GAIN — Phono: 57dB
 GAIN — Hi-Level: 15dB
 INPUT IMPEDANCE — Phono: 47,000 ohms
 INPUT IMPEDANCE — Hi-level: 50,000 ohms
 OUTPUT IMPEDANCE: 600 ohms
 MAXIMUM OUTPUT: 5 volts into hi impedance, 2.5 volts into 600 ohms

EQUALIZER LEVEL: Zero gain controls for left and right channels, continuously variable, for unity-gain compensation from -12dB to +6dB.
 EQUALIZER RANGE: 12dB boost and 12dB cut, each octave centered at 30, 60, 120, 240, 480, 960, 1920, 3840, 7680 and 15,360 Hz.
 MAXIMUM OUTPUT SIGNAL: Variable master volume control allows adjustment of optimum output to match amplifier capability up to 5 volts.
 CIRCUIT BOARDS: Military grade G-10 glass epoxy
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 DIMENSIONS: Walnut-grained case 7 1/4" high x 20" wide x 1 1/4" deep. Genuine oiled-walnut cabinet available, \$49.00 extra. Front panel size 5 1/4" x 18"

\$499.50 INCLUDES WALNUT-GRAIN CASE MANUFACTURED IN SANTA ANA, CA.

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Please list any suggestions:

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Fixing Your Electronic Organ

Jon Turino

THE ELECTRONIC organ has become the favorite musical instrument in many homes, and for good reason. Its versatility and ease of playing make it the best instrument for many kinds of music, from classics to jazz, popular to acid-rock.

Today's electronic organ is a remarkably stable instrument. Most are of excellent design and excellent quality, and failures are not nearly so commonplace as in other home entertainment equipment. But for this reason, finding an experienced technician can be a problem. The good ones are scarce.

With a little know-how and common sense, it is possible to keep the service calls fewer and farther between. If you use the right techniques and materials, you can do most of the maintenance and repair that your electronic organ needs.

First, let's look at a typical spinet organ. Figure 1 shows a medium-sized electronic organ. The main points of interest are as follows:

1. **On-Off Switch**—self explanatory;
2. **Expression Shoe**—this is the volume control for the organ;
3. **Upper Keyboard**—sometimes called the swell or solo manual, most melodies are played on this keyboard;
4. **Lower Keyboard**—sometimes called the great or accompaniment manual, most harmony is played on this keyboard;
5. **Pedal Clavier**—the pedals are used to provide the bass notes, or beat, for your music and

6. **Voice Tabs**—sometimes called stops, tabs are what make organs differ from each other. Not only how many tabs there are, but what they do counts. They determine the versatility and tone quality of the organ.

There are some musical and electronic relationships on the keyboards and in the tabs that are helpful in trouble-

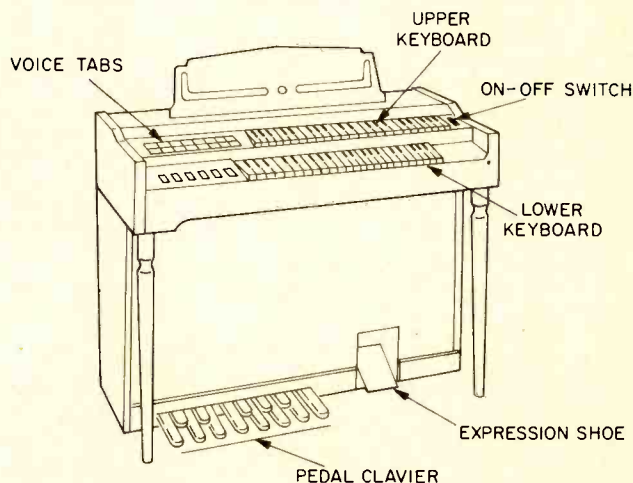


Fig. 1—Typical spinet organ.



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MP 3000.

This superb speaker system boasts 2 tweeters, 1 mid-range, and 1 woofer. Featuring separate controls for tweeters and mid-range, the MP-3000 handles 50 watts program material (100 watts peak). Frequency response: 20-20,000 Hz. Cabinet: 27" x 20½" x 14". Shipping weight: 70 lbs. \$199.95



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shooting. Figure 2 shows a typical keyboard. The musical relationship between any two keys of the same name (Middle C and C above Middle C, for example) is an octave. An octave is the distance from the first note of a scale to the eighth note of the scale (hence the name octave), and a note one octave above another is twice the pitch of the first.

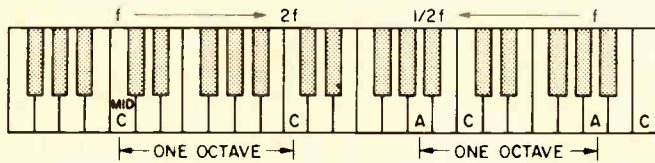


Fig. 2—Typical spinet keyboard.

Electronically, this means that the frequency is doubled. A note an octave below another has a frequency of one-half the first. This is an important relationship, since many electronic organs on the market generate the highest pitched notes on the organ and use flip-flop dividers to obtain the remaining notes.

Figure 3 shows a typical arrangement of "tabs." The "footage" marks (16', 8', etc.) represent the lengths of pipe that

SOLO	FLUTE	CELLO	SOLO	FLUTE	VIOLA	OBOE	VOX	SOLO	FLUTE	SUSTAIN	SUSTAIN
16'	16'	16'	8'	8'	8'	8'	8'	4'	4'	MED	LONG

PEDAL	PEOAL	PEDAL	NORM	FLUTE	STRING	HORN	DIAP	OFF	SLOW	LIGHT	OFF
16'	8'	FULL	ACCOMP	8'	8'	8'	8'	TREMOLO	VIBRATO	VIBRATO	VIBRATO
			FULL					ON	FAST	DEEP	ON

Fig. 3—Typical arrangement of voice tabs.

would be needed to create the pitch of a particular note if you had a pipe organ. A 16' flute is a deep voice (large pipe) and an 8' flute is a higher pitched voice (smaller pipe). These voices are related in a 1:2 fashion. A 16' voice is one-half the pitch of an 8' voice. Figure 4 shows a keyboard with voices to

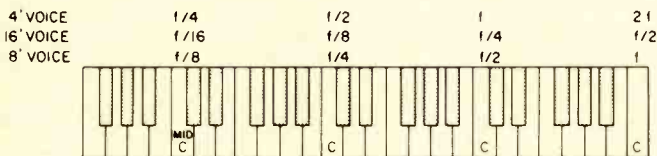


Fig. 4—Keyboard showing relation of voice and frequencies.

the left and frequencies above. As you can see, if you play Middle C with an 8' voice, you will hear the same pitch (F/8) that you would hear if you played C above Middle C with a 16' voice (still F/8). This relationship may be used for four or more notes. As it happens, this also turns out to be a handy troubleshooting aid. Used properly, this knowledge will let you pinpoint a problem to a bad tube or transistor without even removing the back of the organ.

There is one more distinction that needs to be made regarding the tabs on an organ. Some of them are **voice** tabs and provide a sound by themselves when a key is pressed. The others are **control** tabs. By themselves they do nothing, but used in conjunction with voice tabs they create different

effects. Examples of control tabs are **solo** tabs (a solo 8' tab makes all the 8' voices louder), **vibrato** tabs, **volume** tabs and **sustain** tabs.

Maintenance

Let's look first at some of the regular maintenance that should be done. Cleaning is the first thing to consider. For an organ to look, feel, and play properly, it should be clean inside and out. The outside will be happy with a very mild soap (like Ivory liquid) on a damp cloth. Wash, rinse with a damp (not wet) cloth, and dry the keys and tabs regularly. **DO NOT USE SOLVENTS** of any kind. They can damage the plastics and wood finishes. The cabinet will also gleam with this soap and water treatment, and a good liquid polish for the wood surfaces will not hurt. Use a vacuum cleaner on the inside once a year to remove accumulated dust.

The "playing" parts of an organ are the mechanical key switches and tab switches. The right way to clean these is with an aerosol contact cleaner. You want the kind that says, "Leaves no deposits, will not harm plastics" (Miller-Stephenson MS-230, General Cement GC 8669, or similar). Spray the switch contacts and work the tabs and/or keys a few times. This procedure will clear up a whole host of problems, from static in the output to voices and keys that are intermittent. It should not need to be done more often than every six months to a year. Gaining access to the tab switches is not usually too difficult a job, but we come to another necessity. You should have a copy of the service manual and schematic for the organ if you intend to do any real repair work. All organ companies have such material for their technicians, and it is usually available to the organ owner for a nominal fee (around \$3.00 to \$6.00). The address to write to for this manual is in the owner's manual. (Send your request "ATTN: Service Department" and they will get it to you quicker.) The service manual may contain disassembly instructions, trouble shooting aids, and special information that could save you a costly call by a professional technician.

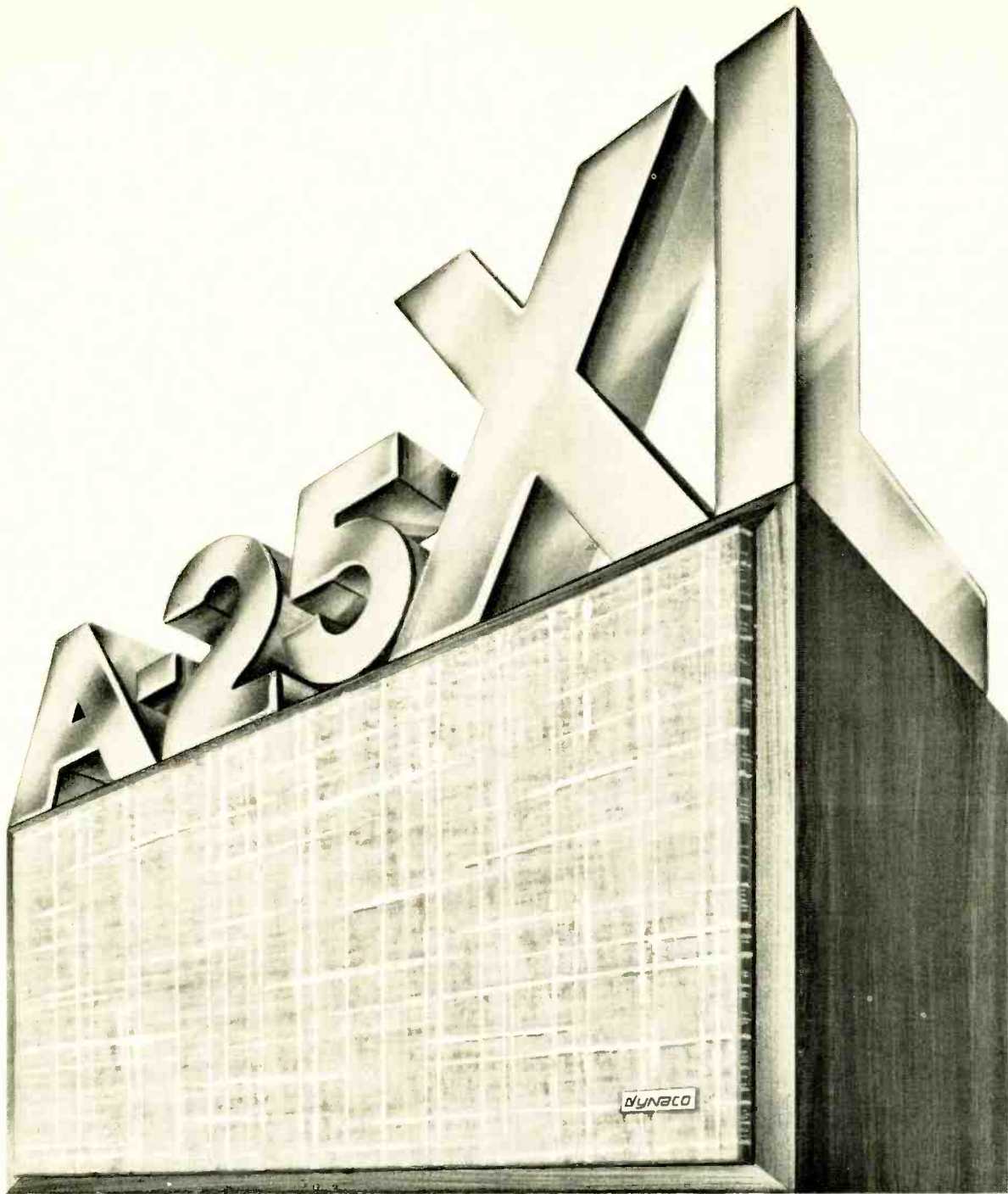
The only other regular maintenance that must be done is oiling. Most modern organs have Leslie speakers (or similar devices) for creating a theater organ sound. The motor should be oiled with a light machine oil once a year. Detailed instructions will be on the speaker unit or in the service manual. When you oil the Leslie, it is a good idea to check the tension of the drive belt that connects the motor to the rotating part of the speaker unit. Be careful to keep oil off the belt and pulley surfaces.

So far we have probably managed to save at least one service call a year, and as you can see, it is not really that difficult to keep an organ in good playing condition. For those of you who wish to dig deeper, some test equipment is in order.

Test Gear

The most versatile piece of test equipment for organ repair is the volt-ohm meter. With the VOM you can check the operation of the oscillators, dividers, filters, power supply, keying, almost everything. The meter should have an input impedance of at least 20,000 ohms per volt, but that is about the only restriction. A signal tracer is also a valuable aid for isolating "sections" of the organ.

Your electronic organ can be divided into five major sections (see Fig. 5). The tone generators are the heart of the instrument. This section is where all the sounds that come out of the organ are born. There are two schemes for creating the necessary pitches in the tone generator. The first is to use an oscillator for each note. Each of the individual pitches are sent to the key switches so that when the proper tabs are depressed, the tones are sent to the filter circuits as keys are played. The same pitch may be sent to Middle C for a 4'



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voice, C above Middle C for an 8' voice and the C above that for a 16' voice. Troubleshooting? Turn on one 8' voice. Play each key in succession. Write down on a sheet of paper any notes that fail. Then turn off the 8' voice and turn on a 4' voice. Play the keys again, writing down the names and locations of the bad ones (see Fig. 6). If only one key on one voice is defective chances are that there is nothing wrong with the tone generator. But if the pattern looks like Fig. 6, you probably have a tone generator out. By tracing backwards on the organ schematic, you can pick the bad oscillator and repair it.

The second tone generator scheme is the more common one. There are twelve oscillators for the highest notes on the organ. These pitches are then sent to the individual dividers to create the lower tones of each family of notes (see Fig. 7). A family of notes is a group that is related by octaves

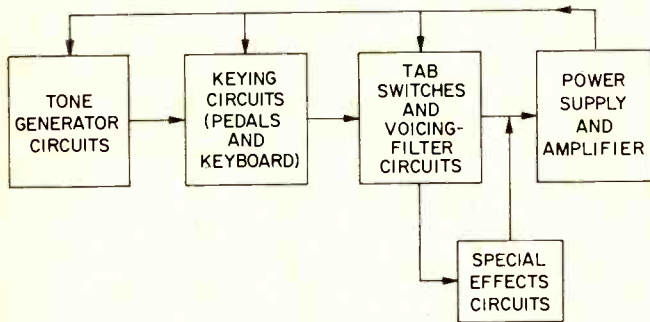


Fig. 5—Basic sections of the organ.

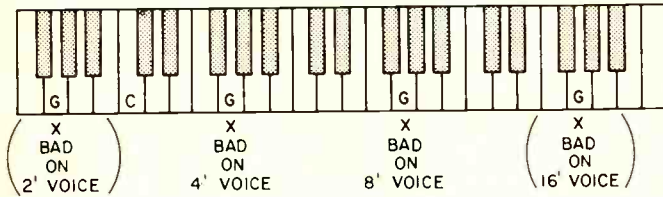


Fig. 6—Bad-note pattern with defective tone generator.

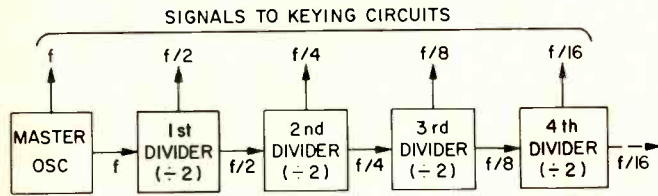


Fig. 7—How dividers create different notes from a single master oscillator.

(the C's, the A's, etc.) The technique for finding a bad stage here is the same as is used in the previous example. However, there are some definite statements that can be made about which stage is bad, so that picking the bad stage can be done from the keyboard. For example, if all the C's are out on all voices, the "C" oscillator is not operating. If the 4' voice is the highest on the instrument, and the top two notes of a family play with this voice on, but the ones below it are silent, the oscillator is operating, the first divider is operating, but the second divider is not. To prove this, turn on an 8' voice. Now only the highest note will play. The 8' pitch of the top note comes from the first divider. The second divider is defective. Now you can see why the octave relationship is an important troubleshooting aid. If you remember the relationship of each pitch to the higher and lower pitches of the

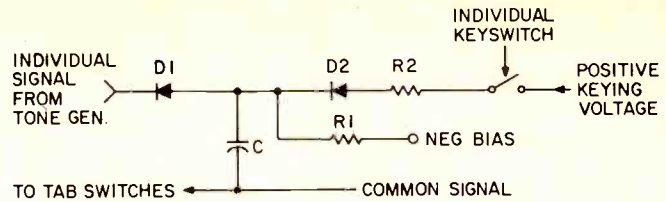


Fig. 8—Keying circuit using reverse-biased diode.

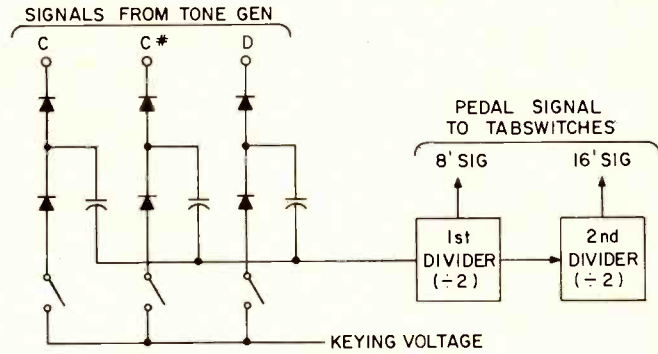


Fig. 9—Pedal divider system.

same family, finding the tone generator trouble is a snap. The most common defect in tone generators is a bad tube or transistor. In tube organs, substitute a new tube for the suspected tube. If the notes play now, you have found the bad tube. In transistor organs, you should find the trouble with the VOM, since replacing transistors is a much more involved task.

The third major section of the organ, from a functional standpoint, is the tab switch and filter circuits. The tab switches are plagued mainly by dirty contacts since they switch audio signals, but other than that should be trouble free. Basically, the signals from groups of notes are sent down to the tab switch and through a passive network of resistors and capacitors to the appropriate filter or mixer when the tab is in the ON position. In most instruments the only voices that will seem affected much by a defective filter are the flute voices. This is because the signals from the key switches must be thoroughly filtered to become sine waves (which is the characteristic waveshape of a flute), while they require little or no filtering to become the proper shape for a clarinet. In other instruments the signals are collected and sent through passive waveshaping networks to the preamp, without going through any active circuitry. There are instruments that embody both methods.

Figure 10 shows a keyboard with filter numbers assigned to key groups with 16', 8', and 4' flute voice selected. With a chart similar to Fig. 10 (which should be in the service manual), you can locate a defective filter almost immediately from the front of the organ. As you can see, you have a cross-check to decide if a filter is defective or if a broken wire

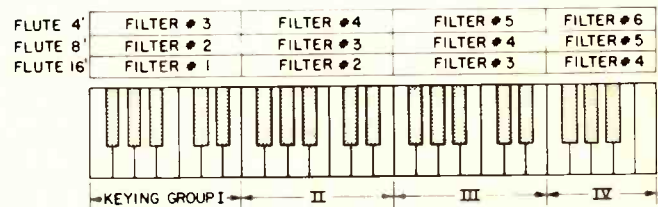


Fig. 10—Keyboard showing assignment of filter numbers.

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from one group of notes collector is causing the problem. If group II is silent with the Flute 8' on, try group I with the Flute 4' voice on. If it is silent also, filter number three is the bad one. The filters are usually one tube or one transistor stages and simple to repair with a VOM to guide you. One word of caution—if there are potentiometers, adjustable coils, variable capacitors or adjustable transformers in the filter circuits, leave them alone. Turning them will not fix anything and most of the adjustments are factory type adjustments—very difficult to make in the home.

Amp and Power Supply

The fourth section of the organ is the amplifier and power supply. These circuits are usually located on the same chassis and they are very straight-forward. Standard troubleshooting techniques should enable you to pinpoint any problems in these areas. This is the first place to look if your symptom is a completely silent instrument. There is one area that deserves mention, however, and that is the expression pedal. It is connected between the pre-amp output and the amplifier input. Figure 11 shows the three schemes used in almost all organs. The circuits are quite simple and easy to fix, but trouble in this area can be easily overlooked.

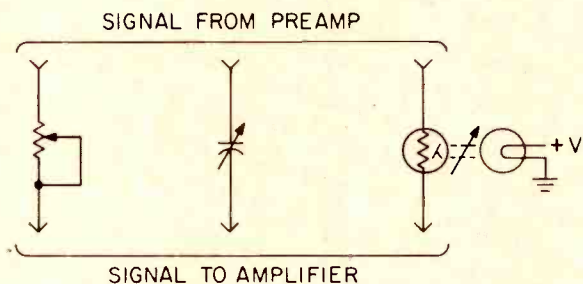


Fig. 11—Three commonly used expression-pedal systems.

The fifth major piece of most organs is the special effects section. Also in this category are some of the control tabs on the organ.

The one control that all organs have is **vibrato**. Vibrato is a variation of frequency with time. Some instruments also have **tremolo**. Tremolo is a variation of amplitude with time. Vibrato is created on most organs by applying a low frequency signal from a phase-shift oscillator to the oscillator portion of the tone generator. This varies the frequency of the individual oscillators in time to the low frequency vibrato signal, adding a pleasant sounding movement to the sound of the organ, much like a violinist adds to his music by wiggling his finger on the strings.

Tremolo on most organs uses the same phase-shift oscillator signal but applies it to a lamp which is optically coupled to a photocell in series or across the signal line from the pre-amp to the amplifier. This raises and lowers the organ volume (amplitude modulates the signal) creating the effect called tremolo. Most troubles in vibrato and tremolo circuits originate in the phase-shift oscillator itself or in the impedance matching stage which usually follows it. The active component (tube or transistor) is again the usual culprit except in older instruments, where the capacitors in the oscillator phase-shift network open up or become leaky and must be replaced to restore proper operation.

Another common control tab, classed as a special effect, is **repeat percussion**. Figure 12 shows block diagrams of the two most common methods for creating repeat percussion, an effect which makes the organ sound like a banjo or mandolin by causing very sharp amplitude variations. Troubles in

this area are usually a function of the circuits used to generate the repeat signal. In the circuit of Fig. 12a, a failure in the repeat generator will show up either as no repeating when

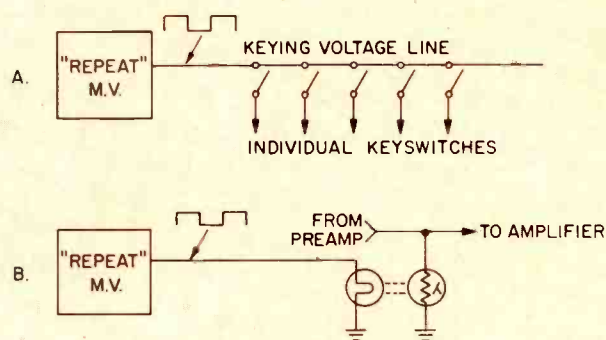


Fig. 12—Two commonly used repeat-percussion systems.

the tabs are turned on or no sound at all on any of the keys whose voltage is supplied by the repeat generator. If the organ seems dead, try some of the keys that use direct (audio) keying. This will help you decide if the trouble is in the repeat circuits or in the amplifier and power supply circuits.

Now we come to the “fun” sounds on an organ—the rhythm. There are two kinds, Play it yourself and Automatic. The voices (drums, brushes, etc.) for both kinds are generated in the same way. Most drum generators are low to medium frequency oscillators biased just into saturation or cutoff. When they are stimulated with a trigger, they oscillate for a short period of time and die away rapidly, creating the percussive sound of a drum. The cymbal and brush sounds are generated by a “noise” diode. A trigger applied to the amplifier stage following the noise generator allows a burst of noise to come through. The sound of a snare drum is synthesized by triggering the drum oscillator and the noise amplifier simultaneously and mixing the output.

The only difference in the two kinds of rhythm are the triggering methods. In the “play it yourself” kind, the trigger pulses for the various voices come from special contacts on the keyboards and the pedals. In the automatic variety of rhythm, a multivibrator “clock” replaces your foot on the pedals and your hand on the keyboard, and logic circuits supply pulses to the various voices at the correct moments. Patterns such as **samba, waltz, cha-cha, march**, and many others can also be selected.

Repairing rhythm circuits of the automatic variety can be a bit difficult if the problem crops up in the timing or logic circuits, but if you have a comprehensive service manual you can accomplish it. Repairing a missing “sound” in either type of rhythm involves only identifying the voice that is missing and fixing its generator.

We have discussed about 90 percent of what is in your electronic organ, and how to find and localize troubles. Obviously, you must use care and proper techniques when doing any actual repair work. Use a small pencil iron for replacing semiconductors and parts on circuit boards. Use proper caution when measuring supply voltages (particularly in tube-type instruments).

By now you should be a good deal more familiar with your own electronic organ. The more familiar you are with it, the more enjoyment it will provide. Proper care will mean a long and useful life for it. To summarize very briefly, read the service book, use all the information you can obtain by observing the symptoms, proceed very logically and carefully, and you will be well on your way to fixing your own electronic organ.

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BUILD A THEREMIN

Robert Brown & Mark Olsen

These circuits are sonic shocks out of the darker quarters of the universe—the sirens' song of age-old myth, languages out of the Greater Magellanic Cloud . . . who knows? It goes by the name of Theremin, its Russian inventor.

The theremin was one of the first entirely electronic musical instruments and is played with what seems to be magic—by the mere proximity of the player's hands to two capacity plates in the circuit. At the time it was brought to the world's attention it was much more than a novelty. It was a playable instrument and a musical event of major proportions in the embryonic field of electronic music. Concert hall performances were even given a couple of decades ago by an orchestra of theremins.

Before the synthesizer, the theremin was probably one of the most versatile of musical instruments, with a frequency range exceeding even that of the cathedral pipe-organ, and a volume range that was limited only by the power capabilities of amplifier and speakers. Its tone is unlike any conventional instrument, or even like electrified versions of conventional instruments. It is a very popular instrument for background music and special effects, for horror and science-fiction films. Without the performer ever touching it, the instrument can produce notes that fall both inside and outside of the regular musical scale, play melodies, or accompany another instrument or a singer.

Not much more need be said about the utility of this instrument in the hobbyist's home electronic music studio.

It has been left in the background perhaps only by the even more astounding synthesizer.

How It Works

Any theremin has at least two r.f. oscillators—one fixed and one variable—which are combined in a mixer-amplifier stage. The frequency of the variable oscillator is designed to be controlled with an external capacity, in the form of an antenna or a metallic plate. The instrument is turned to silence (zero beat) by obtaining exact cancellation when combining the two radio frequencies.

When a hand is brought near the capacitive antenna, the frequency of the variable oscillator shifts. An audible beat, after amplification, is the theremin's output. More complicated designs, like the second circuit offered in this project, involve the addition of a third oscillator to control volume, which is also variable by hand capacity.

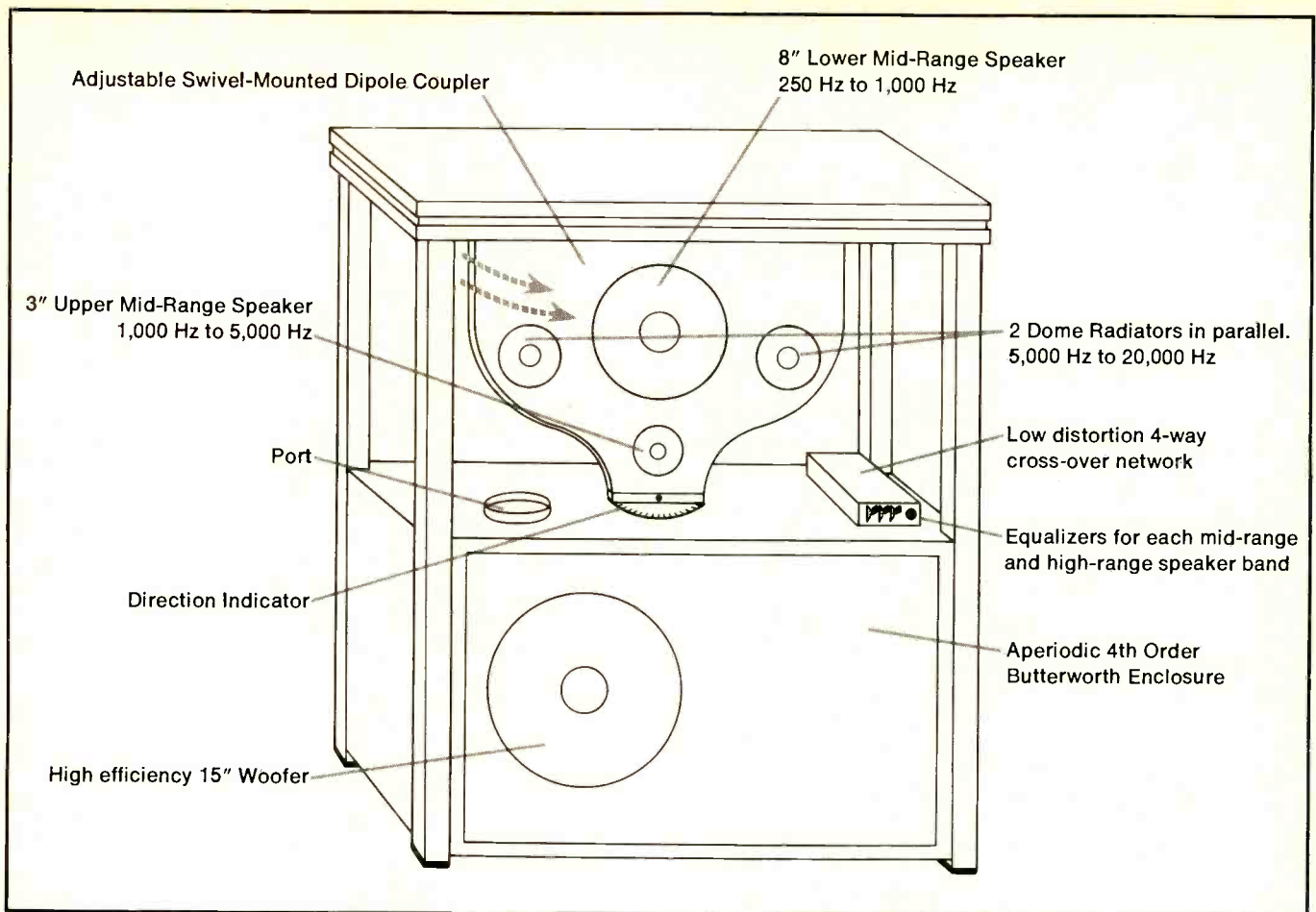
THEREMIN 1

This circuit is a good one for trying out the theremin effect without getting too involved. It cheats a little by using an AM broadcast radio as the fixed oscillator and amplifier. All that is needed are a few components of the junkbox variety. This is about the simplest the experimenter can get with the fabulous theremin. The schematic is shown in Fig. 1.

Construction

Build the circuit using a perforated circuit board and a small metal box. The simplest way to attach the capacity antennas—if short whip antennas are used—is with a couple of commercial antenna binding posts on the box. They are connected into the circuit as shown in the sche-

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matic. A homemade antenna using the lid of a tin can and short wooden dowels is also possible as long as it is electrically sound.

The shield connections on the two transistors should be cut off, and care should be taken to insulate the whole circuit from the metal chassis. That the chassis be metal is a must. The antennas should be mounted on opposite ends of the chassis. Otherwise, their mutual capacity may affect overall operation adversely. The antennas are positioned either vertically or horizontally, depending on preference and antenna design.

Operation

To get this theremin to work, place it near the back of an AM radio. Set the loopstick slugs about half way in. Set the radio near the center of the band and do not move it from this position once the musical instrument is tuned. Adjust variable capacitor C6 until a hissing sound is heard over the radio. Then go to variable capacitor C5 and adjust it until the radio produces a loud whistle. By adjusting C6 again to obtain the lowest pitch possible, the tuning is made complete—and the instrument is ready to play. Moving your hands around a few inches from the antennas should get some results.

THEREMIN 2

As mentioned earlier, some theremin circuits contain an additional variable-frequency oscillator that can regulate output volume by biasing a volume-control transistor. Such is the case with the circuit.

Construction

As in the other theremin project, the enclosure must be metal. Perforated circuit board is a good material for mounting most of the unit's components. A wire bus can be used for grounding the positive side of the circuit. Insulating the entire circuit from the chassis is again an excellent procedure. The circuit does not have its own amplification, but is suitable for connection to an external amplifier. One alternative to this would be incorporating a small commercially available amplifier module into the circuit, as indicated in the parts list. It can be connected with the addition of a potentiometer as shown in Fig. 3.

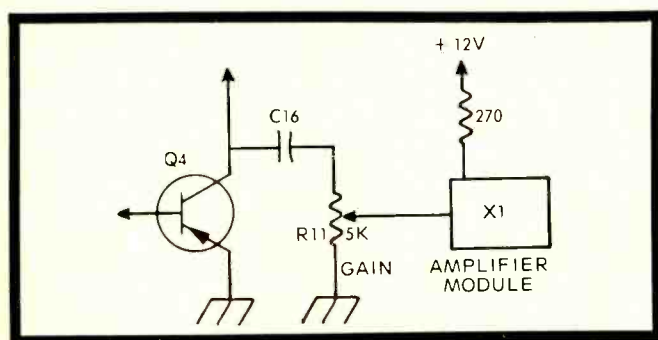


Fig. 3—For a self-contained unit, theremin 2 can incorporate a fixed amplifier module as shown.

The 2 in. of straight, insulated wire shown in the schematic as the r.f. pickup is there for a reason. Just bed it on the perforated board in as straight a position as possible close to L1. It acts as a pickup of r.f. energy radiated by transistors Q3 and Q4. The antenna arrangement may be the same as for the first theremin project. It is not critical, so some homemade arrangement is quite satisfactory.

Operation

Alignment of this circuit is apt to be more complicated than the construction. The procedure followed here is to align first the pitch elements of the circuit and then the volume circuits.

Hook the theremin circuit to the amplifier, turning everything on. The volume on the amplifier should be well advanced. The first step is to temporarily ground the junction between capacitors C12 and C13. Then tune L6 through its entire range. The sound present in the output will "dip" into several zero beats along the way. In one of these ranges, the volume will be greatest. This range is tuned for a zero beat.

Turn the pitch adjust control (C1) about half-open. Turning the slug of L1 counterclockwise will cause the pitch of the sound to rise. Advance it to the highest frequency that you can hear. Now tune L6 to bring the pitch of this tone down to a zero beat again.

When the circuit has been off and is turned on again, the pitch antenna must be touched with a finger to initiate oscillation. This is the basis for the ability to critically align the circuit and for its extremely high sensitivity to hand capacitance.

Continuing the alignment of the circuit, remove the temporary ground connection and attach in its place the test lead from a high-impedance dc voltmeter set to read 3V full-scale. With the "zero" adjust, bring the meter indicator to the center of the scale. This will allow it to read both positive and negative voltages.

Bring the theremin output into the audio range for these tests by adjusting C1 again. The slugs of L3, L4, and L5 should be screwed down so that they are flush with the collars. To set the frequency of the volume oscillator, you will have to call the AM radio into the act again. With the theremin near the back of the radio—and with the radio tuned to the center of the band—tune L3 until the same gentle rushing sound is heard. To prevent radio interference, turn L3 clockwise about four turns.

Set "volume" adjust C11 to half-open. Then tune L5 for the highest positive value on the voltmeter. Tune L4 so that the voltage drops to zero and then returns to the original positive value. L4 and L5 should be adjusted carefully for the greatest volume effect as the hand approaches the "volume" antenna. Whistling as the volume is varied may be cured by changing the setting of L3 slightly.

The function of L7 is to reduce hiss and noise. It will also tend to affect volume, so some compromise between background noise and volume must be worked out. Disconnect the meter and adjust for a zero beat with C1. As can be easily seen, it is especially important in this project to have a removable chassis cover for occasional realignment following the procedure outlined above. A few alignment run-throughs may be necessary, because there is a slight interaction and capacity brought into the circuit with the tools used to tune the coils.

Playing It

This is one of the few instruments in the book for which a few instructions on playing might be useful, although it can be learned only through practice and experimentation. The main requirement is hand dexterity.

Position one hand near the "pitch" antenna at a given distance—which can be determined by experience for any particular pitch. The other hand, moving quickly into position near the "volume" antenna and then quickly out, will produce an individual note. Holding both hands in position will sustain a note. Holding the "volume" hand steady and moving the "pitch" hand will produce a sliding tone. Wobbling either hand will produce a vibrato or tremolo effect. §

SPECIFICATIONS

Specification	Measured In	STR-7065	STR-7055	STR-7045	STR-7035
TUNER SECTIONS					
Sensitivity, IHF	μ V	2.0	2.0	2.6	2.7
S/N ratio	dB	70	70	70	70
Capture ratio	dB	1.0	1.0	1.5	1.5
Selectivity, IHF	dB	70	70	70	70
Image rejection	dB	70	70	90	90
IF rejection	dB	100	100	90	90
Spurious rejection	dB	90	90	56	56
AM suppression	dB	56	56	56	56
Harmonic distortion (@ 400Hz)	%	0.2	0.2	0.2	0.2
Mono	%	0.5	0.5	0.5	0.5
Stereo	%	0.5	0.5	0.5	0.5
FM stereo separation (@ 400Hz)	dB	38	38	38	38
FM frequency response		20Hz-15kHz -1dB	20Hz-15kHz -1dB	20Hz-15kHz -1dB	30Hz-15kHz -1dB
AM harmonic distortion	%	0.8	0.8	0.8	0.8
AM S/N ratio	dB	50	50	50	50
PREAMPLIFIER SECTION					
Input sensitivity and impedance					
Phono	mV ohms	2.0 / 47k	2.0 / 50k	1.8 / 47k	2.5 / 47k
Phono-low	mV ohms	1.0 / 47k			2.0 / 250
Microphone	mV ohms	150 / 50k	150 / 50k	140 / 100k	250 / 250
Tuner, Aux., Tape, REC/PB	mV ohms	150 / 50k	150 / 50k	140 / 100k	250 / 250
Output voltage and impedance	V ohms	1.0 / 47k	1.0 / 47k	1.0 / 47k	0.5 / 47k
Preamp	mV ohms	250 / 10k	250 / 10k	250 / 10k	250 / 10k
Rec out	mV ohms	30 / 82k	30 / 82k	30 / 82k	30 / 82k
REC/PB	mV ohms	30 / 82k	30 / 82k	30 / 82k	30 / 82k
THD @ rated output*	%	0.2	0.2	0.2	0.2
IM distortion @ rated output**	%	0.2	0.2	0.2	0.2
S/N ratio, IHF	dB	72	70	70	70
Phono	dB				
Phono-low	dB	65			
Microphone	dB	90	90	90	90
Tuner, Aux., Tape, REC/PB	dB	90	90	90	90
POWER AMPLIFIER SECTION					
RMS power per channel 20Hz-20kHz	Watts	60	35	30	2
2-Ch., both channels driven @ 8 ohms	Watts				
4-Ch., all channels driven @ 8 ohms	Watts				
THD @ rated output	%	0.2	0.2	0.2	0.2
2-Ch./4-Ch.	%				
IM distortion @ rated output	%	0.2	0.2	0.2	0.2
2-Ch./4-Ch.	%				
Power bandwidth, IHF		15Hz-35kHz	15Hz-35kHz	15Hz-30kHz	10Hz-10kHz
Frequency response @ 1W output		10Hz-100kHz +0 -1dB	10Hz-100kHz +0 -1dB	10Hz-60kHz +0 -3dB	10Hz-10kHz +0
S/N ratio	dB	110	100	50	50
Damping factor (@ 8 ohms)		50	50	50	50
Dimensions (height, width, depth)	inches	6" x 18" x 14"	6" x 18" x 14"	6" x 18" x 14"	5" x 18" x 14"
Weight		33 lbs 8oz	33 lbs 11 oz	31 lbs 1 oz	19 lbs

*Aux. input @ 1kHz **Aux. input, 60Hz-7Hz = 4:1

STR-7065

"If the tuner section of the STR-7065 were categorized as basically meeting its excellent specification, we'd have to rate the amplifier as one that exceeds its claims by far...THD reached the manufacturer's rated (and very low) value of 0.2% at an incredible 85 watts per channel. Remember, that Sony rates the amplifier at 70 watts mid-band, per channel and, even more conservatively, at 60 watts/channel for all frequencies from 20 Hz to 20,000 Hz. At all power levels below 60 watts, THD measured well below 0.15%, while IM distortion measured under 0.1% for all power levels up to 45 watts, rising to the rated 0.2% at 60 watts and remaining at less than 1.0% even at 65 watts per channel and higher."

—Reprinted from Audio, Nov. 1973

STR-7055

"The audio amplifiers of the STR-7055 delivered 51.5 watts per channel into 8 ohms at the clipping point with both channels driven..."

—Reprinted from Stereo Rev., Nov. 1973

"Using Sony's rated 35 watts per channel as a reference full-power level, harmonic distortion was under 0.1 per cent from 30 to 20,000 Hz at full power or less, rising to the rated 0.2 per cent at 20 Hz. Typically, distortion was less than 0.05 per cent!"

—Reprinted from Stereo Rev., Nov. 1973

STR-7055

"The overall performance of the Sony STR-7055 left nothing to be desired, and our positive reaction to the receiver was enhanced by the smoothness of its controls, its noncritical tuning, and its noise-free FM muting system!"

—Reprinted from Stereo Rev., Nov. 1973

STR-7045

"The IM distortion, starting from 0.1 percent at 0.1 watt, increased to 0.2 percent at 30 watts and 0.5 percent at 40 watts...IM distortion was less than 0.2 percent at all power levels from 30 watts down to a mere 1 milliwatt!"

—Reprinted from Popular Electronics June 1974

"Sony's conservative power ratings were emphasized by the fact that at the rated 30 watts/channel (or less), the THD was under 0.1 percent at any frequency from 20 to 20,000 Hz and was typically about 0.02 percent!"

—June 1974 issue of Popular Electronics

"The published ratings of the STR-7045, good as they are, do not do justice to this fine receiver."

—June 1974 issue of Popular Electronics

No matter how good we think we are, there are people who think we're better.

Understatement is as rare in the business of componentry as it is in the business of politics.

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that others fling about. And we know that even though we play ourselves down, our specs still emerge as deeply impressive. And certainly, once you actually *hear* our underrated components, you will be deeply impressed.

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SONY

SPEAKER TESTS:

Anechoic Frequency Response

Richard C. Heyser

THE WORD "anechoic" means free from echos and reverberation. The anechoic frequency response measurement is therefore a free-field measurement in which only direct sound from the speaker, with no other room reverberation, is presented. A principal purpose of this test is a standardized evaluation of the loudspeaker's ability to produce a uniform sound pressure at each frequency in the audio range when driven by a constant-amplitude, variable-frequency electrical signal. It is a strict laboratory measurement in the sense that either a special test facility or specialized data processing equipment is required to perform the test.

The recommended method of making a free-field measurement is to place the measuring microphone far enough away from the speaker so as to be in what is called the "far field" for the wavelength under test. Readings are then referred back to an equivalent distance of one meter under the assumption that the sound spreads in accordance with the inverse square law, that is, doubling the distance reduces the intensity by 6 dB.

Prior to the introduction of coherent processing techniques, the only satisfactory means of making such measurements have been either to use very expensive anechoic chambers, rooms specially constructed to minimize wall reflections, or "roof top" free-field measurements. In the

latter case, both speaker and microphone are hoisted to a sufficient height to be well away from sound-reflecting objects. The economics of either method has led to the placement of the microphone much closer to the speaker than strict far-field conditions would dictate. An additional benefit of this closeness, from one standpoint at least, is that the response tends to become smoother. Consequently, much of the data accumulated by manufacturers and contained in their specifications and advertisements has been obtained very close to the speaker front.

For reasons of reproducibility from one speaker to the next, the anechoic measurements performed for the **Audio** tests are standardized at an actual distance of one meter when practical. The microphone is placed on the geometric axis of the speaker system and spaced one meter from the front-mounting surface of the forward-pointing speakers for direct-radiator systems. When common sense dictates an alternate microphone position, such as would be necessary to measure large panels or horn-loaded systems, a more nearly far-field position is chosen and all measurements corrected to one meter. The electrical drive is maintained constant at that voltage level which would produce one watt into a pure resistor specified by the manufacturer as the speaker impedance,

usually 8 ohms. The sound pressure level (SPL) is plotted in decibels relative to the standard level of 20 micropascals.

Audio uses a fully coherent signal-processing technique known as time-delay spectrometry for making loudspeaker spectral measurements. A special class of signal is used which has a frequency domain representation closely approximating what is technically known as a rectangular function. The time domain representation of this signal is therefore technically described as a sine function, known to many as $(\sin x)/x$. A complete description of this process may be found in the technical literature.

In this brief article we will concentrate only on the anechoic amplitude response as a function of frequency. That, after all, is what is usually called—although improperly—the frequency response of the speaker. This has been a mainstay of speaker measurement for nearly 50 years.

The concept is deceptively simple. A microphone is placed at the desired position and the speaker is driven by a sine wave signal. The output of a pressure responsive microphone is then monitored as a function of frequency. If one wishes to know particle velocity, rather than pressure, he can use a pressure-gradient or similar "velocity" microphone. So long as far-field

(Continued on page 46)

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conditions prevail, the pressure and velocity measurements will be similar.

The first shock one gets, if he is not accustomed to such measurements, is that severe changes in frequency response can occur with minor changes in microphone position. More often than not these changes are due to acoustic interference between widely spaced drivers sharing common frequencies. The speaker manufacturer who places two tweeters several feet apart is creating a situation familiar to antenna designers as a broadside array, with many polar fingers and sidelobes.

If one is compiling data for advertising copy, he then has several alternatives. He may ignore the response irregularities and cite what these drivers are very often able to provide separately or he may smooth the response data over a sufficiently broad frequency range to minimize the condition, muttering things about critical bandwidth. Or he may measure at a point where interference effects are not prominent.

In **Audio's** case we are not compiling copy for advertisements, but are trying to measure speakers for objective comparison by you, the reader. That is why we have tried to pick one common spatial point we can use to measure all speakers. Our data is accumulated on a one-fifteenth octave basis with straight line interpolation between data points. We do this in order to be able to cover at least every musical note throughout the entire audio spectrum. The result is that the measurements are seldom smooth, and some manufacturers who have speakers thus tested are bent slightly out of plumb.

The amplitude plot is a touchstone of performance from the standpoint of direct sound between the speaker and yourself. It represents what the speaker is capable of doing. Because this type of test has been around for such a long time, most of the obvious timbre-related facts that one can infer from this data are well known. There are, however, a few less well-known characteristics which you should be aware of.

For example, any periodicity in the SPL on a linear frequency basis is a sign of physical problems. **Audio** provides a logarithmic frequency plot because this is the way most users want the data. If you mentally convert the frequency readings to a linear basis where 10 kHz is halfway between d.c. and 20 kHz, then some of the defects show up as equally spaced patterns. One such defect is provided by the off-axis broadside array effect of widely

spaced drivers which share the same frequency. The acoustic effect can be very unrealistic and quite disastrous to stereo imagery in some cases.

The speaker manufacturer who economized on acoustic damping material behind a wide-range direct-radiator speaker can be quickly spotted by a periodic SPL pattern. Sound from the back of the cone, which radiates almost as well as from the front of the cone in many cases, travels through the enclosure to reflect from the back wall, then continue back to the cone. Because the speaker cone is not as efficient a wall as the cabinet, some of this first sound comes through and the rest is back-scattered to repeat the process. The energy-time plot, which we will describe in a later issue, is a dead giveaway of this behavior. However, in many cases it is also quite prominent in the SPL frequency response.

A closely allied effect is the cabinet which becomes an echo chamber for the speaker because of pinchpenny use of damping material—or design talent. Again, it shows a periodic SPL pattern on a linear frequency basis. There are usually many peripheral humps and dips in the response which are superimposed on the periodic pattern but which a little practice you can quickly spot a trend.

Another situation to watch out for is the "over-extended woofer." A good bottom end occasionally requires a bit of mass loading of the woofer. This tends to rob some of the top end performance of that woofer if it is also expected to carry the spectrum through the upper middle frequencies. If for economic reasons the tweeter cannot come down far enough to meet the woofer, then a shallow dip in response with a number of sharp dropouts may occur near the crossover frequency.

A shallow dip may be due to a variety of good acoustical design characteristics, but one way to spot if it is due to a woofer running out of steam is to look at the dB-per-octave slope on each side of the dip. An over-extended woofer usually dies at a shallower slope than the rise in acoustic response of a tweeter which is driven far below what should be its proper crossover frequency. Because of the phase behavior of a sharp drop in SPL of both woofer and tweeter, they end up cancelling and reinforcing each other in a narrow frequency range.

If a manufacturer lets two or more speakers share a common frequency range, this will inevitably show up as a number of sharp SPL peaks and dips over a much broader frequency

range—sometimes as much as an octave in extent. This is one result of putting the crossover design book aside and letting the lower frequency unit go up as high as it wants and the higher frequency unit go down as far as it can. The sonic effect can be spectacular. This type of speaker can be quickly sold to a prospective buyer in an A-B comparison with a much smoother unit by playing brass, bell, and percussive material. The smoother unit will sound dull by comparison—even if more realistic. The truth is that a large number of sharply spaced peaks and dips which change with listening position contribute to a sound best described as an "ear burner." Beside the SPL indicator, you can readily spot such a speaker by its sound as records are being played. This is a speaker that has the most apparent record background noise of ticks, pops, and scratch when balanced for the most uniform sound.

Another allied effect to watch for in the SPL measurement is any unusual peak in the response more than 3 dB above the average response in the vicinity of that peak. This is a resonance as distinct from multiple speaker reinforcement. Two speakers sharing the same frequency cannot reinforce to give more intensity than the sum of the contributions of each, although they can cancel to a complete null. This, incidently, is the same for natural sound in a room. Because we are accustomed to such a sound pattern, we can accept it as a manifestation of reverberance. This is one reason for the observation that dips in response are less objectionable than peaks. Again, to listen for it, concentrate on the background noise to see if it is exaggerated. Who among us hasn't put a seashell to his ear to hear the "ocean." We, of course, are coupling ourselves to a resonant chamber that emphasizes the background noise which we are seldom aware of into a recognizable spectral peak. That's exactly what our "peaky" SPL speaker does and the sonic effect is the same.

As a final observation, one of the most ignored components in a loudspeaker system is the physical enclosure. To be sure, most designers concern themselves with enclosure volume and internal damping, but the size and shape of the "box" as well as where the drivers are placed can adversely change frequency response. A good many designers would do well to read some of the fundamental literature on this subject; for example, Dr. Harry F. Olson's "Direct Radiator Loudspeaker Enclosures," **Audio Engineering**, Nov., 1951, and **Jour.A.E.S.**, Jan., 1969.

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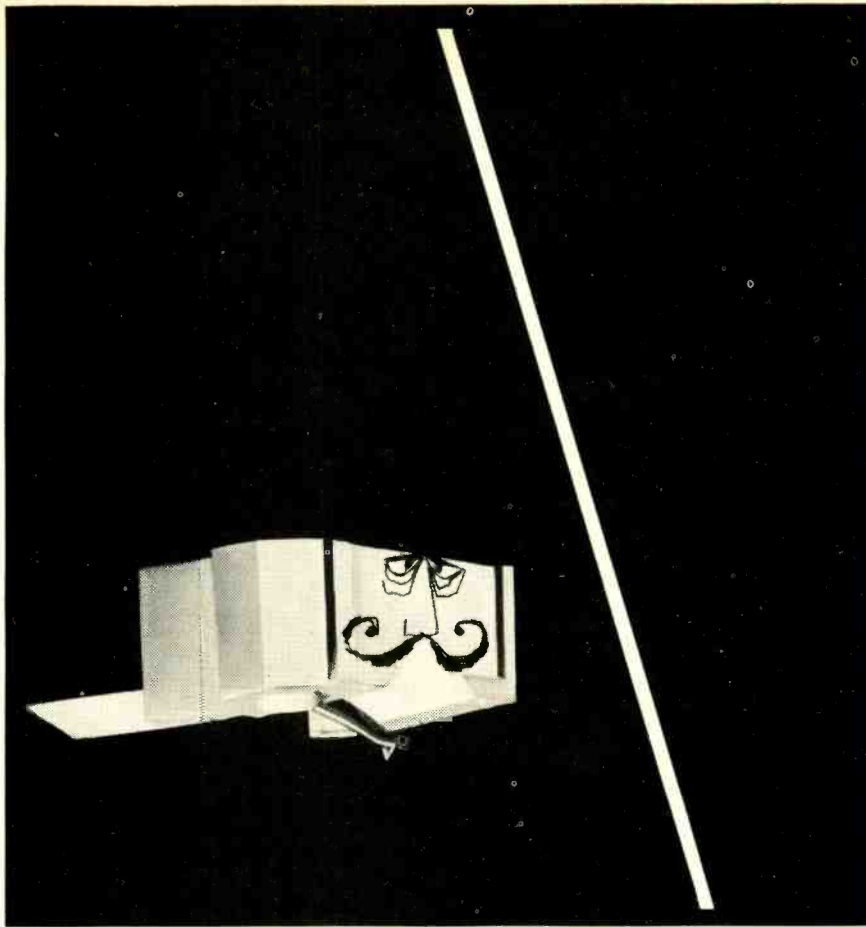


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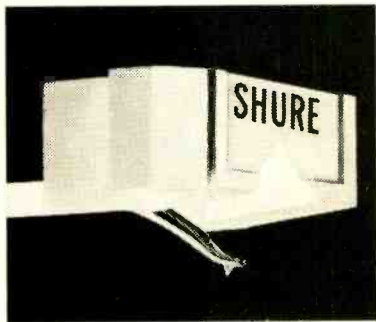
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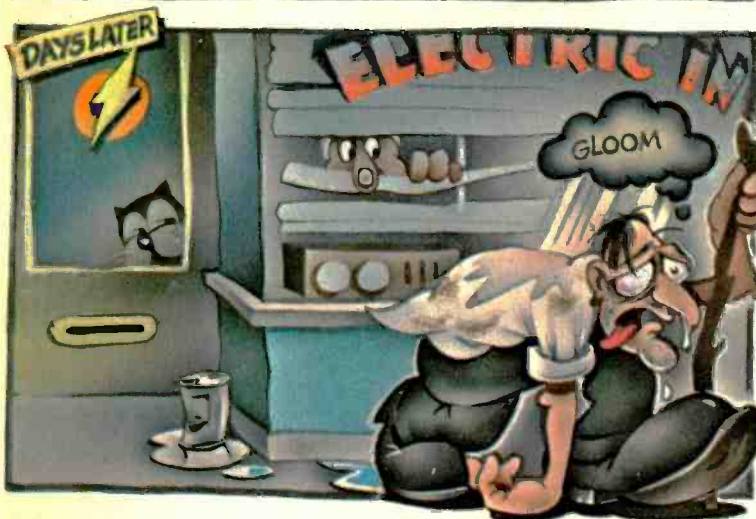
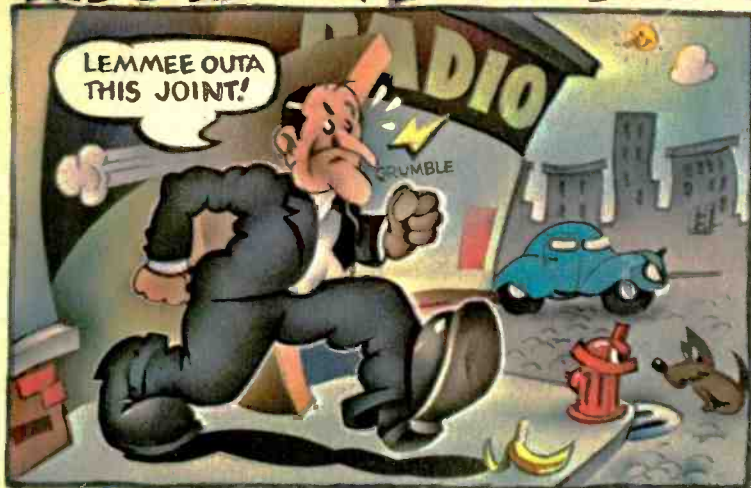
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As an example, the sound pressure wave from a speaker can be visualized as an expanding "bubble" which starts from the speaker cone and grows larger in a spherical fashion. When the speaker is mounted on the front surface of an enclosure, this bubble approximates an expanding hemisphere. When an acoustic discontinuity is encountered, a new sound wave is launched from the discontinuity. Obviously the edge of the cabinet is a major contributor, as are molding trim and recessed speaker-well construction. The result of all this is that a speaker which has a very smooth response when mounted on a large baffle, as is common in anechoic chamber tests, can have a terrible looking response when mounted in a smaller enclosure. Thus, some of the disparity between measured loudspeaker performance provided by **Audio** and the advertised performance of a loudspeaker system may be due to these effects.

Audio measures the 4π anechoic response, that is there is nothing around the speaker in the measurement. A speaker mounted against a large wall is radiating into a 2π or hemispherical environment. An expanding sound wave doesn't know how big the front edge of the enclosure is until it reaches the edge. Until the edge is reached, the enclosure—insofar as the sound wave is concerned—looks like a large, flat wall. If the sound wave has a high enough frequency that at any instant there is a large pressure change between the sound just starting out from the cone and the sound which has reached the edge of the enclosure, then the enclosure looks large enough to act as a wall. We say then that the front of the enclosure itself acts as a 2π half-plane boundary for higher frequencies. For low frequencies, where there is very little pressure change across the front of the enclosure, the enclosure might as well not be there. Because of this, the high frequencies will be slightly stronger than the lower frequencies directly in front of the enclosure when measured in an anechoic environment. That is one reason the bass will come up when you properly place the speaker against a wall. That is also why some speakers with an apparently "flat" frequency response may sound heavy in the mid-bass when you listen to them.

The anechoic frequency response is often improperly maligned by those who fail to take even these simple observations into account. The fact is that the anechoic response reveals a wealth of information when you know what to look for. 

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The features in the 820 are the kind you'd expect to find in turntables costing much, much more.

You get things like our asynchronous motor. Light-touch push button start and stop. Variable pitch control — up to 5% range — with built-in stroboscope ring for 'perfect pitch.' Calibrated anti-skate for both elliptical and conical styli. Cueing that is viscous-damped both up and down. Tracking as low as one gram. Plus our exclusive Magic Wand spindle that holds up to 10 records. And another spindle for playing a single record.

The 820 is the newest member of the Miracord family of automatic turntables. If you'd like the full story on our full line, just drop a line to: Miracord Products, Benjamin Electronic Sound Co., 40 Smith Street, Farmingdale, New York 11735.

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THE MIRACORD 820.

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Equipment Profiles

Technics by Panasonic SA-8000X 4-Channel/2-Channel Receiver



MANUFACTURER'S SPECIFICATIONS

FM Tuner Section:

Sensitivity (IHF): 1.9 μ V. **S/N:** 65 dB. **Selectivity:** 65 dB. **THD:** Mono, 0.3%; Stereo, 0.4%. **Capture Ratio:** 1.8 dB. **Frequency Response:** 20 Hz to 13 kHz \pm 1 dB. **Image Rejection:** 55 dB. **I.F. Rejection:** 60 dB. **Spurious Rejection:** 60 dB. **AM Suppression:** 50 dB. **Stereo FM Separation:** 1 kHz, 40 dB.

AM Tuner Section:

Sensitivity: 20 μ V (external antenna). **Selectivity:** 25 dB. **Image Rejection:** 40 dB. **I.F. Rejection:** 40 dB.

Amplifier Section:

Continuous Power Output: 13 W x 4 or 36 W x 2, 8 ohms, 20 Hz to 20 kHz, (16 W and 42 W respectively at 1 kHz). **Rated THD:** 0.5%. **Rated IM:** 0.7%. **Power Bandwidth:** 5 Hz to 40 kHz. **Frequency Response:** 10 Hz to 50 kHz, +0, -3 dB. **Input Sensitivity:** Phono, 1.5 mV; Aux, 150 mV; Mic, 2 mV. **Damping Factor:** 30 @ 8 ohms. **Residual Hum and Noise:** Phono (IHF "A"), 70 dB; Aux, 90 dB. **Tone Control Range:** Bass, \pm 13 dB @ 59 Hz; Treble, \pm 10 dB @ 10 kHz.

General Specifications:

Maximum Power Consumption: 200 watts at 120 V, 60 Hz. **Dimensions:** 19 $\frac{1}{2}$ in. W x 6 $\frac{3}{8}$ in. H x 15 $\frac{3}{4}$ in. D. **Weight:** 29 lbs., 6 oz. **Price:** \$549.95.

There are two ways of looking at a 4-channel/2-channel receiver such as the Technics SA-8000X. One can view it as a fairly powerful stereo receiver and judge it in the light of more conventional stereo all-in-ones in the same price class. Alternatively, one can judge it as a full-fledged quadrasonic receiver having relatively low power output per channel but equipped with just about every 4-channel control and decoding facility one might possibly want in this era of multiple system quad. Either way, this entry from Technics comes out ahead on nearly every count. Since Panasonic chose to support the CD-4 disc quite early in the short history of 4-channel sound, it is no surprise to find the receiver fully equipped with the demodulator circuitry necessary for playing these "discrete" discs. Matrix discs can be played through the system as well and, though there

is none of the advanced "logic" circuitry now finding its way into some separate matrix decoders and a few all-in-one receivers.

The upper dial area of the receiver contains the usual AM and FM dial scales, a signal-strength meter, four illuminated VU level meters, and a variety of individually illuminated function and mode indicators, including the usual FM stereo light and a "Radar" light which illuminates when a CD-4 record is played. Along the black center-line of the panel are the power switch, a meter-sensitivity push button (which increases meter sensitivity by 10 dB, making them useful at any listening level), a pair of tape monitor push buttons, and four miniature knurled gold knobs used to adjust the CD-4 demodulator circuitry when first installing a new CD-4 cartridge. Since these adjustments need to be performed only during setup, we would have preferred to see them located on the rear panel which might discourage their unauthorized rotation by inquisitive small hands and fingers.

The lower, gold section of the panel contains headphone jacks for stereo or quadrasonic phones, bass and treble controls (operative for all channels at once), 4 individual-channel level controls flanking a master volume control, a pair of slide controls which alter matrix decode parameters, a mode switch (with positions for mono, stereo, a pair of matrix phase settings, and a discrete setting), the program selector knob, and a good sized tuning knob coupled to an effective and smooth flywheel and tuning dial assembly. A phone jack adjacent to the tuning knob accepts a low to medium impedance microphone. This last feature is virtually worthless, since the microphone cannot be used in a "mix" with any other program source nor are there provisions for a stereo pair of mics. Anyone desiring a mono P.A. system would not look to an elaborate 4-channel receiver such as the SA-8000X in the first place!

The rear panel layout shown in Fig. 1 includes the usual input, tape in and tape out phono tip jacks (provision is made for two 4-channel tape decks), 75-ohm, 300-ohm FM and external AM antenna terminals, switched and unswitched convenience a.c. receptacles, and a grounding terminal. Arrangements specifically related to the 4-channel functions of the unit include a three-position slide switch used to calibrate those front-panel separation and carrier adjust controls associated with CD-4 record playing, and a 3-position cartridge selector which permits the use of some of the new semi-conductor cartridges by supplying polarizing voltage for these devices right at the phono jacks. A third position on this switch is intended for use with conventional magnetic cartridges, whether they be stereo or CD-4 types. The speaker terminals are somewhat confusingly labelled (for that matter, the user would be well advised to read the entire instruction manual before starting to hook up this receiver, as with any new piece of gear, and to re-read the hook-up steps as they are performed), in that a stereo speaker arrangement must be hooked up differently from a 4-speaker quadra-

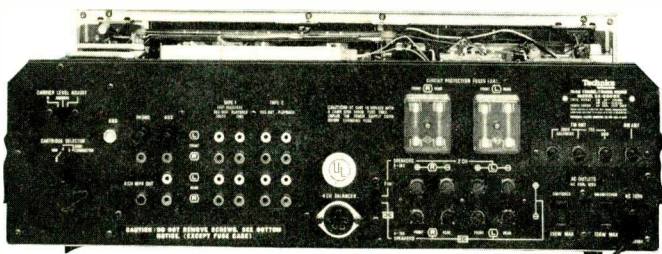


Fig. 1—Rear panel layout of Technics SA-8000X

phonic array. In one case, all the red terminals are used, while in the other case red and black pairs are used for each of the four speaker systems. Besides this reconnection requirement (when converting from 2-speaker to 4-speaker use), an adjacent switch must be thrown from 2-ch to 4-ch (or the other way) in order to alter internal circuitry to what Technics calls "BTL" (Balanced Transformerless) operation and what we, here, generally term "strapping" or "bridging."

A 4-channel FM detector output jack is also provided on the rear panel (for the discrete 4-channel FM broadcast system still to be selected by the FCC some day), and there is a multi-pin socket intended for a "joystick" remote control 4-channel balancing accessory which was not tested. Four speaker line fuses complete the rear panel layout. It should be noted that when using the receiver in the stereo mode, speaker impedance is restricted to 8- or 16-ohms, while in quadrasonic applications, speakers may have impedances of from 4 to 16 ohms.

An internal view of the chassis of the SA-8000X is pictured in Fig. 2. The FM front-end uses a 4-pole MOS-FET for an r.f. amplifier, and tuning is accomplished by means of a frequency-linear variable capacitor. The i.f. section has five stages, including three differential amplifier stages and band-pass characteristics are largely determined by three dual-element ceramic filters which require no alignment. Most of the functions of the stereo FM decoding circuit are performed by a single monolithic IC which incorporates two differential switching circuits.

The phono equalizer preamp section is a two-stage direct-coupled circuit which uses a combination of low-noise PNP and NPN transistors. Tone controls are of the negative feedback type. The power amplifier section features a differential amplifier input and direct-coupled circuitry right up to the speaker output connection points. In the two-channel mode, amplifier sections are paralleled using the now accepted "strapping" technique which places "chassis ground" effectively at the mid-points of the speaker loads. "Common ground" speaker connections are therefore not possible—a condition that is true with most 4-channel/2-channel receivers of recent vintage. The AM section of the receiver, unlike most, also utilizes a frequency-linear, variable capacitor which results in even spacing of the dial calibration from low end to high end and makes station selection somewhat easier. A ceramic filter is used in the AM i.f. section.

FM Measurements

Results of test measurements of the FM section of the SA-8000X are shown, in part, in Fig. 3. Although IHF sensitivity was higher than claimed ($2.5 \mu\text{V}$), 50 dB of quieting was reached with a signal input of only 4.9 microvolts. Ultimate quieting in mono reached a maximum of 70 dB at all signal levels above $100 \mu\text{V}$ —considerably better than

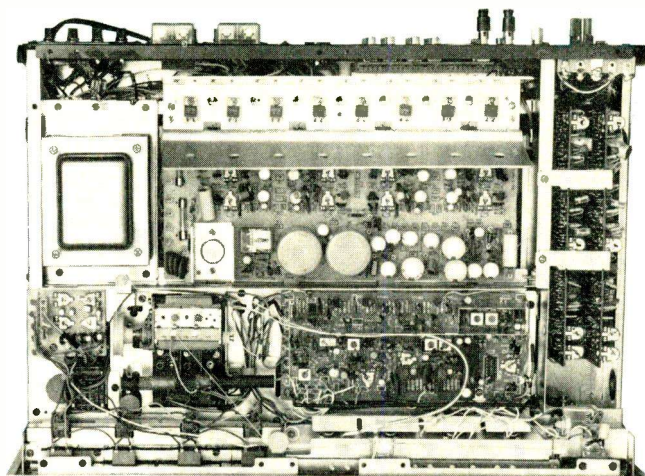


Fig. 2—Interior of SA-8000X

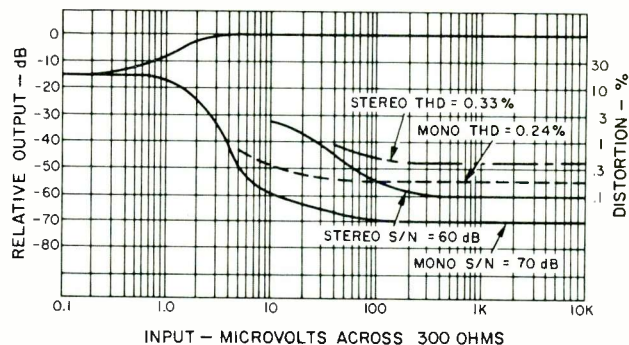


Fig. 3—FM quieting and distortion characteristics.

the 65 dB claimed by the manufacturer. Switchover to stereo occurred at about 8 microvolts, at which signal level noise was already down over 30 dB. Ultimate quieting in stereo reached 60 dB, a very respectable figure considering the fact that residual products then observed consisted of 38 kHz carrier leak-through rather than random noise. Technics claims carrier rejection of only 50 dB. THD in mono decreased to 0.24% for any signal level above $50 \mu\text{V}$, at 1 kHz. In stereo, THD decreased to 0.33% with a 1 kHz signal for all input signal levels above $200 \mu\text{V}$ —again, considerably better than claimed. As shown in Fig. 4, THD tends to rise at the high frequency end of the audio spectrum, reaching just under 1.0% at 10 kHz in mono, and slightly more than 2.0% in stereo at the same extreme frequency. In the case of the stereo THD readings at high frequencies, the meter is responding, in part, to low-level "beats" caused by the interaction of the high audio frequency and the residual 19 kHz and 38 kHz carrier products. AM suppression measured exactly 50 dB as claimed, and capture ratio exceeded claims with measured readings of 1.3 dB for $100 \mu\text{V}$ signal levels. Selectivity measured 67 dB, a bit better than claimed.

Stereo FM separation at mid frequencies, also plotted in Fig. 4, measured 42 dB, decreasing to 26 dB at 10 kHz. At the low end, separation remained at 40 dB or better for all frequencies down to 50 Hz.

Amplifier Measurements

THD versus power for a 1 kHz input signal is plotted for
(Continued on page 56)

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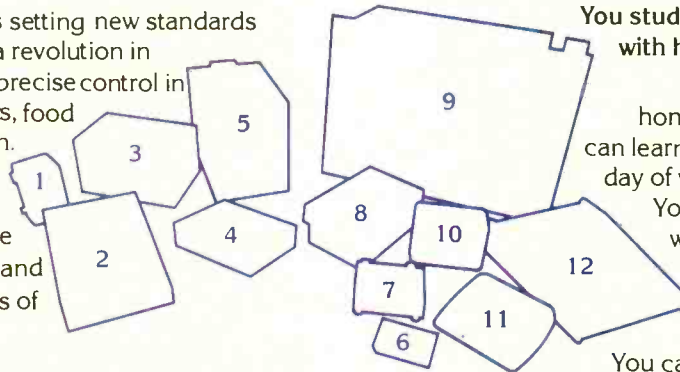
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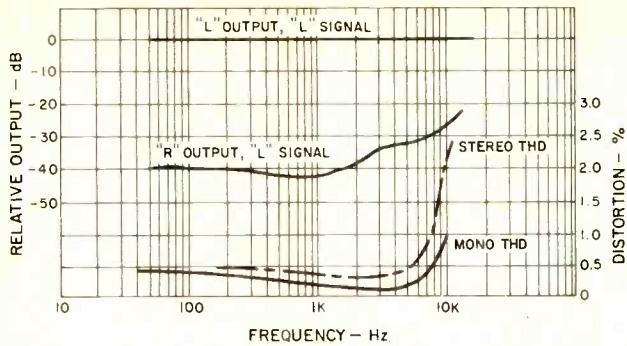


Fig. 4—Separation and distortion vs. frequency.

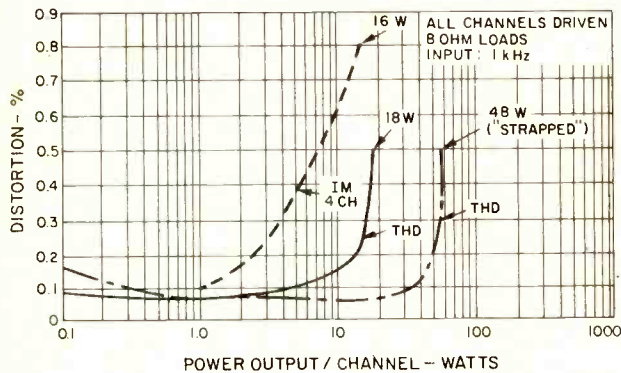


Fig. 5—THD and IM distortion characteristics.

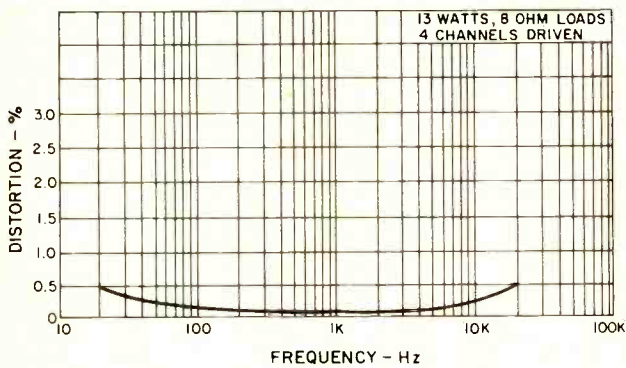


Fig. 6—Distortion vs. frequency.

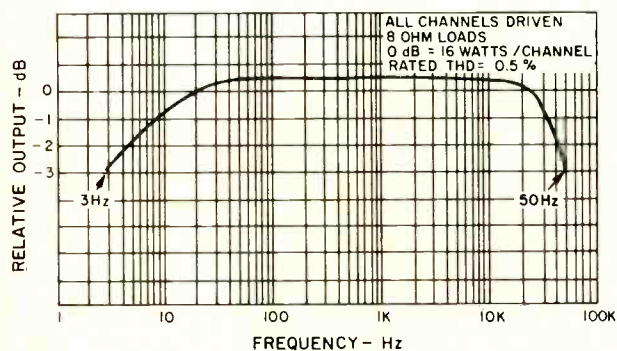


Fig. 7—Power bandwidth characteristics.

(Continued from page 51)

both 4-channel and 2-channel strapped operation in Fig. 5. In both modes, mid-band power output capability was in excess of manufacturer's claims, reaching 18 watts per channel and 48 watts per channel respectively, for rated THD of 0.5%. IM distortion, shown for the 4-channel mode only, tended to rise almost linearly for power levels above 5 watts per channel, but remained below rated value of 0.7% right up to rated output which is 13 watts under these conditions. The 13 watt per channel nominal output was used to measure distortion versus frequency which is plotted in Fig. 6. Under these conditions, the receiver delivers full power from 20 Hz to 20 kHz at less than rated distortion (0.5%).

Power bandwidth, graphed in Fig. 7, extends from 3 Hz to 50 kHz, substantially better than claimed. The measurements were based upon a rated output of 16 watts per channel. If 13 watts were used as a 0 dB reference, the power bandwidth would have extended even higher and lower.

Tone control and loudness compensation for a -30 dB volume control setting are shown in Fig. 8. Both conform closely to manufacturers specifications. There are no high frequency or low frequency filters in the receiver.

Our tests of CD-4 demodulator performance are necessarily based upon measurements using test records and CD-4 cartridges since, to date, no one has come up with a suitable piece of test equipment which can provide the complex signals equivalent to those recorded in the groove of a CD-4 record. Of late, we have been using a new individually calibrated MMC-6000 cartridge manufactured by Bang & Olufsen of Denmark. It is the best CD-4 cartridge we have tested to date and one of the few that can properly track Quadradiscs at tracking forces of 1 gram or less. Using this cartridge, the CD-4 circuitry of the SA-8000X yielded separation of better than 22 dB from front to back, on both sides, and better than 28 dB from side to side, both front and back. Adjustment of the ideal demodulation parameters is accomplished in a matter of seconds, thanks to the four front panel meters on the unit, which are much easier to use in this procedure than simply listening to the test record and adjusting everything by ear, as the record's narration suggests. Carrier sensitivity of the demodulator circuitry was more than adequate for this, as well as for several other CD-4 cartridges that we tested in the course of our evaluations.

FM performance of the receiver was good, with muting threshold sensibly adjusted for about 5 microvolts. Using the muting feature indirectly guarantees that any station received will be heard with a quieting of at least 50 dB—just about enough for serious listening. Of course, the mute can be defeated if you want those few extra "noisy"

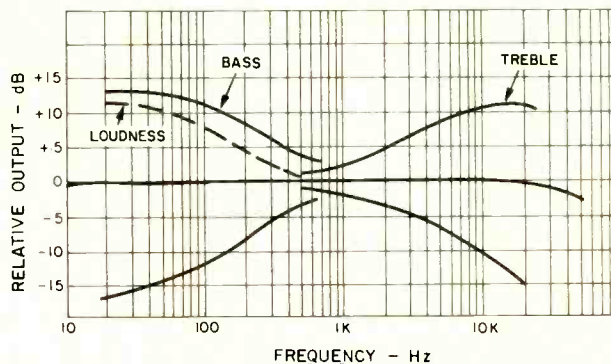


Fig. 8—Tone-control range and loudness characteristics.

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signals from distant stations. The somewhat lower values of image and spurious rejection (compared to high-priced stereo receivers) did not in any way interfere with our dial twirling and listening. The excellent capture ratio of the receiver did much to off-set the "average" AM suppression capability as far as multipath interference in stereo listening was concerned.

AM performance was adequate, but not outstanding—typical of most present day medium and even higher priced integrated stereo and 4-channel receivers. The major design priorities of this set are obviously in the 4-channel area.

The wide-band power response of the SA-8000X helps to offset the fairly low audio power output obtainable in the 4-channel mode. With four reasonably efficient speakers in a good sized room, we had no trouble raising volume levels to fairly loud sound pressures. In the two-channel "strapped" mode, there's enough power for even the low efficiency systems some listeners prefer, but if you plan to purchase this set with 4-channel as your ultimate objective (even if you start out in stereo) it might be a good idea to audition the set in the four-channel mode and choose a pair of speakers that provide enough sound so

that they can be duplicated when you add the extra pair for full 4-channel sound.

Matrix performance was also judged by a series of listening tests. The dual slide control which Technics calls AFD does, indeed, vary the spatial sound field and a variety of 4-channel effects can be created from both stereo and intentionally encoded 4-channel matrix discs. The Phase Matrix 2 position on the AFD slide controls comes closest to properly decoding SQ encoded records and additional variation in sound placement and localization is achieved by selecting either the "0 phase" or "90° phase" positions on the mode switch, but all these variations did not provide the degree of apparent separation that either CD-4 records or matrix records played back through full-logic decoders can. In a musical context, however, this may not be all that important a consideration for the prospective listener who is not likely to walk around from speaker to speaker judging 4-channel crosstalk.

Technics by Panasonic introduced this model about a year ago and, based upon its features and overall performance, we would guess that the SA-8000X will continue to be a popular best-seller amongst that company's group of 4-channel audio products. *Leonard Feldman*

Check No. 60 on Reader Service Card

Sharp Stereo Cassette Deck, Model RT-480U



MANUFACTURER'S SPECIFICATIONS

Type: A.c.-operated, solid-state, stereo cassette recorder, with Dolby "B"-type noise-reduction system and full automatic stop system. **Wow and Flutter:** 0.15% wrms. **Fast Forward and Rewind Times:** 75 sec. (C-60). **Frequency Response:** 45-15,000 Hz with CrO² tape; 45-11,000 Hz with normal tape. **Channel Separation:** 34 dB. **Dimensions:** 17-7/16 in W x 10-1/4 in. D x 4-11/16 in. H. **WEIGHT:** 13.2 lbs. **Price:** \$249.95

The Sharp RT-480U cassette recorder is a neat and attractive unit which incorporates some interesting and useful features, one of the most helpful being the automatic program finder. This device works with the automatic-stop circuitry to permit the user to locate separate selections on the cassette by stopping tape motion at points where there is no modulation on the tape during rewind or fast-forward operations. The stopping circuitry for end of tape involves a magnetically-toothed wheel which rotates adjacent to a reed relay, and while the wheel (which turns with the takeup spindle) rotates, it provides a signal from the reed relay to the gate of the SCR (they call it thyristor) which inhibits current in its anode circuit so the stopping solenoid does not operate. When the "toothed" wheel stops, the gate of the SCR is no longer inhibited, and the SCR fires, tripping the solenoid and stopping the tape motion.

The automatic program finder involves another tape head which contacts the tape during fast spooling and feeds its output to a five-transistor amplifier which similarly inhibits the SCR as long as there is modulation on the tape. When a pause between selections comes along, the inhibiting voltage ceases and the solenoid trips the stop mechanism. Thus, if you are playing a tape with a number of selections on it and you want to listen to the last one only, you simply wind forward in the fast-forward mode until you reach the pause just ahead of the desired selection. (Of course, it will stop at all the other pauses in the tape.) Or, in rewinding, you want to repeat a selection—play it through, press the STOP button, then rewind. When you reach the pause ahead of the selection, the machine stops automatically, and then you can repeat the desired selection by depressing the PLAY key.

Operation is controlled by six "piano keys"—the usual RECORD, REWIND, FAST FORWARD, PLAY, STOP, and, separated by a narrow divider, PAUSE. The cassette holder lid is actuated by sliding knob, which may not be moved if any of the keys are depressed.

To the right of the cassette compartment are two level meters, separated by a panel containing the DOLBY and RECORD indicator lights. Directly below are two pairs of slide controls for record and playback levels, and below them is a brushed aluminum panel containing the power switch at the extreme right, and two toggle-type switches for Dolby on/off and for tape type—the latter a three-position unit labeled CrO², LOW NOISE, and NORMAL. This switch affects only the equalization in the record mode, and does not vary the bias current. To the left of the piano keys are two miniature phone jacks for microphone input, cutting off the high-level inputs when jacks are inserted. To their left is a stereo headphone jack.

Above the jacks is a three-digit counter with the conventional reset button, and above that the nameplate, on which is mounted the on/off switch for the automatic program finder. In all, a neat and functional control panel, with a smoked plastic dust cover over the controls when the unit is not in use.

Circuit Description

Considering the playback circuit first, the output of the record/play head is fed to an IC with suitable tape-head

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Features: 12 Darlington transistors in series output, 400 watts RMS stereo, amplifier and loudspeaker relay protection circuit, full complementary output stage, UNI-SINK heat dissipation system, direct power reading meters.

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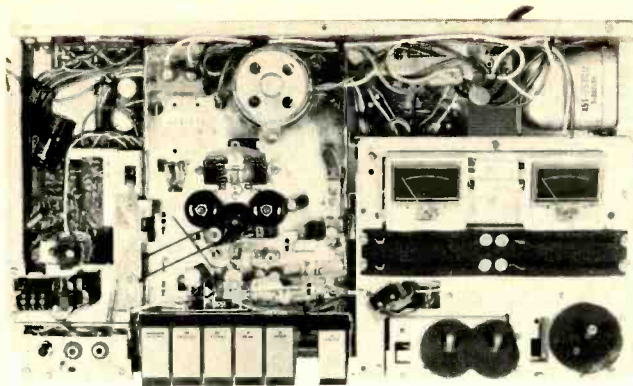


Fig. 1—Top view of the Sharp RT-480U. Note that the power transformer, located at upper right, is well removed from the heads to help ensure minimum hum.

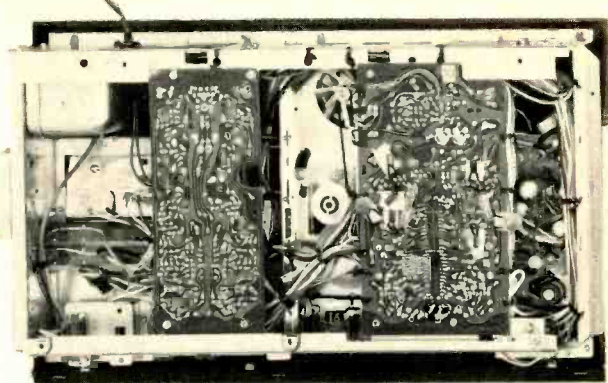


Fig. 2—Underside view of chassis. Larger circuit board incorporates switching between record and playback, with slide switches moving along contacts on opposite side of board. Smaller board contains two Dolby circuits, and is connected to main board by plug and cable assemblies. The automatic stop and automatic program-finder circuits are on smaller circuit board underneath and to the right of the main board.

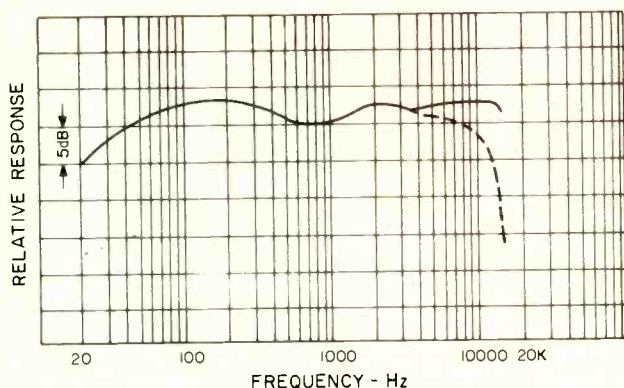


Fig. 3—Response curves of record/playback from line in to line out. Solid curve represents CrO₂ tape, with tape switch in CrO₂ position. Dashed line represents response with TDK SD tape, switch in CrO₂ position.

equalization, thence to the Dolby circuit board, returning to the playback volume control and amplified by a single transistor before being fed to the output jack.

In the record mode, the high-level input signal is fed to the record-level control, then to the Dolby circuit board, and back to the single transistor equalized for the various tape types, and thence to the recording head through a bias trap, with bias of 84 kHz being fed to the head simultaneously. The bias oscillator is a pair of transistors to provide a push-pull output, with variable resistors providing for bias adjustment separately for the two channels. The power supply provides full-wave rectification to the voltage-regulating transistor with an output of 23 volts. The automatic-stop and automatic-program-finder circuits were described previously.

Two more transistors in each channel provide sufficient gain to drive the level-indicating meters and furnish power for the headphones, using a transformer for impedance matching to the phones. Both meter and headphone circuits operate during playback as well as recording.

Performance

The RT-480U came up to its specifications in nearly every particular, if we assume that the bias was adjusted for CrO₂ tape, since frequency response extended out to 16,000 Hz with this type of tape, and with the tape selector switch in the CrO₂ position. With any other tape, the response fell off rapidly, being down 10 dB at 10,000 Hz with respect to the 1000-Hz level, and regardless of the position of the tape

selector switch. Curves are reproduced for the response with CrO₂ tape, and the switch in the CrO₂ position, with dotted curves showing the response with TDK SD tape and the selector in the same position. Curves with the Dolby circuitry in use and not in use were identical (± 1 dB) so it would appear that the Dolby circuit was working perfectly, regardless of the volume level at which the recording was made.

Fast forward and rewind times for a C-60 cassette were measured at 72 seconds, well within specification. Minimum input signal required for a "O" level indicated on the meters was 50 mV in the high-level inputs, 0.3 mV at the microphone jack, and both contributed an output level of 0.32 V at the playback jack. At the same time, a signal of 70 mV was available at the phone jack. Signal-to-noise ratio measured 53 dB with the Dolby circuit in operation, and 55 dB without, all very credible.

As received by us for testing, the machine would be considered quite satisfactory when used with CrO₂ tape. If other tapes were to be used, it would seem likely that bias should be decreased, an operation not readily performed by the user. Wow and flutter measured 0.14 percent, mostly contributed as flutter, since wow alone measured 0.1 percent—very good for cassette recorders.

The accompanying instruction book is remarkably complete, containing information concerning recording from stereo systems, from microphones (two of which are furnished), for recording with a microphone on one channel and music from radio or records on the other, and for recording of Dolbyized FM broadcasts, which because of the reference signals used with such broadcasting, must be done in a specified manner to obtain best results. And last, but not least (in our opinion), service information accompanied the unit we received. While it is not likely that the average user would use this information, it is also not terribly likely that the average hi-fi or recorder service facility would have the information on file. It is, of course, always desirable to be able to give the serviceman a schematic to aid in correcting any possible problems with the unit. If the machine were returned to an authorized service station, the information would naturally be at hand, but that is not always possible or convenient, so the nearest serviceman might be called, and then the information would be invaluable.

C. G. McProud

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may be adjusted for optimum pressure with either conical or elliptical styli, so stylus sits perfectly centered in groove for precise stereo



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How the 810 QX protects records and cartridge stylus assembly.



Tone arm descent is viscous-damped in automatic operation and also when using the manual cue and

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Stub spindle rotates with record to prevent distortion of center hole. Stylus setdown adjustment prevents stylus damage if dropped outside of entry groove range. Tracking pressure



adjustable down to 0.25 grams for newest lightweight cartridges for minimum record

wear. Stylus brush whisks dust off stylus between plays. Lock automatically secures tone arm to prevent damage to stylus from accidental movement. Stylus wear meter records accumulated stylus use in hours. Knowing



when to replace a worn stylus protects your records.

How the 810 QX provides convenient operation in any desired mode.

After touching a single feather-weight button, the 810 QX can either play a stack of records, shutting off after the last one, play a single record and shut off, or play a single record, and repeat it indefinitely until you stop it.



Manual operation uses a single button to start the motor, and the cue control to lower the stylus.

How the 810 QX operates quietly, emitting no sound that can intrude on the music.

The 810 QX uses a unique sequential cam drive mechanism. It is a rigid



precision assembly that replaces the plumber's nightmare of rotating eccentric plates and interlocking gears that other changers use. Unlike other changers, there are no light metal stampings that can go out of alignment and make a lot of noise, from being carried, bumped, or just from use.

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ALTEC
the sound of experience

Crown DC-300A Power Amplifier



MANUFACTURER'S SPECIFICATIONS

Power Output: 150 watts per channel, minimum rms at 8 ohms from d.c. to 20 kHz with no more than 0.05 percent total harmonic distortion and no more than 0.05 percent intermodulation distortion.

Damping Factor: Greater than 200 up to 1 kHz. **Hum and Noise:** 110 dB below 150 watts. **Input Sensitivity:** 1.75 volts for 150 watts into 8 ohms. **Input Impedance:** Nominal 100 kilohms, 10 kilohms at full gain. **Dimensions:** 19 in. W (standard rack) x 7 in. H x 9 3/4 in. D. **Weight:** 45 lbs. **Price:** \$729.00.

The Crown DC-300 was not by any means the first low-distortion, high-power, solid state amplifier around, but it soon proved itself to be one of the most reliable. The latest version, Model DC-300A, was released several months ago, and in this instance, the "A" does not denote a minor modification or just a change in cosmetics but rather a nearly complete redesign. For instance, the older model used four power transistors per channel but the new model has no less than eight. And these are 150-watt homotaxial devices, so there is a dissipation of 2,400 watts available. The input stage now uses an op amp, and the protection circuits have been designed to allow full transient power without premature clipping. Because of the number of parallel output transistors, the maximum output is delivered at about 2.5 ohms, and even lower load values can be used without trouble. Distortion of the earlier DC-300 was extremely low—less than 0.05 percent up to 180 watts—but even this has been reduced, drastically reduced as we shall see later.

The black and silver anodized front panel measures 7 x 19 in., allowing the unit to be mounted on a standard rack if so desired. Total weight has been increased from 40 to 45 lbs.,

mostly due to the massive power transformer. Appearance of the new "A" model's front panel is virtually unchanged from the older unit, with the two large knobs controlling the input to each channel on each side and the illuminated heavy-duty ON/OFF switch right at the center. At the rear are the large terminals for the loudspeaker connections and a line fuse. Because of the efficiency of the protection circuits, no speaker fuses are provided.

Circuit Details

The input op amps are fed from a voltage-regulated power supply, and elaborate compensation circuits prevent any drift. There are two variable resistors used for the input and output offset controls, and these are of course adjusted at the factory. Output is taken straight to the base of the next transistor, and coupling is direct from input right through to the loudspeaker terminals. The output stage is a semi-complementary arrangement using an AB-B circuit with no bias current in the output transistors. The bias is applied to the driver transistors, and there is full thermal compensation. Protection against short circuits and very low impedance loads is provided by a complex circuit that Crown calls "SPACE" for Signal Programmed Automatic Current Executor—an acronym which must have given someone an awful lot of trouble! Briefly, SPACE works by functioning as a signal-controlled current limiter at audio frequencies and a power limiter at subsonics. The parameters of the variable current limiter are such that it does not generate "flyback pulses" with inductive loads, so the overload characteristic is smooth without those unpleasant rasping effects inherent in most circuits using fixed limiting. Further protection is provided by a thermal switch mounted on each heat sink. A bridge rectifier supplies d.c. voltage of ± 60 .

Measurements

Figure 3 shows the power output versus distortion, both THD and IM (SMPTE), at 4 ohms, while Fig. 4 shows the performance at 8 ohms. Both channels were driven in each case. It will be seen that distortion is down close to the limits of the test gear—even at rated outputs—and for some of the tests special equipment had to be made! Nearly 200 watts was obtained at 8 ohms, while 4 ohm output was 340 watts. Figure 5 shows the distortion versus frequency at 180 watts with 8 ohm loads. Power bandwidth extended from d.c. to about 50 kHz, and the -3 dB point for frequency response was 165 kHz. Square-wave response at 40 Hz and 1 kHz was virtually indistinguishable from the input signal, and the response at 10 kHz shows only a slight rounding with no sign of overshoot (see Figs. 6, 7, and 8). Figure 9 shows the symmetrical clipping at a power

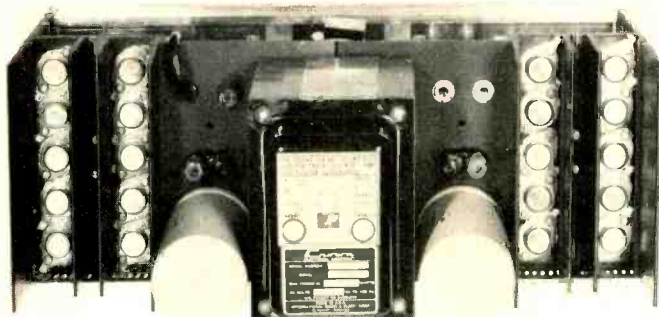


Fig. 1—Back panel, DC-300A.

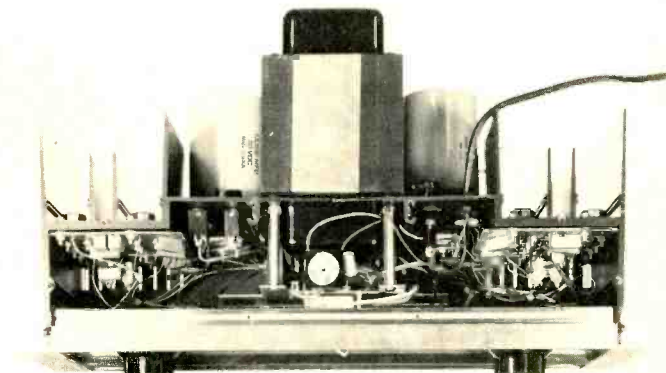


Fig. 2—Interior view.



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And for under \$250*, it's damn hard to beat. You simply can't find features like ours in such a beautifully designed receiver for such a reasonable price.

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While other receivers have one FM tuning knob, that's not good enough for the CR-260. We went to the trouble of engineering an additional second control for ultra-fine FM tuning.

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and another for center of channel tuning. Other deluxe touches are the detents on the bass and treble controls that help you reset any combination exactly.

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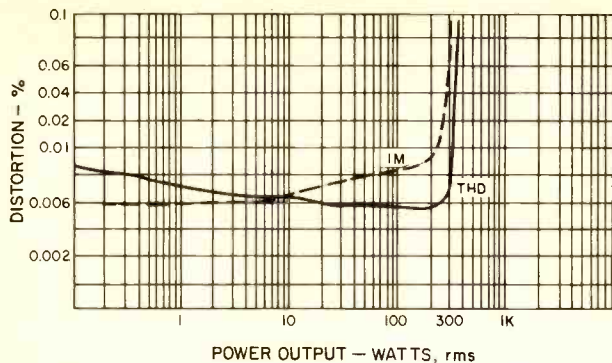


Fig. 3—Power output, into 4 ohm loads, both channels driven.

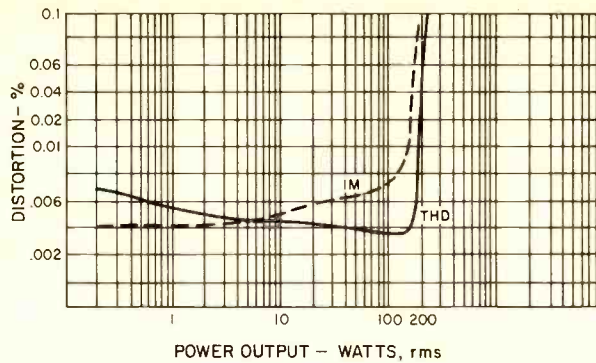


Fig. 4—Power output, into 8 ohm loads, both channels driven.

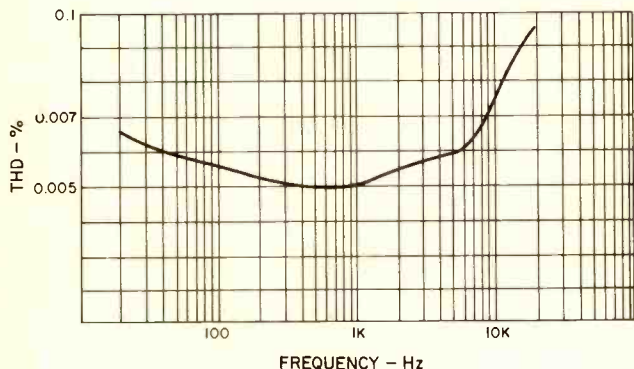


Fig. 5—Frequency versus THD, 180 watts into 8 ohm loads.

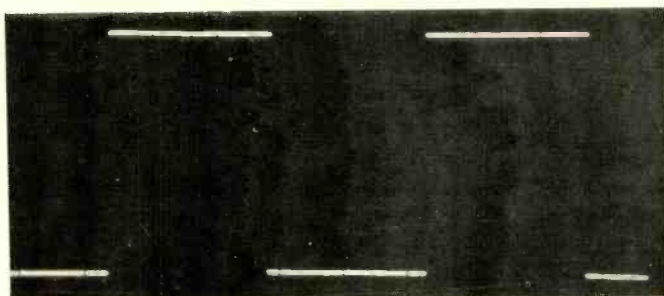


Fig. 6—Square-wave response at 40 Hz.

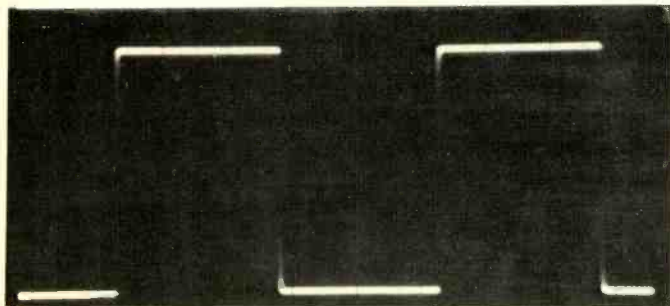


Fig. 7—Square-wave response at 1 kHz.

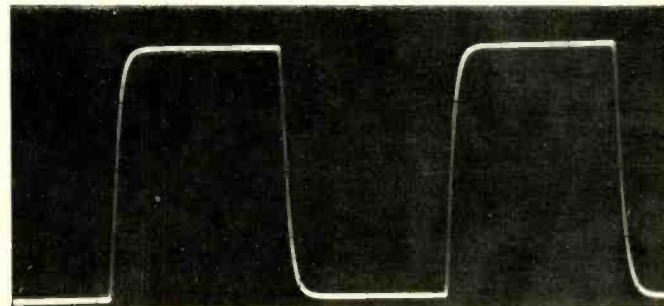


Fig. 8—Square-wave response at 10 kHz.

equivalent to 440 watts (4 ohm load, one channel driven), and Fig. 10 shows the residual hum and noise, which is -102 dB, 200 W., 8 ohms, full band. The input signal required for full output was 1.95 V. Crosstalk was checked but as the specified 90 to 100 dB figures seemed accurate, measurements seemed academic.

Use and Listening Tests

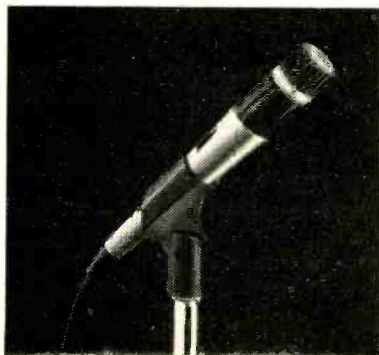
For most of the listening tests, the DC-300A was paired with a Crown IC-150 preamp, while the speakers were switched between AR LSTs and hybrid electrostatics. The phono cartridge used was a Shure V-15 III and the turntable was a Thorens TD-125. As you might expect, the overall sound quality was extremely good, and I am tempted to resurrect

the old cliché about the piece of wire. . . . There was ample power to do justice to those organ pedal notes on my favorite Bach record of the *Tocatta in D minor* (Everest 3156) or the magnificent *Organ Music from Westminster* disc made by that perfectionist, R. W. Fulton, which has excerpts from Widor, Mozart, Bach, and Sweelinck played on a Kimbell Organ (ARK 10251S, 8012 Cedar Ave. South, Bloomington, Minn. 55420). I was particularly impressed with the smooth overload characteristic; full marks to Crown for this and also for the foolproof protection circuits, as well as for the incredibly low distortion.

A word of praise is due for the instruction manual. This is not only crammed with all kinds of information about the amplifier, such as the graphs showing phase response, noise



Good time capsule.



Saving fleeting moments requires a quality tape recorder. But, just as a camera can be no better than its lens, tapes can be no better than the microphone. Whether it costs \$200, \$500—even \$1,000—a tape recorder can be significantly improved by the addition of a Shure *unidirectional* microphone—a mike that can be ‘aimed’ so that only the target sounds will be recorded. Microphone misers who ignore this will never hear the *true* sound of recorded music lessons, parties, classes, speech therapy, sound movies and rehearsals. With Shure microphones, creating tomorrow’s treasures is today’s pleasure.

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Manufacturers of high fidelity components, microphones, sound systems and related circuitry.

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AmericanRadioHistory.Com

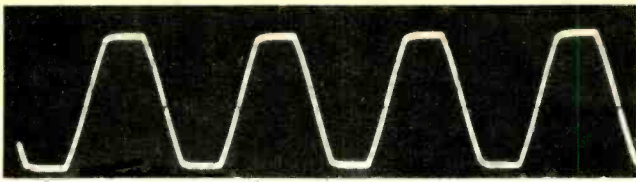


Fig. 9—Waveform at clipping, 440 watts, 8 ohm load.

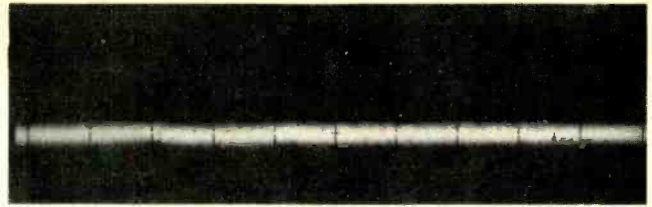


Fig. 10—Residual hum and noise, 102 dB below 200 watts, 8 ohm load.

spectrum, power efficiency, damping factor, output impedance, and so on, but it also gives nomographs for speaker lead resistances, circuits for loudspeaker protection, filters for r.f. interference, and much more. Instructions are also given for the connection of both channels in series to provide a mono 70 V output.

I am often asked, "Which is the best amplifier now available?" If the same question were put to a group of experts,

you would get several different answers. Some would undoubtedly vote for the DC-300A, others might vote for a unit with more power or one with VU meters or illuminated power indicators, but I am certain that all would agree that the Crown DC-300A is in that group at the top against which any new pretender to the state-of-the-art title must be judged.

George W. Tillett

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Fairfax Model FX-350 Speaker System



MANUFACTURER'S SPECIFICATIONS

System Type: Three way, with vented enclosure. **Drivers:** Three; one 3½-in. tweeter, one 4-in. midrange, and one 10-in. woofer. **Crossover Frequencies:** 1 and 4 kHz. **Control:** One calibrated, rotary, tweeter-level control. **Finish:** Natural wood, American walnut. **Size:** 14 in. W x 13 in. D x 36 in. H. **Weight:** 55 lbs. **Price:** \$189.95.

The Fairfax FX-350 is a three-way loudspeaker system using a 4-in. cone tweeter, a 4-in. midrange, and a 10-in. high-compliance woofer in a vented enclosure. The woofer handles the range below about 1 kHz, while the tweeter takes over above 4 kHz. This is a floor-standing model, finished in natural American walnut with a matching sculptured foam grille. The removable grille is secured with press-type fasteners to the front of the enclosure.

Speaker connection is made to well-marked 5-way connectors mounted in a recessed cavity in the rear of the cabinet. A single rotary, tweeter-contour control is placed in the same cavity and is fitted with a pointer knob to assist in balancing by means of engraved dial calibrations. Good tactile cues are offered by this arrangement, so you can adjust the control by reaching around the back without the need to move the enclosure. This facilitates adjusting the sound to suit individual tastes.

The enclosure is sturdily built and can safely take the load of a lamp or other item which might be placed on its convenient 36-in. height. However, as with any piece of fine furniture, the wood top should be protected from possible abuse.

The Fairfax FX-350 is covered by an unconditional five-year warranty against defects.

Technical Measurements

The measured impedance is shown in Fig. 1 for three positions of the contour control. The center position of the control potentiometer is referred to as "zero" on the Fairfax dial plate. This position is called center in Fig. 1. The other two positions are maximum clockwise, which gives highest tweeter level, and full counterclockwise, giving lowest tweeter level. This lowest impedance occurs at the maximum position control setting and is about six ohms. Since it is unlikely this position will be used, the Fairfax can be considered as an 8-ohm system based on the rest of the frequency range.

The woofer section shows the characteristic double peak of a vented enclosure. The lower peak occurs at 15½ Hz, which is low enough to be down in the frequency range of record warp components. This suggests that a preamplifier rumble filter should be used to prevent subsonic energy from causing the speaker cone to experience large excursions which could in turn result in muddiness at high sound level should the cone go out of the linear gap region. The mini-

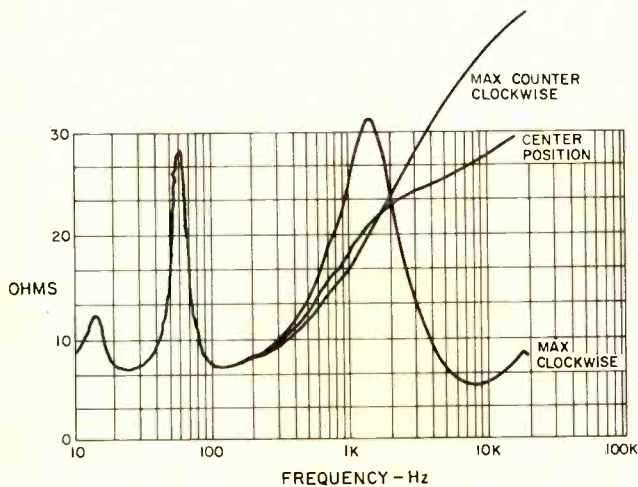


Fig. 1—Impedance for three positions of the tweeter contour control of the Fairfax FX-350.

This is all we want to do. But perfectly.

The engineering of high-fidelity turntables is a technical and controversial subject.

But the concept of a perfect turntable is perfectly simple.

Since a perfect turntable is what we at Garrard have been striving to make, we'd like to communicate this concept to you as unequivocally as possible. Then all the claims and counterclaims you hear will fall into place.

Think of it this way:

A phonograph record doesn't know and doesn't care what kind of mechanism is spinning it,

as long as it's spinning properly. If your hand could turn it at exactly $33\frac{1}{3}$ RPM, without the slightest fluctuations in speed, and keep it moving in the horizontal plane only, without the slightest jiggling or vibrations up-and-down or sideways, you could expect perfect reproduction.

Similarly, a phono cartridge has no idea what's holding it in the groove, as long as it's properly held. If your other hand were holding it, correctly aligned, with the right amount of downward force and without resisting its movement across the record, it would perform faultlessly.

That's really all there is to it.

The basic point is that the turntable and tonearm have exceedingly simple and purely mechanical functions, just like a chemist's analytical balance or a gyroscope. That's why turntable manufacturing is, above all, a matter of precision and integrity, with the emphasis on perfect operation rather than hi-fi pizzazz or features for features' sake.

Of course, theoretical perfection in an actual mechanical device is an unrealizable ideal. But even though 100% is impossible, there's a big difference between 99.9% and 98%.

It's in this most fundamental sense, we feel, that Garrard turntables are in a class by themselves.

For example, in the case of the Zero 100c changer and the Zero 100SB single-play automatic, tracking error has been reduced to a virtually unmeasurable quantity (in effect, zero) by the geometry of the tonearm design. Rumble, wow and flutter figures are also coming ever closer to theoretical perfection in these and other top Garrard models. (The Zero 100c and the Zero 100SB are both priced at \$209.95.)

To a less spectacular degree, the lower-priced models, from \$49.95 up, also come quite close to the theoretical ideal because of this emphasis on fundamentals.

Remember: all we want is to make your record revolve perfectly and to position your phono cartridge perfectly.

And we're almost there.

For your free copy of The Garrard Guide, a 16-page full-color reference booklet, write to Garrard, Dept. G-11, 100 Commercial Street, Plainview, N.Y. 11803.



Garrard
Division of Plessey Consumer Products

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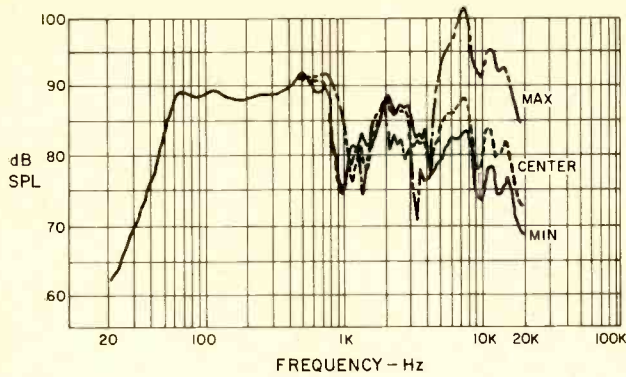


Fig. 2—Anechoic one-meter frequency response for one-watt drive and three tweeter control positions.

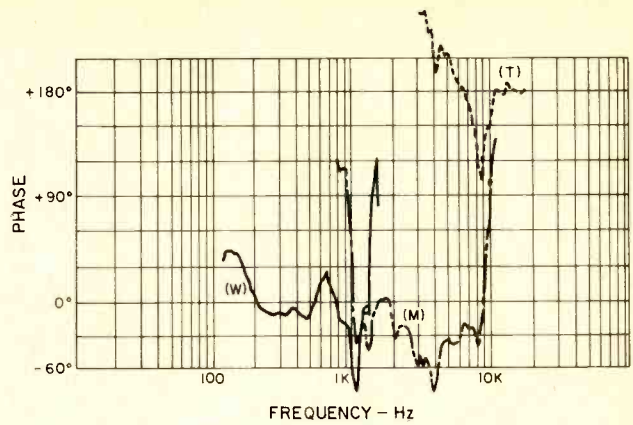


Fig. 3—Anechoic one-meter phase response corrected for woofer, midrange, and tweeter acoustic positions.

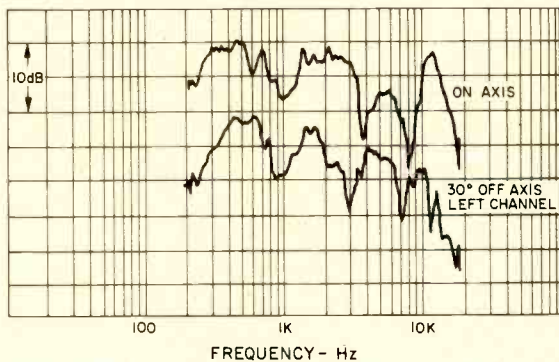


Fig. 4—Three-meter room response.

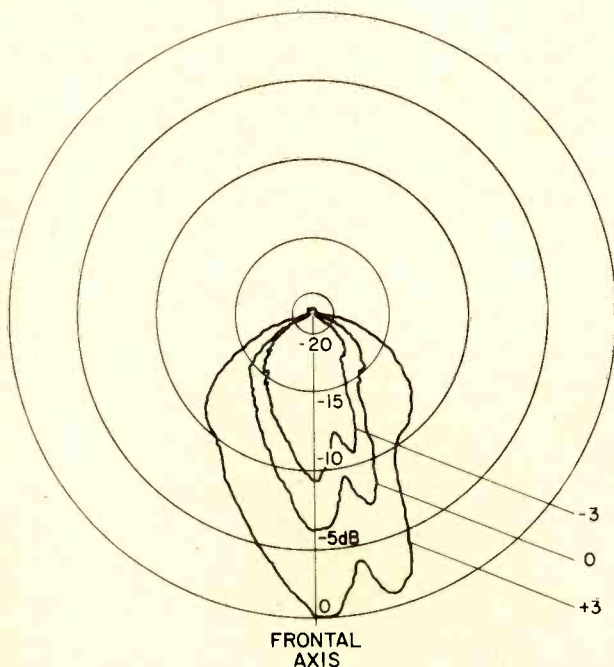


Fig. 5—Horizontal polar response for three tweeter control positions.

imum impedance occurs at 27 Hz.

The anechoic amplitude response is shown in Fig. 2 for the same three control positions as those of Fig. 1. Dips occur at around 1.2 kHz and 4kHz for this axial pressure response.

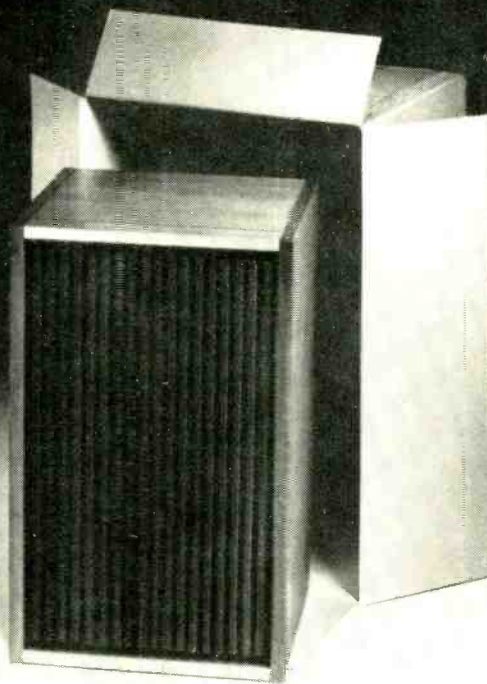
The low bass holds up well down to below 60 Hz, then falls off at around 18 dB per octave. The alignment indicated by the impedance and pressure amplitude show that the low bass might tend to sound slightly heavy, particularly when mounted against a flat wall, due to the acoustic damping of this design. If this happens, a more balanced bass can be achieved by a conventional tone control rolling off the low bass by a small amount. In order to verify the bass alignment used by Fairfax, a close microphone measurement was used on the cone and vent to determine frequencies of loading. The cone SPL peaks at 80 Hz and dips at 27 Hz, while the vent peaks at 60 Hz. This verified the one-meter SPL measurement of Fig. 2. The general strength of the woofer compared to the higher frequency drivers indicates a direct sound which will be strong in mid bass.

The phase response in Fig. 3 shows that the bass and midrange are in phase with each other, while the tweeter—because of its forward acoustic position—leads by 180 degrees. This plot is made in three parts, from 100 Hz to 1 kHz for the woofer, from 1 kHz to 10 kHz for the midrange, and 10 kHz to 20 kHz for the tweeter. The response is non-minimum phase around 1.5 kHz, 4 kHz, and 10 kHz for this one-meter position.

Figure 4 is the three-meter test which generally is a better indication of the timbre of early sound when heard in a conventional listening position. The on-axis and left channel stereo measurements are shown displaced 10 dB on this plot for clarity of presentation. The measuring position is one meter above the floor and three meters from the front of the speaker. The center reference position of the tweeter control is used for this test. These results show that the top end will be down in level when the speaker is used in a conventional stereo position. It will be necessary to use a fair amount of treble boost to bring the extreme top end up to a level equal to the midrange. Fortunately a conventional tone control starting to boost at 1 kHz can substantially correct this condition for the normal listening position. A better solution, if it is possible, is to rotate the speakers toward the listening area. Because of the bass alignment, this works well in combination with moving the speaker into the room and away from a wall for more uniform bass.

Introducing the MX-12.

A new speaker for a new problem.



When receivers boasted modest power, virtually any well-designed speaker system could handle the load.

But this is the Super Ear era; a musical age of bass-heavy rock, driven by super-powered receivers and amps.

And that's a problem—if your ears and speakers can't stand the strain without squawking.

The MX-12 can. It's a new 3-way acoustic-suspension speaker system designed to cruise smoothly and effortlessly at today's listening levels by a new division of the company that invented moving-coil loudspeakers in 1915.

Unheard of power-handling capacity from a speaker nobody ever heard of before.

The power-handling capacity of the MX-12 is impressive. In tests at 30 Hz, it withstood an applied voltage (necessary to produce rated watts) of 25 volts. (Speakers with more famous names grumbled and rumbled at 15 volts.)

The MX-12's high power-handling ability—made possible by a rugged box and high-temperature cement in the long-throw voice coil—permits you to use enough power to fill even the largest living room with music

at satisfying loud levels, with gratifying low distortion.

Linear response for natural sounds. Naturally.

Moreover, the response is slab flat. From the deep frequencies super receivers are capable of (and the MX-12's low resonance reproduces accurately), clear across the spectrum to 20 kHz.

And because the MX-12 is more efficient than many other speakers of its class, you enjoy smooth listening even when you drive it with amplifiers of modest power.

Dispersion is excellent, too, the result of high-frequency drivers of exceptional off-axis response and wide cutouts on the grille—an extra nicety you'll learn to expect from MX Components.

But that's our philosophy: a lot of extras at no extra charge. So, before you go out to A-B any speakers, we suggest you listen to this page.

To learn more about the MX-12—and

the MX-10 (10" woofer), the MX-15 (15" woofer), and MX turntables, stereo and quad receivers—see your MX dealer. For his name, write: MX High Fidelity Component Series, The Magnavox Company, 1700 Magnavox Way, Fort Wayne, Indiana 46804.

Specifications:

Woofer:	12" high-compliance (long-throw voice coil)
Mid-range:	2" hemispherical dome
Tweeter:	2" phenolic ring cone
Impedance:	8 ohms
Frequency response:	25 Hz to 20 kHz
System resonance:	45 Hz
Front-mounted controls under removable, acoustically transparent foam grille:	
Mid-range level:	+ 3 dB, nominal, - 3 dB
Tweeter level:	+ 3 dB, nominal, - 3 dB
Crossover freqs.:	1500 Hz, 4500 Hz
Cabinet finish:	Oiled walnut veneer
Dimensions:	25¾" x 15¾" x 13¼"
Weight:	40 lbs. (approx.)
Recommended minimum amplifier input power:	10 watts FTC
Maximum power handling:	75 watts RMS*

*RMS continuous power at 200 Hz, measured by applying the voltage necessary to produce rated watts into an 8 ohm load. At standard room conditions, the unit would be capable of sustained operation at test voltage. MX engineers consider this rating to be very conservative; this is a much more stringent continuous power test than would be encountered in musical programs.



We'll be heard from.

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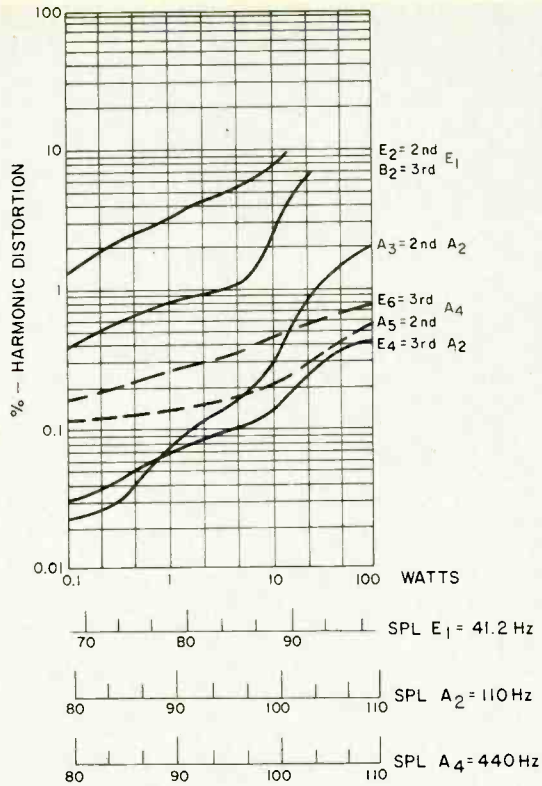


Fig. 6.—Harmonic distortion for musical tones E_1 , A_2 , and A_4 .

The polar energy pattern, shown in Fig. 5, also indicates that more sound energy will be obtained with the speakers rotated toward the listening position. However, there is some polar fingering and you might wish to try several positions for best sound. The tweeter contour control has calibration marks of -3, -2, -1, 0, +1, +2, and +3. These marks cover 180 degrees of the control shaft rotation and are the likely index positions for an owner to use, rather than the extreme clockwise or counterclockwise positions. The +3, 0, and -3 positions were used to obtain the polar data of Fig. 5. If the set is mounted against a wall, this plot shows that the left channel stereo speaker will be somewhat hotter than the right for narrow speaker spacing but will be equal for wide spacing.

Harmonic distortion measurements are shown in Fig. 6. High sound pressure levels are achieved at E_1 (41 Hz) only

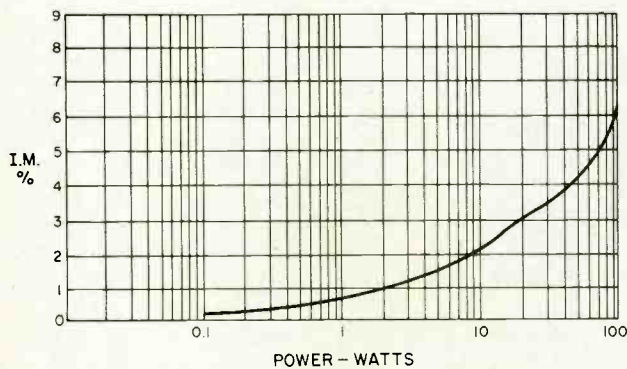


Fig. 7—IM distortion of A_4 (440 Hz) by E_1 (41 Hz), mixed one to one.

at the expense of moderately high distortion. Tones in the octave above that frequency, however, are handled readily with low distortion. In fact, the measured distortion at 110 Hz (A_2) is as low as many of the better amplifiers at normal sound pressure levels, which is extremely good.

Intermodulation distortion, shown in Fig. 7, is also commendably low at all power levels up to the maximum test level of 100 watts. What modulation that does exist is mostly amplitude modulation. The A_4 tone (440 Hz) has about 1 dB average reduction at 100 watts drive compared to 0.1 watt. The crescendo handling ability of the same driver is quite good, and instantaneous noise peaks of over 400 watts can be handled without noticeably affecting inner musical voices. The sound should be clean without any strain on peaks even up the limits of most super power amplifiers.

Figure 8 is the energy-time plot for the first two milliseconds of sound arrival. The leading edge of transients are sharp and clean but diffractive scatter from the enclosure housing takes its toll after the first half millisecond. Because of the substantial volume of sculptured foam used by Fairfax in the grill of the FX-350, a measurement was made of the transient response with and without the foam in place. Except for less than half a dB drop in level for the first one-tenth millisecond, the foam doesn't change the response in the slightest.

Listening Test

Two different positions were used in listening to the Fairfax FX-350. In one position the speakers were placed flat against a wall and in the second the position was away from the wall and angled in toward the listening position. The balance, particularly mid bass, was better when the system was away from the wall. The difficulty with a wall placement was a prominence of middle bass frequencies which could not be adequately controlled by conventional tone controls without causing an unnatural loss of extreme low bass.

When properly placed, the bottom end is solid with only a small tendency toward hangover marring an otherwise excellent performance. When listening at brisk levels, however, warped discs can cause muddy bass due to excessive cone excursion. Therefore, use of a rumble filter when playing discs is recommended by this reviewer.

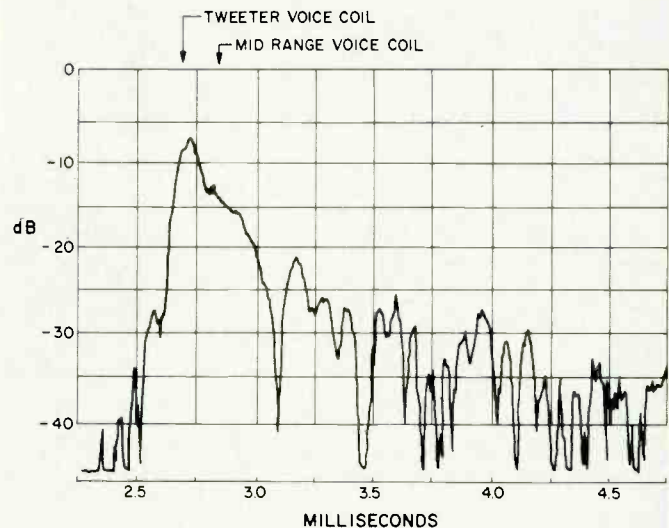
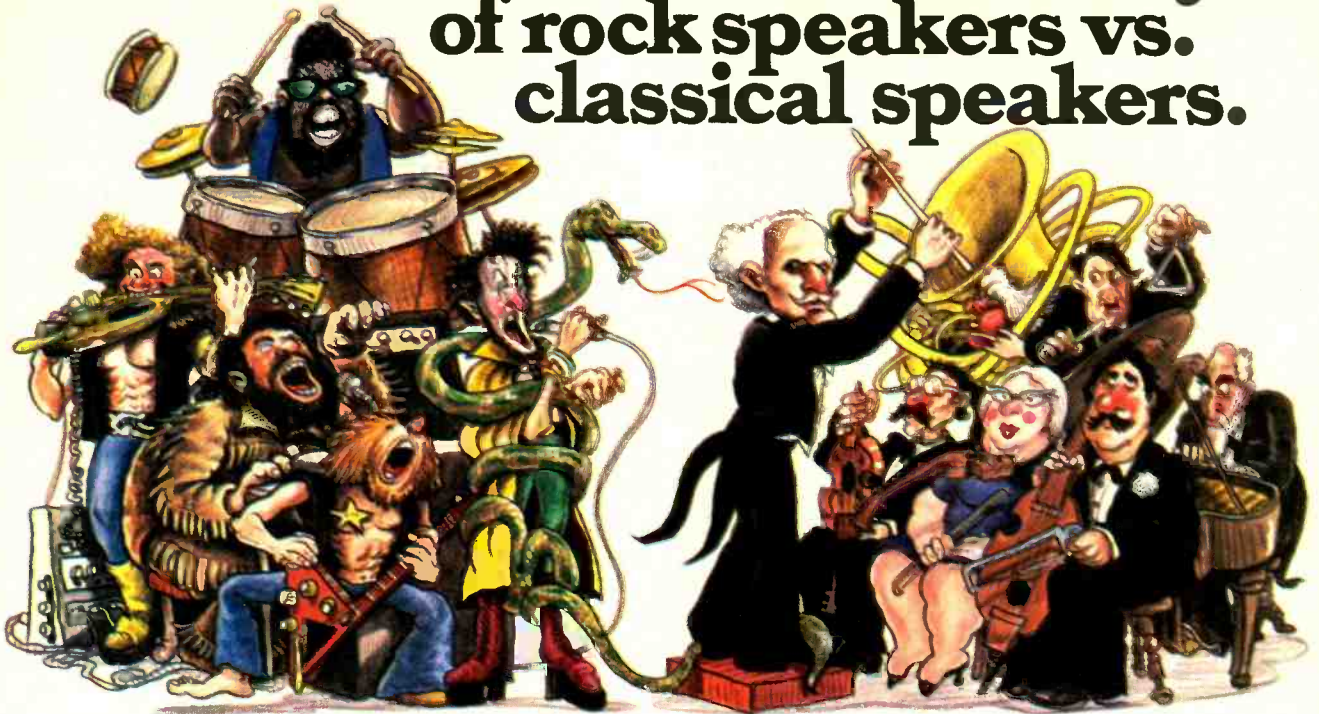


Fig. 8—Energy-time response.

The Rectilinear 5: end of the myth of rock speakers vs. classical speakers.



The new Rectilinear 5 is capable of playing very, very loud. Rock-festival loud. Even with a medium-powered amplifier.

At the same time, it's uncannily accurate. It sounds sweet, unstrained and just plain lifelike at all volume levels.

The temptation is great, therefore, to one-up that prestigious manufacturer who some time ago announced "The first *accurate* speaker for rock music."

But we refuse to perpetuate that mythology. It's perfectly obvious that the Rectilinear 5 reproduces classical music just as accurately as rock. We could never see how a voice coil or a magnet would know the difference between Jimi Hendrix and Gustav Mahler.

So we'd rather use this opportunity to set things straight once and for all.

Thus:

There's no such thing as a rock speaker *or* a classical speaker. Any more than there's a late-show TV set or a football-game TV set.

There are, however, speakers that impose a hard, sizzling treble and a huge bass on *any* music. And others that round off the edges and soften up the transient details of *any* music. That's the probable origin of the myth;

but these aren't rock and classical speakers, respectively.

They're *inaccurate* speakers.

It's true that an aggressive treble and a heavy bass are characteristic of most rock music, even when heard live. It's also true

that some record producers exaggerate these qualities, sometimes to a freakish degree, in their final mix of the recorded sound.

But that doesn't mean the speaker can be allowed to add its own exaggerations on top of the others.

A loudspeaker is a conduit. Its job is to convey musical or other audio information unaltered. If the producer wants to monkey around with the natural sound that originally entered the microphones, that's his creative privilege. He'll be judged by the musical end results. But if the speaker becomes creative, that's bad design.

By the same token, if some classical record producers prefer a warm, pillowy, edgeless string sound, that

doesn't mean your speakers should impart those same qualities to cymbals, triangles or high trumpets. (Stravinsky's transients can be as hard as rock.)

And if you like to listen at very high volume levels (after all, that's what rock is about—but so is *Die Götterdämmerung*),

you still don't need a speaker that achieves high efficiency through spurious resonances. What you need is something like the Rectilinear 5.

Everything in this remarkably original design was conceived to end the trade-off between efficiency and accuracy. The four drivers are made to an entirely new set of specifications. The filter network that feeds the drivers is totally unlike the traditional crossover



Equally wrong: Classical sound made vague and spineless by the speaker.

network. Even the cabinet material is new and different. Of course, those who feel threatened by all this fuss about accuracy and naturalness will point out that the monitor speakers preferred by engineers and producers in recording studios are usually of the zippy, super-aggressive variety.

That's perfectly true, but the reason happens to be strictly nonmusical.

"I use the XYZ speaker only as a tool," a top producer explained to us. "I wouldn't have it in my house. It really blasts at you when you crank up the volume, so that any little glitch on the tape hits you over the head. After eight hours in the studio, that's what it takes to get your attention. I know how to deal with those unpleasant highs; they're in the speaker, not on my tape."

It's easy enough to find out for yourself. Any reputable dealer will let you hear the Rectilinear 5 side by side with a "rock" or "monitor-type" speaker. Adjust each speaker by ear to the *same* high volume level, making sure the amplifiers are of good quality. Then listen. To rock *or* classical.

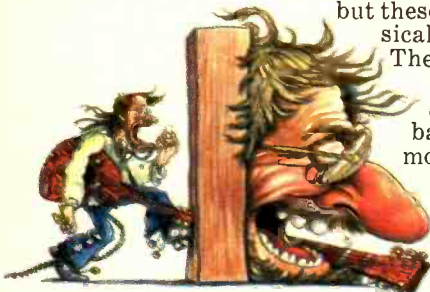
Then and there, the myth will crumble.

RECTILINEAR®

Rectilinear Research Corp., 107 Bruckner Blvd., Bronx, N.Y. 10454
Canada: H. Roy Gray Limited, Ontario



Rectilinear 5 Contemporary Laboratory Series bookshelf/floor speaker system, \$299.00 Rectilinear Dispersion Base (patent pending) optional.



Wrong: Freaky sound made even freakier by the speaker.

The extreme high frequencies are down in relative level. This reviewer found that a +3 tweeter level position together with a treble tone control touch-up restored spectral balance. It is better to bring the tweeter control up partway and then touch up with the tone control, instead of using maximum tweeter level, because too much tweeter causes a top end bite which can be unpleasant with some listening material.

Pipe organ sounds good on the FX-350. All but the deepest pedal register is there, and general sonic balance on middle and upper registers of the organ are good. Stereo center-image solo vocalists, both male and female, are quite good.

However, choral groups appeared to this reviewer to lack stage presence and depth primarily because of the top end drop which reduces sibilants. Rock sounds fine on the FX-350 and good gut-thumping kick drum can be obtained even with the speakers away from the wall. An attractive speaker which will blend with most any listening environment, the Fairfax FX-350 can suit the sonic requirements of most listeners.

Richard C. Heyser

Ed. Note: We understand from Fairfax that a new version of this speaker has incorporated a 5-inch midrange designed to help improve vocal stage presence.

Check No. 63 on Reader Service Card

Scott 451C Sound Level Meter



MANUFACTURER'S SPECIFICATIONS

Standards: Meets or exceeds all requirements of ANSI SI.4-1971 for Sound Level Meter, type S3c. **Sound Level Range:** 45 to 130 dB re 0.0002 dynes/cm². **Frequency Range:** 30 Hz to 8 kHz; Standard C weighting per ANSI SI.4-1971. **Microphone:** Omni-directional ceramic. **Meter:** Taut-band movement gives 20 dB range without switching. **Battery:** One 9-volt transistor radio type (Eveready # 216 or equivalent) gives approximately 200-hour operation. **Environmental:** Operating temperature range of 15 to 150 degrees F. Storage temperature range of 0 to +165 degrees F and 0 to 95% relative humidity. All-metal case provides shielding in electrostatic fields. A magnetic field of 1 Oersted (80 A/m) at 60 Hz does not produce an on-scale reading. **Dimensions:** 2½ in. W x 5 in. L x 2¾ in. D overall. **Weight:** 13 oz. net. **Price:** \$115.00.

The new Scott 451C sound level meter is a scaled down pocket sized version of Scott's earlier Model 450B. The unit can measure a large dynamic range with "C" weighting, which is the meter weighting closest to flat frequency response. The larger Scott Model 450B offers "A", "B", and "C" weighting for more analytical sound work. The 451C's wide dynamic range enables measurement of low level background noise as well as strong signals such as rock music at close range.

The meter is enclosed in a rugged, drawn aluminum case that has a removable rear cover for battery replacement. It is intended for operation with the left hand, leaving the right hand free to write down results or make signals with. Besides the thumb-operated attenuator which selects the range used, three momentary-on push buttons are provided on the front face. The first energizes the instrument, the second enables a battery check and the third converts the normally "fast" meter response into "slow" for more averaged readings. In the "fast" mode the meter responds like a VU meter. Calibration is set at the factory and Scott will recalibrate at any time for \$10.00. The instrument comes with a handsome leather storage pouch.

Test Results

Since a standard coupler-calibrator does not fit onto the Model 451C and since no adaptor is yet available for this instrument, we decided to compare its performance against a General Radio Model 1565A sound level meter set to "C" scale, having first calibrated it using a General Radio Model 1562A calibrator. To first check the frequency response of the 451C, we compared it against a calibrated Hewlett Packard Model 8058A sound level meter which utilizes a ½-in. condenser microphone. We played octave bands of pink noise and compared the response of the 451C to that of the HP 8058A. Table 1 shows the results to be excellent over the range that the 451C covers. "C" weighting has a 3 dB drop at 8 kHz, so that figure is accurate.

TABLE 1. Scott 451C frequency response relative to response of HP 8058A sound level meter.

Frequency	Deviations from HP meter in dB
63 Hz	0
125 Hz	-0.5
250 Hz	0
500 Hz	0
1 K	0
2 K	0
4 K	-0.5
8 K	-3

AUTOMATIC PROGRAM FINDING...

**AT
LAST,
A TAPE
DECK
THAT
ELIMINATES
THE
BIG
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WITH
TAPE
DECKS.**

With other cassette decks, finding your tape selection is hit or miss. You press fast forward... stop... rewind... stop... fast forward—over and over in a mad search for each selection. But not with Sharp's RT-480. Just press fast forward or rewind. Our Automatic Program Finder finds the precise beginning of your selection. And does it automatically. No fumbling,

bumbling, or mumbling.

We eliminate the hiss as well as the hiss. With a built-in Dolby "B" type noise reduction system.

The RT-480 is professional all the way. With Micro Crystal Ferrite heads for CrO₂ tapes. A selector switch for normal, low-noise, and CrO₂ tapes. Pause control for editing. Automatic shutoff in every

mode. Lighted, expanded scale VU meters. Advanced hysteresis synchronous motor for inaudible wow and flutter: 0.15%, weighted, rms. S/N ratio: 58 dB. And the frequency response is from 25-17,000Hz with CrO₂ tape.

All this, plus great styling, 2 microphones and dust cover. And under \$250. For the name of your

nearest Sharp hi-fi dealer, contact "Audio," Sharp Electronics Corp., 10 Keystone Pl., Paramus, N.J. 07652.

MAKES OTHER CASSETTE DECKS OBSOLETE. THE RT-480. ONLY FROM

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To check the accuracy of the meter, FET input stage and amplifier section, we compared the readings taken on the 451C with those from the GR Model 1565A, at the same location from the sound source, attenuating the sound source accurately by 10 dB steps. The results were excellent down to the lowest meter range where minor discrepancy was evident. See Table 2 for the data.

TABLE 2. Scott 451C attenuator accuracy as compared to General Radio Model 1565A meter.

SPL	Deviations from GR meter in dB
110	0
100	+5
90	0
80	0
70	0
60	0
50	+2
45	+3

Using the 451C

Holding the meter in the left hand, the thumb operates the "on" button, energizing the unit. Assuming one has set the range switch to the proper range, also with his thumb, a reading will be evident. To check the battery, the thumb must be extended so that in addition to pressing the red "on" button, it hits the green "battery" button. Once satisfactory battery condition has been established, we're ready for action. To use the meter's "slow" mode, it is necessary to press the black "slow" button. For some, the other hand must be pressed into action now. The whole business of momentary buttons can be a nuisance during use. For one thing, the meter cannot be set down anywhere as becomes

desireable during listing of noise readings. A hand-held meter can pick up noise due to its own motion and handling. A rocker switch is better for slow/fast operation, though the momentary will help conserve batteries. It is possible for the left hand to hold down both the "slow" and "on" switches though it is a bit awkward and uncomfortable.

The 20-dB scale is of respectable size but a bit crowded with number symbols. The ANSI standard, however, requires that all numbers be printed on the scale. The instrument does not have an electrical output so whatever is being measured cannot be recorded or fed to another analyzing instrument such as an octave analyzer or 'scope. The larger Model 450B has an output. Finally, a dust cap and strap would have been nice.

The Model 451C is good for measuring SPL in discotheques, noises from subways and trains, but not for cars because road noise has heavy low frequency components which need to be "A" weighted to be indicative of the perceived noise. It's good for measuring noisy neighbors and noise produced by portable appliances and machines. It's good for checking out the level in your favorite concert hall or rock festival seat, then comparing the readings with readings taken listening to your stereo system at home. We venture to say that in both cases the user is in for a numerical surprise.

For those needing "A" weighting, which more closely approximates the human ear response at low SPL, the Scott Model 451, costing \$115, is available. General Radio and B&K instruments are more flexible in use but are more expensive still. For others merely interested in flat response reading across a wide dynamic range, this instrument fits the bill nicely, and is a third the price of the units used for comparison in these tests.

Alex Rosner

Check No. 64 on Reader Service Card



Aware Of The Finest



All Joys of Good Listening



You Patrons of Music



In Seasons to Come

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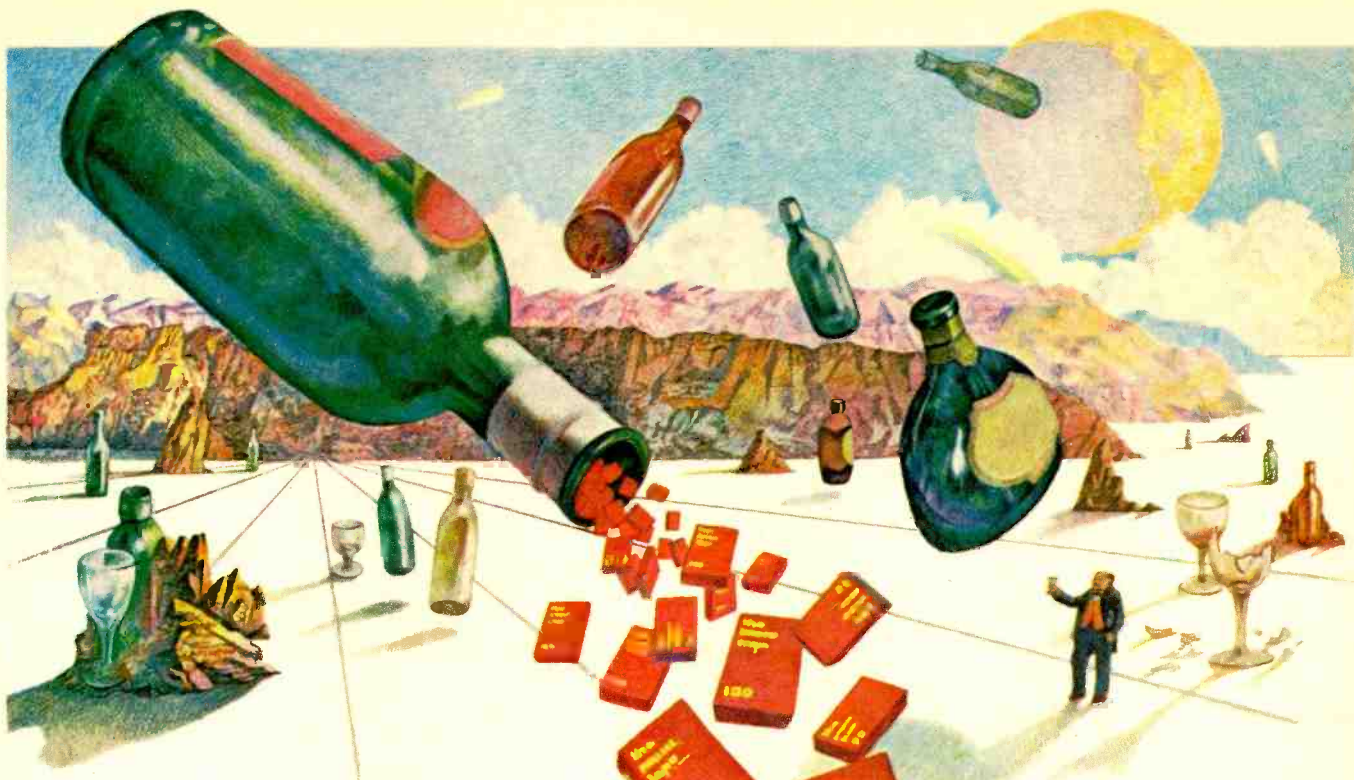
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Ever notice how the audiophile (and oenophile) has built a wall of words—a sound barrier—around selecting a quality blank tape (and a fine wine). Neither should be so complicated to enjoy.

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THE HAWK AND FRIENDS

John Lissner



THIS COLUMBIA doubleset, a repackage of two sessions originally released in 1962, focuses on two late, great tenor saxophonists—the patriarch Coleman Hawkins and his disciple Ben Webster. Hawkins is paired with trumpeter Clark Terry, one of the finest technicians in the business, and Webster with Harry “Sweets” Edison, an ex-Basie bugler who has profitably spent his middle years blowing his bouyant horn in the studios behind singers like Sinatra.

Interestingly, it’s the Webster-Edison partnership that is musically superior. Hawkins, the epic jazz figure, is not always at the top of his form, and the highly regarded Terry is way off his usual pace. Despite this, their session does have its moments, and they are mostly Hawkins’. *Michelle* is an evocative instrumental ballad written by Terry which serves as a vehicle for “Bean’s” full-bodied sax as it shines in a nicely shaped, lyrical solo.

A fast blues, *Feedin’ the Bean*, which opens side one, is another good selection. This Hawkins ever-

Coleman Hawkins & Clark Terry
Ben Webster & Sweets Edison
Columbia KG 32774, \$6.98

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By design, the 201 isn't much on chrome and flashing lights. It is simply a fine and durable piece of machinery meant to provide a great deal of enjoyment in use.

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The Advent 201

Advent Corporation, 195 Albany Street, Cambridge, Massachusetts 02139.

green features the great tenor man driving relentlessly with Terry joining him in a string of swinging riffs. Incredibly, Terry's puckish, instantly identifiable flugelhorn sound, usually a vibrant, creative solo voice, says absolutely nothing as it skips through a routine set of changes. Just as tedious is bassist Major Holley on *Just Squeeze Me*, who gives us one of those bowed-bass-cum-humming routines that Slam Stewart has done to death.

Some of the best moments on the Hawkins/Terry set are provided by pianist Tommy Flanagan, a brilliant musician who combines taste, technique and invention with a superb lyric sense. Flanagan perks up each number with his outstanding ideas delivered in a crisply swinging, supple and flowing keyboard style.

For some mysterious reason of musical chemistry "Sweets" Edison and Ben Webster play more consistently inventive jazz than Hawkins and Terry. Webster has two gorgeous solo outings—his wonderfully expressive, flowing tenor sax enraptures Gershwin's *How Long Has This Been Going On* and Rodgers and Hart's *My Romance*. He plays these standards almost straight, drawing on the strength and beauty of their lovely, melodic lines. Each solo is a minor masterpiece, as this master craftsman combines opulence of sound with restraint and good taste.

The versatile Webster swings at any tempo and most of the swing Ben generates at this session is leisurely. *Did You Call Her Today*, featuring Webster and Edison, is taken at a loping beat that is scarcely more than a trot; it's a stimulating bit of verve and relaxation. *Better Go* is faster, taken at a Basie groove and spotlights a pungent solo by "Sweets" and sixteen sturdy bars by Webster.

The duo gets beautiful support from pianist Hank Jones, whose accompaniment is perfectly dove-tailed into the overall musical pattern. Jones is a consistent delight, playing in a lilting, lightly dancing manner. His touch is genteel, yet he always maintains the rhythmic surge so basic to good jazz.

Overall, Columbia has produced a



solid, unpretentious doubleset; timeless jazz, rooted in the basics of melody and swing. The remastering is flawless, resulting in first-class stereo sound.

Sound: A+ Performance: A-

BACK IN THE MID-40s, critic George T. Simon wrote, after hearing the Woody Herman orchestra for several nights in a row: "This band is so overpowering that

Woody Herman:
Thundering Herd
Fantasy F9452, \$4.98

from now on I'll call it Woody Herman and his Thundering Herd." The name has stuck and on Woody's newest Fantasy album, his super-charged young troops hit hard in the robust but disciplined Herman tradition.

Drive, accuracy, and power have always been hallmarks of Herman's style, and this new recording again demonstrates Woody's genius for taking a collection of young, unknown musicians and fusing them into an exciting ensemble that swings authoritatively, dynamically, with a brassy elan that pins one's ears to the wall.

Even more remarkable is Herman's



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You don't hear distortion, rumble, wow or flutter when you listen to the Philips GA 212. The audio pros already know this. Now it's your turn to hear the best your records have, without listening to the turntable.

Most turntable problems are mechanical. Motors, controls or massive platters usually introduce sounds of their own. The stiff suspensions required to support heavy platters also contribute to acoustic feedback. These sounds are eliminated in the GA 212.

Solid-state electronics simply work more efficiently—with less noise. You just touch a control switch, no pressure is necessary, it lights up to tell you the GA 212 is working.

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work working with the tacho-generator at the heart of the GA 212. It constantly monitors the speed you select. Any deviation is instantly corrected.

The tone arm is as advanced as the electronic control system. Friction is less than 1/10th of the tracking force. There's nothing to interfere with sound reproduction. Moreover, an hydraulically damped, cueing mechanism protects your cartridge and records as well.

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consistent ability to blend the best of contemporary music with his classic big band style. The compositions of John Coltrane, Frank Zappa, Carole King, and Michel Legrand are all represented in this splendid collection. Coltrane's furious *Thunder Bird* explodes with a clean, incisive attack to kick things off on side one; spotlighted are invigorating solos by tenor man Frank Tibori and flugelhornist Bill Stapleton. Trane's poignant ballad *Naima* is framed in a fluent, mellow Tony Klatka arrangement with Woody's suave alto leading the mellifluous sax section. Young Klatka also impresses with some rousing flugelhorn choruses on his rocking original *Blues for Poland*. Carole King's sassy, saucy bit of Latin funk, *Corazon*, grooves along with a sinuous, lilting beat as Woody wails on soprano. Another high point: trombonist Jim Pugh's coolly lyrical solo on Legrand's *What Are You Doing the Rest of Your Life?*

The standard set on the Herman album is consistently high—my only beef is with a selection called *Come Saturday Afternoon*, a composition credited to one Fred Carlin. My objection is not to the band's performance which is first rate, but to Mr. Carlin's claiming authorship to a piece of music that is obviously lifted from Ravel's *Daphnes and Chloe Suite Number Two*. The least Mr. Carlin could do was to give Ravel credit as co-composer.

All told, Woody Herman: Thundering Herd presents us with another crackerjack Herman band, and Fantasy's talented young engineer, Jim Stern, has captured its vigor and temper with excellent clarity and depth.

Sound: A+

Performance: A

DEXTER GORDON, once a star soloist with the bands of Billy Eckstine and Lionel Hampton, and a leading figure of the bop move-

Dexter Gordon:
Blues a la Suisse

Prestige P 10079, \$4.98



ment, is one of those instrumental athletes whose sound and fury usually signifies nothing. Although he has been around almost three decades, he has never been a consistently interesting soloist. Often lacking in ideas, he tries to compensate by the sheer vitality of his playing.

His new Prestige release, **Blues a la Suisse**, recorded live at the Montreaux Music Festival, and remixed at the Fantasy studios is sonically excellent but musically undistinguished. There are brief (very brief) moments of excellence followed by long stretches of self-indulgence as Gordon pads out his solos with shop-

worn quotes and abrasive forays into Coltrane territory. (Lacking Coltrane's imagination and intense passion, Gordon delivers solo lines that are more nerve-racking than noteworthy.)

When Gordon gets to the two ballads in the album, *Some Other Spring* and *Secret Love*, he can't resist tearing them to shreds, projecting a deliberately coarsened sound. After experiencing such lyric masters as Coleman Hawkins and Ben Webster, listening to 44 minutes of Dexter Gordon is quite a chore.

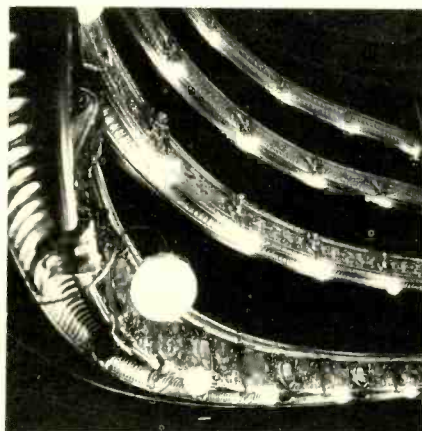
Sound: B+

Performance: C+

Live versus recorded at Covent Garden



Rehearsal scene from Mozart's *Don Giovanni* at Covent Garden, London.



Twenty-four AR-6 speakers are installed at the Danish Royal Opera.



Four AR-LSTs are in use at La Scala, Milan.

The most severe test for a loudspeaker system is to be compared with live music. The ultimate success is for the music from the speakers to remain indistinguishable from the real thing.

This is exactly what is happening at The Royal Opera House, Covent Garden, London. Covent Garden has purchased five AR-LST speaker systems as well as a number of AR-7s. The AR speakers are in constant use in such 'roles' as the Commendatore or the voices of the underworld in *Don Giovanni*. They are also used for the offstage brass band in *Aida* and the taped sequences in the new production of Benjamin Britten's *Owen Wingrave*, as well as for many other purposes.

A recent article by Adrian Hope in England's *Hi-Fi Sound* magazine reported the comments of the Covent Garden technicians who installed the system: 'If you think about it, Covent Garden cannot make do with any audio equipment other than the very best. In a recording studio what you are putting out as a final end product is a recording. What

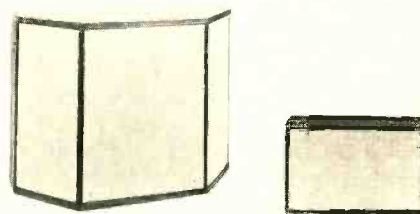
we are putting out here is a live performance and anything electronic is automatically the subject of the classic AB test — the audience can hear live sound *and* sound from a loudspeaker. So they have a perpetual yardstick to judge by.'

The idea of course is to create the illusion for the critical Covent Garden audience that they are always hearing live music.

AR itself has produced public live-versus-recorded concerts. Audiences were asked to distinguish between the performance of live musicians on stage and a recording of the same music reproduced over AR loudspeakers — the same AR loudspeakers that were designed for home listening. As at Covent Garden, the illusion of live music has been virtually 100-percent effective.

The use of AR speakers in live musical performances doesn't stop with Covent Garden's AR-LSTs and AR-7s. The Danish Royal Opera makes constant use of twenty-four AR-6s and six AR-LSTs. And La Scala has recently installed four AR-LSTs.

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(Continued from page 5)

plete stereo control centers. The device need do just one thing, boost the tiny voltage supplied by a magnetic cartridge to a sufficient level for use with a high-level input, plus adding the necessary RIAA compensation.

Even if your amplifier was not designed for use with magnetic cartridges, the preamplifier will make it possible for you to use one satisfactorily.

"Static" in Speakers

Q. When listening to music with lots of high frequencies. I sometimes get a "static" noise coming from my tweeter. As the music becomes louder, the static is louder.

What is this static? What can I do about it?—Andrew Coffman, Las Vegas, Nevada

A. The "static" you hear from your tweeters could have a number of causes. If its intensity varies, depending on how loudly you play your equipment, it is probable that your tweeter is defective. The cone may have become unglued from the voicecoil, resulting in loss of drive during a portion of each cycle, thus causing the noise. It also could be that the voicecoil is no longer centered within the magnetic gap. This would mean that it is rubbing against one of the polepieces, at least at times.

If you hear this noise during loud music passages, regardless of the setting of your volume control, chances are that the noise is associated with the discs you are playing. Either the phonograph must be checked or else the discs are over-recorded, as is all too often the case.

If you can borrow speakers, do so. Listen to these speakers to find out if the "static" occurs in the same musical passages. If it does not, you will know that something is wrong with your speakers. If the sound occurs in the borrowed speakers, you will know that the problem lies elsewhere.

It could be that the amplifier is being overdriven during loud passages; this can cause some strange sounds.

If this "static" condition is noted primarily on FM broadcasts, the sound may be caused by a misaligned tuner or by multipath distortion.

Interference with AM Receivers

Q. The AM section of my tuner exhibits strange behavior. Except on very strong signals. I get an excruciating "buzz" which seems to get worse when the dial is tuned to a lower frequency.

Sometimes by turning off my television receiver, the "buzz" is reduced. Physically

turning the tuner usually helps. I have attached insulated wire for an external antenna, but this makes the "buzz" worse. There is no heavy machinery nor are there any neon lights in the area which would cause this noise.

Can you help me?—Dennis W. Brandt, Indiana, Pennsylvania

A. I do not think that you can totally eliminate the interference you hear on your AM radio. In all likelihood it is produced by television receivers and it is not a problem within the tuner itself. Television sets radiate harmonics from their horizontal deflection circuits. These harmonics extend to perhaps 4 mHz. Harmonics are more intense as frequency decreases, which fact goes along with your observations.

Even though your television receiver is turned off, the television sets of neighbors remain on, and produce the trouble.

You may be able to shield your own set by placing copper screening around the high voltage area, and also by lining the entire cabinet with this screening. The screening should be grounded to the chassis.

The a.c. line of the set should be bypassed to prevent the interference from being radiated into the power line.

If by chance, some of the interference is being picked up by way of the power line, you may be able to eliminate some of this problem by using line bypassing to the tuner's chassis. The entire tuner should be grounded to a good earth ground.

Frequency Response of Phonograph Records

Q. In the book DISC RECORDING AND REPRODUCTION by Mr. P. J. Guv. 33½ rpm "fine-groove" records are reported to have a frequency response of 40 Hz to 15 kHz. Is this the maximum frequency range for all 33½ rpm discs? If so, is this because cartridges cannot track above and below these frequency limits? Is it because of a restriction imposed by the groove width?—Douglas F. Cook, March A. F. B., Calif.

A. A disc with a frequency response of 40 Hz to 15 kHz is actually unusually good. We generally do not find this wide response. Lows are often rolled off. Because of the heavy modulation impressed on all too many discs these days, highs are often rolled off above perhaps 12 kHz. It is possible to produce discs having a wide frequency response, down to perhaps 30 Hz and above 16 kHz. The highs will gradually be lost, however, as the inner groove diameters are approached during playback. Very little can be

done about this loss because of a parameter of the stylus which cuts the disc, and the tip radius of the playback stylus. At the inner-most diameter of the disc, high frequencies are not likely to exceed 10 kHz. Any highs which may be present above this will not be flat.

If one were to attempt to reproduce 16 Hz found on some large pipe organs, very large groove excursions would be required. Hence, a disc side would be reduced in length. If such pedal tones were present for most of the recording, the disc side might be 10 minutes long.

Bass response at really low frequencies will cause some tonearms to skip grooves, especially in the cheaper, home phonographs which are commonly used.

FM Stereo Versus Stereo Records

Q. I have compared recordings played on FM stereo with the same recordings played on my turntable. I notice a loss of highs on the FM/stereo version when compared to my own recordings. Is this the fault of the tuner portion of my receiver or is this the FM station itself? (When I say "loss of highs," I do not mean a complete loss as there are still some high frequencies in the music on FM.) The overall sound quality of FM is acceptable.

I am using Cable TV for an FM antenna. Could this be part of the problem? Would an FM-only antenna be better?

Also, when there are extremely loud passages, I hear a rattling sound, especially in high frequencies, on violins (over-modulation in the recording?)—Larry K. Cook, Albany, Georgia

A. All too many FM stations do not sound as they could. The FCC requires a flat frequency at the transmitter, but this never takes into account the studio equipment, telephone links between transmitter and studio, etc. Also, in order for many FM stations to make any money, they often operate completely automatically, with no announcer on duty. This means that virtually everything is recorded on tape, often played at slow speeds to obtain maximum time per reel. All of this adds up to a loss of quality.

Your receiving antenna will not alter the sound quality of the received signal, at least not in terms of loss of highs. A poor antenna can produce multipath distortion.

The distortion you have heard on high level passages could either be a

The Beogram™ 4002. If you are serious about your audio system, there is no alternative.

The Beogram 4002 began when Bang & Olufsen engineers were told to set aside the traditional solutions to turntable design and begin anew. Their goal was simply stated: Develop an electronically controlled turntable with optimum specifications. The result of their work was the Beogram 4002, an audio component unequalled in both concept and performance.

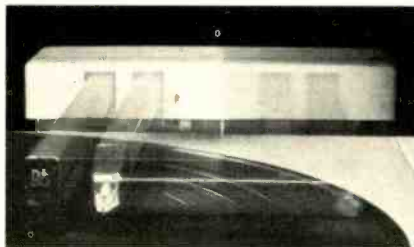
The cartridge. The quality of any turntable is easily negated by using an inferior or mismatched cartridge. Bang & Olufsen engineers felt it was essential to develop a cartridge which was an integral part of the turntable and not simply an appendage added later by the user. Therefore, an entirely new cartridge was developed which could meet the specification levels set for the turntable. This cartridge was the MMC 6000; a brilliant piece of miniaturization capable of reproducing a frequency spectrum from 20 to 45,000Hz. The MMC 6000 features the new multi-radial Pramanik stylus for exceptional high frequency tracing and has effective tip mass of only 0.22mg. It has a tip resonance point of over 45,000Hz, a compliance higher than 30×10^{-9} , and a recommended vertical tracking force of 1 gram.

The tone arm assembly. The Beogram 4002 features one of the most sophisticated tone arm assemblies ever developed. Its tangen-

tial tracking effectively eliminates tracking error and skating force. When a record is being played, each revolution brings the stylus one groove's width closer to the center. This inward movement causes the tone arm to pivot the equivalent fraction of a degree and reduce the amount of light received by a photocell within the tone arm's housing. This causes a servo motor to very slowly move the entire assembly the exact distance required to compensate for the angular deviation. Precision, low-friction

ball bearings keep the vertical and horizontal friction of the tone arm to between 5 and 15mg. As the tone arm is always kept tangent with the record groove, skating force is eliminated.

Operation. The Beogram 4002 utilizes computer logic circuits for automatic control of the operation cycle. Once you have depressed the "on" switch further assistance is unnecessary. The detector arm preceding the tone arm senses the presence and size of the record and transmits the appropriate information to the control unit. If there is no record on the platter, the arm will be instructed to return to the rest position and shut off the unit. When a record is detected, the correct speed is automatically set and the stylus cued in the first groove. A patented electro-pneumatic damping system lowers the tone arm at a precise, controlled speed to prevent damage to the stylus. The entire cueing cycle takes only two seconds. The control panel of the Beogram 4002 also permits power assisted manual operation. You may move the tone arm in either direction and scan the entire record at slow or rapid speed. A slight touch on the control panel will lower the arm exactly in the groove you have chosen; another touch will immediately lift it for recuing elsewhere. During any operation, either manual or automatic, you need never touch the tone arm.

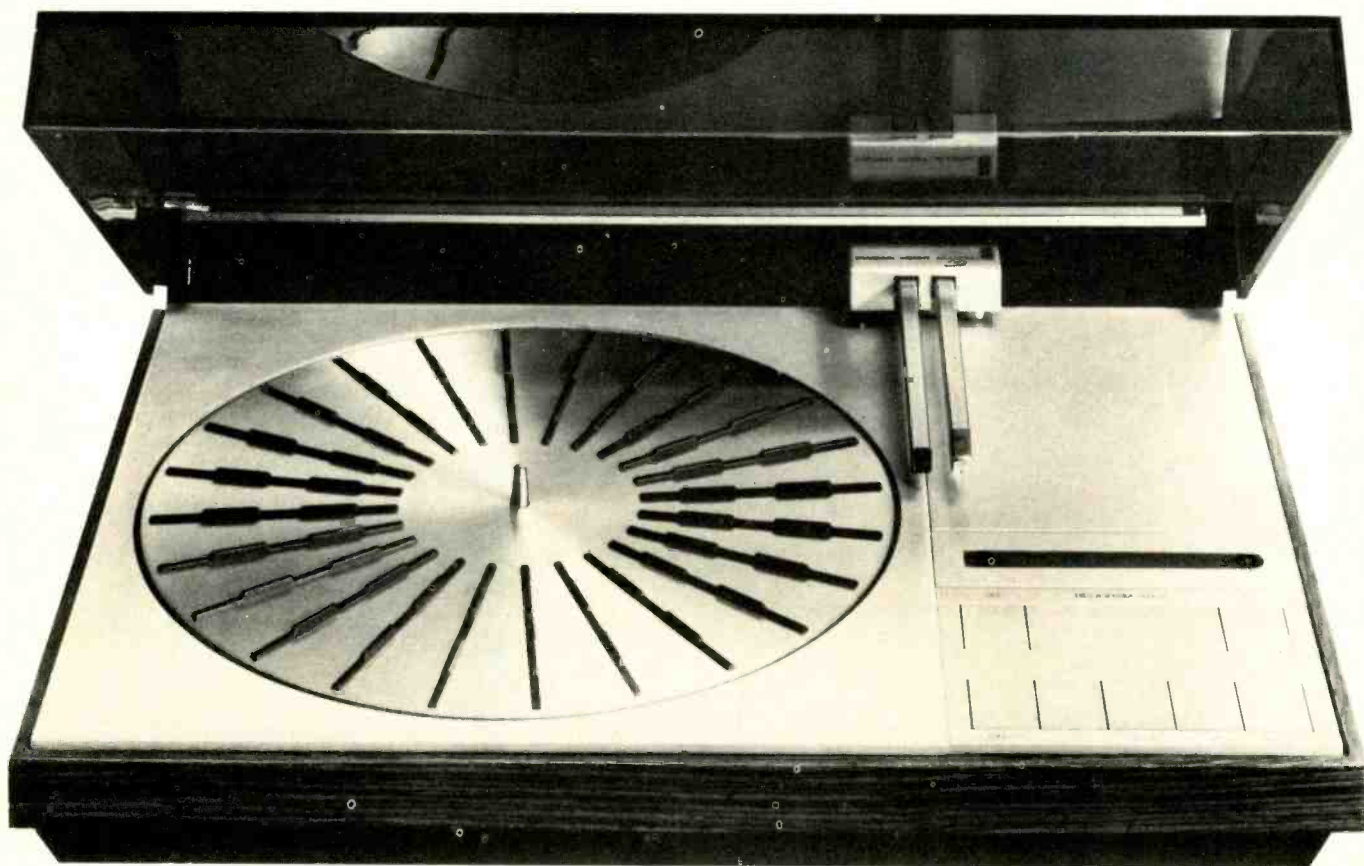


A color brochure presenting all Bang & Olufsen products in detail is available upon request.

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- Whether tapes are available.
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Schwann Record & Tape Guide

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AU

fault in the discs being played, or you are hearing multipath distortion. A directional antenna can reduce this kind of interference.

Noise from an Equalizer?

Q. I have a quadrasonic receiver which does not include tone controls for the rear channels. As my room acoustics are poor, I use my front tone controls to adjust the sound to my liking. After this is done, my rear channels seem weak and masked by the front channels.

To correct my problem, I purchased a five-band equalizer to correct the condition of my rear channels. Since the equalizer was installed, however, I notice more hiss from my rear channels than I heard from the front ones, I am not sure whether the equalizer is at fault or whether the boosted frequencies merely cause hiss to become more dominant. I would appreciate your advice in this matter.—Larry Titchenal, Belleville, Illinois

A. To determine whether your equalizer produces the hiss or whether it is generated in some portion of your remaining equipment, disconnect the input of the equalizer. Set all controls on the equalizer as usual, with the equalizer turned on. If the hiss is present, turn off the equalizer. Note whether the hiss disappears. This may take a few seconds if the capacitors in the equalizer maintain a charge for a time. If the hiss disappears, you will know that it is generated within the equalizer. It may be that your volume controls after the equalizer are set too high, causing you to hear more of the inherent noise than you should.

If your equalizer has input level controls, perhaps they should be set to a more advanced position so that you can then back down on the amplifier controls, thereby eliminating the hiss.

Perhaps the equipment driving the equalizer produces the noise. The added treble boost would make that noise more apparent.

Matrix Quad Light

Q. My FM tuner has a "stereo light," indicating the obvious.

Matrix 4-channel is being broadcast by some FM stations. I have not seen a matrix decoder, however, or tuner or receiver with a "matrix light." Why not? Such a light would be a great convenience in verifying for the listener that the program being broadcast is in matrix quadrasonic.

Certainly the matrix decoder that I am using "knows" when the program material is encoded. Could it latch a light on in this case? How might I hook

one up?—Andrew D. Keller, Wappingers Falls, New York

A. It would be almost impossible to provide a "matrix light" similar to the stereo indicator light found on most receivers. You say that your decoder "knows" when it is decoding matrix quadraphonic as opposed to conventional stereo. Actually, this is not true. It happens that some discs, though not intentionally recorded to have matrix effects, still possess this characteristic. The decoder will process them with some rather exciting results. The decoder only "knows" when it is getting difference information with which it can work its "magic." This difference information is important even when reproducing conventional stereo.

The stereo light found on most FM equipment is operated because of the presence of a 19-kHz pilot signal, which the FM stations do not transmit unless they are broadcasting in stereo or matrix quadraphonic, which is exactly the same technical process as far as broadcasting it is concerned.

This pilot signal is not present merely to turn a light on in a distant receiving set. It is there to provide a reference for the stereo information, thereby enabling proper decoding to take place. The designers of FM equipment have taken advantage of this situation and have made it perform the extra function of operating a "stereo light."

Evaluating Phonograph Cartridges

Q. Can you explain the relationship between decibel output and frequency response? How does one go about subjectively comparing the frequency response of various phonograph cartridges when the measurements were given in different ways for each product?

As an example, we might have three different cartridges with these specifications: 1. with a 10-10,000 Hz plus or minus 1/2 dB rating; 2. with a 20-20,000 Hz plus or minus 1 dB rating; 3. with a 50-10,000 plus or minus 1 1/2 dB rating. Is there a way to convert one specification to the others, so that I could know which cartridge is the best one? Will I be able to determine, in other words, which one has the flattest response?

Is there some mathematical formula which can be used to convert different "decibel outputs" into "equal outputs"?—Neil T. Shade, Dugway, Utah

A. You can determine the frequency response of one cartridge by comparing it with that of another cartridge. Suppose we have a cartridge whose frequency response is stated as being

plus or minus 1 dB from 20 to 20,000 Hz. This, in itself, is a good specification, at least for a stereophonic cartridge. (It would not be satisfactory for a CD-4 cartridge unless we knew more about its characteristics above 20,000 Hz. We would have to assume that, with no data given for the higher frequencies, this cartridge would fall "short of the mark.") Now take a cartridge which is plus or minus 3 dB between 50 and 10,000 Hz. We can immediately assume that this latter cartridge is not nearly as good as the first one in terms of frequency response. Here we have a cartridge which covers a narrower range of the audio spectrum than the first one and which is less flat than that of the first cartridge. Thinking once again of the first cartridge, somewhere in its response, above and below its specified limits, there is a point at which this cartridge will be plus or minus 3 dB. (More likely this will occur as a minus 3 dB point, but not necessarily. There could be a peak somewhere, which could mean a rising response.) These frequencies could be minus 3 dB at 15 Hz and plus 3 dB at 25 Hz, and minus 3 dB again at 30 kHz. (I did not arrive at this by any mathematical work, but merely by familiarity with the behavior of some cartridges.) These are arbitrary figures. Here we have a minus 3 dB at 15 Hz and minus 3 dB at 30 kHz. With the second cartridge we have a response of minus 3 dB at 50 and perhaps minus 3 dB at 10 kHz. Actually, from this data, we cannot know about the high frequency response for certain. It could be at 10,000 Hz we are plus 3 dB, and minus 3 dB at 17,000 Hz. We do not know, and cannot know this unless we can actually measure the frequency response of the cartridge. We can, however, make good guesses that the first cartridge will out-perform the second one by a wide margin.

Suppose we have one cartridge which is said to have a frequency response of plus or minus 1 dB from 20 Hz to 20,000 Hz. Suppose we have a second cartridge rated as being plus or minus 13 dB from 10 Hz to 30,000 Hz. It could be that the two cartridges have much the same overall response, but we cannot know this for certain unless measurements are made.

If you have a problem or question on audio, write to Mr. Joseph Giovanelli, at AUDIO, 134 North Thirteenth Street, Philadelphia, Pa. 19107. All letters are answered. Please enclose a stamped, self-addressed envelope.



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The Column

Fred DeVan



Eric Clapton

ERIC CLAPTON: **461 OCEAN BOULEVARD**
RSO SO 4801

If it hadn't said Eric Clapton on the outside I probably wouldn't have listened to the whole thing. Now that I have, I can't say I'm sorry, but **461 Ocean Boulevard** is so laid back—it falls down. Only Clapton could get away with it. There is less energy in the whole record than the Climax Blues Band or Edgar Winter puts in two minutes. Great record for a Claptonologist, but more Clapton is heard on any of the previous solo outings! Tom Dowd should have his ears stuffed with play-dough for trying to make a vocalist out of Eric. Boo-Hiss (and there is quite a bit of that), but I'll play it again—anyway.

TOMITA: **SNOWFLAKES ARE DANCING**
RCA, CD-4 ARD1- 0488

Snowflakes Are Dancing is a marvelous record and those who are not usually disposed toward classical music should not let their preconceptions deter them in any way. Keith Emerson would approve of it. Isao Tomita uses 27 electronic components/devices to replace Gregg Lake and Carl Palmer (Keith too). It is of course a sonic trip and the highest praise can be made for it by saying that under the most stringent scrutiny it defied every attempt I made to uncover a major flaw. The musical performance is impeccable, not totally as a classicist would see it, but as a part of today. It truly is a

pleasure to hear yesterday and today embellish each other, sans rock. The stature of Debussy's original themes and Tomita's utilization of his devices are complimentary and the end result is a fresh form that still can be taken further. The quad sound was fine, but the performance is nothing that Debussy could have envisioned. It is pure synesis. The Mellotron work is an uncanny as any I have heard. The textures of the Moog and attendant bits and pieces are eclectic. Tomita has pulled off a real non-gimmicky work of art. True variations on a group of themes, but also a work otherwise impossible to create. The mastery of electronics has transmitted one form into a thing unto itself. No need to understand how or why it was done. **Snowflakes** exists

and is as real as any other music around. And around is where it should be. If at all possible, hear it at least once in its entirety in quad, since only in quad are its full dimensions and impact complete. Be aware that there is more to come; it's another milestone in the age of the synthesizer. Welcome aboard, Isao Tomito!

BOB DYLAN: BEFORE THE FLOOD ASYLUM (and that's what the producers of this album need) **AB-201**

Dylan or no Dylan, much of this second product of the David Geffen trip is a lot of high-priced caterwauling. The Band, for its part is doing what they always did and just as well. But Bob Dylan kills some of his best songs, especially *Lay Lady Lay* (back to Nashville Skyline if you want to hear it done right). Any lady hearing this as a love song would be prepared for a hasty departure. As I listen to the other things Bob does on **Before The Flood**, it leads me to a hasty departure to another record. Bob Dylan must have listened to the record—he opened the flood gates at Asylum—split and has resigned with Columbia. Look toward CBS if you like Dylan as I do. This album almost turned me off to him and I have been his neighbor since the early 1960s. This review is too many words for too little of value.

KING BISCUIT BOY EPIC KE 32891

This record has been around my place for a long time and played constantly. It's good—so good it set me off to explore its origins. It was also hard to approach, because of its style, the back-up group, and "Biscuit" himself. First, Biscuit has another name—Richard Newell—is Canadian, and this is his first album on Epic. Biscuit has been described as the finest harp (mouth or harmonica—if you please) player in the world. He sings pretty well also. The style that has stymied me for an apt description is I guess served by *Rock-A-Billy-Gone To-New Orleans*. The *Rock-A-Billy* is all Biscuits, the New Orleans influence is Allen Toussaint and The Meters. Toussaint is the arranger and producer of this album and The Meters are the superb support and back-up band. Now this is all of Dr. John minus Dr. John, and I love Dr. John. This is not imitation Dr. John. He does his thing and King Biscuit Boy does his, and they are as different as can be. The Meters really do their thing well and hang the record together with impeccable agility and flair. Above all this soars King Biscuit

Boy. His harp playing is truly fine. His voice is strong, distinctive and under-rated. He is an impressive artist and you have to be to co-exist with Toussaint and company. My curiosity turned up more than I thought was there. Biscuit has been around for years, mostly in Canada, and is known well there. He also has three U.S. releases on Paramount, one of which I was able to find so far. **King Biscuit Boy With Crowbar** (PAS-5030). Crowbar now has an album on Epic also, **KE 32746**. That not

only is the record number, it is also the name of the album. Crowbar is a good rock boogie band, but Biscuit seems to really come into his own with The Meters. Crowbar seems to find their own level without King Biscuit Boy doing lead.

Back to this record, the first cut on **King Biscuit Boy, Mind Over Matter**, is a real winner. The rest of the album (9 more) keeps up with it just fine—never a dull moment, but I just want to keep hearing *Mind Over Matter* as often as I can. *Rock-A-Billy* is

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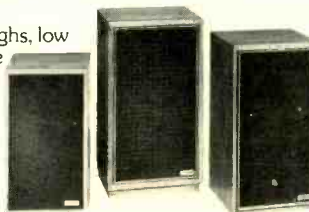
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coming on strong with such artists as B.W. Stevenson, but King Biscuit Boy really has a lead in bringing many elements into focus around him and having a new form that really allows more of us to appreciate the music he is making. **King Biscuit Boy** is a real winner, I hope you like it as much as I do.

Hey, Epic, where is the SQ version this record deserves?

**BAD COMPANY: BAD CO
SWAN SONG SS 8410**

The only bad company these guys are keeping is many of the other four-piece English bands that appear and thankfully disappear. They are keeping pretty good company with the past and rock and roll basics. Their *Rock Steady* is rock steady competence and you can even understand the lyrics. They remind me of early traffic, as a matter of fact, Paul Rodgers reminds me of the Paul Rodgers vocals from Free. Surprising! I really liked Free and still enjoy everything I have recorded of theirs—which is not much. So as far as Paul Rodgers is concerned **Bad Co** fills a void. I have never been crazy about Mott The Hoople, but recognized something that I liked and

kept hoping it would surface. When I can't understand lyrics that I don't want to hear, but don't know, I don't want to hear them until the strain wipes me out. I get put off—to say the least. The sparse, but clever guitar work of Mick Ralphs may have been what I wanted. Since I am one who really nuts out on (Andy Frasier) bass work, Boz Burrell's lazy simplicity impresses me not at all, but it does fit. Simon Kirke is also from Free and he holds back even more than before. He drags just enough to have a distinctive style.

The hype sheets say that Bad Company's trip is simplicity and darned if it doesn't work. It works pretty good, just enough bass, just enough drums, just enough guitar and vocals you can hear. What more can you want? Maybe nothing, except another name for the group.

Now, dear friends, can we have the new Led Zeppelin album. It will be great to follow this record with its opposite.

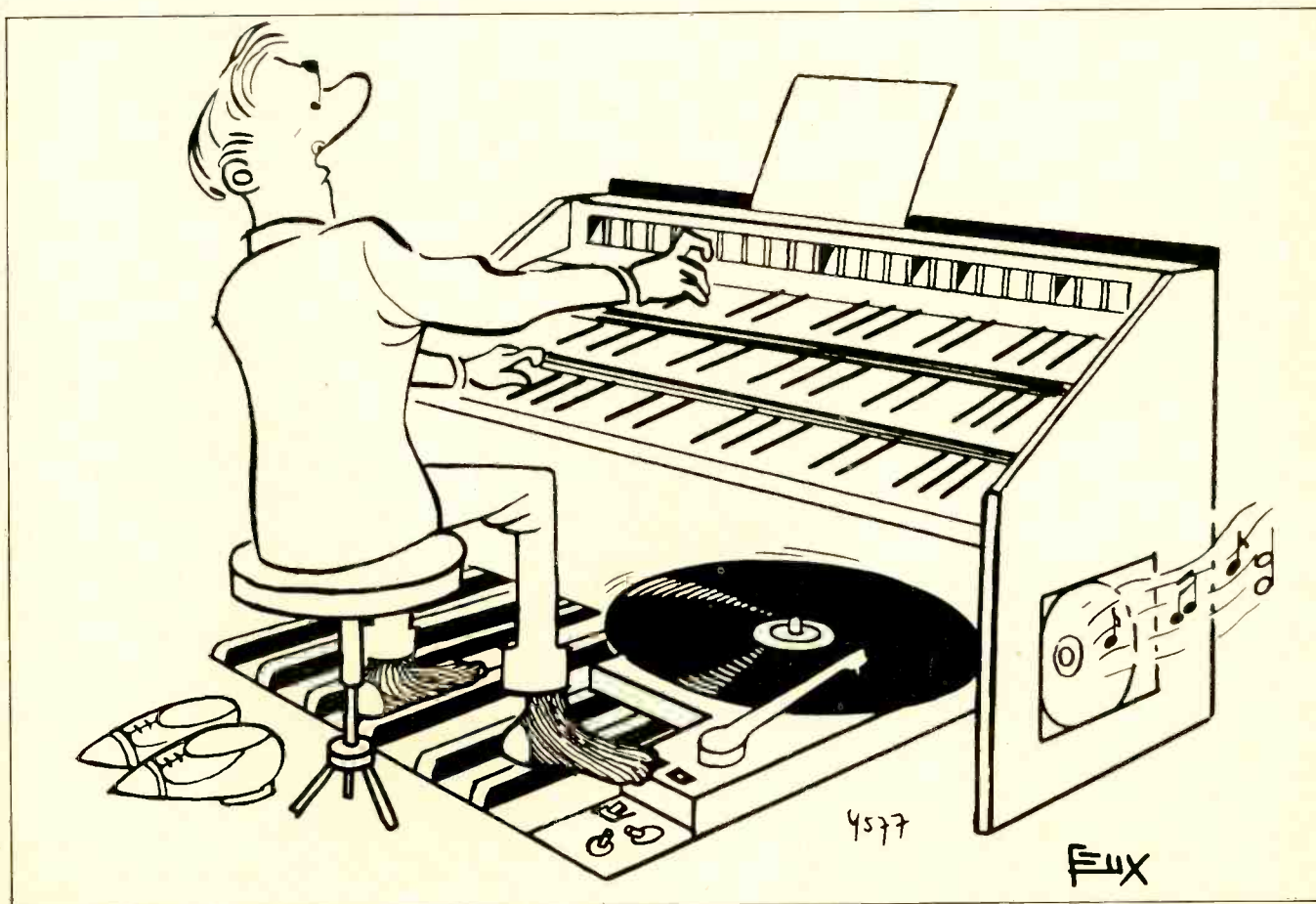
**MARTIN MULL: NORMAL
CAPRICORN CP 0126**

If Martin Mull is normal, so is Alice Cooper. If anything, Martin is a blow

by the forces of good health at the psycho-sickie of Alice Cooper, N.Y. Dolls, and others whose names thankfully elude my awareness.

Martin Mull is crazy. No two ways about it. Martin Mull is fun in ways we have not seen in a long time. His sense of humor is sometimes from left base and at other times dead center on what's really happening. His sense of music is simply plain good taste. There is no way to directly interpret Martin Mull since the meaning of what he says/sings is totally dependent on the realities and orientation of the listener. Woody Allen could be confused by Mull at times. There is a bit of all of us in Mull's songs sooner or later. He does not bash us over the head to be funny, he grabs at a hidden little spot inside and tickles.

I bumped into Martin outside a club and talked near him for a while. I say near because he is always elsewhere. He really talks like his music all the time. He is not a show biz put-on. He is a Martin Mull ??? The jacket is as much fun as the record and if you read it you will find the names of some of the best jazz and studio musicians on the east coast plus a



painting by Martin that gives you a good idea of what is going on inside his head.

Martin Mull and his record **Normal** are together either the lightest heavy or the heaviest lightweight I've ever heard. I'm not sure what else it is, but to me and Martin Mull it's at least fun.

ARLO GUTHRIE REPRISE MS 2183

To Arlo: After **Last Of The Brooklyn Cowboys**, this one was owed to us. It may be presumptuous of me, but by giving this album no other title but **Arlo Guthrie**, it seems a way of saying **Last Of the Brooklyn Cowboys** wasn't Arlo Guthrie. *Bling Blang*, *Presidential Rag*, *Deportees*, *Nostalgia Rag*, etc. and on and on remind me of the musical pragmatist that you are. Your voice and energy is back and then some. Even your western songs don't sound like you stepped on the wrong spot in the prairie. I know that *Running Down The Road* and *Hobo's Lullaby* were hard records to follow, but this one makes it. Stay with us, Arlo, we need you.

To Warner Bros.: Where is the CD-4 version of this one? Here the material is worth the effort and you guys are making the best CD-4 discs in the U.S.

LAST OF THE BROOKLYN COWBOYS. Arlo Guthrie. Reprise MS4-2142, quadrasonic, \$6.98.

"Look here, Arlo," they said. "This is a contract! You signed it. Your manager signed it. This is the music we want you to do. And we have this quadrasonic program and Mancini and Hugo Montenegro are on RCA. You are the best we got and we only have six days to get it done." "But," Arlo started to say, when his manager grabbed him around both shoulders and screamed, "The contract has no buts in it." Arlo's eyes got big then they got narrow like little slits. You could hear his teeth grind from ten feet away . . .

Back here in the real world, as well as in Burbank, a contract is indeed a contract and the record is out. It is an excellent presentation of CD-4. It is pleasant enough to listen to. **Last of the Brooklyn Cowboys** is everything nice, except Arlo is incidental. A great CD-4 demo record, awful Arlo Guthrie. If it's Arlo and his special qualities you are after, pass on this one. If you just got a CD-4 system, get a copy.

Aw, shucks, man, all that talent taking a back seat to technological and marketing needs. What a waste, but a contract is a contract and he is the best they got!

SERPICO (Original music from the soundtrack). Music by Mikis Theodorakis. **Paramount PAS-1016**, stereo, \$5.98.

I almost never listen to soundtrack albums for reasons that were obvious as soon as you heard your first one. This is the only film score album since Alexander Nevsky (Serge Prokofiev-Thomas Schippers, Odyssey Y-31014) that has made me want to see the film. Mikis Theodorakis has taken a biggie and has expanded the score into a suite of wordless songs that stand on their own. This music does not need the movie to justify its existence. Bob James did one hell of a nice job in its arranging. The last thing you expect is the soundtrack of a cop movie to be soft and contained. No heavy dramatics at all. Just oozing sensitivity and gentle human warmth. Pretty, quiet, pleasant, human music that is totally enjoyable and brilliantly executed. I can't wait to see the movie now—missed it the first time around.

David Holland Quartet: **Conference of the Birds**

Musicians: David Holland, bass; Sam Rivers, reeds, flute; Anthony Braxton, reeds, flute; Barry Altschul, percussion, marimba.

Songs: *Four Winds*; *Q & A*; *Conference of the Birds*; *Interception*; *Now Here (Nowhere)*; *See-Saw*.

ECM 1027 ST, stereo, \$6.98.

Very few albums are built around as pleasant a theme as **Conference of the Birds**. Holland explains that when he lived in London, birds would gather at 4 or 5 in the morning to sing together "each declaring its freedom in song." **Conference** communicates well the spirit of his experiences watching the birds, thanks to the primary ingredients of top-notch musicians and Holland's own high standard of writing.

The compositions encompass a spectrum of interrelationships which may very well characterize such a conference. *Four Winds* is a free, swinging number. The bright, early morning feel of the song offers the interpretation of its heralding the awakening of individual birds and the subsequent chirping and gaiety which quickly spreads and builds in intensity. Holland's strong walking bass is a dominating force on this cut. On *Q & A*, Braxton and Rivers squeak and squawk at each other in a manner expected of youthful birds involved in trite, but amusing, morning arguments. The slow and pretty *Now Here* conveys the sudden, spontaneous

transition manifested as the birds pause momentarily from their conversations to create an occasional interlude of tranquility. And, then . . . back to the chaotic, but contained arguments of moments ago, as the group performs *See-Saw*.

If these descriptions are at all relevant (now, there's an often over-used word) to you as they are to me, you will realize Holland's compositions to be "memorable, even hummable" as stated in a press release. There is nothing obscurely avant-garde about the album, except the letter-like signs adorning the back cover, adjacent to the list of musicians. Although the music is varied and unique to ears expecting to hear a steady jazz 4 on every tune, it is by no means any less than superb.

Sam Rivers does a fine job on tenor on this album. He is again beginning to see substantial recording time—something he should have been allotted all the time. His best work is evidenced in *See-Saw* and *Four Winds*. And, if his performances with Holland are any indication of what's on his latest Impulse LP, that one may be worth more than just a listen.

Braxton also does a thoroughly commendable job on alto. Unfortunately, I cannot comment on his flute playing. The album doesn't make clear whether Rivers or Braxton is playing flute at any given time. Hence, there is some trouble distinguishing between the two. In the future, I suggest that a list of which hornman is soloing at a particular time be included, and that something more definite be given than just "reeds" in listing instrumentation.

The copy of **Conference of the Birds** that I received already showed the Polydor (new parent company) label. I'm pleased to report that all of the high standards which ECM originally set remain an integral part of this album as well. The album is a typically brilliant sounding reproduction. Barry Altschul's texturally diverse cymbal work is captured undistorted, the way highs ought to be. On *Conference of the Birds*, a mellow, thought provoking piece, Holland weaves in and out of Altschul's statements on marimba. His bass comes out sounding very clear, not at all muddy (as lower registers have a tendency to be).

All in all, ECM still puts out an album that sets a high standard in jazz for other companies to match. **Conference of the Birds** on ECM is everything it's cracked up to be.

Eric Henry

Canby's Capsules

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MORE SONIC HISTORY

Giesecking/Bruno Walter Beethoven's Emperor Concerto. Vienna Philharmonic (1938). **Vox Turnabout THS 65011**, 2-ch., mono. **Joseph Szigeti Plays Bloch Violin Concerto.** Paris Conserv. Orch., Munich (1939). **Vox Turnabout THS 65007**, 2-ch., mono.

Bartók Plays Bartók. With Ditta Pasztory Bartók. **Vox Turnabout THS 65010**, 2-ch., mono.

Simon Barere Liszt (B Minor Sonata; shorter works). **Vox Turnabout THS 65001**, 2-ch., mono.

RCA DOMESTIC

Amram: Triple Concerto for Woodwind, Brass, Jazz Quintets and Orchestra; Elegy for Violin and Orch. David Amram Quintet, Howard Weiss, vl., Rochester Philharmonic, Zinman. **RCA ARL1-0459**, stereo.

The Cleveland Quartet. Schubert: Quartet No. 14 ("Death and the Maiden"); Mozart: Adagio and Fugue in C mi., K. 546. **RCA ARL1-0483**, stereo.

Messiaen: Visions de l'Amen. Peter Serkin, Yuji Takahashi, pianos. **RCA ARL1-0363**, stereo.

Rachmaninoff: The Bells, Op. 38 (1913); Three Russian Songs for Chorus & Orch., Op. 41 (1918). Phyllis Curtin, Geo. Shirley, Michael Devlin, Temple Univ. Choirs, Phila. Orch. Ormandy. **RCA ARL1-0193**, stereo.

EMI is licensing much material, old and new, to U.S. outlets. These are marked "2-channel, from the original monaural tapes"—whatever this may mean. No 78 hiss, undetectable joints, smooth, even quality throughout clearly *not* from shellacs. (But tapes??) The 1958 Walter/Giesecking is a lean, no-nonsense reading, good for this long Beethoven piece, the sound typically late-78, limited dynamics, edgy in loud parts, very good piano. The Bloch, only months later, is startlingly better in sound—cleaner, wider range, bigger dynamics, larger space. Szigeti in his best younger years. (later, he developed a serious wobble.)

These Bartók recordings have been around before; this is a good compilation though evidently from pressings, or worn masters. (Some are 4 hands, with his wife.) Curious—such "modern" dissonance, yet his piano style is old-fashioned, the left hand rolled before the right, as of his own youth. Pianists should listen.

No date—but Barere died 1950—was this his farewell concert (coughs, edited)? Seems to be early tape, via mic hanging over stage by the sound. Carnegie Hall? Could be. Rather dry Liszt playing, French style, but plenty potent.

Amram is an all-around powerhouse whose music—classical, jazz, anything—spills out at an incredible rate, unerringly big-time, always slickly done, but spendthrift and ill-digested. Enough material here for 20 pieces, jazz (self-conscious, I'd say), near-East folk tunes, Pakistani flute, a skillful mish-mash framed in snazzy orchestral dissonance, 1950s style. His "Elegy" is shorter and simpler, more listenable.

This 1969 offshoot of Columbia's Marlboro is billed as successor to the famed Budapest—yes, they are closer than other quartets, the sound lean and well blended, the intensity extraordinary (maybe even more than Schubert bargained for!). Very 20th c. The grand Budapest architecture isn't quite there yet, but this group does play *music*. They'll go far if they stick together.

Two enormous pianos on stage, two dedicated piano mystics, two sides of very dissonant all-out mystical stuff about various kinds of Amens. Definitely for the new wave; you must be dedicated yourself! But Messiaen is well served. Wish RCA had put more piano separation in the recording.

A splendid and revealing performance of this rarely heard big-scale cantata for solos, chorus and orch. on Poe's The Bells. The piece needs a huge hi fi sound, and it needs real dedication—it gets the works here. Positively grandiose! When the Phila. and Ormandy at last do music that is *fresh*, and Ormandy's special sort too (Debussy, Sebelius, Rachmaninoff), then suddenly things happen! Wonderful. The Three Songs, Russian folk-ish, use only the altos and basses of chorus. Fine, fat, enthusiastic chorus sound throughout.

Pictures at an Exhibition and Bolero. Philadelphia Orch., Ormandy. RCA ARL1-0451, stereo.

Ormandy/Philadelphia Spectacular Marches. RCA ARL1-0450, stereo.
Ormandy/Philadelphia Spectacular Choruses. With Phila. Orch. Chorus. RCA ARL1-0580, stereo.

Bolet at Carnegie Hall (Feb. 25, 1974). RCA ARL2-0512, stereo.

No potboilers here! A potboiler has been overcooked; that's not the way these two Ravel-orchestrated masterpieces of the turn-of-the-century orchestra sound on this disc. Gorgeous hi fi; played in perfect style, rather slowly, allowing for every effect to perfection. Ormandy knows how, and so does RCA. It's meat for both.

RCA seems determined to run off all the potboilers it can ram through the Phila. recording schedule. These are! I couldn't play more than a few minutes of the big swimming-pool extravaganzas. You're welcome to try more, to taste.

RCA is plugging this solid neo-Romantic pianist—he's right in the RCA groove, doing all the old chestnuts brilliantly. Might call it Rubinstein insurance. Mostly hyphen-arrangements here—Bach-Busoni, Strauss-Tausig, Wagner-Liszt, piano spectaculars all.

THE IVES 100th

Charles Ives—The 100th Anniversary, Columbia M4 32504 (four discs), mono/stereo, \$23.98.

A thousand recordings waiting for review—and I get myself all tied up in this monumental commemorative album for days! Why not—that's why we listen to records.

Columbia is a past corporate master at producing big spectacles and this is one of its best and most opportune, to celebrate the anniversary of the eccentric musical sage of Danbury, Conn. Not all the recordings are reissues but some are, properly and judiciously added to a good deal of new material. There is a disc of big assorted orchestral-chamber works, "The Many Faces of Charles Ives," a disc of Ives dramatics, including the cantata "Celestial Country," "Lincoln, the Great Commoner," etc. A whole disc goes to 25 Ives songs, with Helen Boatwright and the Ives specialist John Kirkpatrick, and to round things out there is an interesting entire LP of Ives himself at the piano, playing Ives both improvised on the spot and from the printed notes, more or less. Very instructive. Then comes a fifth wheel, a Columbia bonus disc on which friends and close relatives offer Ives reminiscences—they are listed, but you will have trouble figuring which is which on the record and Columbia evidently intended it that way, as a sort of impressionistic sound picture in words.

Then, of course, there is the big, fat Columbia book of text and pictures, a bit arty and over-styled as always but crammed with an astonishing array of interesting material.

I am glad to find that, at last, Ives begins to emerge from all the facets of this album, spoken, performed and in print and photographs, as the genuine turn-of-the-century late Romantic that he really was, in some senses a sheer conservative, eccentric genius, too, whose world simply never got beyond

the feel and ways of around 1900. He wanted it that way. He was dedicated to that world, not at all to the world of "modern music" into which he lived on for many long years.

No criticism! Ives is Ives and there aren't many like him.

Americana Vol. III. Mrs. Amy Beach: Piano Quintet. Arthur Foote: Piano Quintet. Mary Louise Boehm pf., K. Kooper, A. Rogers, R. Maximoff, F. Sherry. Vox Turnabout TV-S 34556, stereo, \$2.98.

Ha ha! I never thought I would run into this Mrs. Beach, so to speak, in her musical person and I had to laugh when I first saw this disc. Back ages ago, when we were cocky young music students, we used to make fun of the super-Romantic old-line composers who were the first American generation — we hated *all* Romantic music, of course, and would only listen to Bach and Purcell. Mrs. H. H. A. Beach was one of the more preposterous names—she was everywhere called Mrs. Ha Ha Beach, a long-time Boston resident from 1885 onward and in point of fact one of the very first truly American composers of the New Renaissance that began at the turn of the century and just before—the Boston School.

Since those brash student days of mine, I have discovered how interesting these early folk were, once you accustomed yourself to their all-out, bouncing American Romanticism, no holds barred. George W. Chadwick, John Knowles Paine, in Boston with Mrs. Ha Ha, Horatio Parker at Yale—Ives's teacher—McDowell in New York, Hadley, Converse, Mason, and so on. And, again in Boston, Arthur Foote. One day in the thirties an ancient old man came into my class in orchestration with Walter Piston, and sat listening—Arthur Foote in person, the sage of musical Boston. Here he is, too, on this same record.

Mrs. Ha Ha really isn't bad! A bit longwinded and overblown, to be sure; but her hand is steady and her knowledge very sure, especially in the piano part, since she was a pianist. Gotta respect any pianist who can write his (her) own music in style. Arthur Foote is more Brahms-ish, less near-impressionist, more cogent, in his Quintet; but I like them both and I liked these warm, easy performances.

Claude Debussy Maurice Ravel—String Quartets. The Danish Quartet. Telefunken SAT 22541, stereo, \$5.98. These two "Impressionist" Quartets are invariably programmed together on discs, and yet they are so different, the Debussy a complex, thick-textured pieces related to his very last chamber works just before his death in mid-WWI, the Ravel much more stylized, simpler, more playable (Ravel was a genius at instrumentation—writing idiomatically for any given instrument or combination of instruments) and, in the long run, a much less interesting work; the Debussy is the big one. Neither composer wrote another string quartet.

A Danish performance? Sounds unlikely, somehow, but it isn't. These are excellent versions, both of them, thoroughly musical, accurate, alive, very much aware of the proper stylization that rings out the late-Romantic Impressionistic effects, the dramatic colors and moods and textures. A literal-minded reading of the notes can be deadly—and often has been! A fine recorded sound, too—except that as so often in the past I seem to detect a slight fuzzy edge to the Telefunken string sound. Never have been able to figure this out. Could it be a slightly different groove cut? Is it really their distortion, not mine? A mystery ever since I got me my very first Telefunken LPs back at the beginning.

(Continued on page 99)

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(Continued from page 93)

Mozart Violin Concertos (No. 1, K. 207; No. 3, K. 216). Pinchas Zukerman; English Chamber Orch., Barenboim. **Columbia MQ 32301**, SQ quadraphonic, \$6.98.

Zukerman Plays and Conducts Vivaldi Four Concertos (Nos. 9-12, Op. 8 "Il cemento..."). English Chamber Orch., Neil Black, oboe. **Columbia MQ 32840**, SQ quadraphonic, \$6.98.

The Mozart is vigorously played in the orchestra but with a hard sound, not really well phrased, not sensitive—this, I gather, is Daniel Barenboim. He is often that way. Zukerman's violin is better; he continues to grow and mature, I'd say, though his violin still retains some of that peculiarly treacly sound, so much like old Fritz Kreisler! Not appropriate to Mozart, really, but it doesn't interfere here. These performers are in the all-over much too accomplished to play Mozart badly, but I think there have been other performances at a higher, more sensitive musical level, more reverent, shall I say.

(Well—yes! One could also say that it is high time we got away from too much humble reverence, in the Austrian manner, for every note Mozart the God deigned to write down on paper. These concerti were solid show pieces, original but not really Mozart's highest production even at the early age when he composed all of them. I can sense that these performances serve to take a few mystical wraps off the Great Genius, perhaps in the long run to his good. I'll buy the idea, and admit, too, that both Barenboim and Zukerman have been big successes, alive and on discs. Maybe in part on this very basis, for the new generation of listeners.)

Zukerman's Vivaldi—he plays three violin concertos and the fourth is for oboe—is more mature, I'd say, and therefore more idiomatic, better music, than his presumably earlier "Four Seasons" recording. He has caught the sturdy, foursquare precision of Vivaldi's writing here: his fruity fiddle sound and occasional vibrato does not really intrude and the Vivaldi is good. And do I also note a gentler, milder sound from the orchestra, here under his charge? I think so. The Barenboim touch is gone. For better or worse.

In both discs the SQ is excellent and honest. As stereo, the recording is chamber style, impeccably done, a bit on the close side. In SQ-with-logic the room spreads out and the music is richer and more expressive for being bigger. No problem with the solo—SQ does fine in front and neither Vivaldi nor Mozart asks for Center Back solo

sound! In my opinion there simply is no problem (for the listener, anyhow) with "ambience" quadraphonic via SQ when the central interest is basically up front and the room sound all around. When the instruments—classical or otherwise—begin to spread their direct sources all the way around, we have problems and CD-4 is likely to have a good answer to them, at least when the CD-4 is well recorded and the reproduction is rightly tuned up... So, onward and upward.

Glenn Gould—Bach: The French Suites, Vol. 2 Nos 5 and 6; Overture in the French Style. Columbia M 32853, stereo, \$5.98.

The Glenn Gould all-recorded piano career continues—he has not played a live concert these many years nor apparently ever will again. Here, Mr. Audio, is the very artistic embodiment of your special discipline! Give him his due.

This Bach, if I am right, is post truck. In his *Rolling Stone* interview Gould notes that his piano, the only one he ever plays (records) upon, fell off a truck and had to be rebuilt. By himself, I gather. At this point it had not yet settled back into its former suppleness and, accordingly, his playing was modified on the spot (he does very little formal practicing) to accommodate the changed feel and sound of the rebuilt instrument. It is indeed somewhat "pointy" and stiff-fingered here and there, on the staccato side—but so warm and fluent and easy! Astonishing, and characteristic of this still developing genius of the pianistic art. The music is so real, so individual, so *first-hand*, not pianistic Bach, not "authentic" Bach, not harpsichordish Bach either, just the genuine musical communication transferred straight from Gould to that rebuilt keyboard.

Genius? My term for him and with good reason. Genius takes in stride what other souls struggle and seldom achieve. How does he learn, say, an advanced late Beethoven Sonata? He doesn't bother to study it at the piano in the usual way; he just reads it over in his head and learns the entire music in short order; then he goes to his piano and plays it, spending a bit of time on details of fingering and the like, just to be sure all goes well. But do not think this is casualness or sloth—just listen! Mozart as casually composed his symphonies complete in his head, then put off writing them down because of the work. This Bach, learned in a flash no doubt, nevertheless cost its performer as much of his inner vitality as you might spend in weeks. Conservation of energy!

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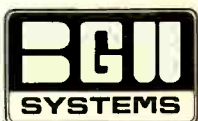
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Theater Music

SHOW BOAT. Selections from the 1932 production. **Columbia AC 55,** mono, \$6.98.

The first record album ever devoted to songs from a single Broadway score was a selection, in 1932, from the revival of the great Kern/Hammerstein *Show Boat*. Columbia Records' Special Products division has released this 40-year-old favorite on a mono LP, and it will be a welcome addition to the collections of those interested in American musical theatre. The entire album has an unaffected, unselfconscious appeal that antedates today's rather more slick, highly technocratized approach to show albums. The orchestration is modest and directed to straightforward presentation of the wondrous Kern score, and the singers have a refreshing spontaneous credibility. One becomes aware at once of considerable differences between this cast and that of later revivals or of the film version which were not, I think, always as good as this.

Paul Robeson's *Ol' Man River* remains a classic, untarnished by familiarity. William Warfield, who sang it in the 1951 film and at Lincoln Center in the '60's, had a resonant operatic quality in his voice, but with that, this song became glamorous. Robeson's higher, tentative voice is more moving; you get a better sense of Joe's exhaustion and anguish in his unadorned vocal simplicity.

The highlights of the disc, for me, are Helen Morgan's *Bill* and *Can't Help Lovin' Dat Man*. Here was a voice of singular delicacy and poignancy, and I like to think of her not fully aware of that—it all sounds so uncontrived. Singers with more vocal sheen and more dramatic intent overload Hammerstein's lyrics with tremolos, trills and glottal pauses. Helen Morgan, however, just directed the song from her heart to the audience, perhaps unconscious of technique. The result is a blend of innocence and sensuality that is alternately warm, funny, tender and almost achingly sad.

By contrast, James Melton represented the sort of tenor no one could take seriously today. With all his sing-

ing from the throat, with hardly any volume from chest tones, and those ghastly rolling r's, Melton's Gaylord Ravenal sounds oddly like Jerry Colonna.

Victor Young's orchestra and chorus will give the post-war generation an idea of a part of abandoned Americana in this classic, and will give their elders another reminder of how greatly our musical idiom has changed in a half-century.

The Columbia series, incidentally, is a good idea: since their archives must contain many additional stampings of other old shows, we can perhaps anticipate more in the future. In the meantime, this *Show Boat* is a little self-contained education about an era that is always in danger of being forgotten.

Donald M. Spoto

LEONARD BERNSTEIN CONDUCTS HIS MUSIC FOR THE THEATRE. New York Philharmonic Orch. **Columbia MG32174,** 2 discs, stereo.

Columbia has released this two-record retrospective of Leonard Bernstein's theater music as part of its current campaign focussing on American composers (see my colleague's remarks on the Copland disc in *AUDIO* for June '73). The selections included are: *Symphonic Dances* from *West Side Story*; the overture to *Candide*; *Facsimile*; two meditations from *Mass*; *Fancy Free*; parts of *On the Town*—all of which were previously available.

The dances from *West Side Story* are unmistakably Bernstein—alternately raucous and lyrical. *Somewhere*, for example, recalls the pastoral quality that characterized the boy soprano solo in the composer's *Chichester Psalms*, and the haunting love theme from *On the Waterfront*. In *West Side Story*, however, Bernstein created mood rather less subtly. It is interesting, too, to note the homages to Copland, which are frequent and uneven: the scherzo echoes whole phrases in *Appalachian Spring*. Distinctively American, slightly obsessed with pizzicati, and irresistibly inviting to toe-tapping, Bernstein often whips his orchestra to fever pitch (and

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shows clear predilection for percussion effects). Subtle it isn't. But it is undeniably theatrical.

Facsimile was the second score Bernstein wrote for a Jerome Robbins ballet (*Fancy Free* was the first), and its liabilities are evident even on first hearing. As in other Bernstein works (the *Mass* and *On the Town* are disparate but bear a curiously related substratum of musical invention), he disappoints just when the music begins to be interesting. I have the impression that—for all his wild abandon on the podium—Bernstein is himself too controlled in his composing. His music never seems wholly credible: it does not have its own inner logic; we are aware of some kind of steely manipulation. *Facsimile* is a score that relentlessly pursues a sociological statement, and in spite of its thematic consistency, it remains, in the final analysis, less than compelling.

Fancy Free, however, fares better. The idea for this ballet was a given, and the dance hall/moody jazz statements flow along with disarming simplicity. *On the Town* is, I think, less fortunate.

The overture to *Candide* never cloys. Its direct appeal lies partly in the carnival spirit that informs it, and partly in Bernstein's sense of the irony in Voltaire's story, which he has neatly turned into an operetta of enormous life and wit (I belong to that small group who believes *Candide* is one of the most brilliant musicals in American history; the original cast album, happily, has been released on the same label.)

Meditations from *Mass*, Bernstein's latest composition, prove to be even less fortunate than they did on the original cast album. His Mahleresque tempi have the odd effect of revealing the pallid melodic line and indifferent orchestration.

Because of Leonard Bernstein's impact on musical theatre (*Wonderful Town* has just been re-released, too; it's pure fun), on music education, in his capacity with the New York Philharmonic, he has become a controversial but undeniably major figure. It is good, therefore, that we have this set, which brings together earlier, apposite recordings under his baton. The man who has become "American music's matinee idol," as Richard Kostalanetz has said, conducts his own works with loving attention to detail, and the processing has been done with care.

Donald M. Spoto

Performance: A- Sound: A-

Jazz & Blues



SONNY STITT: So Doggone Good

Musicians: Sonny Stitt, tenor sax, alto sax; Hampton Hawes, piano; Reggie Johnson, bass; Lennie McBrowne, drums.

Songs: *Back Door*; *Your Love is So Doggone Good*; *Orange Ashtray*; *I Don't Know Yet*; *The More I See You*; *Speculation*.

Prestige P-10074, stereo, \$5.98.

"With impeccable taste" describes well the selection of the title and the music on both sides of this album. Sonny blows comparably well on here as he did on his masterpiece **Tune-up** and its follow-up **Constellation**. All the cuts herein are straight-ahead swingers, several of which are Stitt originals. (*Orange Ashtray*, *Speculation*, *So Doggone Good*) probably composed for this particular date. He doesn't do any of Bird's tunes on this album as on previous releases. There is an obvious thematic quotation of *Constellation* on *Speculation*—but that's it! As much as I dig Bird, it's refreshing to see Sonny writing and recording some

of his own tunes for a change. It is also significant that ordinarily predictable commercial renditions of popular tunes are absent here. Stitt does use *The More I See You* as a vehicle for several choruses of powerful, yet mellow blues-tempo excursions.

The musicians on this date make for an agreeable change from Stitt's Cobblestone releases. These ears appreciate hearing this superb sax player fronting a different rhythm section. Unfortunately, this group doesn't tour with Stitt. It would be great if they did since they managed a very "loose" feel for the short time that the studio's red light was on.

It is especially good to hear more of Hampton Hawes again, particularly on acoustic piano. His solos are technically clean and musically creative—nothing unusual for him. My favorites are *Back Door* and the aerial-tempo *Speculation*. Anyone who recently saw Hawes backing Dexter Gordon on a videotape from Montreal '73 on educational TV can understand Stitt's choice for this keyboard man. (Incidentally, the Hawes workout with

Dex's group should be released soon on one of the Fantasy labels.)

Reggie Johnson plays bass with a lot of gusto here. Anyone, like myself, who is inspired by a good bassist can sit back and enjoy this. His excellent playing is enhanced by an equally fine recording job. A thousand compliments to Prestige for adjusting the mixing of the bass on recent releases. Their improvement adds the necessary pulse that the bass is primarily there for and makes for a thoroughly warmer recording.

McBrowne supports the group with unquestionable drive. He sounds better on these tracks than on previous recordings, attributable to the mellower sound of this product. It sounds, though, as if McBrowne's snare drum is tuned a peck too tight. His ordinarily relaxed feel is, therefore, contrived to sound somewhat tense on the up-tempo *Speculation*.

That shouldn't stop anyone from picking up this Stitt release, however. The music is warm and happy. And, it sounds like a bright and "Sonny" spring day.

Eric Henry

The Big Beat—Art Blakey • Max Roach • Elvin Jones • Philly Joe Jones

Musicians: Art Blakey, drums; Freddie Hubbard, trumpet; Curtis Fuller, trombone; Wayne Shorter, tenor sax; Cedar Walton, piano; Reggie Workman, bass; Elvin Jones, drums; Thad Jones, cornet; Frank Wess, flute; Frank Foster, tenor sax; Hank Jones, piano; Art Davis, bass; Max Roach, drums; Booker Little, trumpet; George Coleman, tenor sax; Ray Draper, tuba; Philly Joe Jones, drums; Lee Morgan, trumpet; Blue Mitchell, trumpet; Cannonball Adderley, alto; Benny Golson, tenor sax; Sahib Shihab, baritone sax; Wynton Kelly, piano; Sam Jones, bass.

Songs: *Caravan; The High Priest; The Theme; Conversation; Jodie's Cha-Cha; Larry-Larue; You Stepped Out of a Dream; Lady Luck; Buzz-at; Pretty Brown; Six and Four; Stablemates; The Carioca (El Tambores); Battery Blues; Gone, Gone, Gone; The Tribal Message.*

Milestone M47016, 2 discs, stereo, \$6.98.

Drummers are obligated to pick up this bag of goodies. However, other jazz fans should not shy away for fear of hearing an album dominated by lengthy drum solos. Rather this LP is a very tasty collection of unique musical blends. As one can see by perusing the list of musicians, each drummer's group is composed of today's giants as they were in their formative or at least earlier years.

This package is a powerhouse of rare material, all the sides having been out of print for years. There is even a cut, entitled *The Theme* by Art Blakey (recorded years ago at Birdland), that is being released here for the first time.

The cuts date from 1958 to 1963. The various styles of drumming range from Max Roach's intense drive of the bop and cool eras (where time was on the ride cymbal) to Elvin Jones' revolutionary freeing of hands and feet to imply the time. Listening to some of the changes from Max's group to Elvin's, one can't help wondering whether it wasn't the drummer who played a decisive role in continuously modernizing the sounds of the jazz group. Certainly, the drummer has influenced changes in rhythm and feel, as historically happened in Trane's group with Elvin. That's as far as I'll go, the rest can be better discussed in a doctoral thesis or while listening to the album with some friends.

The standout on this reissue must be Art Blakey on *Jodie's Cha-Cha*.

He swings the pants off the group on this one with lively accompaniment by Cedar Walton on piano and Reggie Workman on bass. *Conversation* is a classic drum solo by Max Roach. Here he uses his set in a very musical way—making his monologue sound like a very interesting party line. Philly Joe Jones' melodic playing on Benny Golson's *Stablemates* is in the mysterious *Night in Tunisia* idiom at the head, and then it goes into a straight ahead swing.

The entire Elvin Jones side is invaluable. Most of the writing is by brother Thad. Solo work by Frank Wess on flute on *Buzz-at* is especially uplifting. These are cuts from an album originally entitled *Elvin*. When asked to put together these sides for that original LP, he insisted on "a well-rounded musical date" without any excessive or forced building around and over-spotlighting of the drummer-leader. Having the original album in my collection, I can say that Elvin's production turned out exactly as planned. The rest of the cuts are as swinging as those on this reissue, and Milestone should seek to release these on some upcoming reissue date.

The typically creative and neat Milestone cover design features a big bass drum pedal curling completely around the outside. Knowing that's what you have to look for, I suggest you truck on out to snatch up a copy of *The Big Beat*. That way you can relax and groove on these beautiful sides and read Leonard Feather's comprehensive liner notes for some interesting historical background. Meanwhile, I'll be able to stop writing and get back to listening to my copy.

Eric Henry

McCoy Tyner—Enlightenment. Recorded live at the Montreaux Jazz Festival, Summer, 1973.

Musicians: McCoy Tyner, piano; Joonie Booth, bass; Azar Lawrence, tenor and soprano saxes; Alphonse Mouzon, drums.

Selections: Presenting the Tyner Quartet (announced by Pierre Lettes, a French DJ); **Enlightenment Suite, Part 1—Genesis; Enlightenment Suite, Part 2—The Offering; Enlightenment Suite, Part 3—Inner Glimpse; Presence; Nebula; Walk Spirit, Talk Spirit—Introduction; Walk Spirit, Talk Spirit.**

Milestone M-55001, 2 discs, \$6.98.

You can listen to certain albums a thousand times and find that's still not enough. McCoy Tyner's **Enlightenment**, recorded live at the Montreaux Jazz Festival, is one of those extra

special releases. Here is McCoy Tyner matching and exceeding the reputation he has earned as the contemporary progressive goliath of the keyboard. Tyner's compositions are meticulously written (e.g. his large ensemble creations on **Song of the New World**, his last Milestone release) and they showcase his improvisational prowess.

Tyner's quartet is distinguishable from a myriad of others by its pure, electronically uncluttered sound. McCoy uses only acoustic piano, evidencing his no-compromise attitude in a commercially disposed record industry.

The *Enlightenment Suite* is just that. Listening to the first part, *Genesis* (in ¾), alerts the audience to the gems of spontaneity that are being unearthed as the concert is being born. Musical treats are to follow. McCoy begins laying down deep, dark chords with his left hand as his right hand scoots up and down the upper registers to slip the melody line in.

If you've ever seen McCoy in person, you know that on a cut like *Genesis* it is still possible to see his stealthy hands as single images, syncopating infinite rhythms. On a composition like *Inner Glimpse*, the final part of the suite and in an up-tempo 4, the jets in his fingers are fired and his hands appear as but a supernatural blur. The listener will be dazzled and pleased by Tyner's awesome technique and beautiful ideas on this piece, as was the inspirational audience at Montreaux last summer.

Azar Lawrence is an explosive tenor player whose full tone and flowing ideas are an indispensable asset to the group. His solo on *Presence* is an enjoyable free bag. Although playing freely is often misinterpreted by listeners as music lacking form, and is misinterpreted by many artists as the permission to pass off endless honks in some "rude" watery tone, this is not the case with Lawrence. In order to play freely, one must understand harmony and have a mastery of one's axe—so that where there is no recognizable traditional structure, one has the ability to impart a very special and logical structure of his own. Lawrence is one of a small group of players with *savoir faire* to create structure where with many other tenor players, the void would not be filled. For this reason, he fits tightly into McCoy's group.

Drummer Mouzon has since left the group to play with Larry Coryell. This may satisfy certain listeners since his loud in-person performances often made it impossible to hear the rest of the group clearly. Mouzon does sound good on this LP though. His



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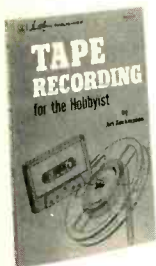


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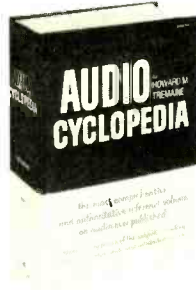


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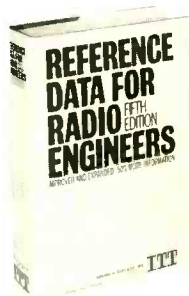


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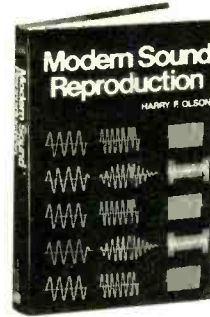


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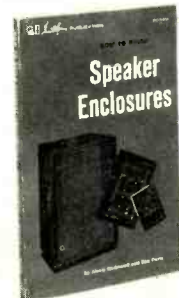


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performance doesn't have the sound of one big crash cymbal having just fallen off a 10-foot high stand, as in person. This might be attributed to good judgment in mixing the recording prior to pressing. Mouzon is an energetic and musical drummer though, and this performance neutralizes some of the previous criticism and low esteem on my part.

This Milestone release has a crisp, clean sound, enabling the listener to appreciate the intricate nuances of Joonie Booth's double stops and accents (with the fingers of his left hand) on upright bass. Booth's technical finesse and Mouzon's polyrhythms keep the coals in a flare behind McCoy.

Action shots of the quartet at Montreaux cover the double-pocketed jacket. Inside is a pleasant, airy, summery picture of Tyner overlooking a river at Montreaux plus a few choice words depicting his views of the music and camaraderie which help to produce such enjoyable festivals. Finally, hats off to Milestone for releasing this one in its entirety. When the word gets around how good this LP is, there may be a shortage of it too.

Eric Henry

WES AND FRIENDS

Musicians: Wes Montgomery, guitar; Milt Jackson, vibes; Wynton Kelly, piano; Sam Jones, bass; Philly Joe Jones, drums; Buddy Montgomery, vibes; George Shearing, piano; Monk Montgomery, electric bass; Walter Perkins, drums; Armando Peraza and Richard Chimelis, latin percussion.

Songs: *S.K.J.*; *Stable Mates*; *Stairway to the Stars*; *Jingles*; *Sam Sack*; *Delilah*; *Blue Roz*; *Love Walked In*; *Love for Sale*; *No Hard Feelings*; *Enchanted*; *Stranger in Paradise*; *The Lamp is Low*; *Double Deal*; *And Then I Wrote*; *Darn That Dream*; *Lois Ann*; *Mambo in Chimes*.

Milestone M-47013, 2 discs, \$7.98.

On smart reissues like this, there is not much one can say without repeating superlatives that were used in describing the albums when they were originally issued. The two discs (Bags and Wes, George Shearing and Wes) are wisely packaged together since they typify a fruitful period in Wes' career (late 1961) when, for him, things were beginning to click.

The first disc spotlights Milt Jackson with Wes. The duo sparkles, with able backing by all-stars Philly Joe Jones and Wynton Kelly, apparently on leave from the then Miles David Quintet. Bags solos especially well on the relaxed and beautiful ballad *Stairway to the Stars*. Listen to Wynton Kelly on

Delilah—playing with the inspired air of his flights with Miles. This happens to be a third take and although never issued before it deserves to be out of the vaults and on the turntable. *Stable Mates* is a pleasant surprise featuring Philly Joe's tasty Casbah-like entrances on the head and then swinging into the solos. This Benny Golson chart can also be heard on **The Big Beat** (Milestone M-47016) which features Philly Joe in the company of a large ensemble. *Blue Roz* is just that—the blues. Some good straight-ahead blowing by Wes and Bags. *S.K.J.*, an old Bags tune (pardon the play on words—I couldn't resist), rounds out the set. It's unmistakably in the flavor of Milt with some flashy fingers topping by Wes.

On the other disc of the set, Wes teams up with members of the family (Buddy Montgomery, vibes; Monk Montgomery, bass) and George Shearing. *The Lamp is Low* but not on this date. The group is burning behind the latin percussion of Peraza and Chimelis. Similarly, *Stranger in Paradise* is a light 'n airy cut, rhythmically propelled by the congas of Armando Peraza. When you get to *No Hard Feelings* sit back in the shade of that big oak tree this summer and relax. This tune is an easy going, swinging one which characterizes a session like this where close friends get together to make beautiful music—and nothing can go wrong. *Enchanted* is quite so, with vibes, piano and guitar interweaving magic harmonies.

Inside the album jacket you'll find a full length interview with Wes Montgomery, circa 1963. Also, there's some interesting info about Wes almost joining Trane way back when, but . . .

If you have the original releases of these sides, you have probably worn them far enough into the grooves to be able to hold them up to that three-way bulb in the den and see clear through the disc. In other words, these things are out of print. Sure, you might find one or two copies in the Hooterville five and dime, but this Milestone reissue offers both records reexamined, redone, remastered, rereleased . . . and now, ready to be rebought. Eric Henry

Herbie Hancock: **Sextant**

Musicians: Mwandishi (Herbie Hancock), electric and acoustic pianos, clavinet, dakha di bello, melotron, handclap; Mwile (Benny Maupin), soprano sax, bass clarinet, piccolo, afuche, hum a zoo; Mganga (Dr. Eddie Henderson), trumpet, fluegelhorn; Pepo (Julian Priester), trombones; Mchezaji (Buster Williams), electric and acoustic basses; Jabali

(Billy Hart), drums; Dr. Patrick Gleeson, ARP synthesizers; Buck Clarke, congas, bongos.

Songs: *Rain Dance*; *Hidden Shadows*; *Hornets*.

Columbia KC 32212, \$4.98.

Webster defines a sextant as an instrument for measuring altitudes of celestial bodies from a moving ship or airplane. Of course, such measurements are most inconvenient, there being no fixed frame of reference. Perhaps that is the reason for giving *Herbie Hancock's* album such a name, because the musicians and producers with sly grins on their faces are cognizant of the music's cosmic nature and its capacity to elude your average listener.

Please don't be turned away from the album just because of that first paragraph. If you like the overuse of electronics by Miles Davis and Weather Report, you'll probably dig this. As is the case with Miles and WR, the personnel used on this date is top notch. Unfortunately, the listener gets to hear them in only one setting—the mildly galactic.

Rain Dance is the cut I enjoyed most. The cut seems to be at least partially conceived prior to the moment of recording. Its sounds conjure up visions of a huge bubbling pot, overflowing with steam and being stirred by the ominous-looking soul on the back cover of the jacket. I found *Hidden Shadows* at least rhythmically interesting as well. Odd meter, unique syncopations and well-executed bass lines by Buster Williams added new colors and textures to what this listener thought would be more of the first cut. It is interesting to note that the horns function as the rhythm section should—repeating certain melodies over and over again—while each of the members of the rhythm section solos simultaneously . . . the antithesis of conventional playing.

Despite some favorable comments, I found very little material worth remembering. For the most part, the music seems to be merely an aggregation of random twists and turns which the purveyors term "free form." Although Hancock is heard in a setting which is becoming more in vogue these days (perhaps because of other artists' success at the cash register with it), the products of this date appear to be little more than trifling experimentation. The reader would be well rewarded in picking up *Speak Like a Child*, *The Prisoner* or even Joe Farrell's *Moon Germs* (featuring HH and recorded at the same time as *Sextant*). These albums more aptly demonstrate the heights to which a great artist like Hancock can aspire.

Some of the music on *Sextant* is fine for a change of pace—and can be thrown in on a more contemporary album in good taste as a token cut. But, it is difficult to tolerate as a steady jazz diet, at least for this reviewer. Hopefully, this album will be used as a sextant by HH in helping him redetermine his position and chart his course in a different direction.

Eric Henry

Mordicai Jones

Musicians: Link Wray, guitar, dobro, bass, steel; Doug Wray, rhythm guitar, proccnail can, vocal; Billy Hodges, organ piano, scratcher, vocal; John Grummere, electric rhythm guitar, vocal; Ned Levitt, foot, hands, vocal; Norman Sue, bass, vocal; Steve Verroca, drums, vocal; Mordicai Jones, lead vocals, piano, mandolin, harp.

Songs: *Walkin' in the Arizona Sun; Scorpio Woman; The Coca-Cola Sign Blinds My Eyes; All I Want to Say; All Because of a Woman; On the Run; Song of a Simple Man; Precious Jewel; Days Before Custer; Gandy Dance.*

Polydor PD 5010, stereo, \$4.98.

The very talented **Mordicai Jones**, whose real name is Bobby Howard but he believes there are too many Bobbies, has played with rock guitarist Link Wray for over twelve years. And when Wray made his comeback a couple of years ago, he brought Jones with him, having taught him to play an arsenal of instruments which include guitar, mandolin, piano, organ, harp, bass, and drums. But Mordicai Jones' forte seems to lie in his voice which he uses here most persuasively.

Recorded at Wray's Shack Three-Track, a chicken coop converted into a studio in Accokeek, Maryland, the sound is amazingly good for the rugged conditions.

Mordicai pure and simple sings rock with a country twang in material that is largely composed by the Wray family except for one Roy Acuff tune, *Precious Jewel*. The songs are notable for their unusual lyrics as illustrated by the candidate for Men's Liberation, *All Because of a Woman*, where Jones sings

*You wear the pants,
I'll wear the shirt*

over a vocal background that simulates the whoo-whoop of a train whistle.

Jones is a very expressive singer, possessing a keen sense of dynamics. The nostalgic biography of someone's father is just such an example: *Son of a Simple Man*. He is explosive in *On the Run*, singing and accompanying himself on harp and backed up by a scratcher and Wray's beguiling electric

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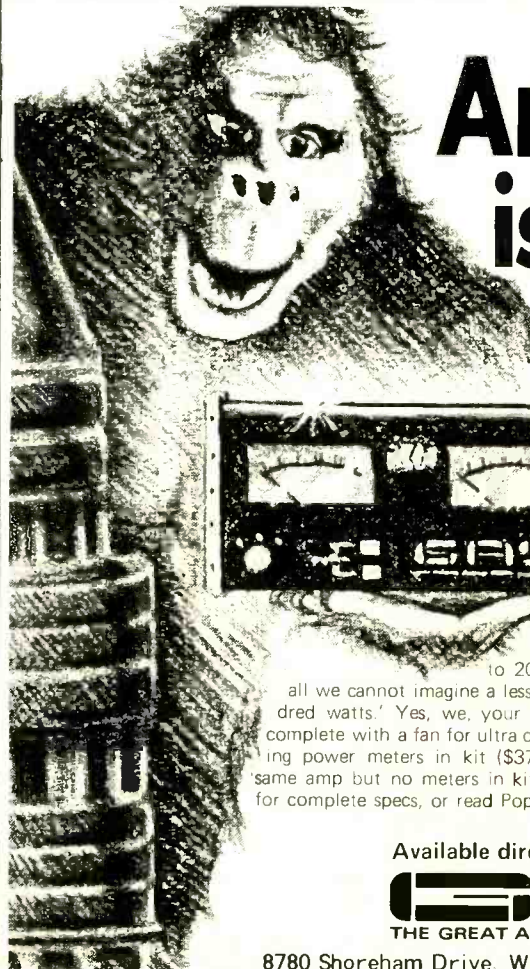
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guitar. Wray, incidentally, does some fine picking throughout.

Noticeable also is Jones' imaginative use of his sky-wide range, especially in *Days Before Custer* in which his voice fairly soars. Here, too, the sound floats from one speaker to the other as do clouds across the sky. *The Coca Cola Sign Blinds My Eyes* is dynamite while *All I Want To Say* scores high melodically but has to overcome a cluttered background.

Jones gives *Walkin' In the Arizona Sun* (which Wray and family are probably doing right now) an authoritative treatment, all the while playing mandolin, but *Gandy Dance*, taken at a travelling tempo, made me come away singing and appears to be the most successful track of the bunch. The mandolin against the guitar is lovely.

Not in the order of routine rock, this is a highly effective recording—all the way to the crickets.

Sound B + Performance B +

EDDIE CONDON: The Eddie Condon Concerts—Town Hall 1944

Musicians: Eddie Condon, guitar; Sidney Bechet, soprano saxophone; Earl Hines, piano; Ed Hall, clarinet; Cliff Jackson, piano; James P. Johnson, piano; Gene Krupa, drums; Hot Lips Page, vocals, trumpet; Pee Wee Russell, clarinet; Willie Smith, piano; Jess Stacy, piano; George Wettling, drums.

Songs: *Avalon*; *In Between the Devil and the Deep Blue Sea*; *Sneakaway*; *Caravan*; *Rose Room*; *I'll Follow You*; *Here Comes the Band*; *When My Sugar Walks Down the Street*; *Uncle Sam Blues*; *The Sheik of Araby*; *There'll Be Some Changes Made*; *I Want to Be Happy*; *Just Before Daybreak*; *Caprice Rag*; *China Boy*; *My Monday Date*; *Dear Old Southland*; *Impromptu Ensemble #3*.

Chiaroscuro, CR113, \$5.98.

Guitarist Eddie Condon recently passed away at Mount Sinai Hospital in New York at the age of 67 but he most certainly will not be forgotten. Self-taught on the banjo and ukelele and a firm believer that "jazz cannot be scored," he was at the helm of musical groups from the thirties to the fifties such as the Mound City Blue Blowers where he doubled as vocalist. Condon opened up his own club on West Third Street which he characterized as "Town Hall with booze" and, when in 1957 it was torn down, he moved to a new location in the Sutton Hotel on East 56th Street. Also during this period he wrote a

humorous column for the *New York Journal-American*. Mr. Condon's autobiography entitled *We Called It Music*, co-authored with Thomas Sugrue, was published in 1947.

In spite of his lifelong dedication to unscored music played by a small band, Eddie Condon had no use for be-bop or progressive jazz as we know it. Condon was strictly a crusader for traditional jazz. And he did not consider jazz in and of itself an art form. Mr. Condon once declared: "Canning vegetables is an art form. So's getting a suntan. Jazz is just unscored music."

So we have a rare individual on our hands, a man who is known as much if not more for his quips and barbs than for his musical prowess. That Eddie Condon was a wonderfully witty raconteur comes right through on this live recording of one of his Town Hall concerts, vintage 1944. Throughout this disc we hear Condon introduce his fellow jazz musicians in his salty, spirited, down to earth manner, forever egging them on to perform. And it is decidedly true that Eddie Condon functions more as a master of ceremonies here than as a soloist. In fact, we do not hear a single note emanate from his guitar. One often wonders whether Condon was indeed playing at all!

But no matter. He has a wealth of talent with him. We have samples here of a generous handful of jazz pianists including Willie "the Lion" Smith, Gene Schroeder, Jess Stacy, Cliff Jackson, James P. Johnson, and Earl "Fatha" Hines who is an entire piano school unto himself. A special star, in my way of thinking, is James P. Johnson whose relaxed and melodic performance of *Just Before Daybreak* is indeed a classic. There is great sturdiness of tempo and a crisp yet light touch that approaches perfection in his style. Johnson plays way up in the treble, separating each note carefully and tapering them off finally to nothing. His *Caprice Rag* is a foremost example of ragtime played fast, something that fellow pianist Scott Joplin might have frowned upon but Johnson does it to a turn here, inserting a surprising mid-section of grandiose chords.

When one compares Willie "The Lion" Smith to Johnson it's like comparing a lion to a lamb. Lion's approach is a muddier yet more powerful one, brimful of lionized harmonies. We hear Smith solo in several numbers, one of which is his positively delicate, *In Between the Devil and the Deep Blue Sea*, in which he stalks into the

bridge with authority, playing an embellishment-ridden piano. Then Smith takes us on a rough and tumble joyride on his very own *Sneakaway* which becomes orchestral in his execution of it. *I'll Follow You* starts out with Smith being a trifle heavy-handed but it eventually intertwines and flows along like a river. And he lights right into a tremendously energetic performance of *Here Comes the Band*, literally pouring it on and ending with a hardy "Look out!"

Earl Hines manages to "struggle through" his own *My Monday Date*, inscribed with sparkling glissandos and curvaceous switchbacks with drummer George Wettling sitting in.

Also on hand are Gene Schroeder and Jess Stacy, Schroeder, one of the great swing pianists of his day romping through *Avalon* and Jess Stacy, whose lucid, clean-cut lines emerge as if they have just been freshly manicured in *Uncle Sam Blues*. Last but not least there's Cliff Jackson whose two-fisted, exceedingly busy version of *There'll Be Some Changes Made* is a joy to behold.

Clarinetist Edmond Hall also figures very prominently in this LP, carrying off a full clarinet tone in *Caravan* where he plays a high note for all it is worth, not letting it loose against George Wettling's rumbling, thundering drums which contribute greatly to the exoticism and allure of this Egyptian contrivance. Hall plays a particularly rosey rendition of *Rose Room* with some vivacious exchanges between the clarinetist and drummer Gene Krupa who is taking a holiday here from his big band chores, beating on tin cans and sending out great clunks and jibes. After Krupa's thundering beginning in *The Sheik of Araby*, Hall enters light, surefooted, and smoothly on clarinet, disseminating excellent tone.

We are also witness to the singing and playing of Hot Lips Page whose voice is mellow and sugar-sweet in *When My Sugar Walks Down the Street*, whose trumpet is stalwart. And the inimitable Sidney Bechet, introduced incidentally by Jimmy Dorsey, unleashes an incredibly lush tone in a rapid version of *China Boy*, further elaborated with that unique Bechet vibrato in a slow, moody statement of *Dear Old Southland* which is evocative of New Orleans. Pointing his soprano saxophone heavenward, Bechet brings it all to an end.

Although Chiaroscuro has released this in stereo it is hardly noticeable and the audio is surprisingly good when one takes into consideration when it was actually recorded. By the way,

it has been made available to us from a transcription by the Armed Forces Radio Service.

French jazz writer Hughes Panassie had this to say about Eddie Condon: "Few musicians have so much to give to a hot orchestra as Eddie, with his metronomically regular rhythm which induces superb swing."

Well, we may not hear him actually play here, but Condon's *joie de veuve* is contagious.

Performance B+

Sound B-

Earl Hines: Earl Hines at Home

Musician: Earl Hines, piano.

Songs: *You Are Too Beautiful*; *Love at Night is Out of Sight*; *It Happens to Be Me*; *Minor Nothing*; *Moon Mare*; *You'll Never Know*; *The Cannery Walk*.

Delmark DS-212, stereo, \$5.98.

Hines fans may visit him in his living room at home playing his own perfectly-tuned piano in this recording. A prize of an instrument and in mint condition, the antique Steinway grand was presented to Hines as a gift by Scott Newhall, executive editor of the *San Francisco Chronicle*. Inscribed above the keyboard on a silver plate are the words: "Presented by jazz lovers from all over the world. This piano is the only one of its kind in the world and expresses the great genius of a man who has never played a melancholy note in his lifetime on a planet that has often succumbed to despair." The elaborately carved Regency style instrument was specially made by Steinway in 1904 for Leander S. Sherman, founder of the Sherman Clay Music Stores.

One of the beauties of the recording, although it is prone to some surface noise, particularly on side one, is the very excellent reproduction of the piano. It was recorded by the late Wayne J. Farlow, a personal friend of Hines, who believed in projecting the natural sound of the instrument, overtones included. Thus Hines' piano fairly rings with brilliance and liveliness.

Hines displays his talents here as not only the very original improviser and jazzman that he is but as a composer, and it is in the latter that he best shines on this LP. *Minor Nothing* takes first prize in this reviewer's book, an enigmatic heart-rending tune into which Hines interjects a stride development with its to-and-fro bass, cheering up the otherwise somber key. Hines' descending left hand against his tinkling right contributes to the jaunty spirit of the tune and we are at last surprised

by a marvelous tag in the upper reaches of the keyboard.

Moon Mare and *The Cannery Walk* are also Hines', *Walk* containing Shooting-Niagara runs and a boogie bass that presides momentarily. Hines sings *It Happens To Be Me* in memory of the late Nat King Cole to his own accompaniment, but his voice does not come through as it should and one has to listen very closely to pick up his mellow tones.

The recording is pleasant but lacks some of the adventuresome spirit of other efforts by Hines. He does not stray far in *You'll Never Know* but fills

Love At Night Is Out of Sight with unpredictable intervals that defy humming.

Unadulterated Hines, however, that soothes the savage beast.

Performance B

Sound B

NATHAN ABSHIRE: Nathan Abshire and Other Cajun Gems

Musicians: Nathan Abshire, vocal, accordion; Lawrence Walker, vocal, accordion; Eddie Duhon, vocal; Floyd LeBlanc, fiddle; Harry Choates, vocal, fiddle; Yvon LeBlanc, vocal.

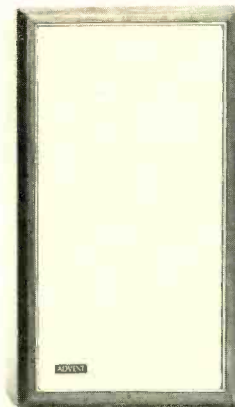
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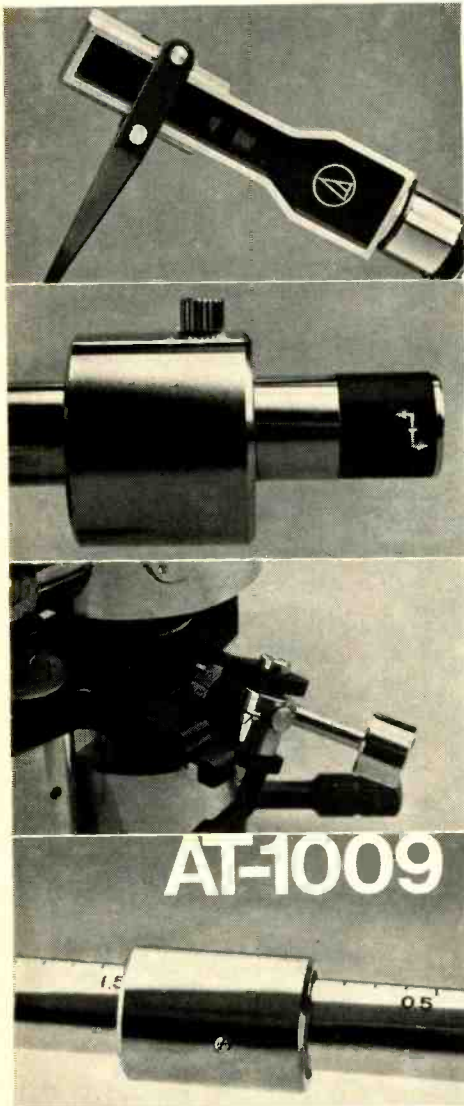
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Songs: *Pinegrove Blues; Kaplan Waltz; Choupique Two Step; Shamrock Waltz; Iota Two Step; Texas Waltz; Point De Lou Two Step; Boscoe Stomp; Tran La Ezy; Orphan Waltz; Mama Rosin; Jole Blon's Gone; Louisiana Stomp.*

Arhoolie 5013, mono, \$5.98.

George Khoury, who owns a record shop in Lake Charles, Louisiana which is right in the heart of Cajun country, recorded some of the musicians who played the local honky tonks, dance halls, and road houses in the area. Thus we have this collection recorded originally on 78's back in the late 1940's and early 50's and made available to us once again by Chris Strachwitz of Arhoolie Records.

Now Nathan Abshire, who works regularly at the Basil city dump, just happens to be one of the most successful Cajun artists of the bunch. Abshire took up accordion at a young age and at the age of eight played his first job. Although he found it difficult to make a living from his music, his *Pinegrove Blues*, included here, was a bestseller and contributed to the resurgence of Cajun music in the early 50's. In it, Abshire creates a kind of drone-like effect on accordion, singing out uninhibitedly with his band.

Comprising the album also are waltzes, two steps, blues, polkas, and popular songs of the time. The *Kaplan Waltz* moves to a rollicking ¾ time, a peaceful melody wherein Abshire's accordion fairly sings. The *Shamrock Waltz* is very authoritative and features a steel guitar and violin which lend a country flavor to the tune.

The *Choupique Two Step* is a fast but definitely danceable two step which reminds me of Appalachian mountain music, all sung in Cajun and you can't understand a word of it! Of interest on the second side is *Boscoe Stomp* with Lawrence Walker singing the vocals and playing accordion with the band. His touch is light and is supplemented by some nice violin playing by an unidentified instrumentalist with almost an Eastern flavor to his playing.

Instrumentally, however, *Tran La Ezy* is the shining light, played by the Musical Four Plus One and featuring Eddie Duhon on vocals and Floyd LeBlanc on fiddle. And there is a terrific anonymous guitarist whose sound is downright jazzy. One of the more coherent and better recorded of the tunes is *Jole Blon's Gone*, featuring Harry Choates on vocal and fiddle. The sound is understandably uneven because of the vintage.

Today Nathan Abshire may be heard with the Balfa Brothers who have

played at folk music festivals all around the country and the band may be seen in Les Blank's film on the Cajuns "Spend It All."

If you can't find this recording at your local store you may order it from Arhoolie Records, Box 9195, Berkeley, Calif. 94709.

Sound B-

Performance B

BACKWARDS SAM FIRK: The True Blues and Gospel

Musicians: Backwards Sam Firk, vocals, guitar; Thomas Hoskins, vocals, guitar; Stephan Michelson, spoons.

Songs: *I'm Glad Blues; East St. Louis Dry Land Blues; Hey Hey Hey; Cigarette; Candy Man Blues; If You Don't Want Me That Freight Train Whistle's Gonna Blow, Momma; Old Reliable One-Way Gal; Be Ready When He Comes; Old Country Dump; Get Back Old Devil; Poor Boy, Long Ways From Home; West Side Blues; I Be's Troubled; Babe's Place; Fixin' to Die; The Unbroken Circle.*

Adelphi AD 1001S, stereo, \$5.95.

Backwards Sam Firk holds sway over these blues with a mastery that is rare. He can sing the slow blues, the fast blues, the soft blues, the loud blues.

Firk sings on five of the sixteen tracks included in this collection as a high-keyed, high level musician/performer. On most of the songs he plays here, he tunes his guitar to D or standard E. And together with these very fine blues are Firk's colorful, pictorial notes attached thereunto for us to peruse while listening. For instance, this is what Firk has to say about Bill Moore's *Old Country Dump* which is taken by Firk at a slow gait but which, despite its snail-like pace, moves right along. . . . "Five old refrigerators appear. Then an old stove, over on its side: a hot, gray lizard sits on it, wondering who you are. Further on, a little hill runs down from the side of the road, strewn with torn bags of grapefruit rinds and coffee grounds, and rusty cans and beerbottles, and watermelon rinds, and boxes of old rags, and broken chair-frames, and old clothes-hampers, and old records melted by the sun, and letters from last year, and faded photographs from twenty years ago, and a bicycle frame, and car tires and truck tires. . . . You look up—away from the stale, dry smell; up past the framework of trees surrounding the clearing, into the clear, bluish-white sky. You hear crows talking among themselves somewhere,

but you don't see them; you hear something a few feet away as a big blacksnake winds through the trash looking for rats; you see how the pile of rubbish runs down the hill and stops, and how there are a few old things lying further back, in the blackness of the forest, where the green water of the swamp disappears in tangled branches and spiderwebs. . . ."

Firk tells us all about how to shoo away the devil in *Get Back Old Devil*, jazzing it up as he strums along, saying . . . "If you want to give him fair warning, just get into standard E and tell him all the mean things you can do, and tell him you wouldn't hold back from doing them to him if he came snooting around, dragging his tail. And I know it will keep him away, because he's pure chicken. . . ."

Backwards Sam plays *Poor Boy, Long Ways From Home* very precisely and clearly here. He gets off some good notions on slide guitar on this blues that has been around. A note of desolation creeps into Firk's *West Side Blues*, a somber low-down blues contrivance in which Firk depicts the rankness of a Chicago West Side slum. Writes Firk of it: . . . "It is a desolate slum, a cold slum, an unfriendly slum. An aura of death emanates from the rows of splotchy-painted building fronts. It creeps down the dirty cement steps, and out into the broken glass in the street; it coats everything and kills it. There is a special sky which is always a dull gray. A dead dog in the gutter decays very slowly. Rats eat at it. An occasional dead tree sticks up out of hard, grassless patches of ground which border the cracked sidewalks. Phantom-like people drift past. This deathly underworld was perhaps the spawning-place of this song. . . ." But Firk makes a thing of beauty out of it all the same.

I Be's Troubled is what one would call a "low down blues dance" which, because of its intrinsic charm, made Muddy Water's career mushroom after he recorded it on Chess Label. Firk plays it here with a bottleneck and there's certainly enough voodoo-type rhythm to dance to.

Firk chases his circle round and round in *The Unbroken Circle*, better known to most of us as the familiar *Will the Circle Be Unbroken?* Sam Firk does Mississippi John Hurt's popular favorite *Candy Man Blues* up brown on vocals and guitar. In fact, Firk's rendition of it is rather poignant as he gets a very pretty sound out of his instrument. The nimble-fingered Firk makes *Candy Man* very decorative and ornamental.

Old Reliable One-Way Gal has a bump and grind about it and is further fleshed out by Thomas Hoskins on guitar and vocal, which does not come through very well, and Stephan Michelson on spoons which sound for all the world like the rat-a-tat-tat of a tap dancer. Firk borrows the tune from Bill Moore from Tappahannock, Virginia.

I'm Glad Blues has a very full, melodically flowing, sensuous sound as played by Firk in open E tuning. The tune, very sweet, was apparently recorded by Skip James for Paramount in 1931. *East St. Louis Dry Land Blues* is the highly rhythmic saga of a voyage from East St. Louis to Memphis, Tennessee. The tune, given to a genuine musical pulse, has Firk playing way up in the neck and singing in his smooth and soft mellow voice. *Hey Hey Hey* is a pure instrumental which has a boogie bass pitted against running scales and slides. Firk is very attentive to the dynamics here.

Backwards Sam Firk plays some mean guitar on these sides. The sound emerges unfortunately with a lot of hiss on his s's. But if you are a student of blues guitar, this one is for you. Just settle back, put your feet up, have a beer if you so imbibe, listen, and read—for Backwards Sam Firk is, among his other many talents, a very talented writer from whom I couldn't resist quoting.

Performance: A- Sound: B-

HAMPTON HAWES: Blues For Walls

Musicians: Hampton Hawes, piano, electric piano, ARP synthesizer; Chache (Oscar Brashear), trumpet, flugelhorn; Hadley Caliman, soprano and tenor saxes; George Walker, guitar; Nyimbu (Henry Franklin), bass, electric bass; Ndugu (Leon Chanler), drums.

Songs: *Blues For Walls; Sun Dance; Hamp's Collard Green Blues; Brother Brantley; Rain Forest; Carmel; Me-ho. Prestige 10060*, stereo, \$4.98.

Hampton Hawes, a pianist who disappeared from the jazz scene during the years of 1958-1960 and who patterns his style after Bud Powell and Charlie Parker, has come up with an exceedingly enjoyable LP on Prestige. The material, all by Hawes himself, illustrates his superb talent as a composer and melodist with a particular emphasis on writing for unison parts as played by saxophonist Hadley Caliman and trumpet man Chache (Oscar Brashear). Also providing very able assists are guitarist George Walker, Bassist Nyimbu (Henry Franklin) and drummer Ndugu (Leon Chanler). (I'd hate to try

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to pronounce these African names.) The end effect of this pleasing combination results in a well-balanced sound that is never cluttered and implies the unfettered coolness of a California climate.

The album contains a sprinkling of blues in which Hawes is at his funkiest. In *Blues for Walls*, Chache enters on a screaming trumpet followed by Caliman on soprano sax who intertwines it all like a snake charmer. Hawes plays machine-gun rivets of sound on electric piano as the bass and drums set up quite a rhythm under him—a litting bump and grind. *Hawes Collard Green Blues* truly swings, featuring Hawes on synthesizer, bluesy against Walker's deft guitar chording and Nyimbu's individualistic walking bass. A medium tempo blues, *Me-ho* takes off with Caliman on a multi-noted tenor saxophone followed by Chache on a seering trumpet and Hawes on synthesizer. *Brother Brantley* features the wah-wah with Ndugu on drums catching every phrase and nuance, never missing a cue and Nyimbu plucking sky-high bass notes, selecting them carefully.

As dappled as raindrops in *Rain Forest*, a slow thoughtful piece with a soothing undulating quality about it, while *Sun Dance* remains a mood piece, pervasively melodic and featuring Hawes on a pensive electric piano. But Hawes' best effort lies in *Carmel* in which he plays sugar-plum fairy lines that glitter and twinkle, an impressionistic and poetic rendering by the pianist. This demonstrates Hawes' acute sensitivity as well as the alertness of his rhythm section.

The sound is A-okay. Don't miss this recording by Hampton Hawes.

Performance B+ Sound B+

MILT JACKSON QUINTET FEATURING RAY BROWN. Just the Way It Had To Be

Musicians: Milt Jackson, vibes; Teddy Edwards, tenor saxophone; Monty Alexander, piano; Ray Brown, bass; Dick Berk, drums.

Songs: *Listen, Hear, SKJ, Who Can I Turn To, If I Were a Bell, The Very Thought of You, Bag's Groove.*

Impulse/ABCAS-9230, stereo. \$5.98

This album by the Milt Jackson Quintet featuring bassist Ray Brown possesses all the warm ambiance that a live performance can provide. It was recorded at Shelly's Manne-Hole in Hollywood, California on August 1 and 2, 1969, statistics for which we thank Impulse/ABC Records for listing. One often wonders the exact date a record was made and upon scanning the album cannot find a trace of it. I guess it is an

attempt by the record company to prevent it from appearing dated in any way but having a date is most beneficial for discographical purposes.

Just the right number of tunes for a jazz LP, the recording contains six well-chosen numbers, permitting enough room for the ample expansion of musical ideas. Milt Jackson, who is primarily noted for his role in the straight-laced Modern Jazz Quartet, is at the mast here but it is almost as if it is Ray Brown's record for he is very much present, sharing the spotlight with Jackson. Brown, who has accompanied singer Ella Fitzgerald and has played with Oscar Peterson among others, inserts robust pizzicato bass lines and excellent notations behind Jackson in *SKJ* who comes in like twinkle-toes. Jackson, whose relaxed and subtle sense of timing is pure joy, was the first bop musician to play vibes, more aggressive and forceful in style when leading his own group. Anthony Newley's *Who Can I Turn To*, which has already, incidentally, become a standard although it is a fairly young tune, Jackson gives a sensitive ballad treatment. Slow at first, then jazzing it up, Jackson floats effortlessly over his vibes against Brown's appropriate bass which finishes off bowed.

Tenor saxophonist Teddy Edwards leads off in Eddie Harris' lively and hot *Listen, Hear*, a funky easily recognizable tune. Edwards digs deep into the grooves, employing lots of scale running. He makes a bright, ebullient entrance in *If I Were a Bell* in a "surry with the fringe on top" beginning.

The Very Thought of You, arranged by Ray Brown, is taken at a soporific glide. Brown beginning it with an excerpt from Rachmaninoff. No yawning bassist, he slides easily into the main theme, then plays exercise-like patterns.

Jackson's all too familiar *Bag's Groove* features pianist Monty Alexander on one of his few piano solos on the entire album. He is actually only given a cursory nod for the most part and it is a pleasure to hear his quick and light approach.

The sound is unfortunately muddy and undistinguished. Jackson is not picked up too well and needs more amplification.

But all in all, a most listenable album and recommended.

Sound C+ Performance B+

The Cecil Taylor Quartet: **Air**

Musicians: Cecil Taylor, piano; Archie Shepp, alto and tenor saxophones; Buell Neidlinger, bass; Dennis Charles, drums.

Songs: *Air; This Nearly Was Mine; Port of Call; EB; Lazy Afternoon.*

Barnaby/Candid Z30562, stereo, \$5.98.

Anyone who has not yet become acquainted with pianist **Cecil Taylor** meet him now on this Barnaby/Candid collector's item which was originally released on Candid in the early sixties. It also features saxophonist Archie Shepp on his first recording session. The Cecil Taylor Quartet, which was conceived in 1955, originally included soprano saxophonist Steve Lacy but was dissolved shortly after this record was made. The result is nothing short of brilliant.

Taylor and Shepp have ventured far since the 1960's, going their own separate ways but remaining in the vanguard of musicianship by forging new paths into experimental musical worlds. Shepp, heavily influenced by the late John Coltrane in both intonation and technique, has moved most recently into percussive realms, while Taylor has come to produce dense, entangled thickets of sound, uncombed and dissonant protracted statements in which one can lose oneself as in his recent solo performance at the Newport Jazz Festival which ran for some 45 minutes. Taylor's art of the seventies is conveyed in a complex musical syntax that virtually spurns analysis.

The classical training Taylor received at the New York College of Music and the New England Conservatory is borne out in his complex allusions to Bartok and Stravinsky. His attack is now percussively forceful, then gentle, his dynamics superb. Cecil Taylor is perpetually creative and innovative, a powerful irrepressible phenomenon.

The five tracks here are generously long and well-developed and include a couple of standards, a fine Oscar Hammerstein's *This Nearly Was Mine* and J. Latouche's *Lazy Afternoon*, which *must* have been written for jazz people. On the latter, after a magnificent entrance, Shepp wails eloquently with Taylor trembling under him, wriggling through the sultry harmonics of the tune which they take at a medium tempo.

This Nearly Was Mine swings softly, Taylor introspective and bare-noted, bluesy and funky, then orchestral and sunny, creating spraddling chords and employing hops, skips, and jumps from the top to the bottom of the keyboard.

Port of Call is cool yet craggy; *Air* lyrical yet jagged and a tune in which Taylor demonstrates his finesse at comping. Buell Neidlinger's bass work and Dennis Charles' drumming are

indispensable throughout as they are supremely elastic members of this cohesive musical unit which comes close to being a family here. Charles is mean with the sticks and Neidlinger plays good notes and is an excellent time-keeper.

EB is a rugged, stop-and-go excursion, Neidlinger playing hickory-dickery-dock running scales with Charles riding high on cymbals like a train. In *EB*, Taylor's style resembles some of the latter-day Chick Corea's work, given to an air of tension-release, tension-release. Taylor

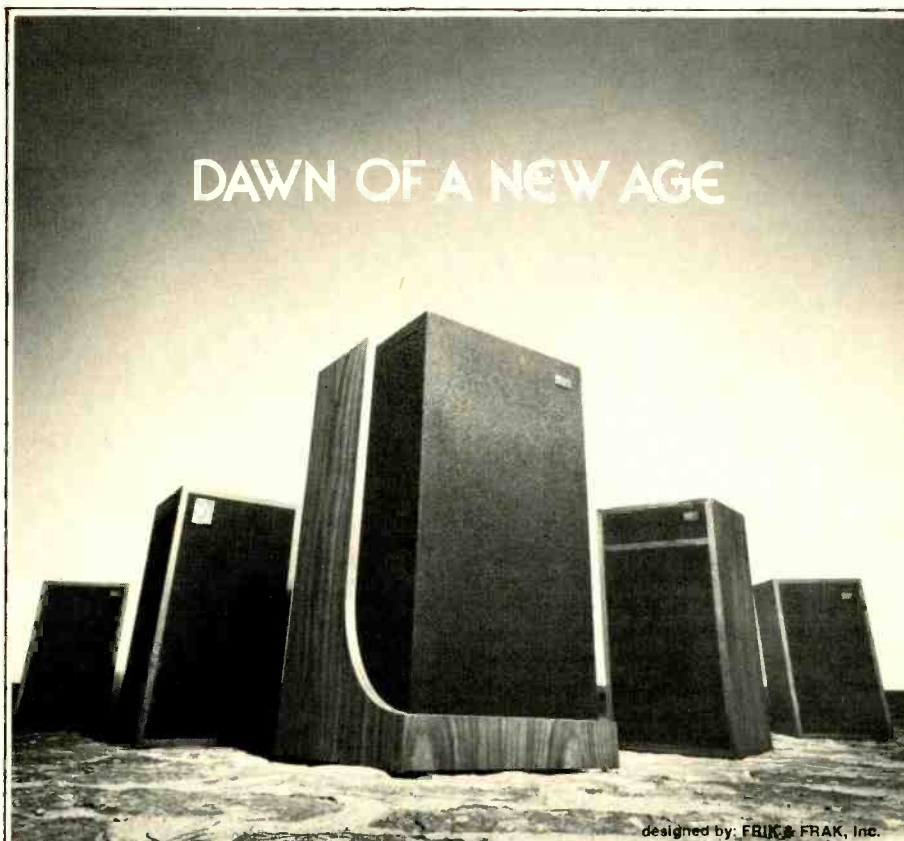
is authoritative and places his intervals well, ending with the impressionism of a Monet lily-pond.

The sound lacks brilliance and it is as if there is a wall between the listener and the reproduction.

But no matter. This is a stunning and appreciated re-issue by the New Wave of musicians who *will* excite. A recording that belongs in everyone's collection, this is Taylor during one of his most lyrical periods.

Performance A +

Sound B



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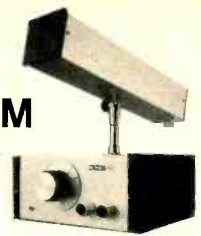
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