


Audio

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TDS In Audio
Measurements

THE AUTHORITATIVE MAGAZINE ABOUT HIGH FIDELITY • JANUARY 1978

47425 

Build
An Audio
Phase
Detector

Selecting
An FM
Antenna

Remembrances
of Stokowski-
Whyte



U0803760 0280 70620015P0101312
DON L HUNTER
2608 CENTRAL BLVD
EUGENE OR 97403

DECKS, OLD IDEAS.

controls plus two large VU meters. All of which helps reduce the dimensions considerably.

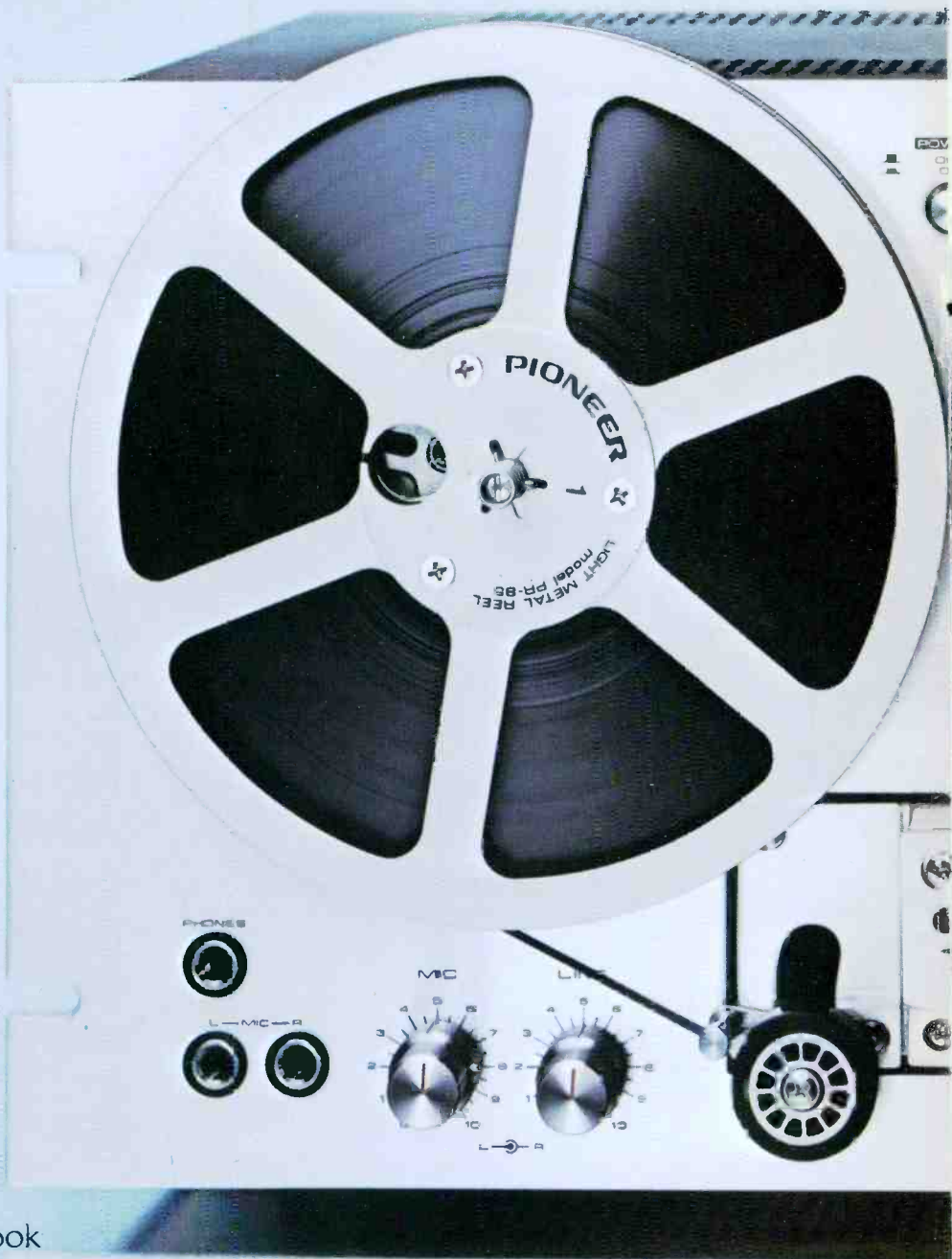
Of course, as you can see from the picture, the entire unit is rack mountable. But what you may not have noticed is that the RT-707, unlike any other tape deck, is stackable. It's made to fit right in with the rest of your components.

AUTO-REVERSE AND OTHER EXTRAS.

While many tape decks have auto-reverse, chances are you won't find it on other comparably priced 7-inch tape decks. You also won't find a repeat button that lets you listen to your tapes endlessly, or circuitry that allows you to hook the RT-707 up to a timer, so you can make recordings even when you can't be there to supervise them.

Obviously, these are only a few of the virtues of our new RT-707. But there are also things like a highly accessible tape head alignment that lets you adjust and clean the tape heads without removing the cover. Solenoid push-button controls that give you direct function switching, so you can go from one mode to another without damaging the tape. And a floating guide roller that helps decrease intermodulation.

The point is, you'll see a lot of things on the RT-707, that you won't see on any other 7-inch tape deck.



But all this revolutionary thinking wouldn't mean much if the RT-707 weren't built to fit comfortably into your budget. It is. In fact, its price is comparable to any "good" tape deck.

See your Pioneer dealer and get a closer look at the most extraordinary 7-inch tape deck ever built.

We think you'll find the only things that the RT-707 has in common with other 7-inch tape decks is the size of the reels. And the size of the price.

High Fidelity Components
PIONEER
WE BRING IT BACK ALIVE.

©1977 U.S. Pioneer Electronics, 85 Oxford Drive, Moonachie, New Jersey 07074

FREQUENCY RESPONSE: @7 1/2 ips 20-28,000 Hz * (30 24,000 Hz ± 3 dB).
SPEEDS: 7 1/2 ips (19 cm/sec) 3 3/4 ips (9.5 cm/sec) ± 0.05%.
WOW AND JITTER: @7 1/2 ips 0.05 (WRMS)
MOTORS: FG AC Servo direct drive motor x 1 (capstan drive), 6-pole inner rotor special induction motor x 2 (reel drive).
SIGNAL TO NOISE RATIO: More than 58-dB
REFERENCE TAPE: Scotch #206.
HARMONIC DISTORTION: No more than 1.0%.

Enter No. 39 on Reader Service Card

THE RT-707.

UNLIKE OTHER 7-INCH TAPE DECKS THIS ONE ISN'T FILLED WITH 15 YEARS

Now there's one 7-inch open reel tape deck with the kind of technology and features found in some of today's most sophisticated 10-inch tape decks. Pioneer's new RT-707.

In fact, the 707, when compared to other 7-inch tape decks, makes them look and sound 15 years old.

THE MOST ACCURATE DRIVE SYSTEM: DIRECT-DRIVE.

The average 7-inch tape deck is equipped with an old fashioned, high speed drive system that works on belts or pulleys.

A system that generates excessive heat, wow and flutter and comes with its own nifty little "noisemaker": a fan. Not the RT-707. It's driven by a far more accurate and efficient AC Servo direct-drive motor. A motor that generates its own frequency to monitor and help correct variations in tape speed. Which results in incredibly little wow and flutter—0.05% (WRMS). In addition, the drive system of the RT-707 is unaffected by fluctuations in line voltage and won't deteriorate with age like belt-drive. And because it doesn't generate heat it doesn't need a fan. So what you'll hear is music with a clarity and crispness not possible on any 7-inch, or many 10-inch tape decks.

A FIRST FOR 7-INCH TAPE DECKS: PITCH CONTROL.

Thanks to this extraordinary direct-drive system, it's also made pitch control possible for the first time on any 7-inch tape deck. Which means that you can regulate the speed of the tape, so your recordings will

have perfect pitch even if they weren't originally recorded that way.

BEYOND THE RANGE OF MOST 7-INCH TAPE DECKS.

In the past, the most you'd expect from any 7-inch tape deck in terms of frequency response was respectability.

But Pioneer's engineers have gone far beyond that. Our super-sensitive tape heads, for instance, will pick up and deliver frequencies from 20 to 28,000

Hertz. The preamplifier, which is built around Pioneer designed integrated circuits, will handle up to 30 decibels more input than any other 7-inch tape deck without distorting. So you can capture all the depth and presence of each and every instrument without losing any part of the music.

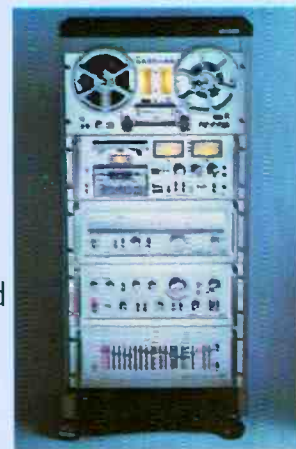
A WHOLE NEW WAY OF LOOKING AT TAPE DECKS.

Where most 7-inch tape decks are big and clumsy, new technology has helped us make the RT-707 smaller and more compact.

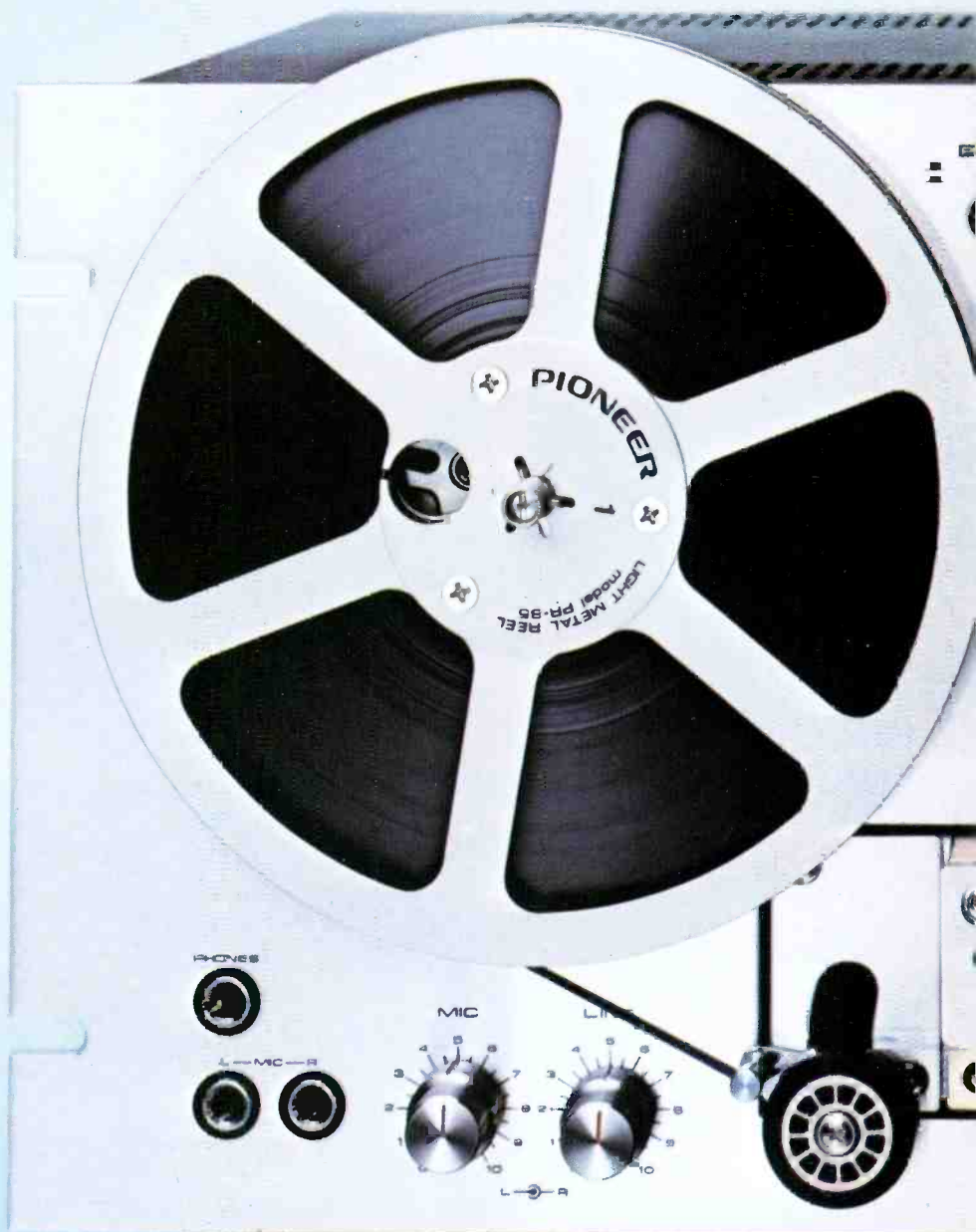
For example, between the take-up reels on the "dinosaurs" of the past, you'll find nothing but wasted space. On the RT-707, however, you'll find this space occupied by a series of highly sensitive



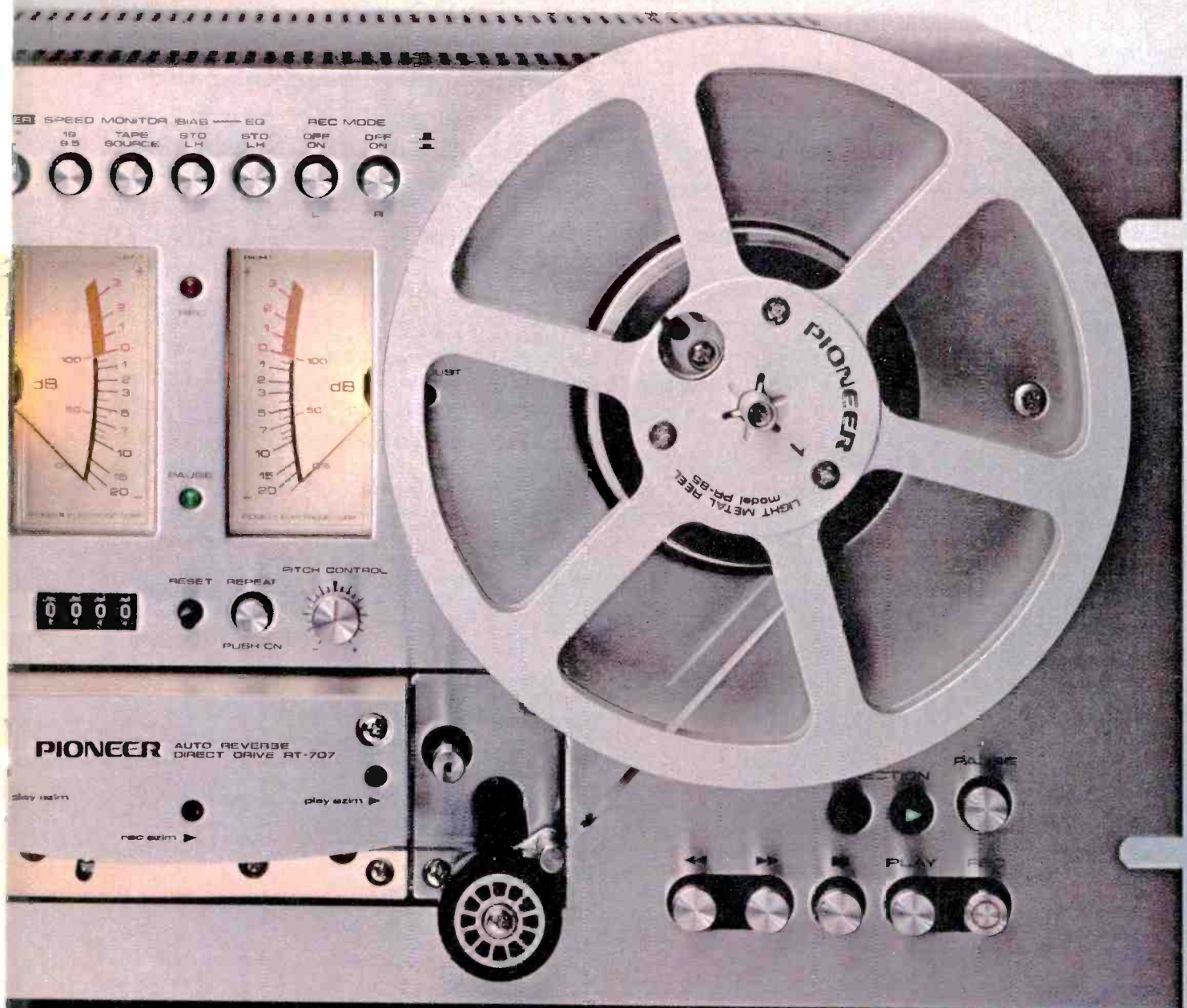
The extraordinary direct-drive system.



Unlike others, the RT-707 can be stacked or rack-mounted.



**THE ONLY THING IT HAS
IN COMMON WITH
OTHER 7-INCH
TAPE DECKS IS THE
SIZE OF ITS REELS.**



DENON
 DENON
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 DENON



AC DIRECT DRIVE

The best of both worlds: smoothness of belts, accuracy of direct drive.

AC Direct Drive is an exclusive DENON system that senses the moving platter with a tape-recorder head.

The actual platter speed is then clocked and made perfect—with a smooth-running AC motor.

Advantages?

No DC motor pulsing. No heavy flywheel platter needed for motor smoothing. (A lighter platter means faster starts and quicker response to speed correction as well as less wear on bearings). No cartridge sensing of tiny motor jerks. No belt to wear out.

AC Direct Drive.

On all DENON turntables from \$298 to \$930.

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Audio

January 1978 "Successor to **RADIO** Est. 1917" Vol. 62, No. 1

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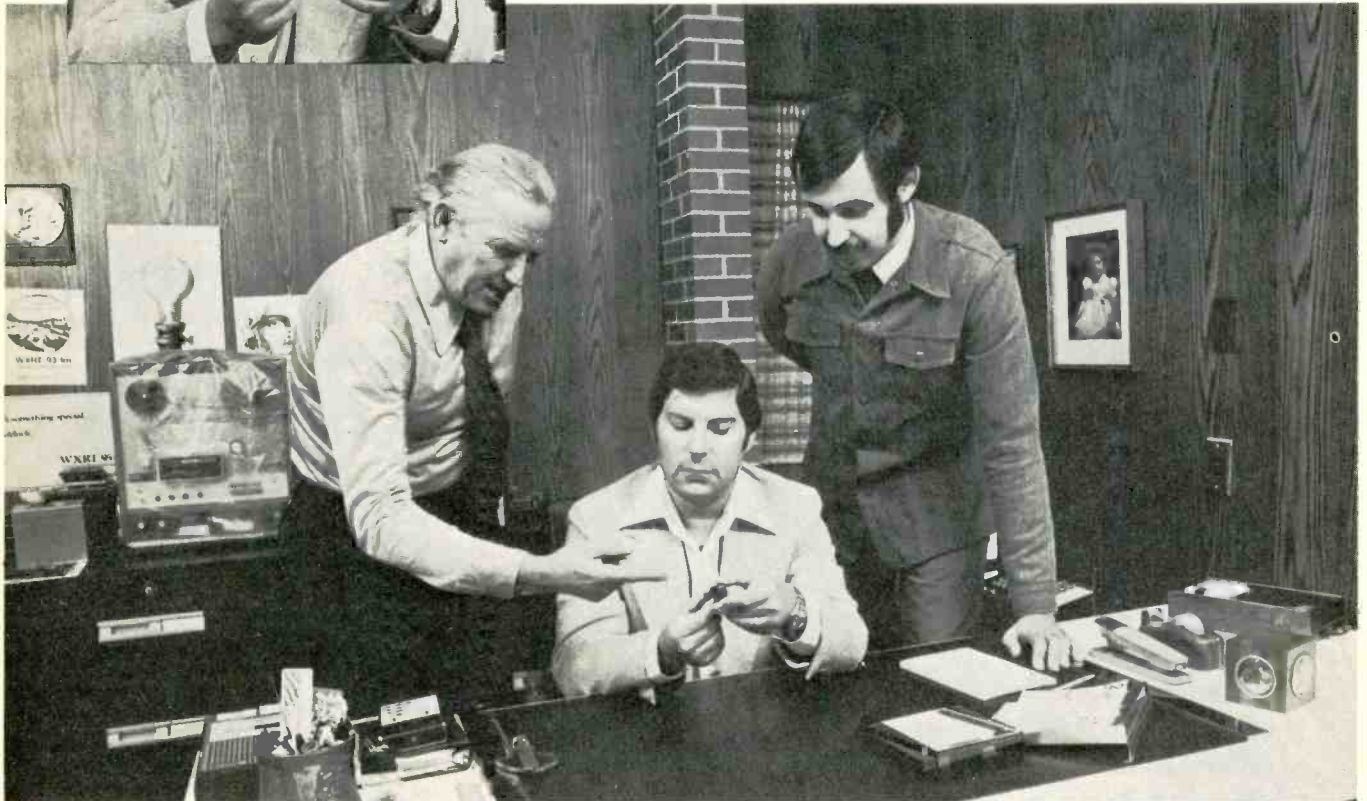


About the Cover: The "J.P. Seeburg Orchestrion" doesn't need a conductor which may be appropriate in light of the recent deaths of Leopold Stokowski and Guy Lombardo. This mechanical orchestra was restored by Albert H. Hreha of the Carousel Mechanical Museum in the Village Mall on Pa. Route 420, Morton, Pa.

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“Not the loudest sound in town, but the best quality” claims WXRT, Chicago, longtime Stanton user...



Daniel Lee, President and General Manager, discussing Stylus Replacement Policy with Howard Williams, Chief Engineer and Ken Rasek, Audio Engineer.

WXRT is a progressive rock, FM station that is unique in many ways. Its whole operation, including Administration, Sales, Engineering, Programming, Broadcasting, Transmitting (even the tower itself), is located in one place . . . a highly unusual set-up for a major market.

In a market crowded with as many radio stations as Chicagoland, the excellence of sound can make or break the station, especially a station like WXRT . . . which plays no tapes . . . has no recorded commercials . . . and goes totally with disc-to-air and live copy.

Since WXRT uses no limiters and no compression to magnify the level of their signal, their turntables and cartridges are absolutely crucial to the quality of their sound.

For over 10 years, the station has used the Stanton product in its turntables. Today, it even uses the 681 Triple-E for disc-to-air playback and, although this stylus was not designed for back-cueing, the engineers and announcers report no problem (they even use them on their AM operation, WSBC).

Leading radio stations around the nation depend on Stanton 681 Calibration series cartridges, because they offer improved tracking at *all* frequencies . . . they achieve perfectly flat frequency response to beyond 20 kHz. Its stylus assembly, even though miniaturized, possesses greater durability than had been thought possible to achieve.

Each 681 Triple-E is guaranteed to meet its specifications within exacting limits, and each one boasts the most meaningful warranty possible . . . an individual calibration test result is packed with each unit.

Whether your usage involves recording, broadcasting or home entertainment, your choice should be the choice of the professionals . . . The Stanton 681.



John Bell hands new record to Scott McConnell.



Air personality, John Bell prepares to play a record.

For further information, write to:
Stanton Magnetics, Terminal Drive,
Plainview, N.Y. 11803.

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Enter No. 47 on Reader Service Card



Model AT15Sa/H Dual Magnet Stereo Cartridge pre-mounted in Universal tone arm head shell.

To find out how much better our cartridge sounds, play their demonstration record!

There are some very good test and demonstration records available. Some are designed to show off the capabilities of better-than-average cartridges... and reveal the weaknesses of inferior models. We love them all.

Because the tougher the record, the better our Dual Magnet™ cartridges perform. Bring on the most stringent test record you can find. Or a demanding direct-to-disc recording if you will. Choose the

Audio-Technica cartridge that meets your cost and performance objectives. Then listen.

Find out for yourself that when it comes to a duel between our cartridge and theirs... we're ready. Even when they choose the weapons!

What you'll hear is the best kind of proof that our Dual Magnet design and uncompromising craftsmanship is one of the most attractive values in high fidelity. For their records... and yours!



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Leader in editorial excellence

It's time for everybody else to start playing catch-up. Again.

From the very beginning, experts have acclaimed the performance and feature innovations of Yamaha receivers as nothing less than spectacular.

But now, we've outdone ourselves.

Yamaha is introducing a new line of receivers with such unprecedented performance, it's already changing the course of audio history.

Real Life Rated.™ While traditional laboratory measurements provide a good relative indication of receiver performance, they simply don't tell you how a receiver will sound in your living room in actual operation. So Yamaha developed a new standard for evaluating overall receiver performance under real life conditions. It's called **Noise-Distortion Clearance Range (NDCR)**. No other manufacturer specifies anything like it, because no other manufacturer can measure up to it.

We connect our test equipment to the phono input and speaker output terminals, so we can measure the performance of the entire receiver, not just individual component sections like others do. We set the volume control at -20dB, a level you're more likely to listen to than full volume. We measure noise and distortion together, the way you hear them.

On each of our new receivers, Yamaha's Noise-Distortion Clearance Range assures no more than a mere 0.1% combined noise and distortion from 20Hz to 20kHz at any power output from 1/10th watt to full-rated power.

Four receivers, one standard. On each of our four new receivers, Yamaha reduces both THD and IM distortion to new lows—a mere 0.05% from 20Hz to 20kHz into 8 ohms. This is the kind of performance that's hard to come by in even the finest separate components. But it's a single standard of quality that you'll find in each and every new Yamaha receiver. From our CR-620 and CR-820 up to our CR-1020 and CR-2020.

What's more, we challenge you to compare the performance and features of our least expensive model, the CR-620, with anybody else's most

expensive receiver. You'll discover that nobody but Yamaha gives you our incredibly low 0.05% distortion and -92dB phono S/N ratio (from moving magnet phono input to speaker output).

You'll also discover that nobody else starts out with such a variety of unique features. Independent Input and Output Selectors that let you record one source while listening to another. A Signal Quality Meter that indicates both signal strength and multipath. The extra convenience of Twin Headphone Jacks. Or the accurate tonal balance provided at all listening levels by Yamaha's special Variable Loudness Control.

More flexibility. It's consistent with Yamaha's design philosophy that you'll find the same low distortion throughout our new receiver line. Of course, as you look at Yamaha's more expensive models, it's only logical that you'll find the additional flexibility of more power, more functions, and more exclusive Yamaha features.

For example, there's a sophisticated tuner, with unique negative feedback and pilot signal cancellation circuits (patents pending), that makes FM reception up to 18kHz possible for the first time on a receiver. Plus other refinements like a Built-In Moving Coil Head Amp, Fast-Rise/Slow-Decay Power Meters, and Yamaha's own Optimum Tuning System.

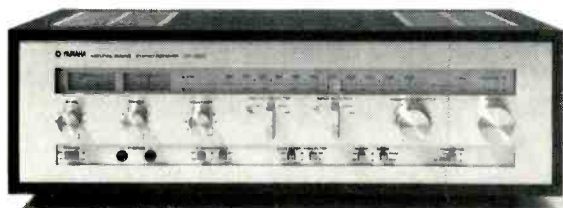
Now's the time to give us a listen. Our new receiver line is another example of the technical innovation and product integrity that is uniquely Yamaha. And your Yamaha Audio Specialty Dealer is an example of uncommon dedication to faithful music reproduction and genuine customer service. It's time you heard them both.

If your Yamaha Audio Specialty Dealer is not listed in the local Yellow Pages, just drop us a line.

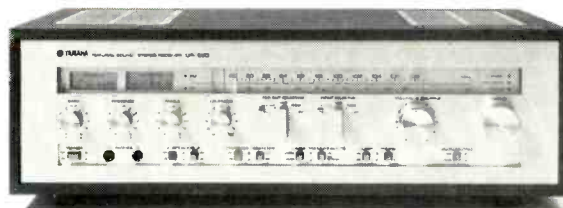


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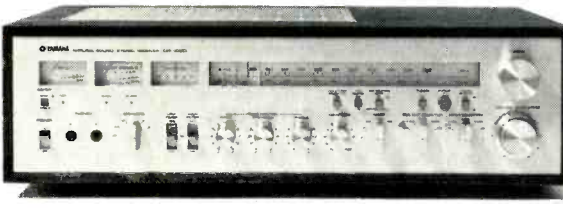
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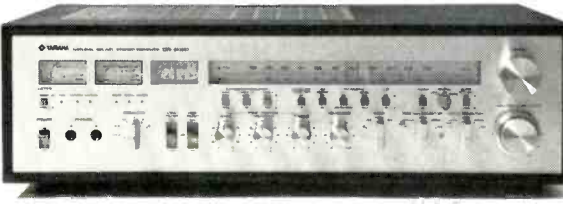
CR-620 0.05% THD 0.05% IM



CR-820 0.05% THD 0.05% IM



CR-1020 0.05% THD 0.05% IM



CR-2020 0.05% THD 0.05% IM

AMPZILLA THAEDRA

The impact of AMPZILLA'S and THAEDRA'S revolutionary circuitry continues to send shock waves throughout the audiophile community. They became classics of audio-design excellence and remain the choice of experts all over the world.

Now, Great American Sound Co. proudly unveils the third generation of affordable discrete stereo components with the uncompromised sound qualities of its illustrious predecessors.



CHARLIE \$559.00

the FM digital tuner (top) features crystal-controlled time readout, wide/narrow band selection and new surface-acoustic-wave low-distortion IF filters. (Available early 1978).

THALIA \$309.00

servo-loop preamplifier (center) with fully-complementary class-A circuitry throughout. Distortion is less than .01% at 2 Volts out, 20 to 20 KHz.

GRANDSON \$309.00

power amplifier (bottom) can deliver over 80 Watts at 4 Ohms with less than 0.3% (20 to 20 KHz). Transient Intermodulation (TIM) Distortion is less than .01%.

Write for our latest Cassettes which include over 32 pages of test reports from *Stereophile*, *Absolute Sound*, *Stereopus*, *Audio*, *Sound Advice*, *High Fidelity*, *Popular Electronics*, etc., as well as specifications and complete information on all G.A.S. Co. products.

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Enter No. 20 on Reader Service Card

Herman Burstein

Tape guide

Meter Recalibration

Q. I want to adjust the calibration of the VU meter on my TEAC tape deck as I am changing to a high output tape that requires a 1 dB greater input level for a 3 dB higher output. How do I go about making this adjustment?—J. Hardy, USS Bryce Canyon

A. Consult the TEAC manual for the location of the control that adjusts the VU indication when recording. Feed a 400 Hz signal into the deck and note the VU reading. Maintain the same input level and adjust the VU calibration so that the meter now reads 1 dB lower than before. However, I feel that the inexactitude of the VU reading is such that a 1 dB adjustment becomes rather academic.

Alcohol Cleaning

Q. Does the use of isopropyl alcohol for cleaning heads damage either the heads or the tapes?—Allan Northcutt, Bedford, Mass.

A. Generally tape heads can be cleaned with isopropyl alcohol without damage. But it is always safest to check the deck manufacturer's recommendations as to cleaning fluid, or if you're using a replacement head, check with the maker of that head. Let the heads dry thoroughly before running tape past them.

Dolby Improvement

Q. I have just added a Dolby noise reduction system to my tape equipment. Can you please tell me if the reproduction quality with the Dolby unit is better when taping at 3¾ ips, that at 7½ ips with the Dolby?—S. Warshauer, Phila., Pa.

A. The quality is better at 7½ ips with the Dolby, than at 3¾ ips with the Dolby—using the same tape machine. However, the improvement in the signal-to-noise ratio is usually more noticeable at the slower speed.

Prerecorded Playback

Q. I understand that if I don't play my prerecorded tapes once a month or so, then before playing them I should rewind them in order to get the proper

tension. The trouble is that I have too many tapes and don't get to hear them for months on end.—D. Pearson, Salt Lake City, Ut.

A. While it is a good idea to rewind unused tapes periodically, I don't think that this has to be as often as once a month, particularly if the tapes are stored after being wound at normal playing speed. Rewinding about every six to twelve months should be sufficient. It is okay to use your fastest operating speed in rewinding.

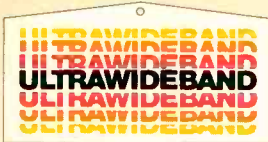
Price & Performance

Q. Based on reports in Audio, I bought a TEAC reel-to-reel tape deck. At 7½ ips, comparison between the tape and the source gives identical results. At 3¾ ips, the TEAC handles the high frequencies without much loss. However, the comparison of the TEAC specs with those of other tape decks leaves me wondering whether I could have gotten more performance for my money.—Larry Scherer, St. Joe, Mich.

*A. If a tape machine had a flat frequency from 0 Hz to 1,000,000 Hz, your ears probably couldn't tell the difference between this machine and one with an essentially flat response from about 50 Hz to 14,000 Hz. In a directory of tape decks (such as appears annually in the October issue of *Audio*), you will see that some high-priced decks have more modest specs with respect to frequency response than some of the lower priced ones. Beyond a certain point—say roughly 15,000 Hz—there is very little to be gained by further extension of the treble response, since it would require a sacrifice in other aspects of tape performance, e.g. distortion and signal-to-noise ratio. Therefore, if your tape decks sounds good to your ears, forget about the specs and be happy with the deck.*

If you have a problem or question on tape recording, write to Mr. Herman Burstein at AUDIO, 401 North Broad Street, Philadelphia, Pa. 19108. All letters are answered. Please enclose a stamped, self-addressed envelope.

AUDIO • January 1978



Harman Kardon's ultrawideband 430 and 730 receivers. Frequency response: 4-140,000Hz.

Amplifier design: true Twin Power.

Two features you won't find in any other receiver except our own limited-production Citation.

Two features you won't find even in separate components—at anything less than twice the price.

They're there for just one simple reason.

The sound.

In sonic terms, ultrawideband components deliver two important benefits. Phase linearity and outstanding transient response.

Outstanding transient response is the ability of a component to respond instantly to the onset of a sound. It keeps the reproduced music as open and clear as the original.

Phase linearity describes a component's ability to pass multiple frequencies without changing their

time relationships. It gives you a sound that stays open and accurate, clear on down to the bottom.

Harman Kardon feels so strongly about these benefits that, in a market full of narrowband components, with frequency response from 20 to 20,000 Hz, we make only ultrawideband components.

The twin power supplies give you a further benefit. When the music makes extreme dynamic demands on one channel, the other channel simply cannot be affected—so even the loudest passages remain clear and open. That's why you'll find this feature in the world's finest high fidelity components.

Among which, of course, the Harman Kardon 430 and 730 receivers have been enthusiastically accepted.

Harman Kardon, 55 Ames Court, Plainview, New York 11803.

harman/kardon
wide,
open sound

Most people think only expensive separates can give you wideband response and twin power supplies.

Except for these two receivers, they're right.



Audio etc.

Edward Tatnall Canby

I turn to the following expression with considerable *compransion*. And if you find those words odd, they merely reflect the gist of my thought which is, can we *compond* or use our home audio system to good advantage as per a burgeoning of recent new equipment, or will things be OK if we leave our music as it is, just as it comes from the audio package—tape, disc, or broadcast? The answer is yes . . . both ways. Some people would put things the other way around: should we compress and expand; but it's all the same to me since expansion is but the mirror twin of compression, two processes which, when all goes well, are one and add up to zero. Which is exactly what the whole thing is about.

The villain of this *compransion*, is the lefthanded twin (*gauche*, *sinister*), *compression*. Compression of signal is a necessary evil in many areas of audio signal processing to make things fit into the audio frame. Nobody does it for fun & games (though they'll do it for background). On the right hand (*dexterous*, *adroit*, *righteous*), we have *expansion*, the saving grace, the redeeming feature and, if I may say so, also inclined to take off on its own, minus twin. It's fun to expand.

When it comes to transmitting music through the interface between acoustic and electronic there is no room for anything but careful compromise, which means compression, limiting, and other negative-type circuitry. Various equalizations are part of the picture, but compression is the main thing, at least as of my present concern, and it isn't simple.

Even live orchestras, I have to remind you, must sometimes acous-

tically compress their own dynamic range, repress their natural expression, even before the microphones get involved; that's one way to do the necessary job. And a nice sub-question is, should we expand *them* electronically in our homes, to make them play the way they might have played, if—? Well, I can tell you right now that that particular expansion will never work. The only way to make musicians

128 (*Audio*, Nov. 1977, pg. 106), a piece of equipment which is highly involved in this sort of mirror operation. If there is anybody in the biz who knows the ins and outs of *compransion*, it must be dbx, and this model is doubly involved, once for the traditional dbx two-stage noise reduction (via mirror compression/expansion circuits) and again via a range expander, hopefully to compensate for the compressions that

undeniably are there in the long chain of electronics that leads from living music to the living room. *Compransion* is a verstaile principle with many uses.

Now it happens that I had another dynamic range expander right in my own home circuit, built into a piece of equipment loaned to me for another purpose. It will be nameless because it is not currently in production—but do you think I didn't try it? I try everything. I listened to normal recorded music with this thing in my circuit, to see what would happen, *this* time.

In all the years I have been writing I had not yet heard one of these expander devices that, however noble the intentions, sounded *right*. Instead, they have left me thoroughly disturbed, for they seemed always to destroy that easy sense of "presence" that is the very basis for good listening; they intruded, they called attention to themselves, like a amiable puppy that comes in and won't leave you alone. The idea is splendid but it never seemed to work out in practice. I just found that I like the plain music better, compressed or not.

So I tried this one, now some years old—and it was the same. I used the helpful controls, I tried to fool myself



sound as if they are playing LOUDER is to have them play louder . . . overtones, physical effort and all that. You cannot make a soft trumpet sound like a loud one by turning up the volume.

But if we merely bring them back to normal, after electronic compression? That is another story and it should work just fine—if we can do it. That's where the dynamic range expander comes in. A mirror-type circuit, its expansion of the volume range matching the compression built into the audio signal. If it works we should have zero, the same thing the players played.

I recently read with pleasure our Equipment Profile on the dbx Model

MIA HALTON

Audiofile housing systems

AUDIOFILE, the new definition in function and style is here.

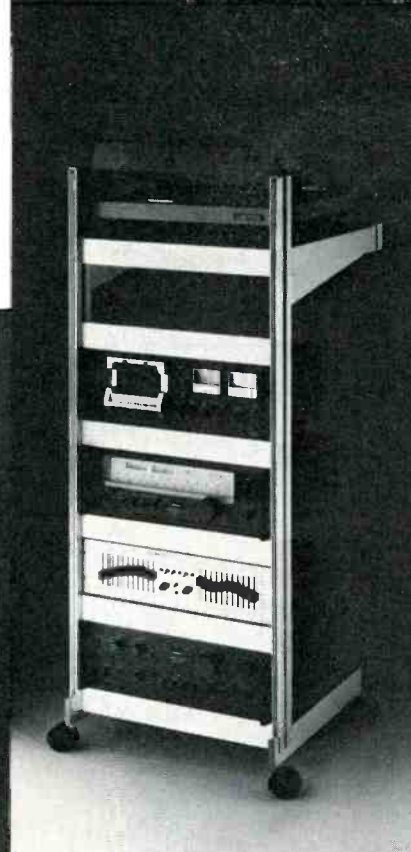
Six outstanding designs to solve the problem.

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Trolleys, Uprights, Lowboys and Wall Mounts –
a design for every need. Priced from \$139.95 to \$549.

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11

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Enter No. 21 on Reader Service Card

by leaving the thing on and hoping to forget it was there next time—no go. The best setting was zero. Out of the circuit. But—? Hope never dies! Even so, the idea *is* good, it *ought* to work. In a way, I was disappointed. Because I rejoice when somebody, at last, manages to do the heretofore impossible. It happens right along, it can happen again. Reason says that this sort of expansion just has to work, if it is done right, especially now, when we can do so much more that we useta could.

The problem, of course, is that here

we are dealing not with one fixed, known compression, to be precisely matched by a fixed and known expansion. Far from it. There are almost as many compression parameters as there are record companies, broadcasters, tape machine builders, and disc cutters; not only that, one compression may be superimposed upon another, in a different place and time, and indeed probably is. These gents don't even know each other to speak to, let alone compare notes on compressions. All in all, I find it astonishing that their final

products get through to us with any sense in them at all, what with so many operating circuits at so many places in the audio chain. In fact, I have a healthy respect for our record producers (and even some of our broadcasters) for their practical know how. If compress they must, then they have learned to do it gracefully.

So our expansion mirror circuit is tackling the impossible, which is to match exactly all of these alterations in the sum total as represented in the signal which reaches your home. The mirror isn't flat. It's full of sonic wiggles and wavers and bumps. That's what I have been hearing—so far. The compressions themselves, again, are generally smooth and unnoticeable, even if they are there. And yet—? I am beginning to see, after all these years, how it could be done. And I am beginning to suspect that the more recent manufacturers have figured it out. Maybe the impossible is no longer so impossible?? There are new ways to go at the problem. But look a bit further into home listening.

The Future Force

Yes, ideally, *compression*—compression/expansion—is a serious basis for the consumer dynamic range expander. But it is not the only basis. If I know the normal hi fi owner, there is another aspect and you can guess what it is—the sheer pleasure of a versatile new way to play around with your fi, to suit your taste and show off your equipment, and to heck with studious mirror images. You can build up your loud music even louder, cut back the soft parts to a smooth whisper, increase the total impact by a whole new order, and all without lifting a finger. Nothing new in this sort of pleasure! After all, your choice of volume level has always been free and variable all over the spectrum, except for practicalities like neighbors. Some like it loud, some prefer the discreet (don't I know). Myself, I've learned to like it loud and you'd be amazed how often I am asked . . . please turn it down. You think I'm just a musician? Same thing for tone controls; mostly we do with them what sounds good. And how about space expansion, reverb, Audio Pulse? All these are adjustable creatively to your choice and *not* necessarily according to any acoustic-music original. So why not dynamic range expansion too? This is a legitimate way to use a clever automatic circuit and I see no reason to be doubtful about it, if that is your taste. A lot of people are going to like the newest expanders on just this basis, a single-stage operation that enhances the

The Phase Linear 4000 Preamp: Quiet, versatile, incredible.

Quiet it is, but a preamp should do more than merely function flawlessly as a control center. To achieve obvious audible improvements in the reproduction of music you have to compensate for the limitations in the recording and playback process.

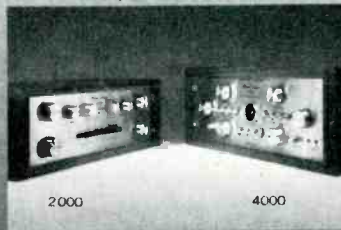
The 4000's Autocorrelation Noise Reduction System virtually eliminates record/tape hiss and FM broadcast noise without affecting musical content. The

Peak Unlimiter and Downward Expander senses gain riding and peak limiting in the recording process and restores the dynamics to the original level. The Active Equalizer produces a flat energy distribution

over the entire audio spectrum, and passive, independent step-tone controls allows precise tailoring of the music to your listening environment.

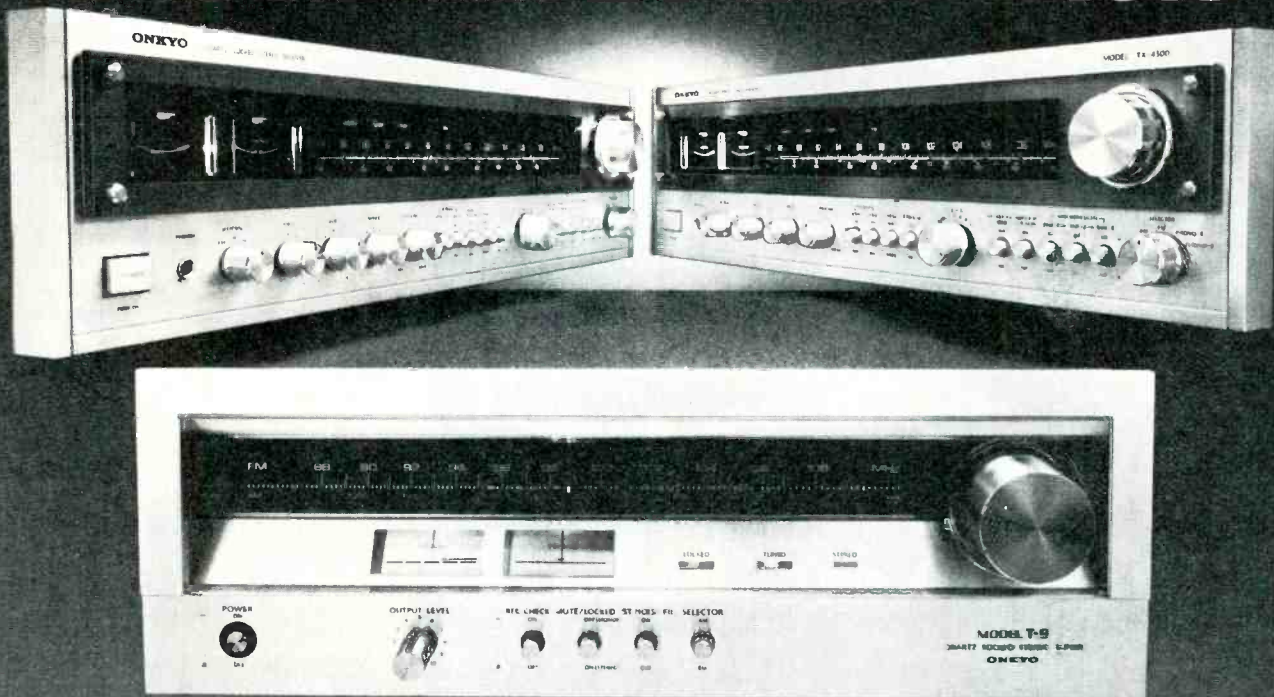
Incredible? See your dealer and listen for yourself.

Phase Linear The Powerful Difference



Manufactured in the USA Distributed in Canada by H. Roy Gray, Ltd.

ONKYO'S QUARTZ-LOCKED ...ACCLAIM BY IMITATION



You know how much you count when people start imitating you. That's happening now with Onkyo's unique Quartz-Locked Tuning System. Since Quartz-Locked has proved to be about the best tuning system in the business, some big names are trying to equal our success.

You might, of course, be better off if they did copy the Onkyo Quartz-Locked. Then you'd have the system which Hirsch-Houck Labs said, "...was virtually impossible to mistune..."* A statement other independent labs have agreed with.

Onkyo's Quartz-Locked Tuning System is controlled by a Sentry Circuit which reacts to your touch on the tuning knob, unlocking Quartz-Locked when you touch it for tuning; locking it when you release the knob.

The system works through a quartz crystal controlled reference signal in constant comparison to the IF frequency. Quartz-Locked detects and corrects off-frequency conditions so fast you never even know it's happening. The result, continuous maximum reception that's rigidly stable.

Of course, we've had Quartz-Locked in our labs for years before putting it on the market. And, in the little more than a year it's been out, Quartz-Locked has made a name for itself... and a lot of audio fans

who appreciate the way it does what it's supposed to do.

In addition to Quartz-Locked receivers, Onkyo also has a Quartz-Locked tuner for upgrading your system. And a few more Quartz-Locked components coming off the drawing board now.

The best way to be sure of getting the Quartz-Locked system that set the standard is to be sure it says "Onkyo Quartz-Locked Tuning System."

Perhaps it can be imitated. We doubt it can be equalled.

ONKYO QUARTZ-LOCKED AUDIO EQUIPMENT

TX-4500 Quartz-Locked AM/FM Stereo Receiver

Power output 55 watts per channel, minimum RMS at 8 ohms, both channels driven from 20 Hz to 20 kHz, with no more than 0.1% Total Harmonic Distortion.

TX-8500 Quartz-Locked AM/FM Stereo Receiver

Power output 110 watts per channel, minimum RMS at 8 ohms, both channels driven from 20 Hz to 20 kHz, with no more than 0.1% THD. Dual Power supply.

T-9 Quartz-Locked AM/FM Stereo Tuner

Dual Gate MOS FET 4-Gang Variable capacitor front end with Usable Sensitivity 1.7 μ V; 50 dB Quieting Sensitivity of 3 μ V; Harmonic Distortion: Mono 0.15%, Stereo 0.3%; Stereo Separation 40 dB at 1 kHz.

*POPULAR ELECTRONICS AUGUST, 1976

Artistry in Sound **ONKYO**

Eastern Office: 42-07 20th Avenue, Long Island City, NY 11105 (212) 728-4639

Midwest Office: 935 Siverd Drive, Wood Dale, Ill. 60191 (312) 595-2970

West Coast Distribution Center: Damark Industries, Inc., 20600 Nordhoff Street, Chatsworth, California 91311 (213) 998-6501

Canada: Sole Distributor, Tri-Tel Associates, Ltd., Willowdale, Ontario, Canada M2H 2S5

Enter No. 35 on Reader Service Card

signal for new creative effects. That, if you wish, is the musical wave of the future and a bigger factor in home hi fi than most of us care to admit. I am all for it, with only one reservation: these sounds, these effects, are not for everyone.

For some of us, the two-stage expander remains a more important objective, factual *compensation*, as nearly as possible, for the alterations built into the musical signal. A flatter mirror is all we want. And decidedly, this is a tougher task, though I think it is the one dearest to the hearts of those who design and build expanders.

Music, *acoustic music*, the sound of music out of the original acoustic instrument, is still a major basis for audio reproduction and those of us who are concerned with this music are understandably leery of creative sonic extremes of any sort as the music comes forth in the home. We are not literal minded. No symphony in the home can ever sound like a symphony in the hall, nor should it. But, there must always be a relationship for us between these two extremes, one that allows us to hear the sense of our music freely "through" the audio medium with that ever-necessary illu-

sion that it is *there*, right out in front of us.


To go back to my start, yes, we can do OK without dynamic range expansion, for the most part, because the altered audio product, such as it is, has been very cleverly tailored to fit the living room. And yet—? Can we do more? We always can.

No, we will never be able individually to match all those compressions with exact expansions, because we don't know which ones are there and how they work. That approach is hopeless. Not by a vast choice of different curves, either—a setting for every record company, broadcast network, disc cutting studio! That would be like the old equalizations for records, before standardization. Do I remember Old Columbia, New Columbia, NAB, RIAA, RCA, and dozen more choices; we were in Alphabet Smith's famous soup all over again. No, *not* that.

Computer Comprasion

Instead, I begin to see the way. By a modern statistical approach, maybe computer aided, of the sort we now do all the time. An expander circuit that operates—my first thought—like a Gallup Poll. Not a literal compensation for all those compressions, but a statistically derived correction, accurate plus-or-minus, almost a prediction, taking sophisticated computer-account of a vast amount of known data—we do know the *possible* compressions. An expander circuit that would turn out to be right within acceptable limits, with only a few careful controls. Phew! One falls into jargon in these things. But this is how it could be done, and maybe has been done.

We have the two essentials. First the computer-type design techniques, the sort that have made incredible strides in the last decade. We can turn out "blueprints" of a predictable accuracy unthinkable a few years ago in the handwork, hit-or-miss, and intuition/guess era. Or worse, the systematic try-everything era. Multiply the old slow calculations by a thousandfold and you have what we have. Tools for design. Second, we can build the circuitry to match, also maybe a thousand times more sophisticated, yet practical for home equipment. Solid state, ICs, and all the rest.

So I am convinced, brainwise, that we CAN produce and probably HAVE produced a dynamic range expander to satisfy all of us, even including me. And all the music lovers. It figures. *It has to be!* All I have to do now is to hear it. 

14

IOCTM

The different distortion indicator

The Input-Output Comparator (IOC) now available on Crown D-150A and DC-300A amplifiers is a significant departure from traditional clipping indicators. The IOC reports all types of overload distortion by telling the user that the output waveform no longer matches the input waveform. The IOC is so sensitive that distortion is reported before it is audible.

In the feedback system used in Crown amplifiers, the input IC is continually comparing input and output waveforms. If there is a difference, indicating a non-linearity in the amplifier, the input IC generates a correction signal.

If the output is distorted from some cause other than overload (for example, crossover distortion) the correction signal will bring the output waveform into compliance with the input.

Overload distortion, however, results from some circuit component operating beyond its linear range. The correction signal cannot change the characteristics of the component, so the input IC continues to generate a large correction signal. This will happen regardless of the kind of

overload—clipping, TIM or protection circuit activation.

The IOC was designed by Crown engineers to take advantage of this behavior, and to use it to report significant information about distortion to the user of the amp. The Crown IOC analyzes the correction signal and reports the existence of non-linearities in the output waveform through a front-panel LED.

The IOC is highly sensitive and detects distortion that is a great deal less than the .05% THD and IMD ratings of the D-150A and DC-300A. The user is thus notified about distortion *before* it is audible. The user also knows that the Crown IOC is reporting distortion of a music waveform, not just a laboratory test signal. Maximum useable gain for the D-150A or DC-300A can be determined by adjusting gain so the front panel LED's stay off, or come on briefly during the highest music peaks.

The IOC is available on all Crown DC-300A and D-150A amps manufactured after October, 1977. Because of its value to any serious music listener, a factory retrofit is available for earlier units.

See your dealer soon for complete information about detecting distortion differently...with Crown.



crown

1718 W. Mishawaka Rd., Elkhart, IN 46514

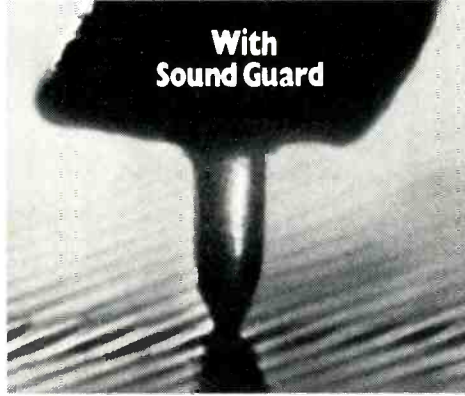
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AUDIO • January 1978

Before Sound Guard®, you only played a record in mint condition once.



Magnification shows the record vinyl wearing away.



Same magnification shows no record wear.

You can see how the picture has changed.

Independent tests* show that records treated regularly with Sound Guard preservative keep the same full amplitude at all frequencies, the same absence of surface noise and harmonic distortion as records played just once in mint condition.

With its patented dry-lubricant film, Sound Guard

preservative maintains sound fidelity by reducing record wear. And with its built-in, permanent anti-static property, it resists dust accumulation.

And now, two new Sound Guard products:

1. Sound Guard™ record cleaner, developed from extensive research into record cleaning problems and

methods, removes all common record contaminants—from dust particles to oily fingerprints.

And whether your records need a light cleaning to remove surface dust or a thorough cleaning to remove deep-seated contaminants, Sound Guard record cleaner does both.

2. Sound Guard™

Total Record Care System puts Sound Guard record preservative and Sound Guard record cleaner in one package—for the best possible total care for all of your records.

Available in audio and record outlets.

*Tests available on request.



Sound Guard® keeps your good sounds sounding good.



Sound Guard preservative—Sound Guard cleaner—Sound Guard Total Record Care System
Sound Guard is Ball Corporation's registered trademark. Copyright © Ball Corporation, 1977. Muncie, IN 47302

Dear editor

Quadraphonic Clique II

Dear Sir:

In response to the **Quadraphonic Clique** letter in your "Dear Editor" column of June, 1977, I would like to say that my wife and I are the proud owners of two quadraphonic receivers. We enjoy SQ, QS, and CD-4, in addition to having a very good deck for Q8 four-channel tapes.

We hope that quadraphonic will come back strong, and we both know that it has almost unlimited possibilities. Here in the Dallas-Fort Worth metroplex area, there are a large number of quadraphonic owners who despair at the limited number of records and tapes presently available.

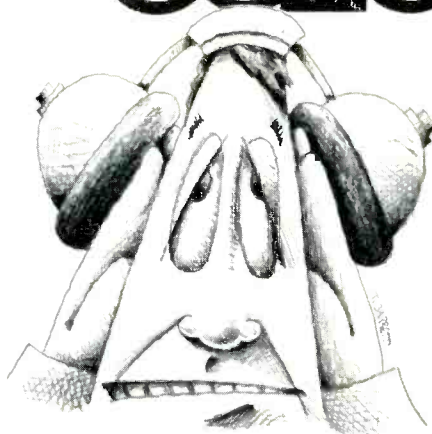
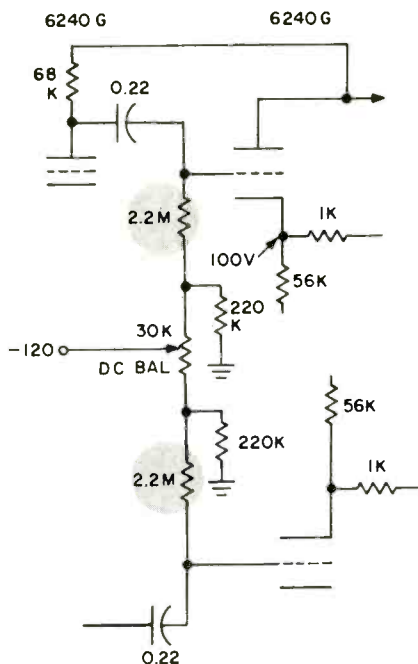
Joe D. Marchand
Arlington, Tex.

16 Lux Amplifier Addenda

Dear Sir:

I discovered that I had made an error in the schematic for the Lux power amplifier which I reviewed in the November, 1977, issue of *Audio*. Here is a partial schematic that shows the two spots where I did not note resistors.

George Pontis



Best of the Worst

Dear Sir:

How about an article on the 10 worst performers of the year, done by your record reviewers? This would be a worthy addition at the end of each year.

I like your magazine very much even though I don't subscribe to it. The reason I buy your magazine off the newsstand and not by subscription is the fact that we Canadians have the worst mail service in the world. In fact, our postal service is not obligated to deliver the current issue until the next one arrives.

William Dang
Calgary, Alta.

Murphy's Move

Dear Sir:

On page 34 of the November *Audio*, I noticed a letter by Boy Wonder W.J.J. Hoge in which reference is made to an alleged statement by Mrs. Edsel.

Please be informed that Edsel Murphy, his family, and any future issue that may come forth from him, are the exclusive property of *db Magazine*. We claim this by right, rather than copyright, since Edsel came to live here 'way back in May of 1968 and ever since has been proving to us just how correct his basic thesis is.

We can only assume that his wife's appearance in *Audio* is yet one more manifestation of the pervasiveness of his law. In fact, I can only hope that Mrs. Murphy's appearance in your pages means that the Murphy clan has moved to Philadelphia.

Larry Zide
Editor/Publisher
db Magazine
Plainview, N.Y.

Wide Bandwidth Preamp Corrections

Dear Sir:

I would like to inform builders of the Wide Bandwidth Preamplifier published last February in *Audio* of a power supply correction and a modification to the RIAA circuit which I recommend. First, the drawing of the regulated power supply published in the September issue was accidentally missing two connection dots. There should have been a dot at the junction of R48, D1, C12, and the base of Q11. Similarly, a dot should have been at the junction of R49, D2, C14, and the base of Q12. I recommend that a 100 ohm, ½ watt resistor be installed in series with the base of both Q11 and Q12. Capacitors C11, C12, C13, and C14 should each have separate ground wires to the power supply main ground point. The inductance of a common ground wire to these four capacitors can cause r.f. feedback, and Q11 and Q12 will become oscillators. Do not use phone jacks for power supply connectors, they will cause Q11 and Q12 to blow when connected or disconnected.

The RIAA circuit can be improved a great deal by increasing C1 to 0.0022 mF and R3 to 82 ohms. C1 should be a physically small capacitor. In case the recommended circuit boards are not used, the leads to C1 and R3 should be as short as possible, and the network formed by these two components should not be routed close to any other components in the circuit. It has been stated erroneously in literature mailed out in circuit board orders that a connection dot is missing in Figure 1 of the February article at the junction of R3 and the emitter of Q1. This should have been at the junction of R3 and the base of Q1.

W. Marshall Leach
Georgia Ins. of Technology
Atlanta, Ga. 30332

Classified Ad Note

Dear Sir:

International Audio Review's citation in your classified ad section of a report in the Boston Audio Society's newsletter, *The B.A.S. Speaker*, appears without our consent or sanction. *IAR's*

Why Micro-Acoustics 2002-e owners enjoy music more than you do.

If you're listening to music with any of the other high-quality stereo phono cartridges on the market today, there's a very good chance you're missing something. Something that's earned us unanimous praise from 2002-e owners: *a significant improvement in sound quality* which can only come from major advances in cartridge design.

Twin-pivot dual-bearings. Perhaps the most unique feature of the 2002-e is its direct-coupled transducing system, which was granted U.S. Patent No. 3952171. Unlike conventional single-pivot cartridges, which can only be optimized for tracking or transient ability, our unique twin-pivot/dual-bearing design is optimized for *both* characteristics — which are equally vital for precise reproduction.

Twin pivots insure superior transient ability, enabling the 2002-e to accurately follow even the most complex waveforms. And dual bearings maximize tracking ability, so that even difficult high-level passages can be accurately tracked at very low stylus forces.

Beryllium cantilever. The 2002-e's precisely-formed cantilever is made of beryllium — an exotic space-age substance that is 35% lower in mass than conventional stylus bars. As a result the cartridge boasts far lower moving mass, contributing further to its superior transient ability and unusually 'transparent' sound. By dramatically reducing moving mass, the 2002-e also reduces record wear to vanishingly low levels.

Low cartridge body weight. More and more tone arm designers are discovering the importance of cartridge weight, especially in tracking warped

records. Since over 95% of today's records are warped to some degree, a lighter cartridge means more effective tracking at lower stylus forces. *At less than half the weight* of most high-end cartridges, the 2002-e enables you to enjoy records that couldn't be tracked by other cartridges.

The mismatch problem: solved. Until now, an exact match between phono cartridge and preamp (or receiver) input impedance was required for flat frequency response. The 2002-e's built-in passive microcircuit *eliminates* mismatch problems by automatically controlling output impedance. This microcircuit also makes the cartridge immune from the effects of cable capacitance, so the 2002-e may be used with all types of tone arms — even those lacking low-capacitance cables.

Critical acclaim/popular acceptance. Few contemporary high-fidelity products have received such unanimous critical acclaim. And no other stereo phono cartridge has been so successful in satisfying the critical demands of today's sophisticated, dedicated music lovers.

But don't take our word about why 2002-e owners enjoy music more than you do: the proof is waiting at your Micro-Acoustics dealer. Or contact us for more information.

Hear the difference. To help you evaluate and compare cartridge tracking and transient abilities, we've developed a unique demonstration/test record which is itself enjoying widespread critical use and acclaim. (For a postpaid copy, send \$3.95 to the factory.)

Micro-Acoustics Corp., 8 Westchester Plaza, Elmsford NY 10523. In Canada, H. Roy Gray Ltd., Markham, Ont.

ma

Micro-Acoustics

"Because good tracking isn't enough."

\$119.00, suggested list.

© 1977, Micro-Acoustics Corporation

editor and publisher J. Peter Moncrieff advised us of the ad's content after he submitted it to you for publication. When we registered our strong objection, he apologized and promised to eliminate the reference from future advertisements, but said that it was too late to recall the one already submitted. We want to make it absolutely clear that the opinions we expressed in the cited article are those of the member who authored it, not of the Boston Audio Society. The Boston Audio Society makes no endorsements of any kind. It does not endorse the conclusions of the cited article, and it does not endorse *International Audio Review*.

Michael D. Riggs, Editor
The B.A.S. Speaker
P.O. Box 7
Boston, Mass. 02215

Editors Note: The display classified ad in question appeared in our November, 1977, issue, and was changed by Moncrieff for December.

Record Problems

Dear Sir:

The September issue of *Audio* featured an article about tape print-through. I would like to describe an interesting phenomenon that occurs with records. On many of my discs, I hear a pre-echo which is, to say the least, quite unpleasant. A great deal of my records have this problem, but in most the level is low enough so that it doesn't really become annoying.

This is just one of the many problems that records have. They also have sibilant "S" sounds, background noise, and poor sound quality in general. I used to think that some of these problems were due to my system, but after upgrading it with a more expensive cartridge and carefully aligning it, the imperfections in my records became more apparent. On the other hand, records on imported labels, especially Deutsche Grammophon and Philips, sounded great.

Since American record companies have deemed fit to raise their list prices to the level of imports, they should have a product of at least equal quality. I feel that the record companies should try to improve the sound quality of their records to give some justification for their ever increasing prices.

Robert Herbin
Yonkers, N.Y.

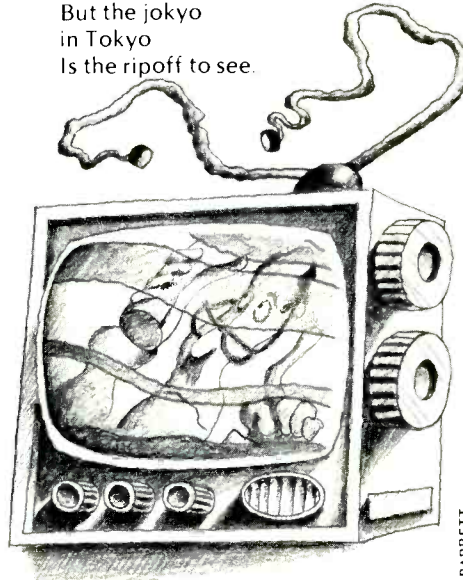
Lirpa Ecstasy

Dear Sir:

Believing as I do in adages, "Love thy neighbor but don't get caught" and

"Do unto others and split," I am compelled to share a unique use of the Lirpa I with you. I stumbled upon this quate by accident. In a recent (Mohammad) Ali fight, I am sure that it was the Inoki fight, because before it I wrote:

He float like butterfly,
He sting like bee,
But the jokyo
in Tokyo
Is the ripoff to see.



Shortly before the exhibition started, I connected the audio output of the TV set to the input of the Lirpa I. In so doing, the feedback from the Lirpa completely obliterated the TV picture. Then I noted another improvement . . . the intermodulation distortion of the sound became so strong that the sound coming from the TV could not be heard. The hum could not be measured in dBs. But I can tell you it Hertz the ears. Because I have a low threshold of ooms (as in Ram Dass ooms) resistance, I went quickly into a trance-like state of bliss. When I came out of the trance, the fight was over. It was the greatest Ali fight I have ever seen. I have also used this same TV-Lirpa hookup during the Mr. Whipple/Charmin' commercials to great advantage.

E. Claude Farnsworth III
Racine Wis.

Unexpected Expenditures

Dear Sir:

Several years ago I decided to take the plunge and make a considerable investment in audio gear. On the whole, I have been quite pleased with my decision. Recently, however, I have become aware of a problem which appears to plague most audio enthusiasts.

After giving me years of trouble free service, my equipment has now started to need repairs (coincidentally, this appeared to occur just at the expiration of my warranty period). This did not cause me any distress . . . after all,

nothing is perfect. I assumed that obtaining these repairs would be a minor annoyance. But, not so.

Despite the fact that I live some distance from a major urban area, I am able to obtain repairs for appliances, cars, etc. in the local community. Not so with audio gear. One factory-authorized station wouldn't even look at my equipment until it had been in the shop for three weeks and they considered that generous. In and out repair times of six weeks are not unheard of.

In addition, some manufacturers and distributors do not seem to be overly concerned about providing service. One well-known manufacturer limited his communication to me to a toll-free line which told me where I might get service. In another situation, the turntable I am using has had three distributors in as many years, and the current distributor seems to be unconcerned about models he did not originally handle.

Initially I was told that repairs were hard to obtain because the equipment was so complex. I pointed out, however, that one model needed a new pilot light which could easily be replaced, while the other component had a mechanical problem. Besides, I doubt that audio equipment is much more complex than, say, a color TV.

I cannot think of any other merchandise that is comparable in price, quality, and prestige which offers such shoddy warranty and repair service. This simply would not be tolerated in other industries. Since my own work requires dealing with closed-circuit TV equipment, I know from experience that service in this field is both fast and efficient. Either audiophiles are overly meek about this situation, or the industry hasn't caught on to the fact that his kind of dis-service either has or will nullify most of the advertising thrown at us.

I feel that the number of repair service facilities and the typical repair time for a hi-fi component should be studied by a publication such as yours.

Bernard R. Kingsley
Apple Creek, O.

Editor's Note: We currently have in house an article examining the service practices and attitudes about warranties of various major brand service managers and service facilities. While it appears that most audio buffs experience substantially better service than has Mr. Kingsley, it does appear that there are several steps which can be taken by the consumer which will lead to better and quicker repairs. We anticipate that the article will be published early this year. — E.P.

IF YOU HAVE AN EAR FOR MUSIC, YOU NEED THREE HEADS TO TAPE IT.

2-Head Cassette Recorders made home recording convenient. Now the 3-Head Fisher CR5120 makes it professional.

It really isn't fair to compare the Fisher Studio Standard CR5120 to other cassette recorders. Its superior flexibility and performance are comparable only to the most sophisticated reel-to-reel tape decks. The CR5120 combines the conveni-

ence of cassette with 3-head tape/source monitoring. The CR5120 delivers exceptional performance with important recording features like Dolby* noise reduction, signal limiting, and LED peak indicators.

Eliminate

Guesswork. The only way to make consistently perfect high fidelity recordings is to compare the quality of the taped signal to the original while the tape is actually being made. Studio engineers call this "monitoring," and it can only be accomplished on a 3-head tape deck. Monitoring subjects every inch of tape to instantaneous analysis by the most sensitive acoustic device available—the human ear—assuring a perfect "take" without guesswork.

Better Sound. Nearly all cassette decks have two tape heads—an erase head and a record/playback head. Even the best of them exhibit certain unavoidable compromises due to the combination record/playback head configuration. These compromises, although accepted by the industry, were not acceptable to Fisher engineers. They created the CR5120, a major advancement in cassette deck technology utilizing three separate, precision long-life ferrite tape heads: erase, record, and playback. Fisher engineers developed a wide-gap

4-micron record head for high output with an incredible 64dB signal-to-noise ratio...and a playback head having a very narrow gap (1.6 micron) for extended frequency response—30 to 18,000 Hz, ± 3 dB. The result is sound recorded on the CR5120 is exactly like the original. No more...and no less.

A recording studio engineer would never consider recording without the improved performance and monitoring capabilities of a 3-head tape deck—and neither should you.

The CR5120 provides a tape/source monitor switch for instantaneous comparison while listening. **2-Motor, Dual-Capstan Tape Transport.** Professional recording requires tape alignment exactly perpendicular to the tape heads. To accomplish this, Fisher engineers equipped the CR5120 with two capstan/pinch roller assemblies: one preceding, the other following the tape heads. Both capstans are micro-ground for absolute concentricity; and each is fitted with a heavy, dynamically balanced flywheel for smooth operation. The capstans are driven by a servo-controlled

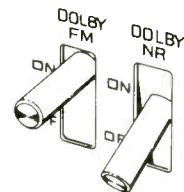
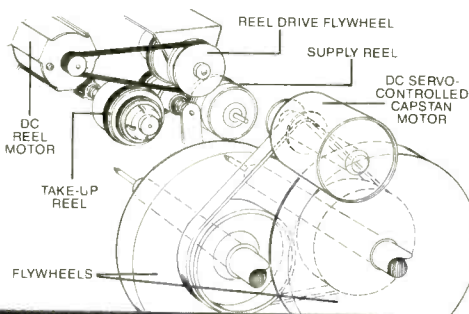
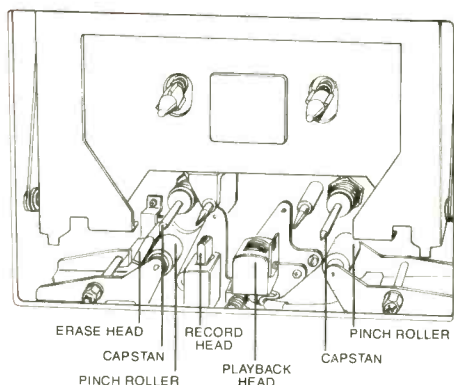
Hall-effect DC motor for absolute speed accuracy, independent of fluctuations in AC line voltage. A second, DC-controlled motor provides the proper hold-back tension. This configuration, standard for professional recording equipment, is responsible for the CR5120's exceptionally low wow and flutter specification of 0.04% WRMS ... performance superior to most reel-to-reel decks.

Dual Dolby Noise Reduction For Tape and FM. The CR5120 utilizes Dolby noise reduction to suppress tape hiss, improving recorded dynamic range up to 10dB. It incorporates separate record and playback Dolby IC circuitry so that both the source and monitored signals are simultaneously Dolby processed—a feature found only in the most advanced recording systems. Dolby circuitry is also provided to decode Dolby FM broadcasts.

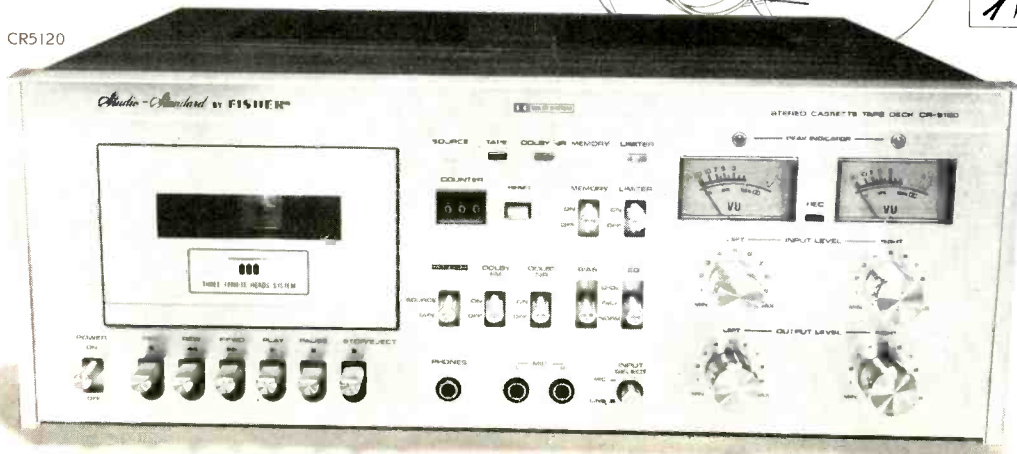
Other Professional Features. Separate input and output controls for each channel provide maximum flexibility. Two illuminated VU meters, each with an LED peak indicator calibrated to +3 VU for accurate visual monitoring. Switchable limiter circuitry prevents distortion due to tape saturation. A three-digit counter with memory is included to quickly, automatically, locate the start of a recorded program.

The Final Word. The unique Fisher CR5120 is priced about \$400** Available at fine audio stores or the audio department of better department stores.

For location of nearest Fisher dealer, call toll free 1/800/528-6050, ext. 871 from anywhere in U.S. Arizona residents call 1/955-9710, ext. 871.



CR5120



FISHER
The first name in high fidelity.

© 1977, Fisher Corporation, 21314 Lassen St., Chatsworth, Calif 91311

*Dolby is a trademark of Dolby Labs. Inc. **Mfg. suggested retail price. Actual sale price is determined by dealer.

Specifications

Frequency Response (record/playback)	Standard Tape 30-15,000 Hz, ± 3 dB CrO ₂ Tape 30-18,000 Hz, ± 3 dB
Wow & Flutter	0.04% WRMS
Signal to Noise Ratio	64dB
Dimensions (HxWxD)	6 1/2" x 17 1/4" x 12 1/2"

Behind the scenes

Bert Whyte

In New York, there is a snap in the air, and the autumnal colors have come. Even without these harbingers of Fall, I know the season is upon us by the number of press releases and invitations to press conferences to preview new audio equipment. The Audio Engineering Society reminds me I am due at the 58th convention at the Waldorf, November 4-7. No sooner do we catch our breath, when we check into Terry Rogers' "New York Hi-Fi Stereo Music Show" at the Statler Hilton, running from November 10th through the 13th. There has been much controversy about the value of "hotel hi-fi shows" to audio manufacturers. Be that as it may, the show appears to be "sold out." Since this is the first hi-fi show in New York in over four years, interest among the audiophiles is sure to be high, and the audio companies are going to tempt them with a plethora of new products.

You may recall that I visited Studer/Revox in Zurich during July of 1976, and Willi Studer gave me a "look see" at some new developments, with intimations of other products to come. Thus, when I recently received an invitation to a Revox press conference, I felt sure I would be shown a new generation of Revox audio components. Not only did they show the new B77 tape recorder I expected, but the B760, a new quartz-controlled digital FM tuner; the B750, a 60 watt/channel @ 4 ohm integrated amplifier, and, totally unexpected from Revox, a very sophisticated, quartz-controlled, direct-drive turntable with a tangential-tracking tonearm!

Revox Roundup

The B77 is a new tape recorder, but it is not the successor to the A77, which stays in the line. It does however retain many of the features of the A77, such as the die-cast chassis, the outside-rotor supply and take-up motors, and the servo-controlled, direct-drive capstan motor. New on the B77 is full electronic logic control of tape motion. There are no levers or

relays and any of the drive modes can be entered directly without going through the Stop mode. There are new record and playback electronics, with the bias oscillator putting out 150 kHz. Revox is particularly proud of the 24-dB headroom on the B77 in both record and playback, which puts it right up with the professional recorders in this respect. Revox also makes a point of their frequency response of 30 Hz-20 kHz, ± 3 dB @ 7.5 ips, noting that their 0 dB point is at 1 kHz, thus their worst case droop at the upper and lower frequency extremes is only 3 dB. Revox makes much of the fact that their heads, made in their



Revox B77 tape recorder

own plant, do not exhibit the low-frequency head-bump excursions, which are a design anomaly present even in some of the best professional heads. A very strong claim is made for the wear characteristics of the B77 magnetic heads, stating that head life cannot be surpassed by any recorder currently on the market. The B77 employs new VU meters, considerably larger than the meters on the A77, and they are fitted with long scales and LED over-modulation indicators. To the right of the head assembly, the B77 sports a new splicing block with built-in shears. New muting circuits are used which prevents source/tape monitor switching transients from affecting the recorded signal. Electrically, the B77 claims a S/N ratio of 66 dB @ 7.5 ips,

half-track "A" weighted, and total harmonic distortion of 1 per cent for the record/play cycle. The B77 will be available with quarter or half-track head configuration with tape speeds of 3.75 and 7.5 ips. No doubt, a high-speed (7.5/15 ips) version will ultimately be available, as was the case with the A77. The suggested price of the B77 is \$1195.00. With a recorder in this price and quality range, there will be some who question the use of microphones with unbalanced lines and input impedances 600 ohms and up. However, with most high-quality mikes having impedances of 50-150 ohms, this shouldn't be much of a problem. Another point of controversy is that bias and equalization facilities are not available on the front panel nor does the playback potentiometer control the VU meter movement, making the use of alignment tapes difficult. With any new tape recorder there is bound to be some nit-picking. All in all though, the B77 seems to have a lot going for it, and with Willi Studer's well-founded reputation for high quality, it should prove to be a fine performing tape recorder. Time and testing will tell!

Revox, like many other audio companies these days, evidently wants to have a full line of components to offer audiophiles. Their B760 digital FM tuner is a very sophisticated unit, utilizing frequency synthesizer tuning controlled from a quartz reference crystal. There are 15 pushbuttons which can activate a CMOS memory and store the frequencies of 15 stations. Tuning is as simple as pressing a button, and the number of the station, and the station frequency is digitally displayed. A 68.18 nS digital FM demodulator is a feature, and the unit has very wide bandwidth and linearity, plus very low distortion. A Dolby card can be plugged into the tuner for decoding of Dolby FM broadcasts.

The B750 integrated amplifier puts out 60 watts/channel into 4 ohms, with THD less than 0.1 per cent up to full output. A fully complementary push-pull output stage is featured for each

If you believe that perfection is a thing of the past, take a good look at the Nakamichi 410 Preamp, 420 Power Amplifier and 430 FM Tuner—the most elegantly compact, best performing trio of components on the market today.

Timelessly styled, they adapt to the most limited spaces (each measures less than 9"x16"x3¼") and can be arranged in an endless variety of ways. Altogether, they occupy less space than most receivers, yet, since each is a separate component, the three easily adapt to unusual space requirements. Installed "bare", they are a handsome addition to any interior; attractive walnut finish enclosures are available at small additional cost.

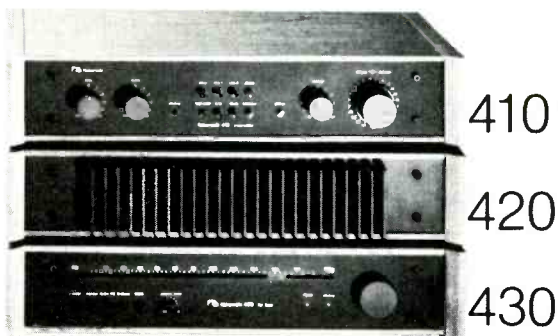
Each, of course, embodies world-famous no-compromise Nakamichi engineering and quality construction... with the distinctive "feel" of meticulous manufacture. The 410 Preamp and 420 Power Amplifier have established that great things do indeed come in small packages. Both challenge the theoretical limits of error-free amplification. Performance specifications, such as a phono equivalent input noise figure of -140dB (IHF-A) or a power amplifier THD figure of under 0.0008% (@ 1kHz and any power level below clipping), are proof of Nakamichi's highly advanced engineering know-how and skill.

Perfection...from Nakamichi

The recently introduced 430 FM Tuner completes the system. It utilizes a specially-designed linear-phase IF stage, resulting in distortion of less than 0.06% in mono, 0.09% in stereo. A phase-locked-loop multiplex demodulator ensures maximum stereo separation. Nakamichi's tuning lamp system with "self-lock" circuitry makes pinpoint station selection a breeze. Other features include narrow/wide selectivity switching, defeatable interstation muting, hi-blend, and an optional plug-in card for Dolby[®] FM. FM broadcast quality will have to improve tremendously before the 430 can be fully appreciated.

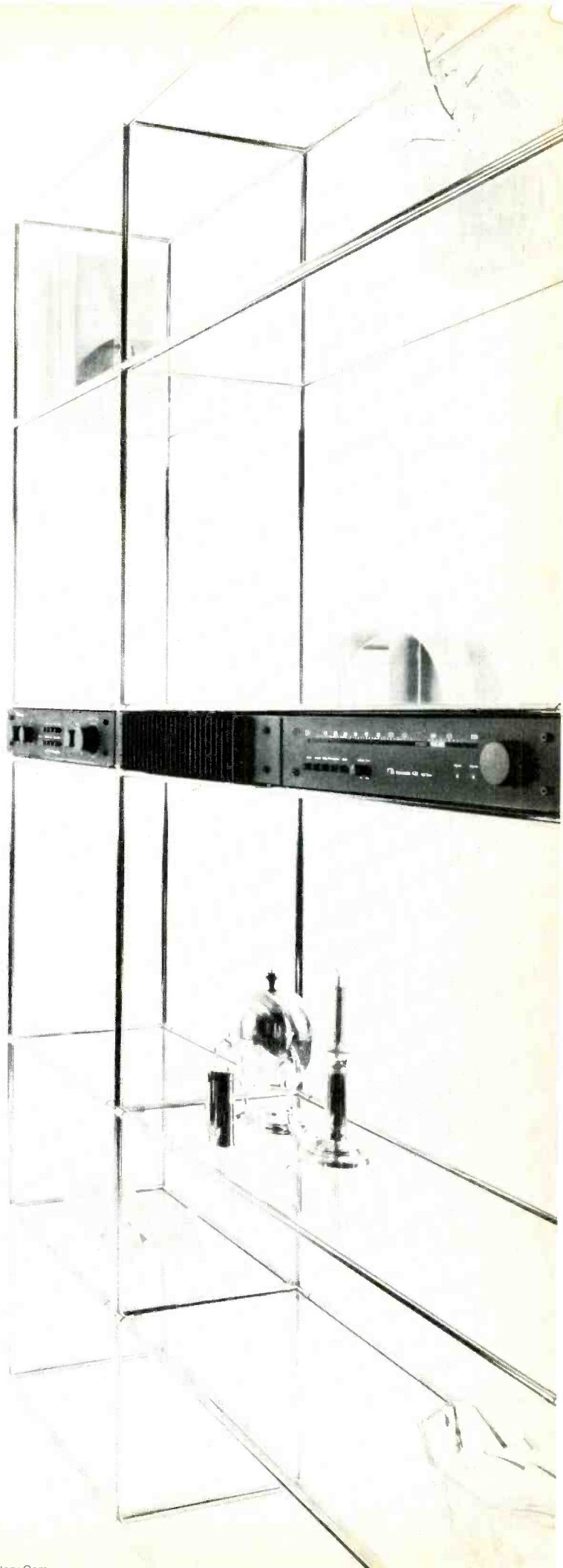
The most pleasant surprise will come when you price the Nakamichi 410, 420 and 430—they are amazingly affordable. So, if you're limited by space or budget, but unwilling to compromise on quality or performance, nothing could be more perfect. See and hear them at your Nakamichi dealer soon. For further information, write Nakamichi Research (USA), Inc., 220 Westbury Ave., Carle Place, N.Y. 11514.

*Dolby is a Trademark of Dolby Laboratories, Inc.



Nakamichi

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channel, and Revox makes the eyebrow-raising claim that the amplifier has *no* transient intermodulation distortion! A unique feature is that the two amplifier sections can be separated by switching for separate use or for coupling to an external equalizer.

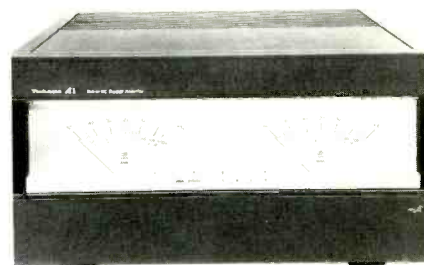
Surprise of the Revox press conference was the B790 turntable, a direct-drive turntable with servo electronics phase locked to a quartz reference. Nice, but nothing too unusual there. Ah, but the arm is another matter. After a record is placed on the turntable, an arm cradle

assembly is swung into position and an ultra-short arm, less than 2 inches in length, tangentially tracks the record. The arm is servo controlled, with a geared servo motor guiding the tone-arm cradle across the record. Two photo diodes on the end of the arm receive infra-red light from an LED through a slot in the arm. Any canting of the arm from perpendicularity causes an asymmetrical amount of light at the diodes, the servo pre-amplifier detects this, and appropriate correction is made. Lowering and lifting of the arm is via electro-magnetic con-

trol. An Ortofon VMS20E phono cartridge is supplied with the unit, and while it is not a special type, changing of the cartridge is supposed to be a factory matter. I don't know whether you are "locked" into the Ortofon cartridge. It is a fine cartridge, but if someone prefers another brand, this may pose problems. In any case, this a unique, "hands off" turntable that provides optimum tangential tracking. Price is supposed to be "around \$700.00"

Technics Triumph

Hard on the heels of the Revox conference, Technics held a press conference and introduced some new components that really had us all agog. How about a 350-watt-per-channel, class-A d.c. stereo power amplifier! This is the rating of their SE-A1 unit which is claimed to have no more than 0.003 per cent THD from 20 Hz to 20 kHz. At 1 kHz, they state the THD is unmeasurable on the best test equipment. All this is accomplished by



Technics SE-A1 amplifier

what Technics calls "class-A plus" operation. In their explanation, a class-A amplifier, of about two watts power, has its power supply ground potential floated, while a high voltage, synchronized with the amplitude of the audio signal, is applied from an independent power supply amplifier. The output of the "class-A plus" is connected directly to the speaker terminals in push-pull operation, thereby eliminating switching and crossover distortion. To do all this, a total of eight separate power supply stages have been incorporated, four for each channel, in this bi-monophonic constructed amplifier. Four electrolytic capacitors of 100,000 μ F each have been coupled to the class-A amplifier, and another four capacitors of 22,000 μ F each are connected to the power supply amplifier. Both left and right channels also include high capacity, low d.c. resistance toroidal transformers. All coupling capacitors have been eliminated from the signal path, including the negative feedback loop. The problem of d.c. drift, common to all d.c. coupled amplifiers, was

WOW!

and other comments from audio critics about Ohm C₂ loudspeakers:



Comments from High Fidelity:

"The speakers produce a sound that is clear and well detailed and — if you want it that way — loud. Transient response is crisp . . . Things seem to be accurately positioned from left to right . . ."

"Surely, all things considered, the design of the Ohm C₂ represents a fine achievement. With classical music its performance is adequate with something to spare. And with popular music — wow!"

Comments from The Complete Guide to Stereo/Hifi Equipment:

"The C₂ is a high-efficiency speaker with ruler-flat response to 37 Hz., high-power handling capability, very smooth treble response, and excellent dispersion. Considering the size of the box, performance, and price, the Ohm C₂ must be reckoned with as one of the better speaker values available . . . Ohm speakers are very well made, and we recommend this model highly."



241 Taaffe Place, Brooklyn, N.Y. 11205

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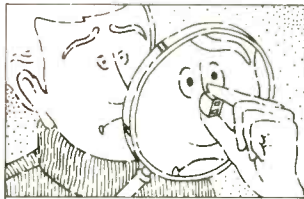
AUDIO • January 1978

ARE YOU BLAMING YOUR TAPE RECORDER FOR PROBLEMS CAUSED BY YOUR TAPES?

Every day people all over the country go into hi fi dealers with complaints about their tape recorders.

When in reality what they should be complaining about is their tapes.

Because the fact is, a lot of the problems that plague tape recorders can be attributed to bad tape.



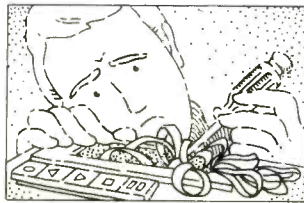
HEAD WEAR IS CAUSED BY YOUR RECORDER. OR IS IT?

If you have to clean your tape heads more than usual, for example, it could be your tape doesn't have a special nonabrasive head cleaner.

Maxell has one.

If your recorder jams, it can be any number of things. Maxell does something to prevent all of them.

We make our cassette shells of high impact polystyrene. And then so they won't crack



JAMMING IS CAUSED BY YOUR RECORDER. OR IS IT?

even after years of use, we finish them to tolerances as much as 60% higher than industry standards.

Inside, we use free rolling Delrin rollers so the tape doesn't stick.

And finally, we screw instead of weld everything together because screws make

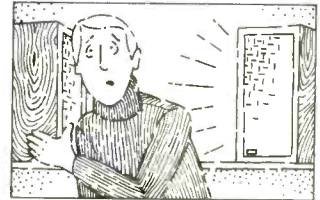
for stronger cassettes.

If your recorder frequently suffers lapses in sound, it could be the tape is of inferior quality. And nobody's bothered testing the tape for dropouts before it leaves the factory.



DROPOUTS ARE CAUSED BY YOUR RECORDER. OR ARE THEY?

Maxell tape is made of only the finest polyesters. And then every



POOR TRACKING IS CAUSED BY YOUR RECORDER. OR IS IT?

step of the way it's checked for even the slightest inconsistencies.

So if you're having problems with your recorder, try a Maxell cassette, 8-track or reel-to-reel tape.

You might find there's really nothing wrong with your tape recorder, just with your tape.



MAXELL THE TAPE THAT'S TOO GOOD FOR MOST EQUIPMENT.

Maxell Corporation of America, 130 West Commercial Ave. Moonachie, New Jersey 07074.

Enter No. 29 on Reader Service Card

solved with an active, thermal servo-control amplifier, independent from the signal path. With this new circuitry, in spite of the huge 350-watt/channel output, the amplifier is not overly large, although it weighs 112 lbs. and does not get hot enough to require a cooling fan. This is, of course, in marked contrast to most class-A amplifiers. Frequency response of the SE-A1 from d.c. to 200 kHz is +0, -1 dB; S/N ratio, IHF "A" weighted, is 120 dB, and the unit has a slew rate of 70 volts per microsecond. The amplifier has two special +10 to -50 dB, rapid-response, peak-reading power meters,

with switches for 4-, 6-, 8- and 16-ohm readings. It has four sets of speaker terminals with four independent level controls. Input terminals are gold-plated. Obviously, a class-A amplifier of this power breaks new grounds and is most likely the prototype for a whole new family of class-A amplifiers. It is incontestably the tops in one category . . . price. Are you ready, fellas? . . . \$4000.00!

As a companion unit to the SE-A1 amplifier, Technics introduced their SU-A2 d.c. control amplifier, which combines the functions of a preamplifier and parametric equalizer. Class-A

amplifier operation is employed in all stages of the SU-A2 and is claimed to completely eliminate all switching and crossover distortion. There is a separate phono input for moving-coil cartridges with a S/N of 80 dB @ 100 μ V. The phono input for moving-



Technics SU-A2

magnet cartridges is said to have the astonishing S/N ratio of 107 dB for 10 mV! The MM input signal is claimed to have less than 0.003 per cent THD from 20 Hz to 20 kHz. As in the power amplifier, all coupling capacitors in the signal path have been eliminated. The equalizer circuit is completely d.c. The d.c. drift is again under control of thermal servo circuits. The preamplifier has fade-in/fade-out, touch-type switches which eliminate crosstalk signal leakage and shock noise by utilizing reed relays for optimum switching. This unit has "whistles and bells" galore . . . a built-in oscillator which produces sine waves, square waves, pink noise, and warble tone signals, plus a universal frequency equalizer. There are special meters for peak and average modes, and peak hold as well. All input and output terminals are gold-plated . . . I could go on and on, but you get the idea! Another \$4000.00 will mate this pre-amp control unit with that nice 350-watt amplifier. Can't you just see this \$8000.00 pair showing up as "his and her" baubles in the Neiman-Marcus Christmas catalog?

AES Prelude

The 58th AES convention at the Waldorf is shaping up as one of the biggest ever. In fact, new areas of the hotel are being used for the first time. As I have pointed out before, the AES is becoming a mini hi-fi show, with this year over 30 companies presenting sound demonstrations, necessitating a move to the 10th floor. The trend to digital recording may well begin at this convention, with a number of systems finally available for commercial use. The showing of a digitally-encoded audio disc with laser read-out, a la the Philips/MCA videodisc, by Teac at the Tokyo Audio Fair, may give added impetus to the idea of digital recording. As usual, I will bring you a complete report on the audio products making news at the AES convention. A

What neither the hi-fi slicks nor the "undergrounds" will tell you.

Consider the dilemma of the serious audio enthusiast looking for sophisticated guidance and tough, no-nonsense equipment reviews.

The big, commercial hi-fi magazines can't afford to offend their advertisers. Most of their reviewers are ultraconservative company men who never met an amplifier they didn't like. The so-called underground audiophile reviews are somewhat more helpful, since they at least report truthfully what they heard from where they were sitting. Unfortunately, most of them are untutored in physics, mathematics and electrical engineering, so they're unable to deflate technical mumbo jumbo

or to distinguish defective design from defective operation. (One of them recently reported a 16,000 Hz peak in a *power amplifier!*)

Only when The Audio Critic appeared on the scene early in 1977 did a satisfactory alternative become available. Six times a year, The Audio Critic lays it right on the line, both subjectively and objectively. It still gives top priority to listening tests but firmly believes in verifying its conclusions in its own well-equipped laboratory. Its staff is equally at ease with Mozart, Pink Floyd, spectrum analyzers and the difference between Butterworth and Chebyshev filter response. And it's 100% noncommercial, accepting advertising neither from manufacturers nor from dealers. So no one can inhibit or influence its reviews. Some of these are already classics — the first to point out little-known products of great merit, and to demolish sacred cows, pretentious hypes and downright frauds.

One year's subscription to The Audio Critic (six issues) costs \$28, first-class mail only. (No Canadian dollars, please!) For overseas airmail, add \$5. No single copies are sold for any reason whatsoever, but the unused portion of canceled subscriptions is refundable on request.

We strongly suggest that you begin your subscription with Volume 1, Number 1, in order to own a complete set and be thoroughly familiar with our approach. If you wish, however, we'll start you with any issue you specify. And we'll do the same for anyone whom you want to surprise with a Christmas gift subscription.

Send your \$28 for your first six issues today to The Audio Critic, Box 392, Bronxville, New York 10708.

Volume 1, Number 4 July/August/September 1977

The Audio Critic

In this issue:

The speaker survey at last, with 15 systems from \$224 to \$5200 a pair compared in this first go-around. (The \$5200 one sounded best, alas.)

Our power amplifier survey continues in a rather positive vein, especially since this second batch includes our new reference standard.

We launch what may be our most important and, to some, most disturbing inquiry so far: an updated investigation of the cartridge/arm/turntable relationship. Including 10 tone-arm and turntable reviews for openers.

Plus, of course, our regular features.

Sony's reputation for quality is now being challenged by its reputation for value.

For elegant engineering and technical finesse, the world looks to Sony. But what is often overlooked is the solid value that Sony represents.

Witness three important Sony receivers: The STR-6800SD, \$565. The STR-5800SD, \$450. And the STR-4800SD, priced at \$350. (Mfr's. Suggested Retail)

We respectfully care any manufacturer to give you features like these at prices like those:

Sony. Your local power company. The 6800, 5800 and 4800 are rated at 30, 55 and 35 watts, respectively. Minimum RMS at 8 ohms, from 20 to 20kHz, at 0.1% T.H.D. And keep in mind that we're conservative; tougher on our ratings than any independent rating lab would be.

Get out of the Dolby doldrums. If your favorite station is Dolbyized, rest assured that these receivers have a complete FM Dolby noise reduction system. That minimizes noise and over-load distortion.

Acousti-Comp is no small compensation. For listening at all levels, an exclusive 3-position loudness adjustment. It compensates for the lack of highs, lows, or midrange. Insuring accurate reproduction regardless of room acoustics or speaker deficiencies.

A new transistor is invented! You may not have heard it on the news, but news it is. Our LEC (low emitter concentration) transistor is designed, made by, and exclusive to Sony. It guarantees low noise, and a wide dynamic range.

You'll be glad you use our dia. The dials on these receivers incorporate an LED that doubles in length when the station is being properly received. That's part of what we call human engineering—and it's based on the observation that machines don't use our machines, people do. So also you'll find a stereo indication light, signal strength meter, and more. All placed for your convenience, not ours.

So to all those who are struggling to match Sony's quality, now you have to match our prices, too.

SONY AUDIO

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What's new

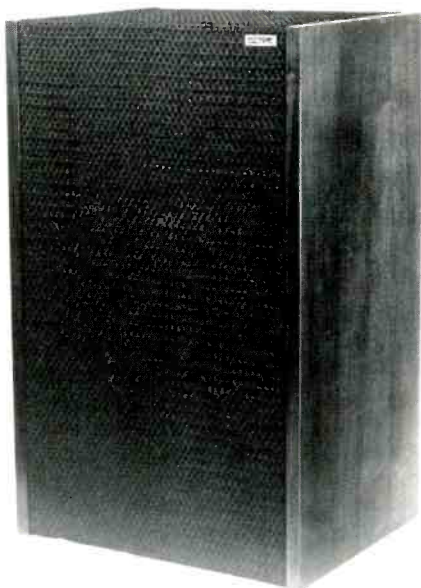
Community Light Catalog

Product specifications for the firm's radial, straight high-frequency, multicell, and cone-driven horns and cabinets, along with information on drivers, accessories, and systems design and application. Also included are detailed comparative measurements of the firm's products versus similar products from other well-known makers. These measurements give coverage angle by frequency and 6, 12, and 20 dB down points, along with data on system Q, D_v, and sensitivity for 1-watt of pink noise input.

Enter No. 80 on Reader Service Card

STR Loudspeaker

The STR Delta 3-way, acoustic suspension loudspeaker features a 10-in. woofer with a high flux density [8,500 gauss], 20-oz. magnet and a low loss voice coil, a 12-cm mid-range



driver, and a Metastatic slot, solid-state tweeter. The rated output level is 99 dB SPL at 1 meter on axis with 1 watt rms power at 100 Hz. Amplifier power limits are a minimum 10 watts rms/ch and maximum 75 watts rms/ch, while frequency response is specified as 37 Hz to 31 kHz. Price: \$200.00.

Enter No. 81 on Reader Service Card

Burwen Headphones

The PMB 6 headphones feature a push-pull orthodynamic driver, which utilizes a thin voice-coil diaphragm printed with coaxial conductors and positioned between two perforated



disc magnets. The frequency response is 16-23,000 Hz, THD 0.3 per cent, maximum sound pressure level 121 dB at 1 kHz, and impedance is 140. Price: \$89.95.

Enter No. 82 on Reader Service Card

PS Audio Preamplifier

The PS II preamplifier features passive RIAA equalization with an accuracy of ± 0.2 dB re: RIAA; rated harmonic, IM, and TIM distortion figures of 0.01 per cent; a gain of 40 dB @ 1 kHz, and a S/N ratio of 78 dB "A" weighted re:10 mV. The input impedance is 47 kilohms, the input overload of 380 mV @ 1 kHz, and an output impedance of 6.8 kilohms. Price: \$119.95.

Enter No. 83 on Reader Service Card

Koss Loudspeaker

The Model CM/1030 four-way loudspeaker system has a 10 in. woofer, two 4½ in. mid-range drivers, and two 1 in. tweeters. The vented-box design was tuned to Thiele-Small parameters using a computer to specify relations between cabinet design, drivers, and crossover for the optimum trade-offs between low-frequency cut-off, efficiency, and box volume. Bandpass response [3 dB down points] is 29 Hz to 19,000 Hz, recommended amplifier power rating is 15 to 200 watts per channel. It measures 16½ in. x 14½ in. x 39 in. and weighs 74 lbs. Price: \$385.00.

Enter No. 84 on Reader Service Card

Books on Tape Catalog

The free Summer 1977 Complete Catalog lists 75 titles of full-length readings by best-selling authors recorded on rental cassettes of 1 or 1½ hours. Categories of books include Americana, classics, fiction, history and war, non-fiction, and travel and adventure. Price: \$6.50, \$7.00, \$7.50 (depending on book length), plus \$1.75 per book for postage and handling.

Enter No. 85 on Reader Service Card

BGW Stereo System Control Center

The Model 203 contains a dual-band phono preamplifier design, a high output line amplifier, dual voltage-regulated power supply circuitry, active 18 dB per-octave subsonic and scratch filters, high/low gain switch for optimizing signal-to-noise ratios, front-panel tape-copy and headphone jacks, and provisions for remote moving-coil pre-preamplifier and remote a.c. power switching. Input impedance for phono is 47 kilohms, input overload for phono is 100 millivolts at 1 kHz, rated output is 4 volts rms into 5 kilohms, total harmonic distortion is less than 0.01 per cent at rated output 20 Hz-20 kHz, S/N ratio is 88 dB, and frequency response is ± 0.2 dB, 20 Hz to 20 kHz from level inputs. Price \$649.00.

Enter No. 86 on Reader Service Card

BGW Power Amplifier

The Model 410 stereo power amplifier features an arc-scale, peak reading L.E.D. display; controls for adjustment of input sensitivity and



speaker selection, a headphone output jack, high-speed arc-interrupting and relay speaker protection circuitry, and complementary symmetry, d.c.-coupled design. The unit delivers 200 watts continuous power into 8 ohms, with 0.05 per cent THD. Price: \$699.00.

Enter No. 87 on Reader Service Card



Model A-4000

METRON/Measure . . .
(CR Definition "measure . . .")

THE METRON GROUP—a small, international band of ingenious engineers, scientists, and assorted crazies bent on expanding the boundaries of audio technology.

Our group is informal, motivated and well credentialed. We are trying to correlate the best measurement technology available with enlightened listening experience—that is, reconcile subjective opinions and objective test data. Some people say this is difficult. Some say it's downright impossible. Our group seems to think that it's probably somewhere in between, so we are trying anyway.

We are well supported by the financial and technological resources of a large independent audio manufacturer. Independence from conglomerate red tape makes this deep commitment possible.

The initial Metron electronic products have impressive specs indeed, but we also know that impressive specs and impeccable sound don't necessarily correlate. We have concentrated on parameters that contribute most directly to the listening experience.

The Model PR-1 Preamplifier Control Center

- Enormous dynamic range due to high supply voltages and low noise

- High slew rate: 100 V/μs
- Accurate IIA equalizations: ±15dB
- Low transient I.M. Distortion
- Fully regulated, symmetrical tracking power supplies
- Every gain block from input to output is double differential, full complementary high voltage, discrete, with optimum local feedback
- No rubbing contact potentiometers used in signal paths
- All controls in signal path are ganged, precision silver-plated attenuators with fixed deposited film resistors
- 7 inputs and 5 outputs up to +23dBm (12 volts) THD less than .005% 20Hz-20kHz

The Model M-200 Power Amplifier

- Symmetrical, differential, full complimentary circuitry
- 50 V/μs slew rate
- Clips gracefully with rapid dynamic recovery
- Low transient IM distortion
- Relay malfunction protection (No D.C. fuses)
- RMS integrating meters
- Minimum power at clipping: 200 Watts RMS/per channel into 4Ω
- Distortion .02% THD at 125 watts RMS per channel into 8Ω, 20Hz to 20 kHz

- Noise: -92dB<1.0 volt, Dynamic Range: 122dB

The Model A-4000 Power Amplifier

Same specifications as M200 including:

- Sample and hold peak reading meters/50dB range
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These initial three products distill the essence of two high-technology cultures into a total amplification system without peer. The construction is elegant, meticulous and precise. The components are fabricated from the finest materials to meet the most stringent specifications.

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Audioclinic

Joseph Giovanelli

Equalizers & Long Cables

Q. I am thinking about buying an equalizer. I have my stereo equipment in one room and my speakers in another, but I want the equalizer to be in the same room with the speakers, which is at least 30 feet away from the other components. I need to know a way to run the lines that far without changing the frequency response, or adding hum and hiss. I know of only two ways that this can be done . . . either by using matching transformers or through the use of integrated circuits. I need to know the answer to this before I buy the equalizer, since the equalizer is of no use to me if I cannot adjust it during each album I play.
—Michael D. Snyder, Pittsburgh, Pa.

A. Most equipment these days has low impedance output and relatively high impedance input. Because of this, it is possible that you can actually run your equalizer with no matching transformers, ICs or other intermediate devices. The signal levels are high enough so that hiss or hum should not be a problem. It is only where the reactance of the shielded cable, interconnecting the equipment, becomes low enough to equal the output impedance of either the equalizer or the equipment driving it at higher audio frequencies, that high frequency attenuation takes place.

If you use a separate preamplifier and power amplifier, then I suggest that you put the equalizer between them because this position will make it more likely that you can operate the equipment with no problems. This will now depend upon the output impedance of your equalizer relative to the capacitive reactance of the cable connecting the equalizer to the power amplifier. Make sure that the equalizer can supply the power amplifier with sufficient signal without becoming overloaded.

However, if you use tape monitor facilities, you must consider both the output impedance of the equalizer and that of the circuitry which drives the tape recorder inputs. These tape monitor output jacks are sometimes of high enough impedance so that the use of long cables might cause some high frequency losses.

Where it becomes necessary to use some other means to achieve your re-

quirements, I suggest that you use a simple emitter or source follower which should work very well providing low impedance and, at the same time, providing good signal level. With the use of matching transformers, the loss of signal, in most cases, will be too great. I see no need to use ICs where one single, discrete component will work fine.

Disc Playback with Dolby

Q. Please explain why the Dolby system cannot be used for the playback of discs. I would certainly think that it could. —Fletcher King, Andover, Mass.

A. Let us keep in mind that the Dolby system is a complimentary system. It is used where the program is both recorded and then played back with it. Note that recorded tapes are now available that have been recorded with the Dolby system, and you must use Dolby when playing them back in order to obtain the correct frequency response and dynamic range. As for disc recordings, the master tapes are often recorded using Dolby and when these tapes are transferred to discs, the Dolby system is once again used. So the final disc recordings are already properly decoded and further use would not be warranted.

Plastic Record Sleeves

Q. Are records better off stored in their original paper sleeves or in those plastic-lined ones?—David J. Lee, Wash. D.C.

A. I do not like those plastic-lined record sleeves as they cause more static build up than the paper sleeves. This static results from the sleeve rubbing against the record when it is withdrawn and reinserted. Static build up means that dust will be attracted to the surface of the disc, and in these days of high compliance phono cartridges and low tracking forces, dust causes more background noise and ultimate damage to the record surfaces than wear from playing the record a number of times.

If you have a problem or question on tape recording, write to Mr. Herman Burstein at AUDIO, 401 North Broad Street, Philadelphia, Pa. 19108. All letters are answered. Please enclose a stamped, self-addressed envelope.

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PART I

WHAT KIND OF FM ANTENNA IS BEST FOR YOU?

Michael J. Salvatti

The first FM antenna an audiophile usually comes into contact with is the ribbon dipole packed with most FM tuners and receivers, an antenna that is adequate for non-critical applications in high-signal strength areas. However, since the theme of this series of articles is quality FM antenna systems, the ribbon dipole will be relegated to the carton and the discussion of outdoor antennas will commence.

Omnidirectional Antennas

Omnidirectional antennas pick up signals equally well in all directions without the need of a rotator. Although high-gain omnis are possible, with few exceptions the only omnis readily available are the types shown in Figs. 1 and 4. Both of these antennas are variations on the simple folded dipole.

The Channel Master 4405 shown in Fig. 1 is simply a folded dipole bent into an S-shape to convert the dipole's "figure eight" horizontal-plane polar pattern (Fig. 2) into an approximation of a circular pattern (Fig. 3). The resulting antenna has a gain of about -1 dB relative to a 1/2-wave dipole. This type of omni is sold by Winegard (FR-1), JFD Electronics (AFM450), Kay Townes (FMOD-G), Gavin (FMS), and of course Channel Master.

The Lance FMO shown in Fig. 4 consists of two folded dipoles arranged at right angles to each other and connected by a 1/4-wave phasing harness. This yields a pattern somewhat like that shown

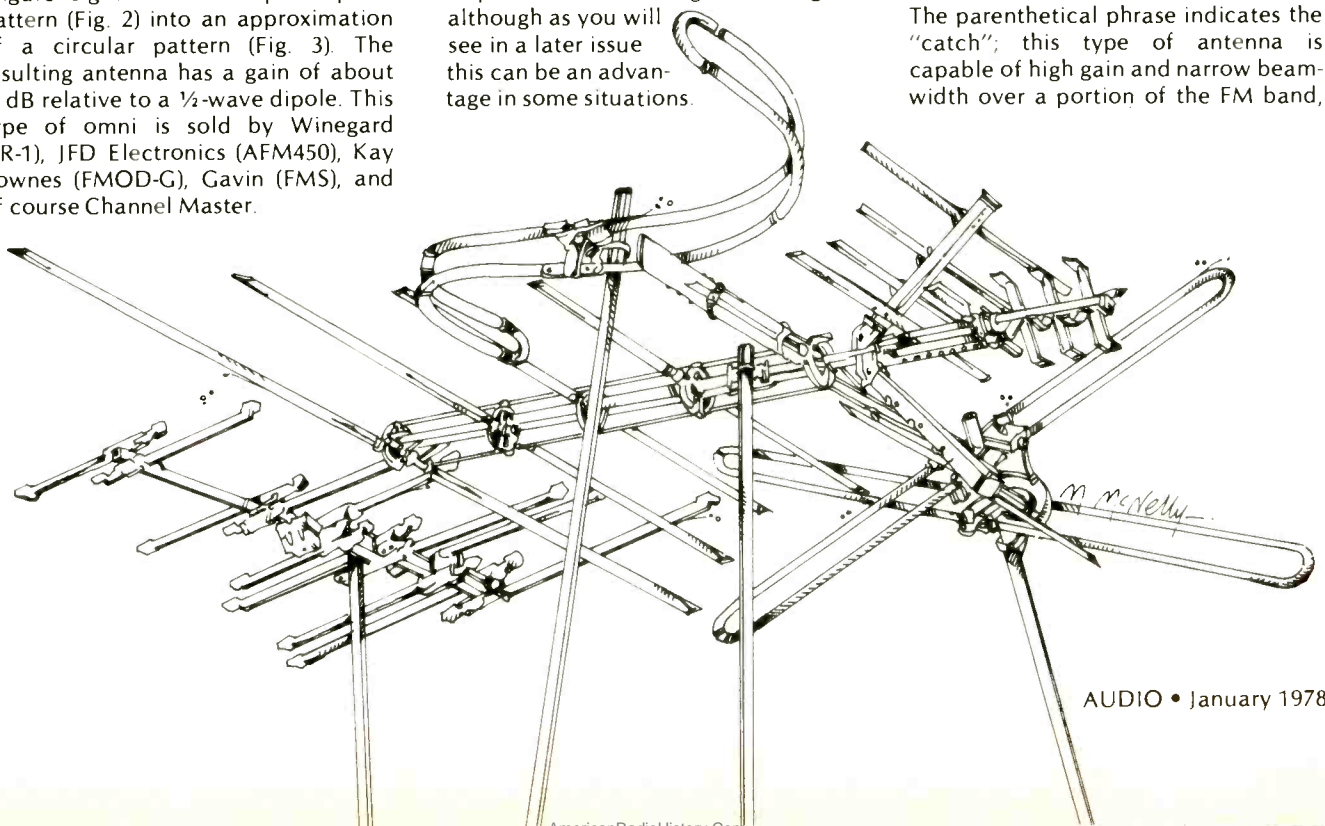
in Fig. 5. This type of omni, often called a "turnstile" antenna, has less gain than a 1/2-wave dipole. This very popular antenna style is also sold by Winegard (FM-3T), S&A Electronics (WCF-5), Antenna Corp. of America (AC-103), Kay Townes (FMND-1G), Gavin (FM-7), Jerrold (C677M), RMS Electronics (F-3), Channel Master (4403), and Antennacraft (GFMSS). Antennacraft also makes the G2FMSS, which consists of two vertically stacked turnstiles to achieve a few dB more gain and vertical-plane discrimination. This means that it has minimal pickup of noise and multipath signals originating above and below it.

When properly located and installed, one of these antennas and some 300-ohm twin leads comprise a very satisfactory antenna system for a large percentage of FM enthusiasts. The popularity of these antennas is due to the fact that when properly located and installed they provide a good S/N ratio for decent reception in metropolitan and suburban areas, are small and lightweight, low priced, easy to mount, and require no operation (rotation) in use. Their chief disadvantage is they afford no protection against multipath and noise pickup in either the horizontal or vertical planes. A possible disadvantage is low gain, although as you will see in a later issue this can be an advantage in some situations.

High-Gain Directional Antennas.

A high-gain antenna is needed when a distant station must be received with adequate quieting or when one antenna must drive a number of tuners. A high-gain antenna may also be needed in strong-signal areas, not because of its high gain, but because of the directionality that accompanies high gain. Directionality (narrow beamwidth and high front-to-back ratio), is the best countermeasure for multipath distortion and various types of r.f. interference. The idea is that a highly-directional antenna will pick up lots of signal in the direction it is aimed, but very little signal in other directions (where, presumably, the r.f. interference or multipath is coming from). These directional characteristics also permit listening to a distant station on the same frequency as a nearby (stronger) station. Naturally, these benefits are obtainable only if the desired station lies on a different bearing (direction) from the undesired stations or interference signals. Further discussion of this aspect of directional antennas continues in the section on reception problems at the end of this series of articles.

A very common type of directional antenna is a 3- to 5-element yagi (or beam) antenna. These usually consist of a folded dipole with reflector, and one or more directors (Fig. 6). The reflector and directors change the bidirectional (figure eight) pattern of the dipole to an essentially unidirectional (single main lobe) pattern, like that shown in Fig. 7. Generally, the greater the number of directors, the narrower the beamwidth and the higher the gain of the antenna (at certain frequencies). The parenthetical phrase indicates the "catch"; this type of antenna is capable of high gain and narrow beamwidth over a portion of the FM band,



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Much credit for its smooth coherence must be given to the precisely matched transient characteristics of the five drivers. And, a good deal has been written about the DQ-10 and its extraordinary solution to the problems of time delay or phase distortion. It is not surprising that other high quality speaker designers have followed suit in offering their versions of time delay correction.

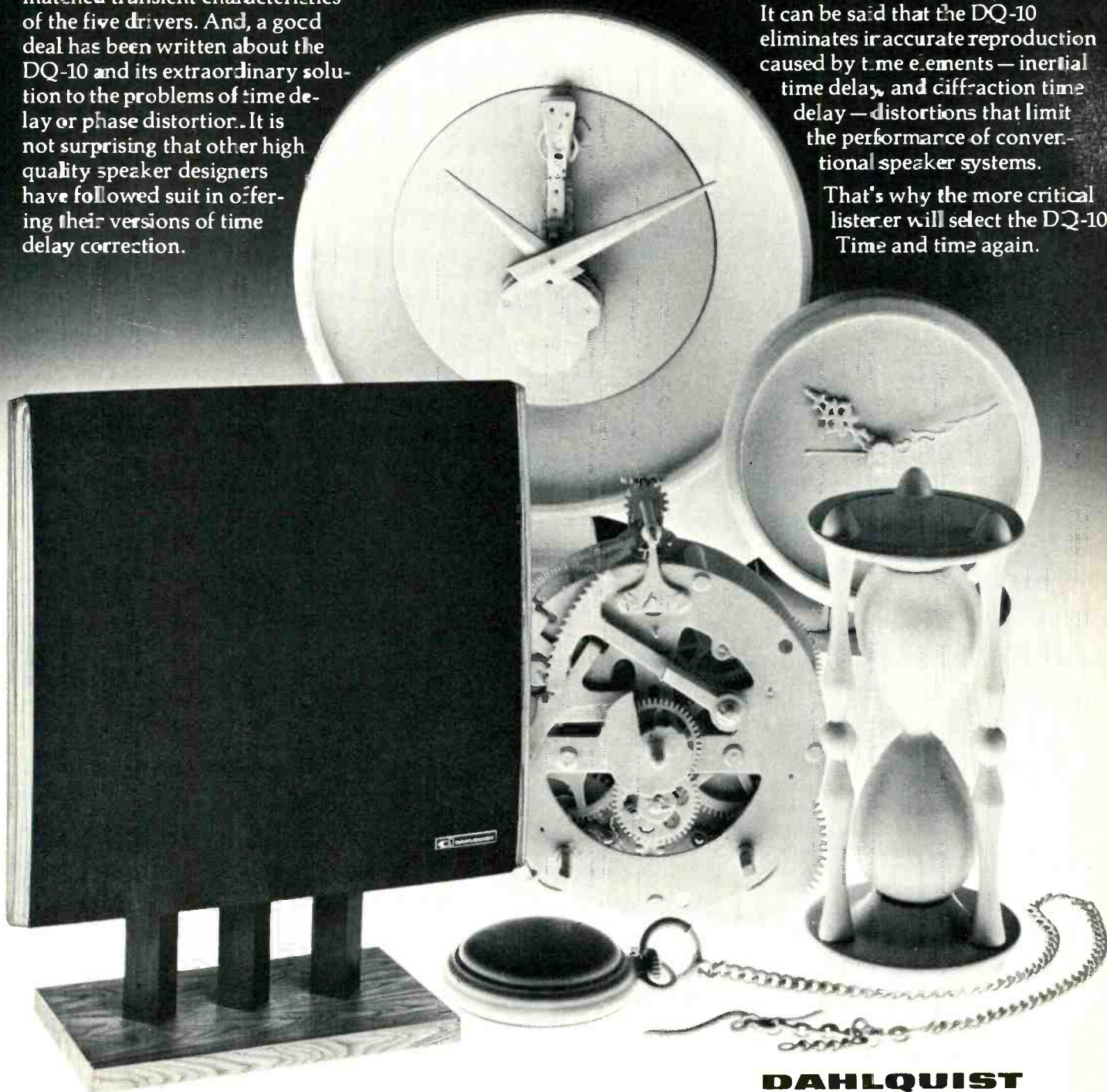
... and Time Again

The real "secret" to the unprecedented performance of the DQ-10 lies in Jon Dahlquist's patented method for reducing *diffraction*, a more audible and destructive form of *time* distortion. The separate baffle plate on which each driver

is mounted is dimensioned to minimize diffraction in the frequency band in which it operates. Thus, the effect of the sound we hear is that of a driver mounted in free space, without obstructions or surfaces to distort the original sound source.

It can be said that the DQ-10 eliminates inaccurate reproduction caused by time elements — inertial time delay, and diffraction time delay — distortions that limit the performance of conventional speaker systems.

That's why the more critical listener will select the DQ-10. Time and time again.



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Fig. 1—The Channel Master 4405 antenna is a folded dipole bent into an "S shape."

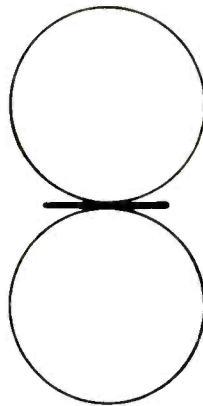


Fig. 2—Polar pattern of a folded dipole.

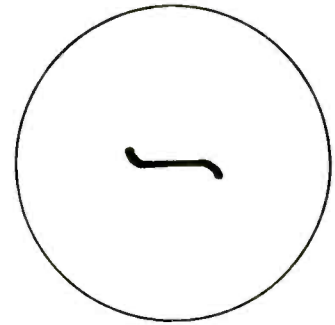


Fig. 3—The polar pattern of an S dipole.

but cannot provide consistent performance over the full FM band. Still, if cost is a factor, these simple yagis can be quite useful in all but the most critical situations. Even a very simple yagi will provide better S/N and multipath performance than an omni. The vertical-plane pattern of a small yagi is such that signals above and below the antenna are rejected, as well as those lying along azimuths not covered by the main lobe.

The very best directional antennas are those built to the log-periodic formula, which may be either pure logs or logs with directors. The characteristics that qualify this type of antenna as "best" include high absolute gain, excellent gain flatness across the entire FM band, excellent impedance match (VSWR) across the FM band, and nearly constant polar patterns at any frequency in the band. As you may conclude, the matter of consistent performance across the entire FM band is essentially what sets log periodics apart from the simple yagis.

A small but high-performance log periodic is the Winegard CH-6060 shown in Fig. 8. This ruggedly built antenna has less than 0.4 dB gain variation and only 7° beamwidth variation across the entire FM band, producing about 8½ dB gain with just a 60-inch boom length. A weatherproof housing on this antenna encloses a cartridge offering a choice of 300- or 75-ohm output impedance, so it can feed coaxial cable directly, without the need of an external antenna balun. As you can see from its polar patterns (Fig. 9), it has excellent front-to-back (F/B) ratio (20 dB minimum) and deep side nulls, with a beamwidth of 63-70°. A much larger version, the CH-6065, offers 1 to 2.4 dB more gain, and narrower beamwidth.

Jerrold's QFM-9 (Fig. 10) is a longer antenna (101 inches) costing about the same as the CH-6060. The QFM-9 has

slightly less gain (7 dB average), but unusually narrow beamwidth and the same excellent F/B ratio and deep side nulls. The beamwidth of the QFM-9 is only 56° over most of the band, narrowing to 49° at the upper end. This very narrow beamwidth at 108 MHz can be used to advantage in combating CB harmonic interference, as you will see in a future issue. (Note: All antenna gain figures in this article are from their respective manufacturer. Because of the many complex factors

involved in determining absolute antenna gain, the gains claimed for antennas not measured at the same time on the same test range should not be compared without considering that an error of up to 2 dB between antennas is not unusual.)

Factors that might be considered disadvantages of log periodics and long yagis are size, weight, and inconvenience. High gain and directionality are achieved at the cost of great size; antennas such as the Winegard CH-6065 can be over 140 inches long! Aside from the aspect of something this size above your dream cottage, large size also means lots of bucks, both for the antenna and a secure mount. And, except for cases where only a single station is within reception range or where all stations lie in the same direction, these antennas must be repositioned (via an antenna rotator) each time you listen to a station in a different direction from the previous one. Here the really good antennas extract the maximum in inconvenience; the very large and directional antennas must be positioned more accurately than smaller antennas with wider beamwidths. (There is no free lunch.)

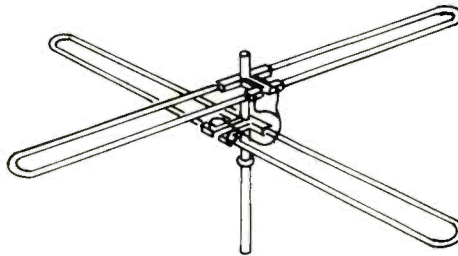
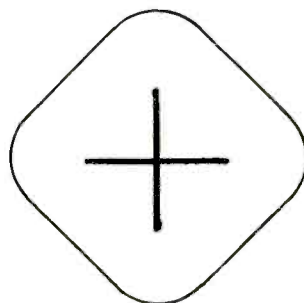


Fig. 4—The Lance FMO turnstile antenna consists of two folded dipoles arranged at right angles to each other.

Fig. 5—Polar pattern of the turnstile antenna.



Using Your TV Antenna For FM Reception.

Many people who desire a moderate-gain directional FM antenna do not wish to erect a separate antenna and rotator when they already have a large and rotatable TV antenna on their roof. This can be a sound idea with the right antenna—or a terrible idea with the wrong one.

Some TV antennas are designed to provide low-band frequency coverage that holds up well to 108 MHz just as the antenna comes out of its carton. Other antennas are designed to block FM reception as shipped, but can be

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Fig. 6—A typical 5-element yagi antenna.

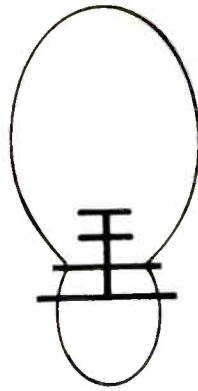


Fig. 7—Undirectional pattern of a typical yagi antenna.



Fig. 8—The Winegard CH-6060 high-performance, log periodic antenna.

modified to receive FM at full gain. Still other antennas are designed with frequency coverage that falls off rapidly after 88 MHz, and cannot be readily altered for good FM reception.

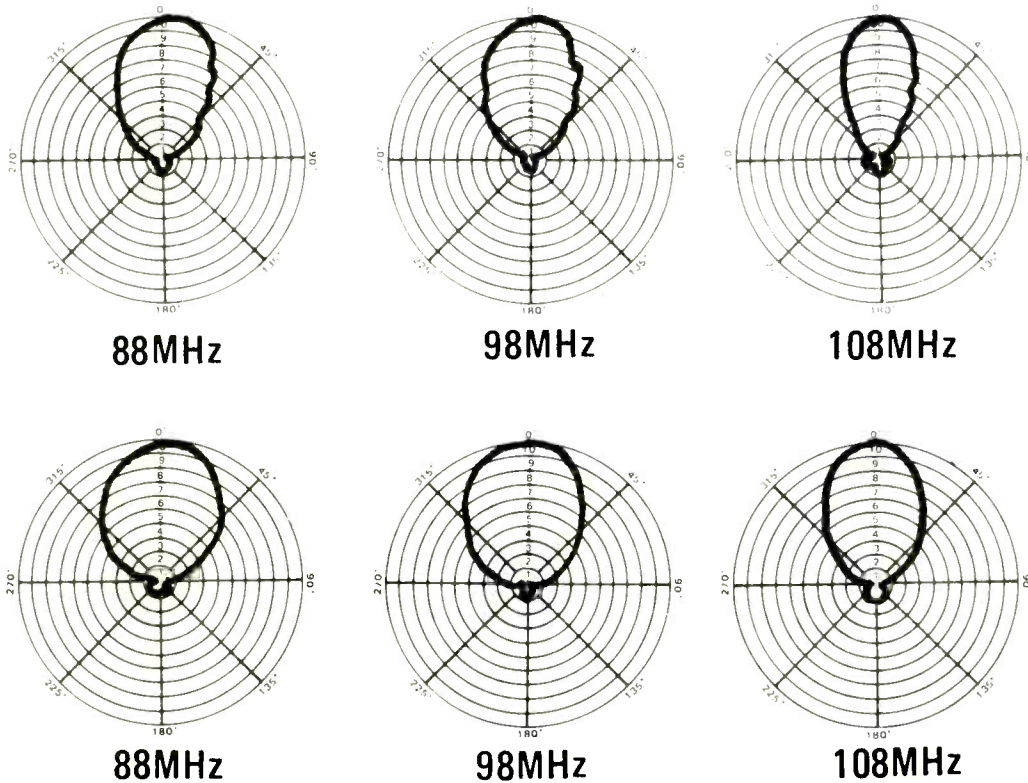
The Jerrold VU-932S (Fig. 11) is an outstanding example of an all-channel antenna that provides excellent FM performance as shipped. As shown in the VU-932S gain chart in Fig. 12, this compact antenna will provide 3 to 4 dB gain over the full FM band. Since this antenna is also a superb TV antenna (whose performance was verified by the author in competitive measurements), it is highly recommended as an "everything" antenna for metropolitan

and suburban areas. At this point I might mention that the VU-932S's performance is not typical of most TV antennas claiming FM coverage. The FM performance of most TV antennas falls off as shown by the center gain chart in Fig. 12. However, since a fair amount of directionality remains even at the high end of the FM band, antennas of this type are usually satisfactory for strong-signal areas.

The Jerrold VU-934S is a larger version of the antenna just mentioned. It also offers superb performance, but *it must be modified* per the manufacturer's instructions to function on FM. This antenna is an excellent example

of an antenna designed to block FM signals as shipped, but which can be easily modified (by snapping off the FM control elements) to provide superb FM gain. The gain curves at the right of Fig. 12 show the VU-934S's performance before and after modification. The solid line is for the antenna as shipped; there is a huge "hole" in the response after 90 MHz and in this condition it will perform terribly on FM. The dashed line shows the antenna's gain characteristics after the FM control elements are snapped off. Now the VU-934S has extremely flat gain over the full FM band. In fact, the FM performance of this antenna approaches

Fig. 9--Polar patterns for two Winegard log periodic antennas. The CH-6065 (top) has a narrower directional pattern than the CH-6060 (bottom).



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Fig. 10—The Jerrold QFM-9 high-performance log periodic antenna with an unusually narrow beamwidth.

that of an 8-element log periodic! This is the ideal TV/FM antenna for the far suburbs.

When signals of all kinds are provided by one antenna, a device called a *band separator* must be used at the bottom end of the transmission line to direct the FM signals to the FM tuner and TV signals to the TV set. With this device most of the signal in each frequency band is automatically applied to the proper receiver. Quite a few TV accessory manufacturers offer three-way band separators that provide VHF, UHF, and FM outputs from a single input. They are

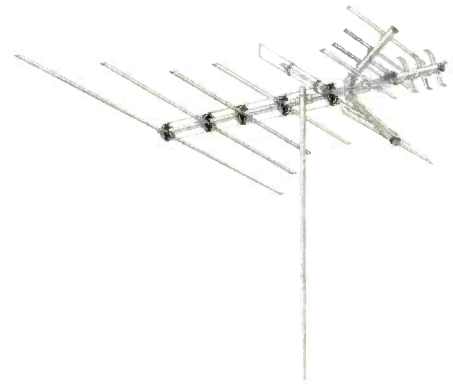


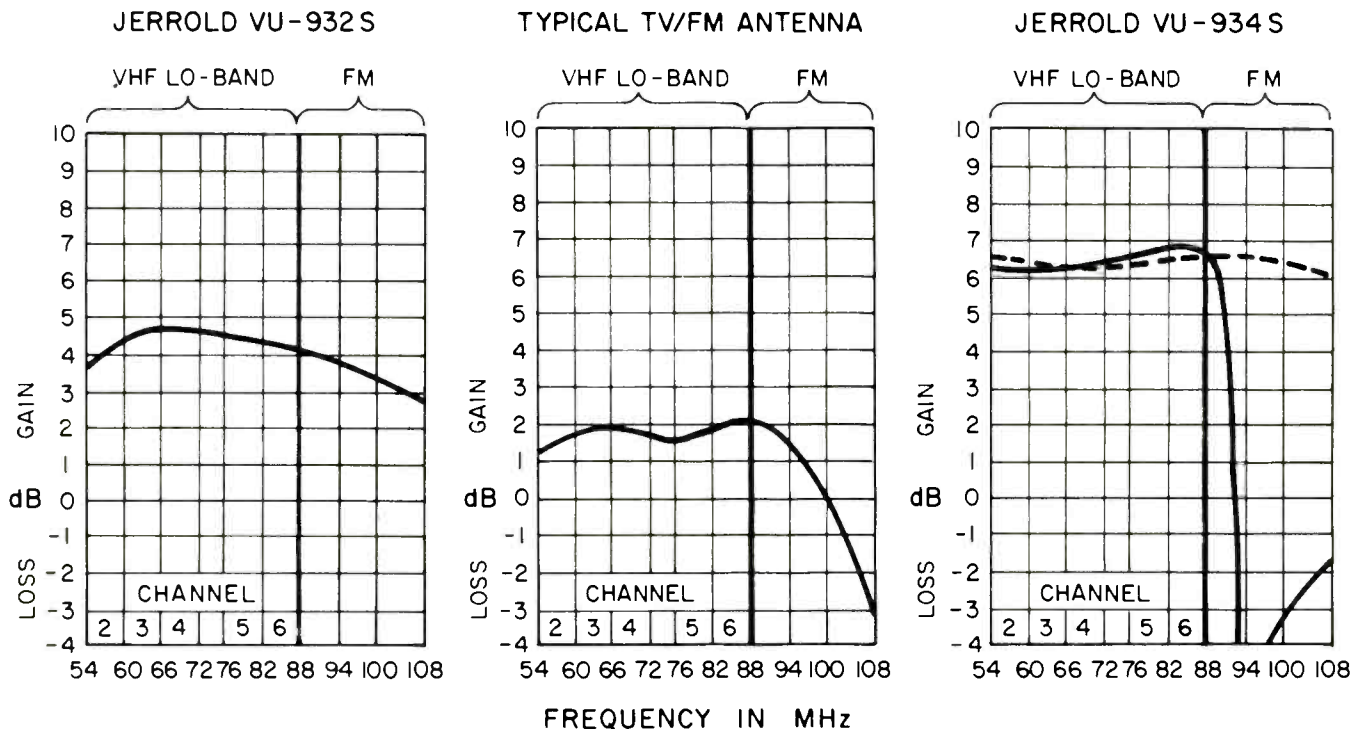
Fig. 11—Jerrold Electronics VU-932S all-channel antenna.

Fig. 14). Naturally, both entertainment devices cannot be used simultaneously with this technique. The Jerrold DCS is a superb 75-ohm cable switch at a reasonable cost. If the FM stations are so strong as to interfere with your TV reception, you can insert a Winegard T-FM7 FM bandstop filter in the cable going to the TV set.

Where to Mount the Antenna

Advice on where to mount an FM antenna invariably includes sure-fire phrases like "as high as possible" and "in the clear." While these are quite true, attempting to achieve "as high as possible" could involve an expensive

Fig. 12—FM gain characteristics of several TV antennas. The Jerrold VU-934S curves (right) show TV and FM performance before (solid line) and after (dotted line) modification.



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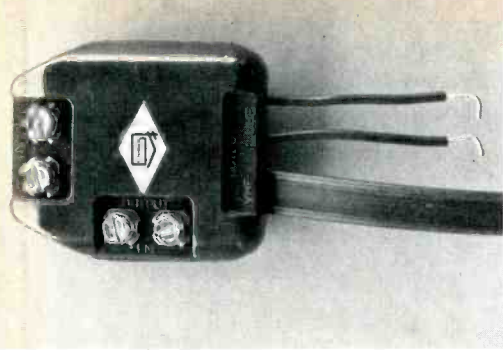


Fig. 13—Typical VHF/UHF/FM band separator.

and sometimes prohibited tower, while "in the clear" could require you to move from some locations! For most of us, the selection of a place to mount an FM antenna is limited to finding the best place on our residence to erect a 10-foot mast. The lucky will live in a one-family house amid a sea of one-family houses or in the highest apartment house in the area. The unlucky will have a small home right next to an apartment or water tower. This latter group can only pray that some orientation of their high F/B ratio log periodic will yield a sufficiently strong signal that is reasonable free of multipath effects.

My advice is actually on where *not* to mount your antenna. Do *not* mount

it close to a TV antenna; the proximity of another antenna operating in roughly the same frequency range will disturb the directional characteristics of each antenna, thus increasing the likelihood of multipath pickup. Similarly, never mount the FM antenna on the same mast as the TV antenna; you cannot get sufficient separation with simple masting to allow this. Don't use too short a mast; stick with the standard 10-foot mast for omnis and small logs, and a well-guyed 20-foot mast for large log-periodics. Don't put the mast on the side of your house adjacent to a heavily-trafficked road if you want low-noise, weak-station reception. Don't mount any antenna, particularly one on a high mast, anywhere near power lines. Many people have been killed by masts tipping over into power lines during installation. ▲

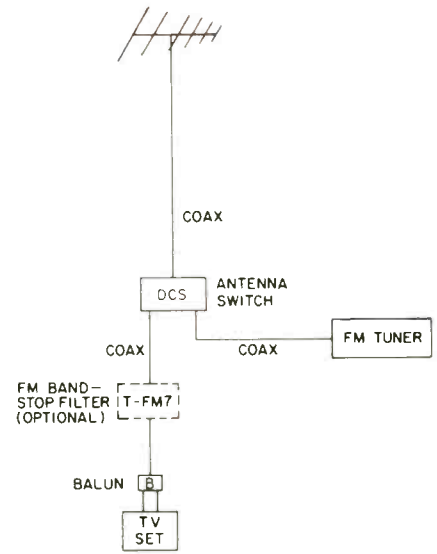


Fig. 14—Manual switching technique to direct the entire antenna output to either the FM tuner or the TV set.

Manufacturer's Directory	Channel Master Ellenville, NY 12428	Lance Industries P.O. Box 4156 Sylmar, CA 91342
Antennacraft P.O. Box 1005 Burlington, IA 52601	Jerrold Electronics P.O. Box 487 Hatboro, PA 19040	Winegard Co. 3000 Kirkwood St. Burlington, IA 52601

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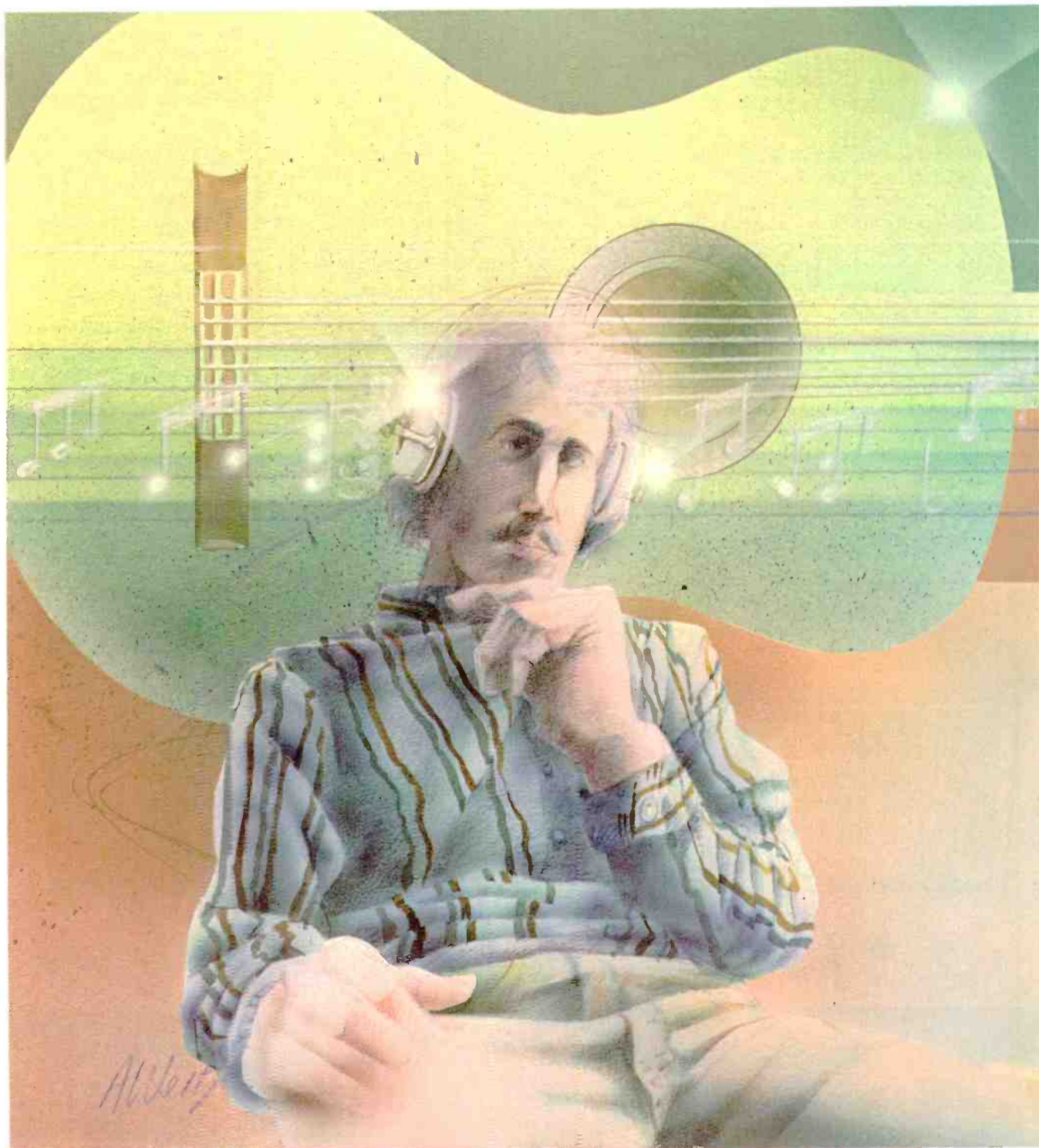


Recordings for Critical Listening

Daniel Shanefield

A relatively small number of disc recordings are now available that come close to providing the illusion of the live performance, when properly played back through a good system. While an illusion of "realism" is not necessarily the goal of every audiophile, the pursuit of this illusion is often both pleasurable and technically enlightening. Using realism as the focal point, the present article will discuss a group of records which are unusually successful in aiming towards that goal.

By comparison with these, the majority of modern discs are so much poorer in quality that the recording itself is usually seen as the weakest link in the playback chain. Regarding the poorer records for a moment, some audiophiles ardently seek the illusion of the concert hall or night club performance in their home listening rooms by assembling new chains of ever more elaborate components, but it is a pity that too many of these people are using discs which simply do not contain the "good vibrations" being



Anthony Weitz

sought. A great deal of attention is focused on the phono pick-up cartridge, the preamp, etc., and this brings only slight changes in the sound, but not a convincing illusion of reality. On the other hand, playing the recordings listed on the following pages can sometimes provide both an immediate and a great improvement over the more commonly heard sounds, even if only medium-priced playback components are used.

There are, of course, many excellent recordings which are not on the list, and this article is only meant to be used as a starting point. New recordings of good quality are becoming available every week or so, although they tend to become buried among myriads of sonically poor ones.

I am hopeful that some of the records on this list will satisfy the readers' artistic tastes, in which case the subtleties of timbre made available through technical excellence can enhance the overall musical pleasure. In addition, these discs can help one to fine-tune the rest of the record-playback chain and show which components need improvement. However, the reader should be warned that most systems will sound rather good when spectacularly good recordings are being played. Therefore, when evaluating new components, the listener should play a few old-favorite discs also, since those are the types of recordings that will be used most of the time after a component has been added.

An additional use for the recordings listed in this article is in demonstration. Taking a string of short selections from these discs and dubbing them one after the other onto a single tape can make an impressive sound show.

Characteristics of Realism

What distinguishes these recordings from other, less realistic ones? The main characteristic seems, to me, to be a special sort of transient response which allows a minimum of blurring. The important thing that must not be blurred is a kind of very fast vibrato or tremolo. (Vibrato is quick variation of the frequency, while tremolo is a quick variation in the amplitude.)

Musical instruments provide not only fundamental sine waves and complex harmonics, but also beat frequencies and interference effects which cause the sound to be modulated, with very fast variations and perturbations of the tones. It is this which imparts "stringy," "brassy," "reedy," and "woody" sounds and quickly distinguishes natural music from synthesized electronic music, even when the steady-state frequency distributions are nearly the same.

Taken all together, a first-class recording on an optimized playback system is able to simulate the eyes-closed sound of the live performance to a high degree, indeed.

Close miking has been used to make many realistic recordings. But not all such recordings are made that way, and not all close-miked recordings are realistic. There still seems to be a great deal of art (and, occasionally, sheer luck) mixed into acoustical engineering. No record company which makes a large number of discs is completely consistent in attaining realism.

Considerable personal taste is involved in evaluating the total record-playback system, and it must be emphasized again that realism is simply a good illusion, and this involves several highly subjective and even emotional factors. An interesting way to shed some light on this aspect is to attend a live performance and focus your attention on the crystal clarity of the sound. Stare at the musicians with a sort of conjured-up intensity, and at the same time, out of the corners of your eyes, make yourself aware of the great space around you in the concert hall, night club, or whatever. Then suddenly close your eyes. The great space collapses, the sound gets somehow flattened, and the whole image is degraded. It is true that some details of the sound can often be heard more clearly with your eyes closed, but the *spaciousness* feeling is much diminished. The eyes-closed sound is all that you can ordinarily reproduce in your home listening room, since there are neither big spaces nor musicians to see. It is remarkable how quickly we tend to forget that much of the spaciousness feeling at the live concert is derived from other-than-sonic clues.

To compensate for this, a slightly exaggerated set of purely sonic clues would appear to be philosophically permissible. In other words, a little bit of extra reverb, a little bit of extra up-close-ness, and a little bit of anything else that's legal should really be OK, if it provides the illusion of the concert.

At a live performance in most concert halls or night clubs, in most of the audience seating area, the "stringiness" (very fast tremolo or vibrato) is only audible at the *beginning* of each

note. Immediately after that, the reflected sounds usually overwhelm the direct sound and cause some blurring. (Editor's Note: To me, this "blurring" results from the inability of any large group of musicians to continue to play a vibrato or tremolo in strict unison, and the later, reflected sounds contribute to the sense of hall or ambient space.—E.P.) But we know we are in the presence of the live performers, and we tend to focus the mind's ears on the good things which go along with reality, not on the later blurring. At home, in the listening room, we need a little extra continuation of the clearest sounds to compensate for negative visual clues which tell us we are not "there" after all.

Another aspect of up-close sound is a frequency response which is rich from about 800 Hz to about 6 kHz. Distant sounds tend to be weak within this range because furniture, clothing, human bodies, and even grass and shrubbery, all absorb reflected sound strongly in the 800 Hz to 6 kHz range (see Fig. 1). Therefore, the ear and brain train themselves to recognize that distant sound sources are deficient in this range. Any time you want to fool your ear into thinking that a recorded sound is coming from a great distance, borrow or buy a graphic equalizer and cut the midrange and mid-treble response by about 4 dB; the source will seem to recede to great distances. In the opposite direction, increasing the response in that frequency range above the normal levels makes the source seem unusually close.

The illusion of extreme closeness is not necessarily a good thing in itself. European record companies, such as Philips and Deutsche Grammophon, tend to avoid it, and European record reviewers tend to criticize relatively close sound while American companies tend to use it for recording classical music. Since most of the seats in a concert hall or night club are not up close, the optimum illusion in your listening room is that the virtual image of the performers is somewhere on the other side of the listening room's front wall, as far as distance is concerned. This illusion takes your attention away from the loudspeakers, and it also corresponds to the most probable distance between you and the stage at a performance. The ideal apparent distance should be reasonably, but not conspicuously far away. (Of course, the clarity of the sound should be such that the wall itself does not seem to be there at all.)

Thus, we have examined two characteristics which are at least responsible for a feeling of realism, (1) an unblurred transient response, and

(2) just the right amount of midrange and mid-treble in the frequency response. The superb-sounding discs on the accompanying list almost all have a lot of number one, often somewhat more than a live performance. Poorer-sounding discs, especially some of those made by American record companies, show a tendency to exhibit too much of number two, giving an extreme up-close feeling, but not really giving much clarity. In fact, too much mid-treble can cause a harshness or sonic glare when the disc is played back on average-quality equipment.

Optimized Playback

Getting the best results from a recording can be dependent on a few subtle points of great potential value. Foremost is the need for a strong hand on the tone controls. While American records often have accentuated response in the 800 Hz to 6 kHz range for exaggerated "presence," as mentioned above, many of the newer

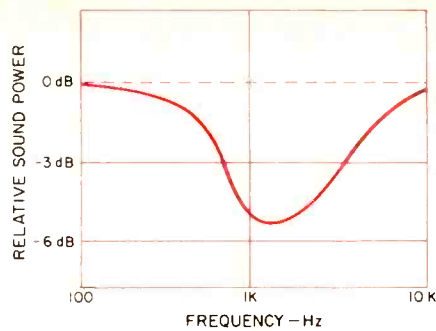


Fig. 1—Frequency spectrum of flat-response sound after it has been reflected from the surfaces of a typical room with carpet, sofa, plaster walls, and curtains. (Dashed line shows spectrum at original sound source.)

European discs have strong treble at about 9 kHz to 12 kHz, which can sound strident on systems that are not adjusted for this. If the treble is cut somewhat, the resulting sound is quite smooth, and the high frequency background noise is much reduced

also, as an extra bonus. (A graphic equalizer is useful for fine-tuning the frequency response, and this is often best done by ear rather than by meter.) In other words, a few records might sound good on a given system, but judicious adjustments can make a wider selection of discs sound just as good or better.

Similarly with dynamic range, a few discs are excellent in this respect, but some of the new noise reduction devices (including simple expanders) can bring life to many other discs. Various methods for adding in a certain amount of reflected sound can help to provide a realistic sense of distance and spaciousness, particularly if delayed sound is also added at the back of the room. (For a simple but effective method, see Fig. 3 of my article in *Audio*, Nov. 1975, pg. 50).

Taken all together, a first-class recording on an optimized playback system is able to simulate the eye-closed sound of the live performance to a high degree, indeed.

TABLE 1—Technically Excellent Recordings.

Deep Bass Frequency Range

Organ Music from Westminster. Edward D. Berryman. **Ark 10251-S**, stereo, \$6.95 postpaid (Fulton Electronics, 4428 Zane Ave. North, Minneapolis, Minn. 55422). Side 2, Band 4.

Played by an organist whose technique includes a heavy foot on the bass pedals. Too many notes at around 32 Hz for good taste, but wonderful for rattling large picture frames and somehow tickling the air spaces in your chest. Unusually pure fundamental and first few harmonics of the lowest musical notes, which are only rarely recorded on disc. (If your playback system can not reproduce the fundamental, you can still hear the harmonics.)

Holst: The Planets Bernstein. Columbia 31125, MQ SQ quadraphonic, \$7.98. Side 2, Band 2, at 95% of the band.

Very loud, very low notes, for a demonstration of the kind of bass that can be (but usually is not) recorded.

Dark Side of the Moon: Pink Floyd. Harvest SMAS-11163, stereo, \$6.98. Side 1, at 60% of the side.

Powerful heartbeats at low frequencies build up to a loud climax. The recording also contains realistic clock chimes and bells, at 55% of Side 1.

The Sound of Musical Instruments. AR-1, stereo, \$5.00 postpaid (Acoustic Research, 10 American Drive, Norwood, Mass. 02062). Side 2, Band 2

The low frequencies here are in subtle "hall sounds," which provide a feeling of being inside a large night club. In addition, a Dixieland jazz band is recorded with truly sensational high fidelity. (See also the comments at the end of this list.)

Mid Bass

Percussion Music. DesRoches, New Jersey Percussion Ensemble. **Nonesuch H-71291**, stereo, \$3.96. Side 2, Band 2, at 15% of band.

The drum has a particularly membrane-like sound which is lost if the loudspeakers used for playback do not have good transient response.

Pig's Eye Jazz; Fidelity First, Vol. 2, stereo, \$10.95 postpaid (Insight Records, 7726 Morgan Ave. South, Minneapolis, Minn. 55423). *That Side*, Band 2.

A woody, reedy bass clarinet is the main feature of a Dixieland jazz band, and the other instruments such as the drums and trumpets are also superbly recorded. The trombone is unusually good on the next band, too.

Young and Rich: The Tubes. A&M 4580 stereo, \$6.98. Side 2, Band 1.

Excellent drums. Also, excellent piano on the next band, and realistic guitar on the last band of Side 2.

Bach: Cello Suites. Starker. Mercury SRI 3-77002, stereo, 3 disc set, \$20.00.

The cello sound is very "stringy" on this recording, which was made several

years ago and has been reissued and stamped in Europe from old American master tapes. Judging from discussions at recent meetings of the Audio Engineering Society, nobody really knows why the old Mercury tapes are so good. Some engineers speculate that it was the simple microphone techniques (no "mikes mix tricks"). But others disagree, since modern multi-miking procedures can sound just as good.

This One's for Blanton: Duke Ellington and Ray Brown. Pablo 2310-721, stereo, \$7.98.

Another reissued oldy, with "squeaky clean" bass violin sounds in a group of swing era duets. The piano is also very good. Tone controls should be adjusted to suit the listener's tastes. The disc contains a great deal of treble, and too much will sound raspy, while too little will sound dull. If a graphic equalizer is available, a 4-dB cut in the mid-treble might be tried.

Low Midrange

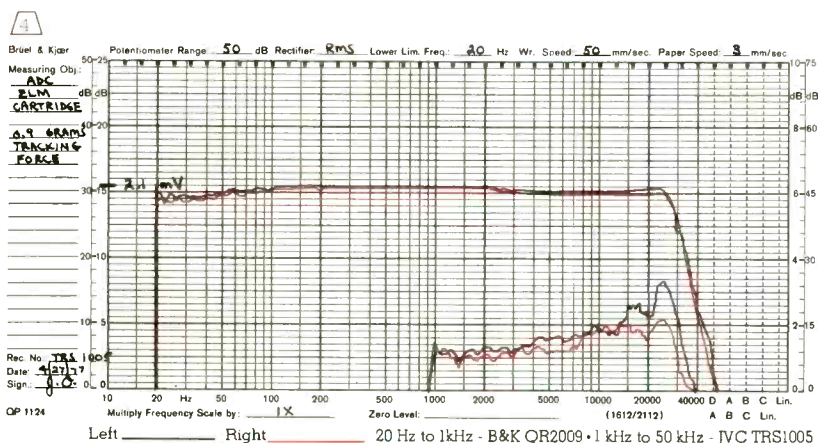
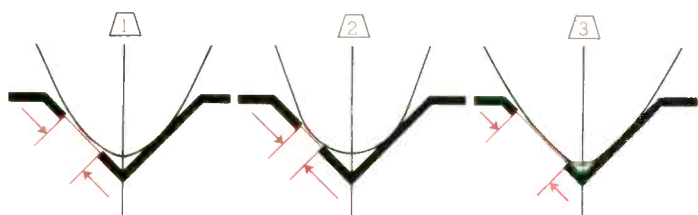
The following three records have all caught the woodiness and stringiness of the piano.

Rachmaninoff: Piano Concerto No. 2. Sviatoslav Richter; Warsaw Philharmonic, Stanislaw Wislocki. **Deutsche Gramophon 138 076**, stereo, \$7.98.

Beethoven: Bagatelles, Op. 33, 119, and 126. Stephen Bishop. **Philips 6500 930**, stereo, \$7.98.

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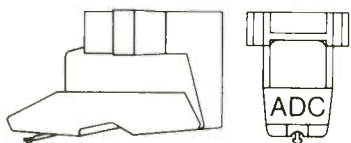
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Brahms: Piano Concerto No. 1. Rubinstein; Israel Philharmonic, Mehta. **London CS 7018**, stereo, \$6.98.

Midrange

When playing back these two popular vocal selections, the listener should attempt to adjust the frequency response to eliminate any chesty, boxy sound. It will probably *not* seem as though the performer is in your listening room, but it might sound quite a lot like a live performance in a small night club, if everything is done right.

Tea for the Tillerman: Cat Stevens. **A&M SP 4280**, stereo, \$6.98. Side 1, Band 5.

Judith: Judy Collins. **Elektra 7E-1032**, stereo, \$6.98. Side 1, Band 1.

High Midrange

Organ Recital. Earl Barr. **Sound Environment TR-1003**, stereo, \$8.55 postpaid (Sound Environment, 100 North Sixth St., Minneapolis, Minn. 55403).

Realistic organ pipes.

Stravinsky: Pulcinella. Academy of St. Martin in the Fields, Neville Marriner. **Argo ZRG 575**, stereo, \$6.98. Side 1, at 70% of the side.

Realistic woodwinds.

Treble

Trilogy: Emerson, Lake, and Palmer. **Cotillion SD 9903**, stereo, \$6.98. Side 1, Band 4.

Stringy, woody acoustic guitar. (The vocals are not particularly well recorded.)

Beethoven: Symphony No. 5. Vienna Philharmonic, Carlos Kleiber. **Deutsche Grammophon 2530 516**, stereo, \$7.98. Side 2, at 5% of the side.

A stunningly metallic group of horns is followed by a clear group of cellos (at 17% of the side). Many other types of full-orchestra delights have been caught here, with wide dynamic range and plenty of reverberation from the concert hall. On most systems, the treble needs to be cut somewhat.

Tchaikovsky: Symphony No. 5. Concertgebouw Orchestra, Haitink. **Philips 6500 922**, stereo, \$7.98. Side 1, at 15% of the side.

Essentially the same comments apply to this record as were made immediately above. The strings can be used to illustrate "definition," as contrasted with the more commonly heard "stereo separation." The listener should perceive a *group* of violins, quite near to each other, but clearly a plurality and not a homogeneous blend.

Direct from Cleveland: The Cleveland Orchestra, Maazel. **Telarc 5020**, stereo, \$16.00 postpaid. (Telarc Records, 4150 Mayfield Rd., Cleveland, OH 44121.)

Classical selections from Berlioz, Bizet, Falla, and Tchaikovsky recorded by the direct-to-disc method. Violins, horns, and other instruments are sharply defined against a very quiet background.

High Treble

Bach: The Goldberg Variations. Gustav Leonhardt. **Telefunken SAWT 9494-A**, stereo, \$6.98.

This recording has apparently been pre-equalized for playback in an average home listening room, since much of the midbass response has been reduced. Therefore, if a graphic equalizer is ordinarily used in the system, the listener should try switching the equalizer out, to provide an optimal rich harpsichord sound.

Lincoln Mayorga and Distinguished Colleagues, Volume III. **Sheffield LAB-1**, stereo, \$10.00, postpaid. (Sheffield Records, P.O. Box 5332, Santa Barbara, Cal. 93108.) Side 1, Band 2.


This is a direct-to-disc recording with an extremely wide dynamic range. The surface noise is at a state-of-the-art low level, and the cymbals come on very strong with harmonics measured at up to 20 kHz. On other bands of the disc, a variety of instruments is also recorded spectacularly and realistically.

Various Sequences of Individual Musical Instruments (Cello, Drum, Violin, etc.)

The Sound of Musical Instruments. **AR-1**, stereo, \$5.00 postpaid (Acoustic Research, 10 American Drive, Norwood, Mass. 02062).

Short music pieces of uniformly excellent quality, each emphasizing one type of instrument.

Sessions. Stereo, \$3.00 postpaid (James B. Lansing Sound, Inc., 3249 Casitas Ave., Los Angeles, Cal. 90039), 2 discs.

Solo instruments, and also an interesting series of rehearsal takes, mixes, equalizations, etc., with explanations by a narrator. Uniformly excellent quality. 

Editor's Note: Here are some additional discs which have appeared on the market since this article was written, which we feel have many of the fine qualities exhibited by the author's selection:

Sheffield Lab, Inc., P.O. Box 5332, Santa Barbara, CA 93108.

Santa From A Good Place: Harry James. **Lab-6 (SL23/SL24)**.

Discovered Again: Dave Grusin, **Lab-5 (SL19/SL20)**.

A-Train Ltd., 8719 Wilshire Blvd., Beverly Hills, CA 90211.

Firebird: Kenji Mori Quartet, **TBM3003**.

Mozart String Quartet: Mari Iwamoto String Quartet, **ALC-1038**.

Beethoven Funeral Sonata op. 26: Hans Kann pf., **ALC-1024**.

Decibel Records, Dept. 2, P.O. Box 631, Lexington, MA 02173.

This Is the One: Dick Wellstood, **Audiophile AP-120**, \$15.00.

Direkt To Disk, Sonic Arts Corp., 665 Harrison St., San Francisco, CA 94107.

Piano Fireworks: Russell Stepan, **DTD-01**.

The Piano: David Montgomery, **DTD-02**.

Gasparo Co., P.O. Box 90574, Nashville, TN 37209.

J.S. Bach Suite No. 1 in G Major: Roy Christensen, Cello, **GS-102**.

James B. Lansing Sound, Inc., 8500 Balboa Blvd., Northridge, CA 91329.

The Los Angeles Philharmonic Orchestra, **CSO 1010**.

Crystal Clear Records, Inc., 225 Kearney St., San Francisco, CA 94108.

Charlie Byrd, CCS-8002.

Reference Recordings, P.O. Box 77907, San Francisco, CA 94107.

Viola and . . . : James Carter Chamber Ensemble, **RR-4**.

Finnadar Records, Atlantic Recording Corp., 75 Rockefeller Plaza, New York, NY 10019.

Chopin • Prokofiev • Scriabin: Idil Biret, pf. **Finnadar SR125**, \$12.98.

Umbrella, Audio-Technica U.S., 33 Shiawassee Ave., Fairlawn, OH 44313.

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Rough Trade Live: Rough Trade, **Umbrella DD-1**.

Big Band Jazz: Rob McConnell & the Boss Brass, **Umbrella DD4**

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“Given its features, appearance and performance, this is no mere run-of-the-mill receiver... The excellent audio-distortion ratings... obviously place it among the cleanest of the currently available receivers... every aspect of the receiver’s operation and handling was as smooth and bug-free as its fine appearance would suggest.”

Typical of the circuitry and features that result in such fine performance are these: a dual-gate MOSFET front end for high sensitivity, and a special linear-phase filter array for high selectivity, low distortion and wide stereo separation. The preamplifier section has a two-stage direct-coupled amp for accurate

RIAA equalization and a good phono overload capability. And the power amplifier is direct-coupled DC, in a true complementary symmetry configuration, for excellent transient and phase response.

Operating features include a six-LED peak level indicator for each channel; tape-to-tape dubbing with simultaneous listening to other program sources; turn-on time delay speaker protection plus automatic overload shutdown.

The sound of the R-1050 has been appreciated as much in England as here. For example, the British magazine *HiFi at Home* said: “... treble quality was light and delicate, something LUX engineers always seem to achieve... bass output seemed plentiful and strong, as is often the case with enormous, low impedance power supplies.”

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TDS

in Sound Measurements

Don Davis*

The only licensee of time delay spectrometry (TDS) in the audio industry to date is Cecil Cable, an audio consultant from Edmonton, Alberta, who has spent the last five years applying the basic ideas of TDS to professional sound system applications. The first detailed explanation of a sound system's early-room-reflection interactions in the determination of bandwidth of the filter required to suppress feedback modes resulted from this research on TDS in large arenas (AES Convention, May 1977). Before we go into some of the practical sound system applications of such devices, let's look at the basic theory behind this fascinating tool.

TDS Basics

Sound travels through air at a finite speed (typically around 1130 ft/sec at 70°F), thus it is possible to speak of the distance sound travels in either feet or milliseconds. If we divide one second into 1000 mS, we then find that the

sound has traveled 1.13 feet in one mS or it takes 0.885 mS to go one foot. Therefore, if we placed a microphone 10 feet in front of a loudspeaker and switched on a 1 kHz tone to the loudspeaker, the microphone would not receive the tone until $0.885 \text{ mS} \times 10 \text{ ft} = 8.85 \text{ mS}$ after the loudspeaker first sent it.

At the instant the loudspeaker emitted the tone, if the generator driving the loudspeaker were to begin a sweep upwards in frequency at the rate of 10,000 Hz/sec or 10 Hz/mS, by the time 1000 Hz reached the microphone, the loudspeaker would be sending at the very same instant in time $1000 + (10 \text{ Hz/mS} \times 8.85 \text{ mS}) = 1088.5 \text{ Hz}$.

If the microphone is connected to a narrow (10 Hz) filter capable of sweeping at the same rate (10 Hz/mS) as the generator but synchronized to start its sweep at the exact instant the signal arrives at the microphone (8.85 mS after the generator sends it or 88.5 Hz behind the generator, then the readout device (meter, oscilloscope, wave analyzer, etc.) will see only the frequency arriving at the microphone,

and by means of the filter's selectivity, discriminate against all other frequencies (see Fig. 1). Thus, room reflections caused by lower frequencies can't get past the filter and only the direct sound of that frequency from the loudspeaker itself is present at the microphone during the time the filter is tuned to that frequency.

Figure 2 illustrates graphically these interlocked relationships, and Fig. 3 shows Cecil Cable's modified H.P. 8552B/8556A analyzer with the accompanying digital frequency counter that allows the monitoring of the frequency between the generator and the receiving filter.

The arrangement discussed thus far allows rapid, accurate plots of the direct sound from the loudspeaker without any influence from the room. This is a truly anechoic response plot.

Early Reflections Spectra

It can be seen that by "tuning further out" in space (or time), that is, by delaying the receiving filters' sweep

*Synergetic Audio Concepts,
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Audio consultant Cecil Cable is shown at work with his modified Hewlett Packard 8552B/8556A analyser with the digital frequency counter.



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2. All entries must be postmarked by January 31, 1978, and received by February 28, 1978.

3. Winner will be selected in a random drawing. Result of the drawing will be final. Winner will be notified by mail. Odds of winning will be determined by number of entries received. Only one prize sound system will be awarded. State, federal, and other taxes imposed on the prize-winner will be the sole responsibility of the prize-winner.

4. Employees of TEAC Corporation of America (distributor of Accuphase), affiliated companies, and sales agents, and the families of any such employees are not eligible. Void where prohibited or restricted by law.

5. Any request for the name of the winner should be mailed after February 28, 1978, to: **Accuphase Super System**
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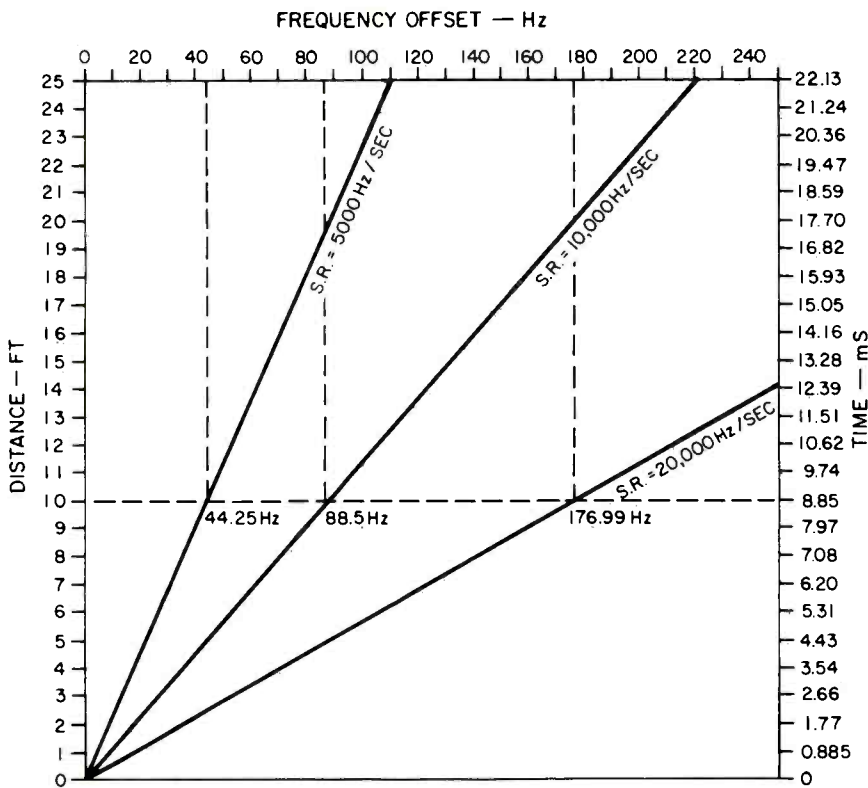
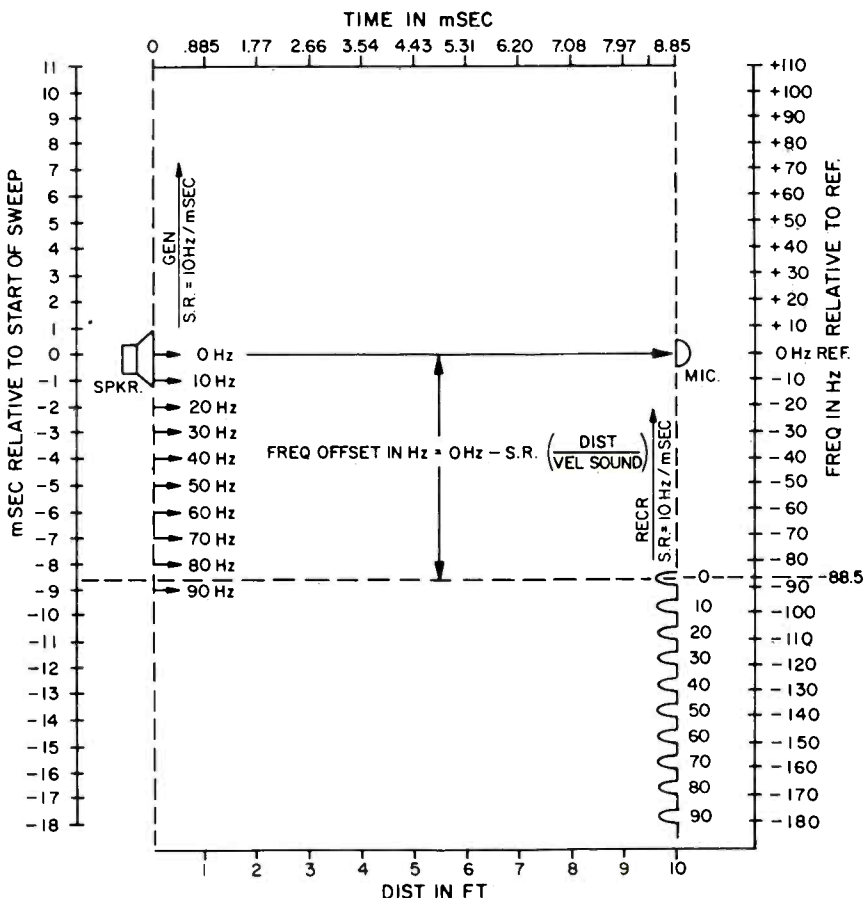


Fig. 1 — Relation between sweep rate, time, and offset. The frequency offset in Hz = 0 Hz — sweep rate $\left(\frac{\text{Distance}}{\text{Velocity of sound}} \right)$.

Fig. 2 — The relation between the generator and the receiver during the sweep.



until after the direct sound has passed the microphone, that it becomes possible to discriminate against the direct sound as well and see, for example, only the spectrum of a reflection off a nearby wall, ceiling, or floor (see Fig. 4).

If, for example, the microphone were 10 feet from the loudspeaker and the reflective surface was another 10 feet from the loudspeaker beyond the microphone, the frequency offset (FO) required between the generator and the filter, if the sweep rate were 10,000 Hz/Sec, would be:

$$10,000 \left(\frac{30^*}{1130} \right) = 265.49 \text{ Hz}$$

(*Note: the sound travels 20 ft from the loudspeaker to the reflective surface and then 10 feet more returning to the microphone.)

Practical Uses of TDS

The ability to directly compare the difference in level between the direct sound spectrum and the chosen reflected sound spectrum makes absorption vs. frequency immediately visible, and the focusing of reflective surfaces is easily identified.

One of the fundamental measurements undertaken by Cecil Cable was the identification of time align anomalies that interact with the normal modes in a room to create acoustic feedback as system gain is increased (see Fig. 5). Cable has shown that the feedback modes that occur when a sound system is used in an enclosed space are due to the room modes riding on the "comb filter" response of the time align anomalies generated by the early reflections spectrum. This coincidence of the early reflection spectrum and the room modes have, at long last, demonstrated why it seemed as if the room modes joined into clusters of modes, rather than operating as individual, very narrow areas.

By being able to place the total spectrum of both the direct sound and the total reflected sound on the same analyzer screen, it becomes practical to study how loudspeaker Q, the critical distance, and the ratio of direct-to-reverberant sound behaves at differing locations of source, listener, and boundary surfaces relative to frequency.

"Dead" Rear Wall Wrong?

A "dead" rear wall with a hard front wall in a control room is fundamentally questionable. Presuming that the loudspeakers are properly flush mounted, then the early reflection

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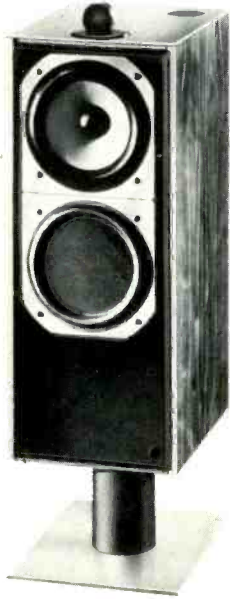
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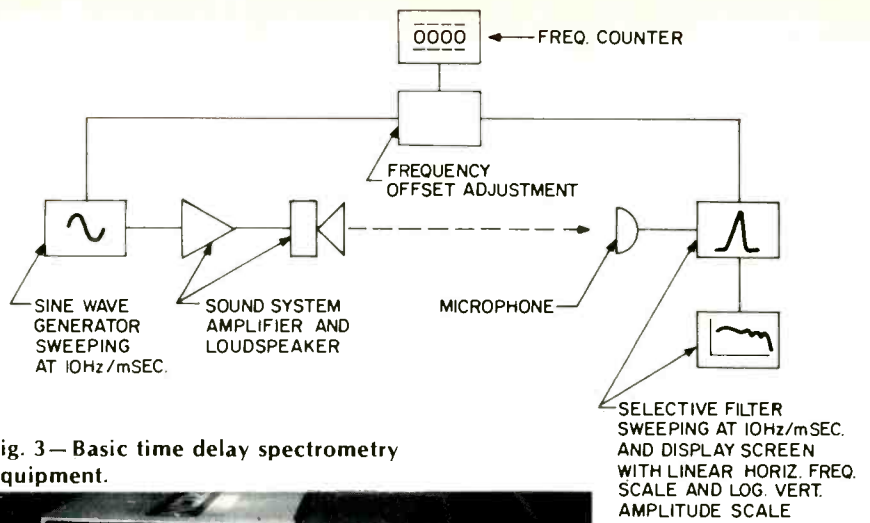
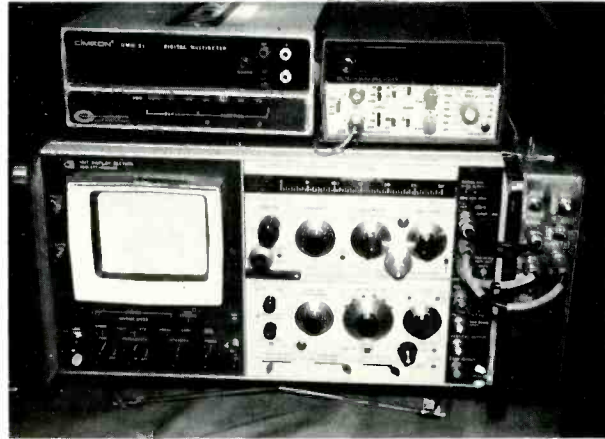


Fig. 3—Basic time delay spectrometry equipment.

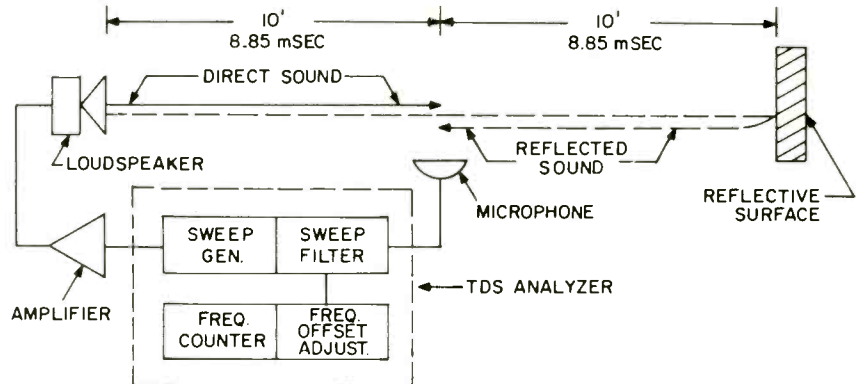


spectrum will look like a comb filter with very broad (one octave or wider) humps which are quite audible. If, however, the loudspeakers are *properly* flush mounted (an art in itself), the adjacent surrounding area is made very absorptive, and the rear wall is made hard and diffuse, then the early reflection spectrum will look like a comb filter with a large number of very narrow humps, which individually are

not significant, but as a group enhance the sound level. Obviously, the larger the control room the better, with up to 40 feet in depth offering good acoustic possibilities.

Time delay spectrometry (TDS) allows us to look at the spectrum of the early reflections and objectively analyze them. Time align™ monitors have eliminated many of the subtle masking effects.

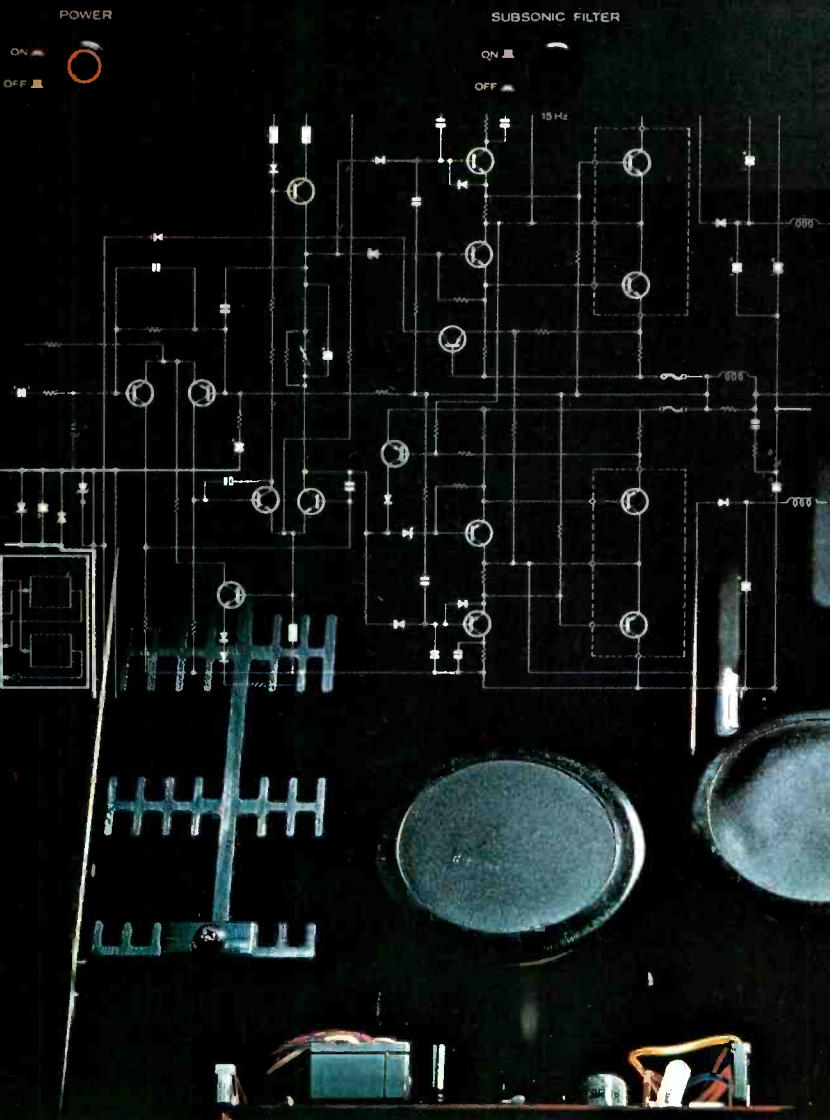
Fig. 4—Measuring the spectrum of a reflective surface.



FREQ. OFFSET (F.O.) BETWEEN GEN. AND FILTER

(GENERATOR BEGINS SWEEP FROM 0Hz BY F.O. Hz AHEAD OF THE START OF THE FILTER SWEEP—BOTH GEN. AND FILTER SWEEP AT SAME RATE)

$$F.O. = \text{SWEEP RATE} \left(\frac{\text{TOTAL DIST. REFLECT. SOUND TRAVELS TO MIC.}}{\text{VELOCITY OF SOUND}} \right)$$



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- RMS output power per channel*
(both channels driven into 8 ohms
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Or in other words you're not only getting a little extra, you're getting about twice the amplification for the price of one amplifier.



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TDS Instrumentation

The present instrumentation format is not considered ideal, but is the result of adapting as economically as possible an available precision spectrum analyzer. One "flaw" in the present system is that the display on the screen is linear along the frequency base (1000 Hz per division), while a logarithmic display would be preferable.

In order to achieve such a display, it might be necessary to exchange frequency offset between the tracking generator and the filter for a continuously variable time delay and "trigger."

Summary

TDS has demonstrated its fundamental usefulness to those of us privileged to use it thus far (a small but select group at this writing. However, it has been shown and demonstrated by Cecil Cable at each of the Syn-Aud-Con sound engineering seminars since May, 1977). It is obvious, at present, that it only awaits publication of its benefits, along with the educational assistance of those who would respond to its enormous promise, in order to become the first logical extension beyond the acquisition of real time spectrum analysis. A

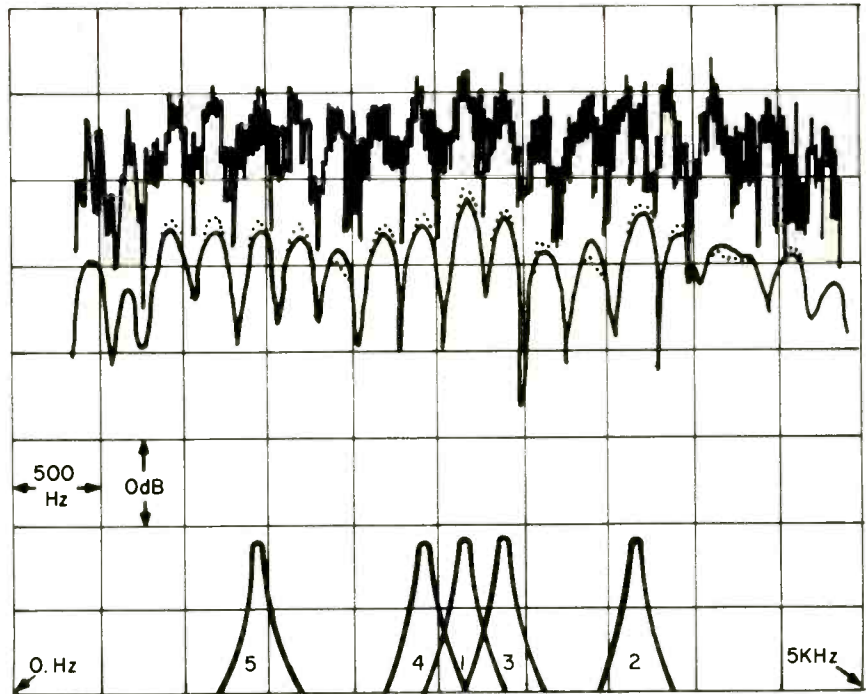


Fig. 5—Acoustic feedback's parameters. The lower trace shows the frequency response of early sound with the loudspeaker 2.26 feet in front of hard wall. Upper trace shows the room mode pattern through a

two-second window, while the dotted lower trace is shown with loop gain. The baseline markers indicate order in which oscillatory feedback appeared.

"Something wonderful* happens when $Z_1 Z_3 = Z_2 Z_4$ "

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Z's 1 to 4 are the four passive components which interconnect the current dumpers, (the output transistors which supply the power), to the small high quality amplifier which provides the error signal, so that when the above condition is met the current in the load, the loudspeaker, is independent of the current in the dumpers and hence distortion is solely dependent on the quality of the error amplifier, which because it is small can be very good.

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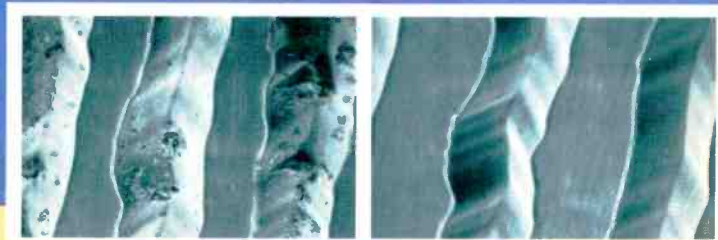
* Elektor Electronics Magazine No. 8, Dec. 1975

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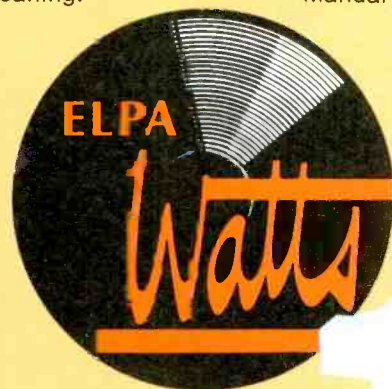
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Still
Number 1

Build An Audio Phase Detector

Charles Kitchin*

For the owner of a modest stereo system utilizing one speaker per channel, phasing the speakers is a relatively easy task. By correctly connecting the speakers by their polarity dots or by switching the leads to one speaker and listening for the most solid bass response and best stereo centering, proper phasing is accomplished.

However, if more than one amplifier is used such as in biamp and triamp systems, speaker phasing can become a horror show. Unless the amplifiers are identical (i.e., the same phase shift in each), wiring up the speakers by polarity will not work. The problem is compounded by the electronic crossover which may, or may not, have the bass, midrange, and/or treble outputs in phase with one another. Also, microphones and audio lines are difficult to phase correctly.

Device Description

A simple and inexpensive solution to this problem is to send a coded signal

through the system. It is then picked up on a portable receiver which can listen to each speaker individually and indicate its phase relative to the other speakers in the system. Such a device is the audio phase detector presented here. The coded signal is a sawtooth waveform generated by an integrated circuit voltage-to-frequency converter (a voltage-controlled oscillator), the Analog Devices AD537. The sawtooth waveform is ideal for the code because the sloping portion of the waveform, the ramp, *A*, is low-frequency energy for a relatively long period of time, while the rise, *B*, is very fast, high-frequency energy for a short time (Fig. 1a). This sawtooth waveform is connected to the line input jack of an amplifier, amplified, and the speakers will reproduce the waveform into a sound wave picked up by a microphone on the receiver. The air mass between speaker and receiver acts like a capacitor and differentiates the waveform, (Fig. 2). The long, slow ramp (*A*) becomes a long duration, very low signal, while the fast falling portion (*B*) becomes a high amplitude spike. So in practice, the high amplitude spike can be detected, and its polarity will be

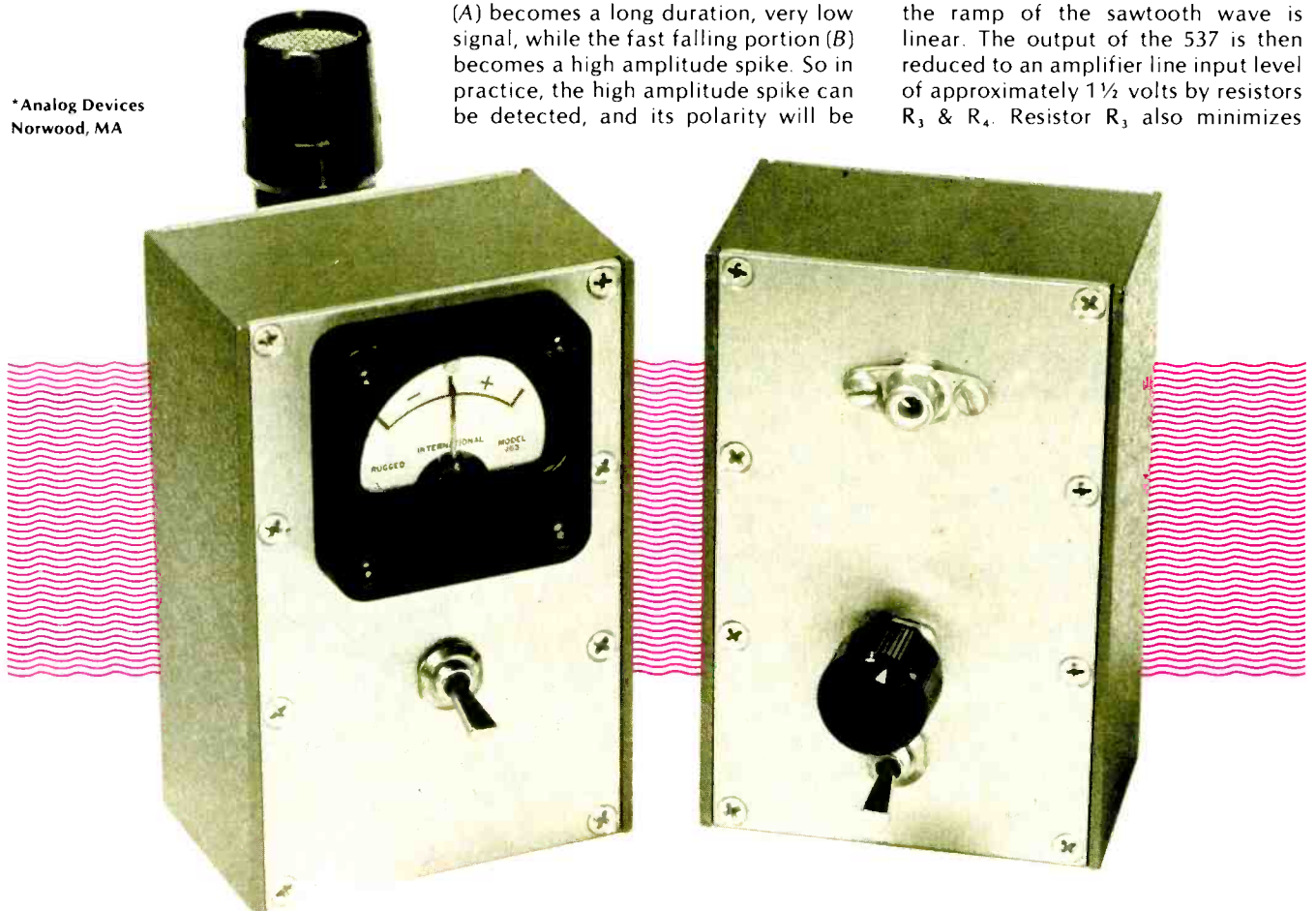
due to the relative phasing of that particular speaker.

Circuit Operation

The heart of the transmitter is the Analog Devices AD537, a monolithic voltage-to-frequency converter. The AD537 was chosen because it is very stable over temperature variations and contains its own voltage reference which is used as the voltage input to pin #5. The AD537s are closely matched to one another, because of this the user does not need an oscilloscope or frequency meter, and no adjustments are required. Frequency of operation is determined by capacitor C_1 and resistor R_1 , (Fig. 3). The output of the AD537, pin 14, is normally a square wave, however, for this application a sawtooth waveform is desired. This is accomplished by an RC time constant of 10 mS at the output, using resistor R_2 and capacitor C_2 . The time constant is long enough, compared to the operating frequency, that the ramp of the sawtooth wave is linear. The output of the 537 is then reduced to an amplifier line input level of approximately 1½ volts by resistors R_3 & R_4 . Resistor R_3 also minimizes

54

*Analog Devices
Norwood, MA



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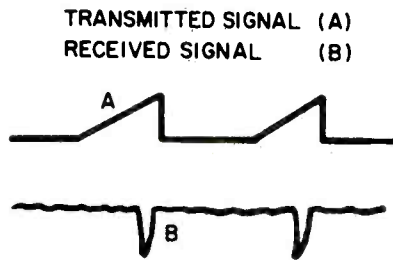
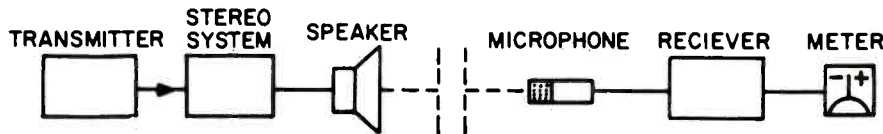


Fig. 1— The coded signal is a sawtooth waveform.



"TRANSMISSION THROUGH AIR ACTS AS A CAPACITOR"

Fig. 2— Block diagram of the detection system.

loading of the output, keeping the output waveform undistorted. Power is supplied by a 9-volt transistor radio battery.

Receiver

The receiver uses an inexpensive portable cassette recorder microphone; any dynamic microphone with a high-impedance output will also work. The microphone output is connected to J_1 and amplified by IC_1 , a 741 operational amplifier with a gain of 200 (Fig. 4). The signal then runs to a dual peak detector D_1 & D_2 , is filtered by C_1 & C_2 , and the two d.c. signals are mixed by R_3 & R_6 . The two d.c. signals are the detected ramp and the detected spike of the sawtooth waveform that was transmitted through the speaker. The spike will be much greater in amplitude and override the smaller ramp signal.

The resistors R_3 & R_6 also serve as the gain setting resistors for IC_2 in conjunction with resistor R_4 . The resulting d.c. level is amplified by IC_2 which has a gain of 10 and runs to voltage divider R_7 & R_8 . Resistor R_8 is an overall gain adjustment to make up for the output level variations in microphones. The meter is a miniature 50-0-50 d.c. microammeter with a 1 3/4 inch square outside diameter.

Power for the receiver is also a 9-volt transistor radio battery. Resistors R_9 & R_{10} convert the 9-volt battery output into ± 4.5 volts to ground for powering the operational amplifiers. Capacitors C_3 & C_4 assure a low a.c. impedance to ground. Jack J_2 is a differentiator input for inputs from audio lines, amplifier outputs, etc. Capacitor C_6 differentiates the input signal, instead of using an air mass.

Construction

Both the transmitter and receiver were built on small breadboards and placed in 2 3/8 x 4 inch miniboxes. The best boxes to use are the Model 3301 miniboxes made by Pomona Electronics Co., which can stand up to heavy duty and look professional. The power switch for the transmitter may be located at any convenient point on the minibox. On the receiver, the meter should be located near the front of the top side of the minibox. The microphone is attached to the bottom side, its front extending out about an inch from the front of the minibox.

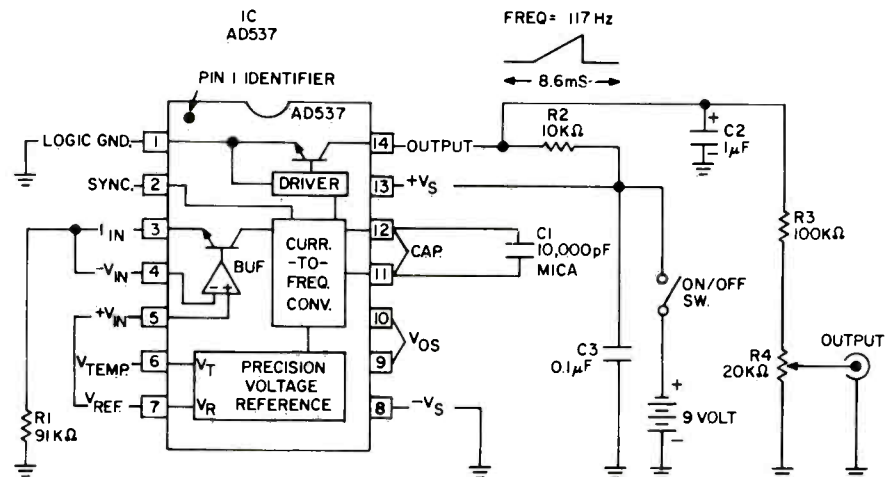
The microphone can be attached to the bottom of the box by stick-on tie wrap anchors and tin wraps. The breadboarded circuitry for the transmitter and receiver can be placed in the miniboxes on standoffs. The cost is under \$30.00.

Calibration and Use

Connect the output of the transmitter to the line input jack of the left channel of the stereo amplifier in the system to be phased. If more than one amplifier is used in the system, connect the output of the transmitter to the high level input of the preamplifier. Set the tone controls to *Flat* position, and turn off the loudness contour control. Turn on the transmitter, and adjust the output of the speakers to a fairly loud but comfortable level. Turn on the receiver and hold it so that its microphone is 1/2 to 3 inches from the speaker you wish to phase first. Adjust the trimpot, R_8 in the receiver so that the meter registers a strong indication to either the left or right of center. The direction the meter travels will depend on the relative phase of that particular speaker. Next, check all the other speakers in the left channel. They should all indicate the same direction. If any are different, reverse their leads until all the speakers in that channel cause the meter to deflect in the same direction. After the left channel has been phased, connect the output of the transmitter to the right channel and phase all the speakers in that channel so that they deflect the receiver's meter in the same direction as the left channel. When you are finished, all speakers in the system will be in phase.

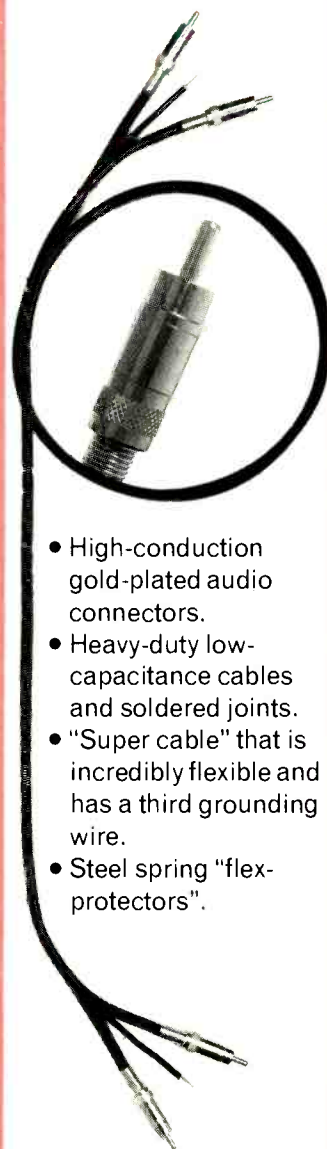
It must be pointed out that proper operation of the phase detector is dependent on the sawtooth waveform from the transmitter arriving undistorted at the speaker terminals. Tone controls and other frequency shaping devices must be set to their *Flat* position. Loudness controls should be turned off. Electronic crossover networks should be set to flat or bypassed. If the preamplifier system can-

Fig. 3— The transmitter schematic.



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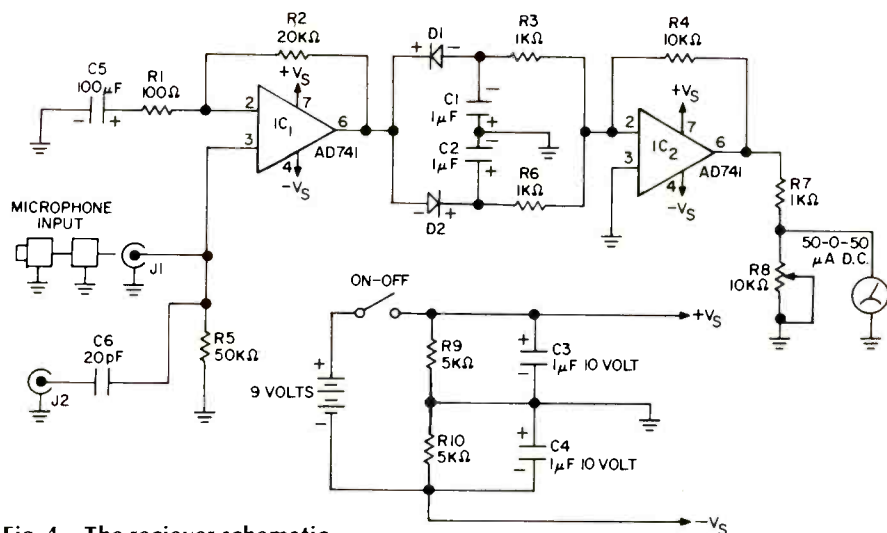


Fig. 4—The receiver schematic.

not be set for flat response or if it has no unequalized inputs, phasing should be performed by feeding the transmitter output directly into the power amplifiers.

To phase microphones, simply unplug the microphone from J_1 and substitute the microphone to be

phased. They can be plugged in one at a time and held $\frac{1}{2}$ to 3 inches from the speaker. They should all deflect the meter in the same direction if correctly phased. The second jack, J_2 , is for phasing amplifiers, lines, and various other audio gear. The jack accepts a line level of from 0.5 to 1.5 volts. Δ

PARTS LIST

Transmitter

- C_1 —10,000 pF capacitor, mica or polystyrene
- C_2 —1 μ F, 12 V tantalum capacitor
- C_3 —0.1 μ F paper capacitor
- IC—AD537J V/F converter, manufactured by Analog Devices
- J_1 —RCA phono jack
- R_1 —91 kilohm, 5% carbon resistor
- R_2 —10 kilohm, 5%, $\frac{1}{4}$ watt carbon resistor
- R_3 —100 kilohm, $\frac{1}{4}$ watt 5% carbon resistor
- R_4 —20 kilohm potentiometer
- 1—14-pin dip socket
- 1—9V transistor radio battery
- 1—Battery clip
- 1—2 $\frac{5}{8}$ x 4x1 $\frac{1}{2}$ inch minibox, Pomona Electronics, Model 3301
- 1—Single-pole, single-throw *On/Off* switch, Microswitch 8C1021
- 4—Small rubber feet

Receiver

- C_1 , C_2 , C_3 , & C_4 —1 μ F, 10V tantalum capacitor
- C_5 —100 μ F tantalum capacitor
- C_6 —20 pF mica capacitor
- D_1 , D_2 —IN4148 diodes
- IC $_1$, IC $_2$ —AD741J operational amplifier
- J_1 , J_2 —RCA phono jack
- R_1 —100 ohm, 5%, $\frac{1}{4}$ watt carbon resistor

- R_2 —20 kilohm, 5%, $\frac{1}{4}$ watt carbon resistor
- R_3 , R_6 , R_7 —1 kilohm, 5%, $\frac{1}{4}$ watt carbon resistor
- R_4 —10 kilohm, 5%, $\frac{1}{4}$ watt carbon resistor
- R_5 —50 kilohm, 5%, $\frac{1}{4}$ watt carbon resistor
- R_8 —10 kilohm trimpot
- R_9 , R_{10} —5 kilohm 5%, $\frac{1}{4}$ watt carbon resistor
- 1—50-0-50 d.c. microammeter, International Model 163
- 2—8-pin TO-99 sockets
- 1—9V transistor radio battery
- 1—Battery clip
- 1—2 $\frac{5}{8}$ x 4x1 $\frac{1}{2}$ inch minibox—Pomona Electronics Model 3301
- 1—Single pole, single throw *On/off* switch, Microswitch 8C1021
- 1—Inexpensive dynamic microphone
- Tie wraps and tie wrap anchors

Note:

The three ICs may be purchased by ordering: One AD537JD @ \$13.00; two AD741CH @ \$3.00; postage and handling, \$1.00, for a total of \$17.00. Send prepaid by check or money order to: Order Processing, Analog Devices, Inc., Rt. 1 Industrial Park, Norwood, MA 02062.

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Leopold Stokowski

Bert Whyte

On September 13, 1977, the brave heart of the seemingly indestructible Leopold Stokowski finally was stilled, and one of the truly great men of music was dead at the age of 95. He died on his native heath, in the quaintly named village of Nether Wallop in Hampshire, England, and with him, an era ended.

The press of the world has noted his passing with fulsome obituaries, and if you want to read about his vital statistics, they are there in 100 languages. I'd rather talk about the man, the musician, and the friend I was privileged to know for 26 years.

It is incredible to me to realize that I was nine years old when the maestro made the first electric recordings with the Philadelphia Orchestra. I was a choirboy, a soloist, and heavily into oratorios and such. By odd chance, my next door neighbor was Thelma Votipka, a mezzo-soprano of imposing stature, who sang at the Metropolitan Opera for many years, mostly in secondary roles, and specialized in Wagner. She introduced me to Wagner, and at age 12 I discovered Stokowski's Wagner; I worshipped at the Maestro's shrine from thenceforward. Stokowski entered my life in 1951, when I was a sales executive and musical director for Magnecord, in Chicago, one of the pioneer manufacturers of magnetic tape recorders. Because we had built a two-channel recorder for a U.S. Navy underwater project, I had been experimenting with binaural sound. One day a letter arrived for me, and . . . my God! . . . it was from Leopold

Stokowski! To this day, I have no idea how Stoky found out about the binaural project, but in his letter he said he had experimented with binaural and stereophonic sound with a man named Alan Blumlein (!) in England and a Dr. Braunmuhl in Berlin, had heard about our experiments, and went on to say that he was going to give a conducting seminar at the University of Illinois, and would I like to do some recording with him! What a thrill! When I met the Maestro at the University concert hall, he greeted me most graciously, and then launched at once into a discussion of the music and recording techniques. Needless to say, I was in awe of this Olympian figure, and, of course, this was the first time I had been personally exposed to the famous Stokowski accent. Many people have been puzzled by his accent. It seemed to have no specific ethnic origins, other than vaguely "mitteleuropean," and his detractors asserted it was merely a phony affectation. I can tell you this . . . if the accent was phony then he was a consummate actor. In all the years I knew the maestro, not once, not even in our most relaxed moods when we were aglow with good wine, did he lapse into the accent you would expect from what he was . . . a most cultivated English gentleman. I was in the maestro's Fifth Avenue apartment one day when the phone rang, and he answered the call in fluent German. A little while later, another call and this time he spoke French. Still another call and he conversed in flowing Italian. So perhaps his accent was an amalgam of

all the tongues he spoke. Perhaps the accent was a sort of "protective coloration," stemming from American pre-occupation with European music culture, when a symphony orchestra conductor was expected to have a foreign accent. In any case, way back then at the University, I soon learned that a microphone was pronounced "meek-ro-phon," and when we discussed his great Disney film "Fantasia," it came out as . . . "Fantasee-ah."

At the University, the maestro informed me that the work chosen for the conducting seminar was the massive Monteverdi Vesper Mass of 1610, with full orchestra, organ, and chorus of 250! The seminar was to last five days, at the conclusion of which he was to conduct a gala performance of the work. Observing Stokowski at work at this seminar was a revelation. Now mind you, this was a raw student orchestra . . . and I do mean raw. Virtually every other note, there was a problem. Bad ensemble, missed cues, poor entrances, awful phrasing, horn clams, bad intonation . . . you name it. I still marvel at what the maestro accomplished with that orchestra (and chorus as well) in those five days. He always had a special rapport with young people, and incontestably, he was one of their greatest teachers. Of course, he commanded their absolute respect. He was gentle with the miscreants in the orchestra. With particularly intractable players, his admonishments were firm, but he never humiliated anyone. He never was sar-

castic, never flung invective at them, never displayed the volatile temperament that is supposed to be a characteristic of symphony conductors. Of course, Stokely knew the limitations of his players and he didn't try to gear the orchestra to the levels of proficiency of the few truly talented musicians in the group. Rather, he concentrated on fundamentals. He opted for good attacks, cleaned up the ragged ensemble playing. Always big on strings, he was daring enough to change them from unison bowing, to his "free bowing" techniques for which he was justly famous. More relaxed, the strings began to have better intonation. Coaxing them, guiding them, gently chiding them, and praising them in equal measure, by the time the concert came, Stokely really had the orchestra "up" for the event, with most of the players performing beyond their normal abilities. What the maestro had done in five days was well nigh miraculous. Don't get me wrong . . . this student orchestra was still a long,

long way from even approximating a polished ensemble, but at least they were "listenable," where previously they were excruciating.

Placing The Chorus

It was at this seminar that the maestro taught me the use of risers and that the placement of orchestral choirs in a symphony orchestra is not a sacrosanct tradition. Risers are sturdy platforms of various heights, which can be placed in certain positions on the concert hall stage, and various groups of players can be seated on them. Generally, the maestro kept the entire string body flat on the stage, while the woodwinds, brass, and some percussion were placed on risers. In this manner, the instrumentalists on the risers were not playing into, but over the backs of the string players. Stokely felt that this layout gave him better control of orchestral balances and produced a more sonorous, richer, and more powerful sound from the orchestra. I used this technique in all of

my Everest recordings and will use it in my upcoming recording of Arthur Fiedler and the Boston Pops.

During the seminar, the maestro and I got along very well, and we established a relationship that was to stand the test of time. A few weeks after the seminar he invited me to record his concert with the Detroit Symphony Orchestra. The musicians' union kicked up a fuss about the recording, but Stokely went to the head of the union and told him that he "must have these experimental stereophonic recordings," and that some day this kind of recording would benefit orchestras everywhere. How prophetic! With the Detroit Symphony, the maestro didn't differ too greatly in his relationship with the players, as compared to those in the student orchestra. He still was the great teacher but, of course, on a much more elevated level. He respected and expected professionalism in the musicians' performances, and made it clear that he would not tolerate any breaches of this phil-

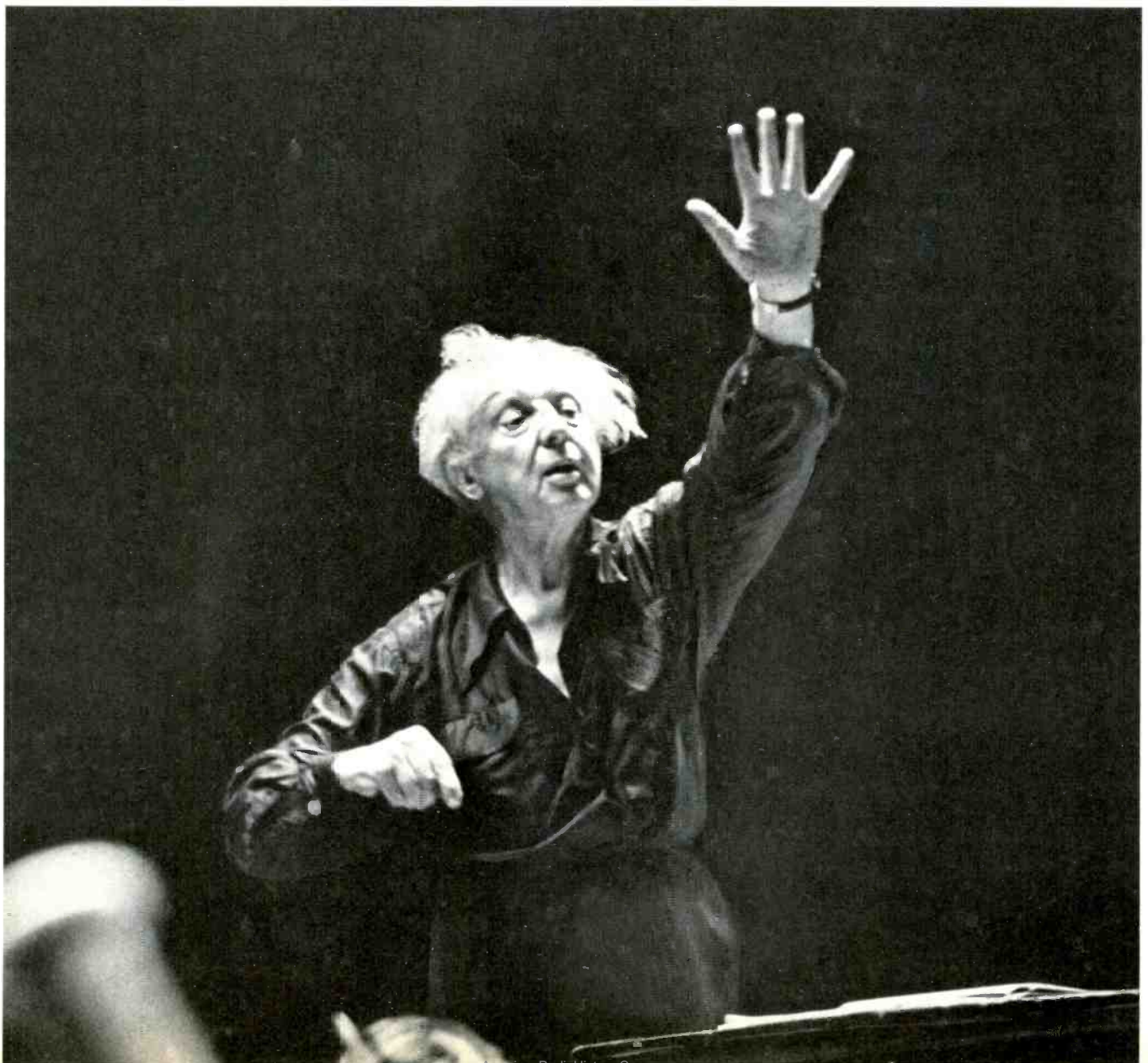


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Leopold Stokowski and Associate Editor Bert Whyte raise a toast to friendship and good music.

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osophy. Only once, many years later, did I see the maestro come close to "blowing his cool." We were recording one of the major orchestras, and frankly, in the inner circles of the classical music field, these musicians were considered a rather blase and cynical group, who could make things tough for a conductor. We had been recording for a few minutes, and it was obvious some things weren't going right, that some "monkey business" was going on. The maestro put those wonderfully expressive hands of his flat on the score stand in front of him, stopping the music, and in his inimitable accent, his voice shaking with anger, he said, "Listen to me . . . if you want to act like high school boys, you do that, and we can all pack up and go home. You're supposed to be professionals. If you want to play like professionals and have respect for the music, we will continue." Treated to a rare display of Stokowski temperament, and properly chastened, the musicians settled down and we made a fine recording.

Stingy Stoky?

I could write volumes about the maestro, but some personal glimpses will have to suffice. Somehow Stokowski had gotten a reputation of being "close with a dollar." Perhaps this had some substance, but not as far as I was concerned. For example, it is customary for a conductor to receive an advance payment against the royalties he expects to earn on his recording. Stokowski was the only con-

ductor I ever recorded, who never asked for advance royalties of any kind. With me, he was never anything but generous. At times he combined his generosity with his delicious sense of humor. He had a way of having a little smile play around his lips, when he was ready for some fun. One mid-morning at his apartment in New York, I made ready to leave, and he asked "Why don't you stay for lunch, Bert?" Came time for lunch and his maid put a bowl in front of me containing some shredded lettuce, chopped celery, chopped peanuts, sans any dressing, and a very miniscule portion it was. I looked rather disdainfully down my nose at this, and he said "Oh, come on, Bert, eat it! It's good for you, and you're too fat anyway!" But for dinner that night we went to L'Armorique, owned by Marcel Gosselin, former *chef de cuisine* of the great Chambord restaurant. The maestro and Marcel, both wearing the rosette of a Chevalier of the Legion d'Honneur in their lapels, greeted each other as old friends and began discussing details of our epicurean repast in voluble French. Marcel's famous fresh *fois gras en brioche* and *homard l'absinthe*, washed down with a superb Batard Montrachet, isn't exactly the kind of dinner you expect from someone who is supposed to be parsimonious. Needless to say, you can't go into any kind of a public place, particularly a restaurant, with Stokowski and not create quite a stir. At L'Armorique, Stoky, my wife Ruth, and I were seated at a banquette

in one corner, and there was a stunning red-head at the next table. Stokowski was an inveterate and outrageous flirt. Of course, the red head was looking at him, and he was smiling at her and ever so slightly saluting her with his wine glass, much to the discomfiture of her companion.

Where He Lived

Stokowski lived in the 14th-story penthouse of a Fifth Avenue, New York City, apartment building. The living room was huge, with windows overlooking Central Park. The furnishings were comfortable, a melange of different styles and periods. On the wall separating the living room from the adjacent study, the maestro had built a large clock, some three feet in diameter. The clockwork was in the wall, and he had marked off the hours in varied colors. Scattered around the clock wall were piles upon piles of books on music and scores, many of them quite rare. Then there was the maestro's odd collection of exotic instruments, mostly percussion, including a huge tam-tam suspended from a stand. Stoky had a spindly period desk at right angles to one of the living room windows. This was his base of operations, and he used one of those one-piece Swedish Ericaphones. When he was in the process of building the American Symphony Orchestra which he founded, he would sit at this desk and audition potential candidates for the orchestra, concentrating on string players. He would often com-

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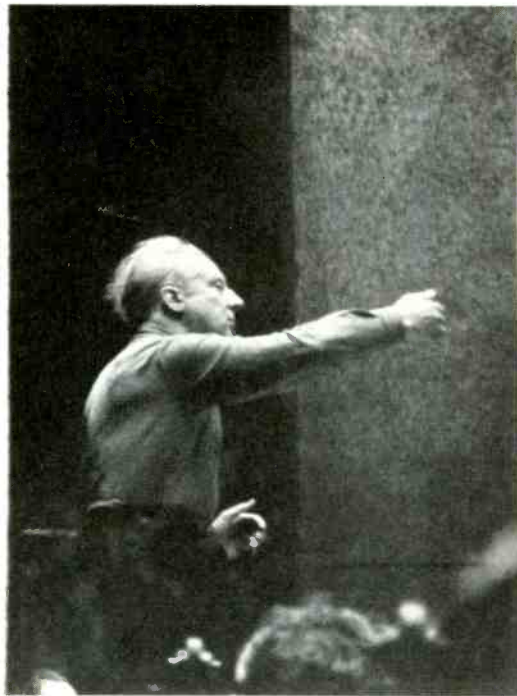
ment to me, that he was worried about the chronic shortage of string players. He said that America wasn't producing enough of these instrumentalists. The maestro felt this was because string instruments were difficult to learn, and there was little chance the players could earn supplementary income in pop orchestras. In contrast, there were plenty of brass players, since they could augment their income in dance bands, etc.

In his study, surrounded by still more stacks of scores, was Stoky's hi-fi system. When I set up this system for him in 1959, he told me he wanted a good system, but not something in the very top category. He said he wanted to approximate the kind of system used by the average hi-fi enthusiast. This was in the early days of stereo, of course, so we settled on a fairly large pair of Wharfedale speakers, a mid-powered H.H. Scott receiver, and a Garrard changer with a Pickering cartridge. He liked this system, but a few years later he wanted more power and better bass, so we installed a McIntosh pre-amp and amplifier. Like many an audiophile today, his chief complaint was noisy record surfaces, and he would rail at record company executives to correct this deplorable problem.

Stokowski was a very private person, to many people an aloof and remote figure. He despised phonies, poseurs, and "pushy" people who wanted to involve him in commercial projects. Oddly, at the same time, he was one of the most democratic persons you can imagine. When the maestro was recording for me at Everest Records, quite often he would be chauffeured to the studio by a character who worked for us named Rocky. Rocky was our all around "go-fer" and truck driver, a rough and ready sort of individual of Italian extraction, who lived in an apartment in the wilds of Brooklyn. Rocky was a nice guy, and he was very fond of Stoky. One day at the studio, Rocky knew that the maestro had been to my home for dinner the previous evening, and in his best "Brooklynese" he said to Stoky, "I know Bert is a good cook, maestro, but my wife makes the best lasagna you ever tasted... you ought to come out to my place and try some."

Well, by God, Stoky accepted the invitation, and in due time Rocky drove him to Brooklyn, to a neighborhood a far remove from Stokowski's usual kind of environs. Of course, his visit created a tremendous stir, and the maestro agreed that the lasagna was indeed quite exceptional! Speaking of driving, the maestro loved fine cars, although he rarely drove in his later

years. One time when he was coming to my home for dinner, I arrived at his apartment building in my new pride and joy, a full-bore, fuel-injected, competition Corvette. I apologized to him for the car being so low-slung, and somewhat difficult to enter. Now remember, at that time he was 76, but nothing daunted, he deftly folded his frame into the Corvette. With that little smile playing around his lips, he said, "This is your kind of car, Bert. It suits you." He let me ponder whether he was complimenting me or needling me! When we got further out on the Long Island Expressway, and traffic was light, I was cruising along at 70 in deference to the maestro, and he said,



"This feels like a very stable car, Bert. Can you go faster?" This Corvette could go from 0 to 100 in 15 seconds, so I dropped a gear and zapped up to 105 mph. Stoky was quite impressed, but not the least bit flustered.

THE Stoky Mix

What about the stories that the Maestro remixed and "tampered" with his recordings? Partly true. If he thought the hall wasn't good enough to achieve the balances he liked, he would try to remix. This largely depended on the company he was recording for, since in many of them, a strong engineers' union would prevent him from touching the board controls. There was no doubt he had a fantastically keen ear, and he often improved the balances of the original recording. Stoky liked working at our Everest studios, and he was quite fond of Harry Belock, who cofounded Everest with me, since Harry was a

perfectionist like himself. He really liked recording with the 35 mm magnetic film system we pioneered, because it gave him a better signal-to-noise ratio and much greater dynamic range than that obtainable on standard magnetic tape. Like almost everyone else in those days, we recorded three-channel masters. Stoky would like to sit in on the mix-down from three channels to two, when we would be making the dubbing master for our prerecorded tapes. (For our disc recordings, we used the actual master, with the reduction to two channels taking place in the playback console and going directly to the cutting amplifier.) The maestro's mixing was minimal, mainly he was always striving for more sonority from the contrabasses. He never complained when I would gently tell him, that good as our 35 mm system was, he was approaching the limits of the equipment. He respected that, and respected my judgment. There were some engineers in one of the record companies Stoky worked for that thought they could put one over on the old man. When Stoky mixed this particular recording in their studios, the faders activated the amplifiers and he heard the changes through the loudspeakers, but the output of the console was not linked to the tape machine. When Stoky listened to the test pressings of his recording (which had the sound as originally recorded), he took only a few minutes to announce angrily that this was not the recording he had mixed.

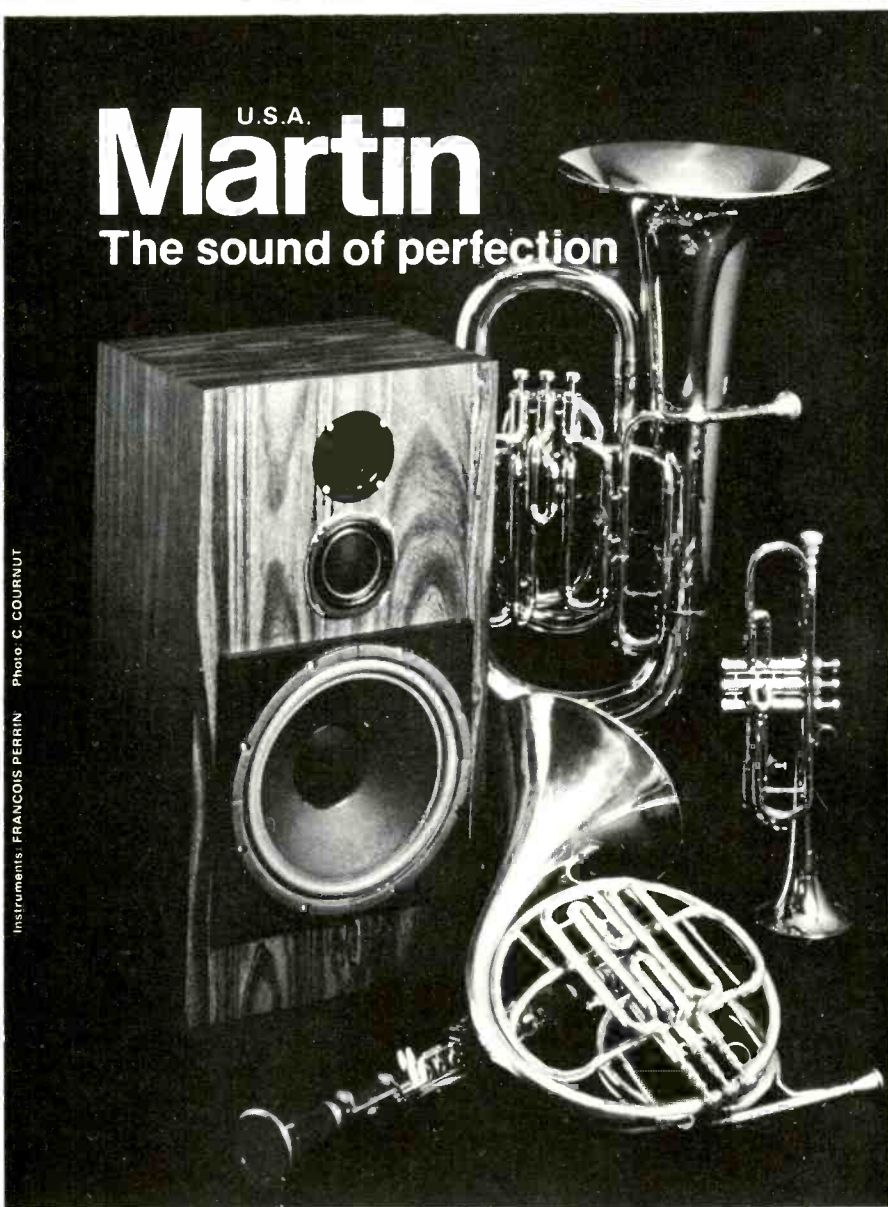
The Maestro had a profound respect for music. In all the years I knew him, in the many casual relaxed conversations we had, he never strayed far from music. He was not really a political creature nor much on sports. He had an almost mystic dedication to music, and of the many conductors I have known and recorded, his knowledge of music was far more comprehensive than theirs, virtually encyclopedic. And, of course, he had championed so much new music in his long career. He gave either world or American premiere performances of works by such composers as Mahler, Shostakovich, Prokofiev, Schoenberg, Rachmaninoff, and many others.

Stokowski was a tireless experimenter in trying to achieve ever more realistic sonic presentations of his beloved music. Early on, we had discussed multi-channel sound (and, of course, he had this kind of experience with the movie "Fantasia") and the need for ambience systems to simulate the original acoustic environment of the recording locale. Nothing was too difficult in his service to music. When we were recording some excerpts from

"Parsifal" with the Houston Symphony (which he pronounced "Hoo-stun"), the score called for these very special Wagner chimes, which as far as I know are used only in the annual Bayreuth performances. Well, we couldn't duplicate those, but the maestro had the Schulmerich Carillon Co. in Pennsylvania build him this monster set of amplified chimes, and the damn thing stood about 12 feet high! The sonority of those chimes was truly stupendous, a brazen clangor you could feel in your bones!

Stokowski and I dreamed many dreams of music we wanted to record. Unfulfilled was our dream of a really definitive "Boris Godounov," with the

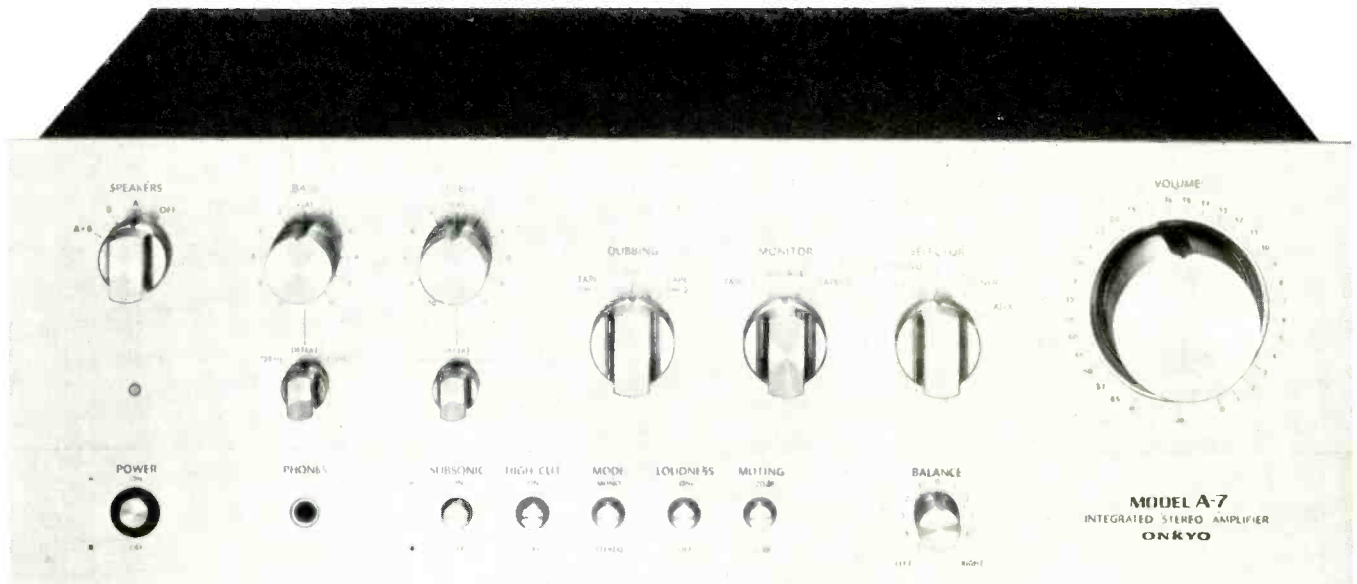
original orchestration. We were set to record a long cherished Shostakovich 7th, the "Leningrad" symphony and *Le Sacre du Printemps* with the Chicago Symphony, and the plans fell through. There were many other things, for we were always discussing repertoire. I am so glad I had a chance to visit with the maestro last summer, as I related in my column on the visit to Decca Records in London. Frail as he was, still very much alert, and after our greetings, the first question was "Well, Bert, do you have any new ideas for repertoire?" This, at age 94! The maestro was a dear friend, and I consider myself very fortunate to have known one of the truly great giants of music in this century. Δ



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General Specifications

Power Requirements: 120 V, 60 Hz a.c.

Dimensions: 17½ in. (44.5 cm) W X 6¼ in. (15.9 cm) H x 15 in. (38.1 cm) D.

Weight: 29.7 lbs. (13.5 kg).

Price: \$349.95.

To the audiophile who has progressed beyond the "receiver approach" to high-fidelity components, a good integrated amplifier offers the next logical step if budget needs and inclination are not geared to a system of total separates. Many manufacturers, recognizing this renewed interest in integrated amplifiers, have been concentrating their efforts on mid-priced, mid-powered preamp-amps which offer precise and comprehensive control and switching flexibility, attractive styling, and fairly compact packaging. Typical of such integrated amplifier designs is Onkyo's Model A-7, the higher-powered of two similarly configured integrated amplifiers in their present line.

The front panel of the A-7 features a massive volume control knob at the upper right, calibrated in 1 dB detented

steps down to -18 dB, then in 2 dB steps down to -28 dB, and in larger attenuating increments from that point downward. Three easy-to-grip selector switches handle program source selection (two phono inputs, AUX and tuner), tape monitoring of up to two decks, and tape dubbing from either deck to the other. Separating the dubbing and monitoring switches in this manner makes it possible to dub from tape to tape, while listening to any other program source such as phono or tuner. Click-stop bass and treble controls (affecting both stereo channels at once) are associated with three position turnover switches located just below them which select 125 Hz or 400 Hz bass turnover or 2 kHz and 8 kHz treble turnover points. In their mid-positions, these switches by-pass tone control action completely. A

Up to now you had to choose
between the turntable you wanted
and the turntable you could afford.



Introducing the MKII Series. Three new professional turntables: The SL-1300MKII automatic, the SL-1400MKII semi-automatic and the SL-1500MKII manual. All with a totally quartz-controlled direct-drive system with one big advantage: a moderate price.

So to unparalleled speed accuracy, powerful torque and fast start-up action, Technics MKII Series adds quartz accuracy to whatever pitch variation you desire. In exact 0.1% increments. At the touch of a button. And instantaneously displayed by LED.

What's more, all this technology has been compressed into four high-density IC's. So the MKII Series' styling is low, lean and clean.

And our low-mass S-shaped universal tonearm has been made so accurate, friction is an incredibly

low 7 mg. (vertical and lateral). The MKII Series also boasts a double-suspended suspension system and anti-resonant base material to minimize feedback.

Compare specifications. Compare prices. And you'll realize there's no comparison for Technics MKII Series.

MOTOR: Brushless DC motor, quartz-controlled phase-locked servo circuit. SPEED: 33 1/3 and 45 rpm. STARTING TORQUE: 1.5 kg. per cm. BUILD-UP TIME: 0.7 seconds (= 90° rotation) to 33 1/3 rpm. SPEED DRIFT: Within ±0.002%. WOW & FLUTTER: 0.025% WRMS. RUMBLE: -73dB (DIN B). PITCH VARIATION: ±0.9%. SUGGESTED RETAIL PRICE*: \$399.95 (1300), \$369.95 (1400) and \$349.95 (1500).

The MKII Series. A rare combination of audio technology. A new standard of music excellence.

*Technics recommended price, but actual retail price will be set by dealers.

Technics Professional Series
by Panasonic

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speaker selector switch is located at the upper left of the panel, above a power-on indicator light and the power *On/Off* pushbutton switch.

Other controls and switches along the bottom edge of the front panel include the usual phone jack, a series of five pushbuttons which activate a sub-sonic filter, high-cut filter, mono/stereo selection, loudness circuitry, -20 dB audio muting, and a small rotary balance control knob.

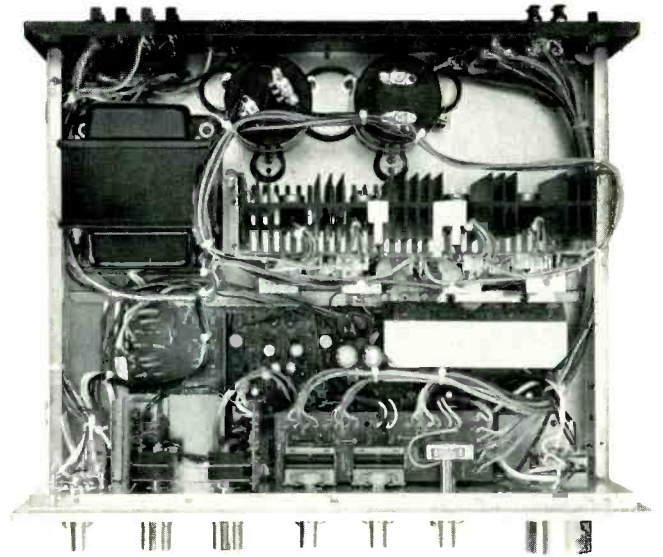
The rear panel of the Onkyo A-7 contains the appropriate input jacks, tape-out jacks, preamp-out/main amp-in jacks (interconnected by means of wire jumpers for normal use), and a chassis ground terminal at the left. At the far right are two sets of color-coded speaker terminals which feature vertically oriented molded channels or routing paths that make it nearly impossible to create short circuits between adjacent speaker wire ends. Easily replaceable 5 ampere fuses are also located in this area (these are in series with the output signals), along with a linefuseholder and three a.c. receptacles (one switched, the other two unswitched). Output stage heat sinks are located inside the chassis itself, and three rows of ventilating slots are located at the center of the rear panel to permit adequate air flow through the unit.

Internal Construction and Circuitry

The A-7's large power transformer and associated 25,000 mF filter capacitors are clearly visible in the photo of the internal layout of this amplifier. Onkyo claims that this oversized power supply system, though common to both channels, together with their use of a buss feeder ground, brings the equivalent series resistance of the power supply as close to "zero" as possible.

The phono preamplifier-equalizer section of the A-7 uses class-A, differential-amplifier, push-pull circuitry, and a total of six transistors is required for each stereo channel of this phono preamp. The power amplifier section utilizes a class-A, push-pull driver stage and differential, direct-coupled, pure complementary-symmetry output circuitry. Two major printed circuit modules are used in the A-7. One is for the preamp/control circuitry, the other is for both channels of the power amplifier section and is mounted vertically and integral with the massive heat sinks. A circuit refinement worth mentioning has to do with the tape switches. When the monitor switch is in the *Off* switch, connection to the *Rec Out* jacks is interrupted to prevent possible loading of circuits by associated tape deck input impedances.

A relay-type protection circuit is incorporated in the A-7 in addition to the output line fuses mentioned earlier. If abnormal d.c. voltage should appear at the speaker terminals because of power amplifier malfunction or some other



reason, the relay contacts will open to protect against speaker damage.

Power Amplifier Section Measurements

Figure 1 is a plot of harmonic and IM distortion versus power output, using 8-ohm loads. Under this load condition, using a 1-kHz test signal, the amplifier delivered a continuous power output of 71 watts per channel for rated (0.1 per cent) THD and 76 watts per channel for rated IM distortion (0.1 per cent). At rated power output, THD measured 0.006 per cent for a 1-kHz test signal, while IM distortion was 0.019 per cent. Since Onkyo offers a power rating for 4-ohm operation, measurements were repeated for this lower load impedance, and results are plotted, for a 1 kHz test signal, in Fig. 2. During these tests, the amplifier delivered 93 watts per channel for rated THD and IM.

Figure 3 is a plot of distortion versus frequency, taken at rated output (65 watts per channel, both channels driven) once again using 8-ohm loads. On the basis of the results obtained, it is clear that Onkyo has rated this amplifier very conservatively and might well have specified the power band as extending from below 10 Hz to 30 kHz.

Frequency response, measured via the main amp inputs, extended from below 10 Hz to 65 kHz for the -1 dB roll-off points and up to 110 kHz for a -3 dB roll-off. Damping factor measured exactly 50, as specified. Unweighted signal-

Fig. 1—Harmonic and intermodulation distortion characteristics of the Onkyo A-7 amplifier with 8-ohm loads.

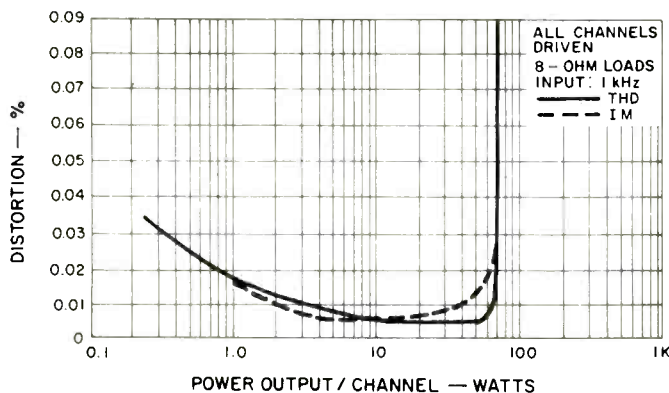
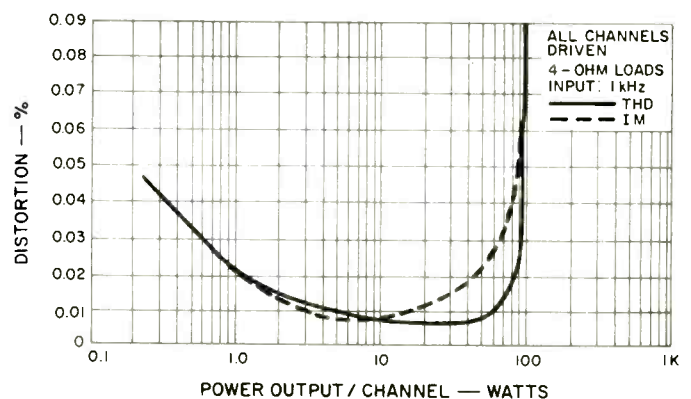


Fig. 2—Harmonic and intermodulation distortion characteristics with 4-ohm loads.





ONE GOOD THING



LEADS TO ANOTHER.

When it comes to a super-powered receiver, people know a good thing when they hear it.

That's why our KR-9600 is one of the most popular receivers in its category.

For less than \$750* you get 160 watts per channel, minimum RMS at 8 ohms, from 20-20,000 Hz with no more than 0.08% total harmonic distortion. With all the features and performance you'd expect from our top of the line receiver.

But let's face it. A lot of people don't need all that power. That's why we developed the KR-4070.

It's got 40 watts per channel, mini-

imum RMS at 8 ohms, from 20-20,000 Hz, with no more than 0.1% total harmonic distortion. (That's correct, 0.1% THD.) Plus all the features most people need.

But what's incredible, is that you can buy it for less than \$300*.

Depending on how much power you need, either receiver will give you more performance for less money than you thought possible.

Because at Kenwood, we think you can't get too much of a good thing.

*Nationally advertised value. Actual prices are established by Kenwood dealers. Handles optional.



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*Introducing 3 new ways
to get the truth out of your
cassette deck.*



WER

REW

FF

STOP

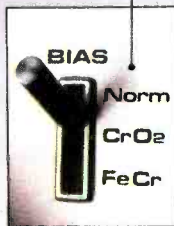
PLAY

REC



ON

OFF



The Master Series.TM
A Scotch[®] cassette for every
switch position.

Three totally different tapes. Each developed to deliver the truest, clearest sound possible at each tape selector switch position.

Our Master I cassette is for normal bias recording. It features an excellent dynamic range, low distortion, uniform high frequency sensitivity and output that's 10 dB more than standard tapes.

Our new Master II replaces chrome cassettes and is designed for use on hi-fi stereo systems with chrome bias (70 microsecond equalization). It features some spectacular performance characteristics, including a special coating that gives it a 3 dB better signal-to-noise ratio at low and high frequencies than chrome cassettes, yet it's less abrasive.

Our new Master III is for the ferri-chrome setting. It's formulated with the most advanced technology available, giving a 3 dB output improvement at low frequencies and 2 dB at high frequency. And the unique dual layer construction increases both low and high frequency sensitivity over chromium dioxide and ferric oxides.

All this, plus unique inner workings you can actually see. Our new Master line has a special bonus feature. A precision molded clear shell that allows you to monitor the inner workings of the cassettes. You can actually see the recorder head penetration and the unique roller guides in action. Look closely at the transparent shell and you'll see the water wheels which were specially designed to move the tape evenly across the head, reducing friction and noise. And two radially creased shims insure smoother wind, improved mechanical reliability and reduced wow and flutter.

Enough said. Now it's time for you to take the true test. Match up the right Master cassette with the bias you prefer. Then just listen.

You'll find that whichever switch position you use, a Scotch[®] Master is the way to get the most out of it.

Scotch[®] Recording Tape.
The truth comes out.

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to-noise ratio for the main power amplifier section measured 104.5 dB relative to full rated output.

Pre-amplifier Section Measurements

Phono input sensitivity (for both *Phono 1* and *Phono 2* inputs) measured 2.6 mV for rated output. Phono overload was an impressive 245 millivolts (as opposed to 230 mV claimed), and phono S/N was outstanding, with readings of 81 dB (IHF "A" weighted), referred to actual input sensitivity.

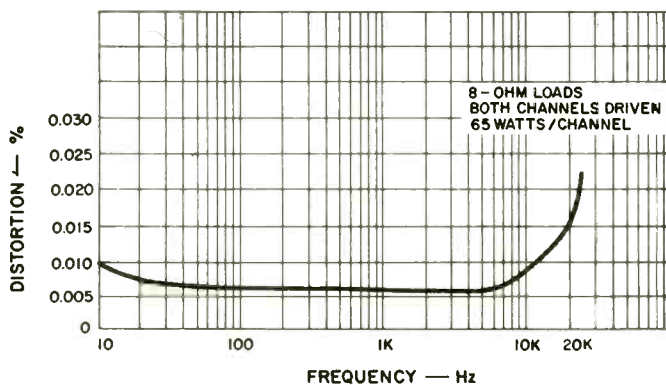
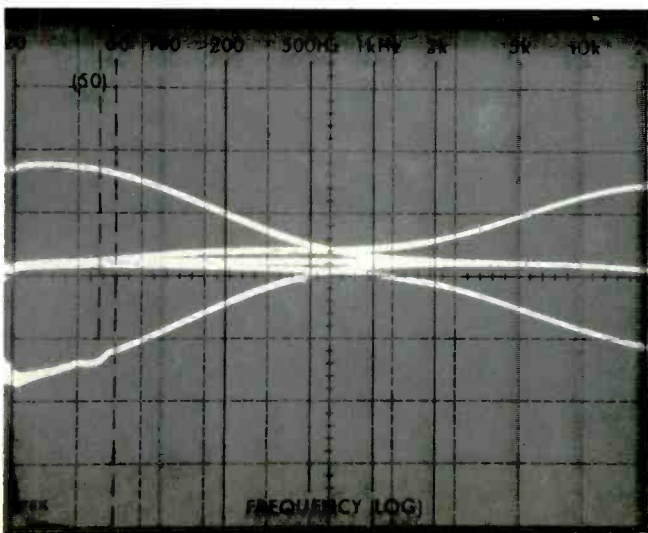


Fig. 3—Distortion vs. frequency with both channels driven at 65 W into 8 ohms.

Fig. 4—Tone control range of the Onkyo A-7 with turnover switches (A) set to 400 Hz and 2 kHz; and (B) at 125 Hz and 8 kHz.

A



RIAA equalization was accurate to within 0.2 dB of the "old" RIAA curve (new standards require an additional roll-off time constant at sub-sonic frequencies), but the combined use of the sub-sonic filter along with existing RIAA equalization comes very close to meeting the new RIAA standards.

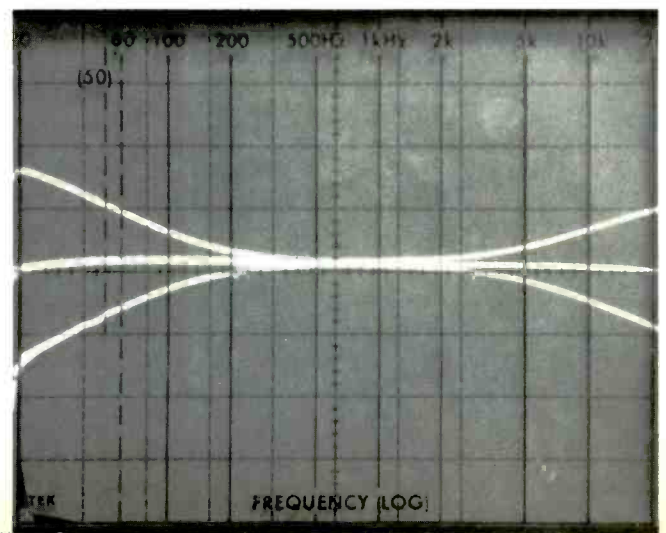
The advantages of having selectable turnover tone controls are clearly illustrated in the 'scope photos of Fig. 4. In Fig. 4(A) the 400-Hz and 2-kHz turnover points were selected, and tone control range is typical of most bass and treble controls. In Fig. 4(B), turnover points were switched to 125 Hz and 8 kHz, and the tone controls become more useful in adjusting extreme bass and extreme treble without adversely affecting mid-frequency musical response of the system.

Action of the sub-sonic filter, which has a cut-off point of 10 Hz, does not show up in the sweep-frequency 'scope photo of Fig. 5 since that sweep extends only from 20 Hz to 20 kHz. The action of the high-cut filter is clearly seen, however, and although its slope rate is only 6 dB per octave, its cut-off point is sufficiently high in frequency so that some small noise-reducing benefit is afforded without sacrificing too much in the fundamental musical frequency range.

Listening and Use Tests

It took us only a few minutes to become familiar with the controls of the A-7. One gets the feeling, when operating this integrated amplifier, that all the controls and switches are just where they should be and all of them do their jobs positively and very smoothly. The outstanding thing we noted while listening to music reproduced via the A-7 was that it seemed capable of delivering more power than our bench measurements had indicated. Perhaps this is in part a result of the extremely flat power-band characteristic at the low end which, in turn, may be a result of the care that Onkyo

B



The Realistic® 2000



75

Proof that you don't have to pay a fortune for a first-class, high-power stereo amplifier

What more proof do you need than rave reviews by a major audio magazine? Stereo Review (April 1977) says "The SA-2000 can deliver as much power, with as little distortion, as will ever be required by the vast majority of its users." 55 watts per channel, minimum RMS at 8 ohms from 20-20,000 Hz, with no more than 0.3% total harmonic distortion. Our tone controls "are among the better ones we have seen," says Stereo Review. They give you a choice, by boosting or cutting bass at 125 or 400 Hz and treble at 3 kHz or 7 kHz. It's almost like

having four separate tone controls. Stereo Review also says ours is "one of the very few loudness compensation systems that really works." That's because exclusive Perfect Level® makes our Perfect Loudness® system adjustable to any listening level so that the "boominess" so often heard with ordinary loudness systems is eliminated. Among many other features, the SA-2000 has two magnetic phono inputs, dubbing and monitoring circuits for two tape decks, and a walnut veneer case. Only \$269.95* — even less if you buy it in a complete system.



These two credit cards honored at most Radio Shacks.

*Prices may vary at individual stores and dealers.

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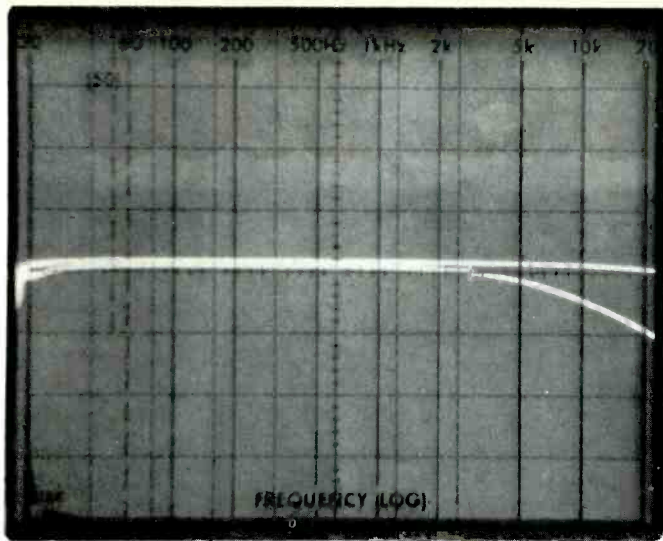


Fig. 5—The high-cut filter response of the Onkyo A-7.

took is designing that power supply to have such low internal impedance and to provide such great power reserve at the bass end. In any event, the A-7 sounded very good to our ears when coupled to a rather low-efficiency pair of sealed-enclosure speaker systems which have previously required upwards of 100 watts per channel to deliver the kind of clean, powerful sound we normally seek. Obviously, continuous power ratings do not tell the whole story, FTC power rule notwithstanding.

If a few of the frills normally found on some separate preamp/control units are missing from the A-7 (notable separate tone control of each channel, sensitivity selection of phono inputs, or cartridge impedance matching selection), these omissions are more than justified in an integrated amplifier that sells for as low a price as this one. Onkyo has, in our opinion, put together an integrated amp that offers excellent value for its price, both in terms of front panel functions and in terms of reproduced sound capability.

Leonard Feldman

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76



Burwen Research Model DNF-1201A Dynamic Noise Filter

MANUFACTURER'S SPECIFICATIONS
"Hiss" Reduction: Up to 30 dB above 5 kHz, 5 to 14 dB total above 400 Hz, depending upon program material and control settings.
Frequency Response: Minimum bandwidth, -3 dB @ 500 Hz, -10 dB @ 1 kHz, -20 dB @ 2.5 kHz; Maximum Bandwidth, ±0.5 dB, 10 Hz to 20 kHz.
Input Level: 0.77 V (0 VU), adjustable to 10 dB lower level.

Maximum Input: 6 V @ 0.1 dB gain.
Rated Output: 2.5 V (+10 dB).
Clipping Level: 6 V.
Output Impedance: 50 ohms, d.c. coupled.
Gain at 1 kHz: 0 dB adjustable to +10 dB.
THD (Sensitivity at Maximum): 0.2 per cent at any frequency from 20 Hz to 10 kHz.

IM Distortion: 0.05 per cent.
Internal Noise: 100 μV rms. 20 Hz to 20 kHz.
General Specifications
Dimensions: 17½ in. (44.5 cm) W x 2⅞ in. (7.3 cm) H x 8¼ in. (21 cm) D.
Weight: 8 lbs. (3.6 kg).
Power Requirements: 105-125 V, 50/60 Hz, 8 W (210-250 V model optionally available).
Price: \$379.00.

The Burwen Research DNF-1201A is a much improved and totally restyled and re-engineered version of Dick Burwen's earlier Model 1201 which we had an opportunity to examine some years ago. The Burwen operation is now headquartered at the same location as KLH, in Cambridge, Mass., both companies being part of EAD Industries. Evidently, with Mr. Burwen now able to devote all his efforts to engineering (instead of trying to run his small, independent company and worry about new products all at the same time), he has come up with a truly effective dynamic noise filter.

A dynamic noise filter, unlike the more familiar "high cut" passive filters found on most preamplifiers, amplifiers, and even receivers, may be thought of as a filter whose cut-off points and degree of attenuation are constantly changing, depending upon the musical content of the program source. In other words, if a moment of music comes along which contains no high frequencies, the filter cuts down overall system

response (it is usually inserted in the signal path via the tape out/tape in jacks available on most amplifiers and receivers), and high frequency "hiss" or noise is sharply diminished. At the instant when a high frequency musical signal comes along, the filter "opens up" and lets the music come through unattenuated. Sounds simple, but execution of an unobtrusive dynamic filter is not that easy. As for what happens to hiss when the filters are wide open and highs are contained in the music, a well known characteristic of human hearing known as the "masking effect" takes care of that very nicely. During such time periods, the high frequency musical content tends to mask the lower intensity high-frequency noise so that even though it is very much there, our ears simply do not respond to it.

The front panel of the 1201A is gold anodized and has a low-profile design. The power On/Off pushbutton is located at the lower left. Four interlocking pushbuttons determine the



level of signal processing which is to occur. The first button bypasses the filter entirely, while the next three switches are labeled MAX (for maximum processing of poor quality program material where high levels of hiss are present), MED (intended for signal processing of average quality tapes, records, or broadcasts), and MIN (for signal processing of very high quality, low-noise programs of all types).

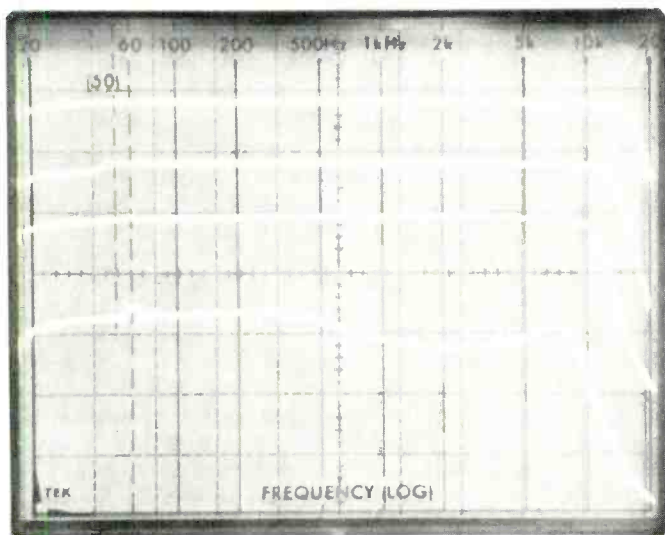
A sensitivity control, in the form of a continuous slide lever, is flanked by red and green LED indicators and allows the user to "fine tune" the filters once the appropriate signal processing switch has been selected. Optimum performance occurs when the LEDs flash on and off alternately. In actual use, if this condition cannot be obtained for any setting of the sensitivity control, the user is advised to use an alternate signal-processing button and try again.

The rear panel of the 1201A contains a pair of tape-out and tape-in jacks, in addition to the input and output pair of jacks. These replace the ones used up on your amplifier or receiver in connecting the 1201A, and the user can select tape monitoring by means of the tape monitor button on the front panel. The button at the extreme lower right of the panel permits the user to interpose the filter ahead of the connected tape recorder's inputs or after the tape deck's line outputs, thereby enabling pre- or post-recording filtering.

How It Operates

The Model 1201A uses a bandwidth control circuit which includes a complex multistage nonlinear filter. The band-

Fig. 1— With the "MIN" button depressed the DNF-1201A provides mild bandwidth suppression which increases at low noise levels. Here the Sensitivity control was set to mid-position. Each vertical division equals 10 dB.

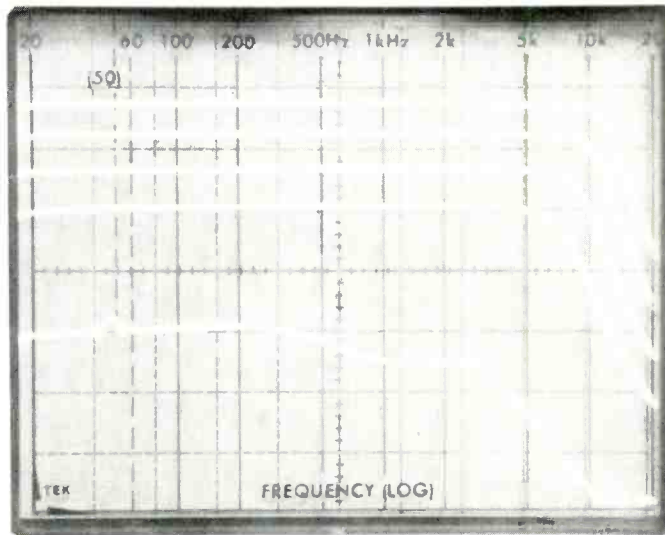


width controller measures the high frequency content of the sum of the bandwidth in accordance with both level and frequency. Dynamic filtering is achieved as the bandwidth controller generates a d.c. control voltage that constantly regulates the cutoff frequency of a voltage variable low-pass filter. Bandwidth changes occur gradually at low levels but rapidly enough to track the signal. According to Burwen, sharp transients can extend the bandwidth to full response in as short a time as 600 microseconds attack time. Reduction of bandwidth, or decay time, is adapted to the incoming signal and varies in the range from 50 milliseconds to 1.5 seconds.

Laboratory Measurements

From the foregoing description, it should be obvious that a dynamic filter such as the Burwen DNF-1201A does not lend itself too well to "static" or constant-signal bench testing. When measuring frequency response, for example, results can be confusing because the bandwidth of the device changes with incoming frequency and levels. Nevertheless, we looked about for a way to illustrate graphically what is happening in the filter under different signal level conditions and came up with a series of scope traces which helps to clarify the action, we feel. Figure 1 is a 'scope photo of frequency sweeps (from 20 Hz to 20 kHz) taken with the signal-processing set to minimum and the sensitivity lever set to its mid-position. At high level input (top trace), response is almost out to 20 kHz, as it should be, since high frequencies at this level cannot be anything but "music." The lowest trace (some 40 dB lower) exhibits a cut-off at around 7 or 8 kHz. In other words, the filter has "closed down" somewhat, perceiv-

Fig. 2— Greater bandwidth contraction occurs when the "MAX" button is depressed. Each vertical division equals 10 dB.



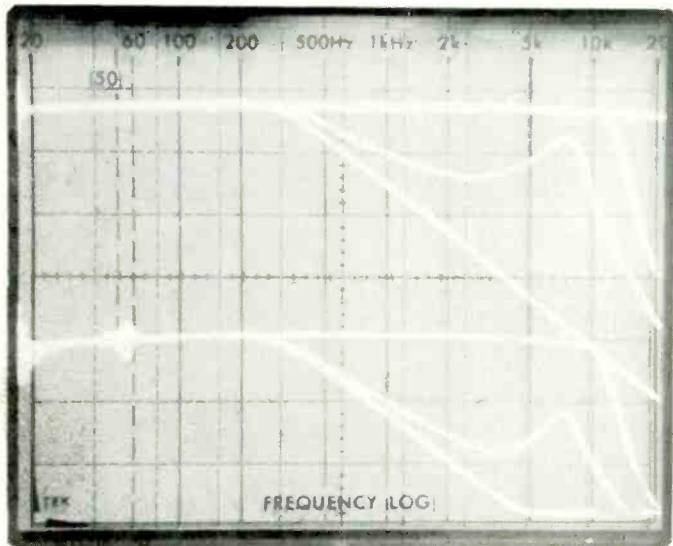


Fig. 3—Varying sensitivity control of the 1201A with the high level sweep frequencies applied resulted in the upper group of response curves. With the low level sweep, lower response curves were obtained with the "Min" button depressed.

78

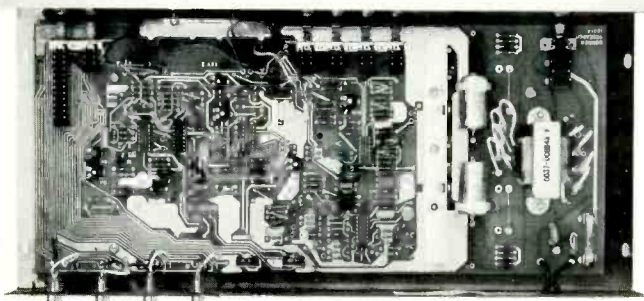
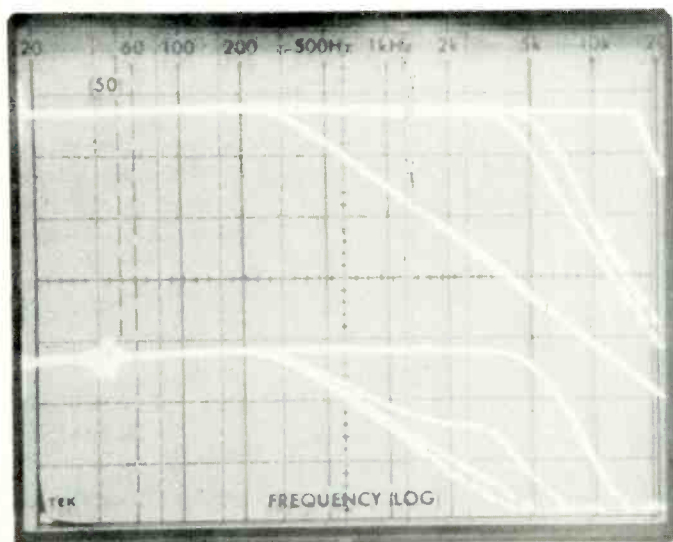


Fig. 4—Procedure was the same as used in Fig. 3 curves, except that this time the "MAX" signal processing button was depressed.



ing this low level sweep (or its high frequency content) as being "noise." Note that each of the response sweeps is the result of an instantaneous change of a shift in the instantaneous output/frequency response with input frequency and amplitude.

In Fig. 2, the MAX signal processing button was pushed and successive sweeps were repeated as in Fig. 1. Note that this time, cut-off occurs at approximately 10 kHz, even for high level signals, while at lowest sweep level, cut-off moves down even further in frequency, as it should be expected to do.

Figures 1 and 2 represent a series of frequency response curves all taken with the slide sensitivity control in a set (mid) position. To get some idea of the action of this control, we recorded additional sweeps in Figs. 3 and 4. This time, for Fig. 3, we used the MIN signal-processing button and applied high-level and low-level sweep signals. For each level, we varied the setting of the sensitivity control and obtained a series of response curves for each of the constant input sweep levels (low and high).

These experiments were repeated using the MAX signal processing setting, again using low- and high-level input frequency sweeps and varying the sensitivity control from one extreme to the other. By examining the results obtained in Figs. 3 and 4 and correlating them with earlier Figs. 1 and 2, readers should be able to get a pretty good idea of how the filter expands and contracts bandwidth, depending upon the input level and frequency content.

Accurate static measurements can be made only with the OUT button depressed and, under those conditions, response measured flat within 0.5 dB from 10 Hz to 20 kHz, as claimed. We were able to drive the output to a level slightly greater than 6.0 volts before noticeable clipping occurred. With the sensitivity control set to maximum (worst case), total harmonic distortion at 1 kHz was just under 0.1 per cent. IM distortion measured 0.03 per cent. Signal-to-noise ratio of the unit itself (with the OUT button depressed) measured a very acceptable 88 dB below rated output.

Listening and Use Tests

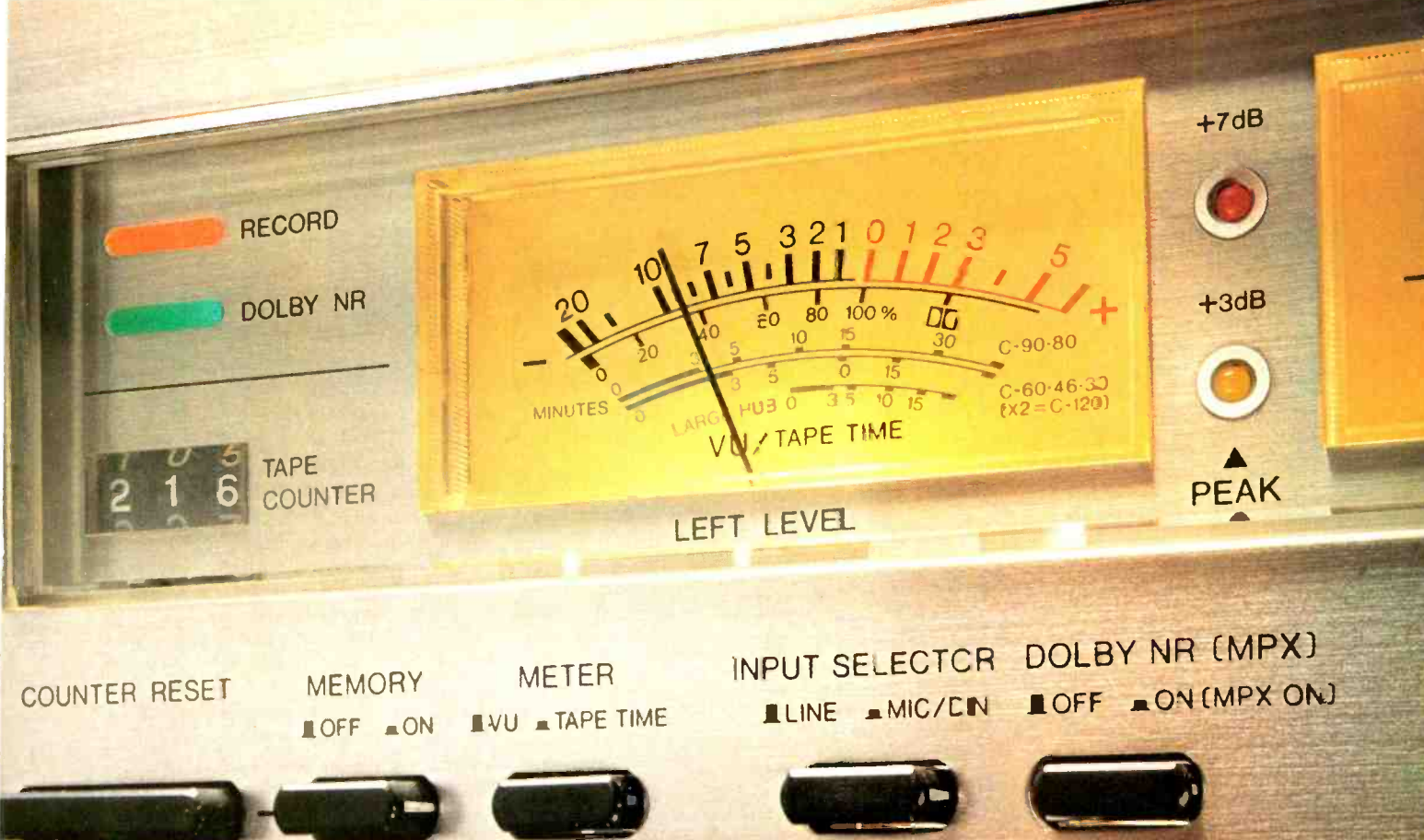
The only proper way to evaluate a device such as the 1201A is to listen to it while playing a variety of program material having varying degrees of noise content. We did just that, using everything from some antique 78 rpm discs (there is nothing noisier), to weak-signal stereo FM programs and moderately noisy LP discs. With a bit of experimenting for each of these program sources we were finally able to adjust the controls and choose the right buttons so as to achieve really significant noise reduction with barely a trace of musical loss. If you have a chance to experiment with 1201A, don't be fooled by a phenomenon which first tricked us . . . we are all so accustomed to have high frequency hiss accompany treble tones that when the hiss disappears, we tend to *think* that we have lost treble response (for the music) as well. It takes a bit of careful listening and A-Bing to realize that this is not the case. The OUT button on the 1201A makes it very easy to conduct such comparison tests.

Since the Burwen is a "one-sided" noise reduction system, it can be applied to any program source and does not require "processed" or "encoded" program sources (such as Dolby, dbx, or other "two-sided" signal processing systems). As such, it will prove useful to anyone who has records or tapes (or listens to FM programs) that are anything less than totally noise free. Of course, at \$379.00, owners of mid-priced hi-fi systems will have to think twice before spending very nearly as much as they may have spent for all their other components, but for the purist, who has unlimited funds and also owns records or tapes that have become overly noisy and are irreplaceable, the Burwen DNF- 1201A may prove to be one of the most worthwhile investments you can make.

Leonard Feldman

Enter No. 91 on Reader Service Card

AUDIO • January 1978



3 Minute Warning from AIWA

With the AD-6550's unique new Remaining Tape Time Meter you never have to worry about running out of tape in the middle of recording your favorite music. In the past you monitored your tape visually and hoped that the musical passage and tape would finish together. Now, this extremely easy to use indicator gives you plenty of warning. It shows you exactly how many minutes remain on the tape. So that when you record the "Minute Waltz" it won't end in 45 seconds.



Bias Fine Adjustment

But there's a lot more to the AD-6550. AIWA has included a Bias Fine Adjustment knob that permits the fine tuning of frequency response to give optimum performance of any brand of LH tape on the market.

Wow and Flutter: Below 0.05% (WRMS)

The AD-6550 cassette deck achieves an inaudible wow and flutter of below 0.05% (WRMS) thanks to a newly designed 38-pulse FG servo motor and AIWA's special Solid Stabilized Transport (SST) system. And because we use Dolby* we also improve the S/N ratio to 65dB (Fe-Cr). So you can listen to the music instead of tape hiss. The AIWA AD-6550C. Be forewarned.

AIWA®

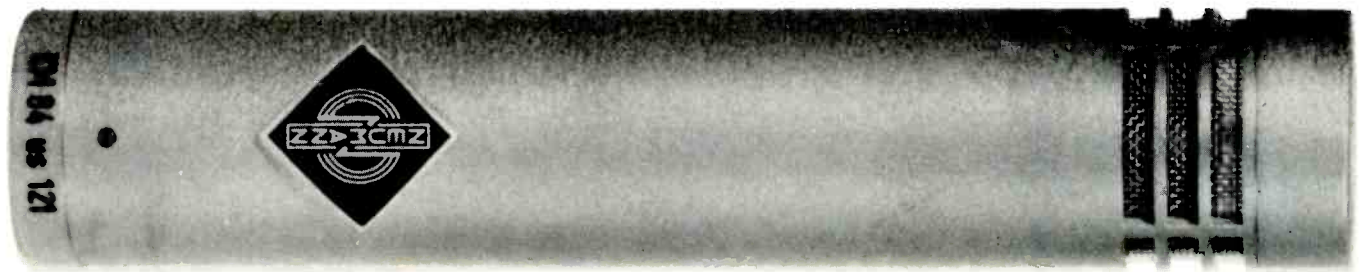


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Neumann Models 83, 84, & 85 fet-80 Series Microphone System



MANUFACTURER'S SPECIFICATIONS

Model KM-83 Assembly

Capsule Model No.: KK-83.

Preamp Model No.: KMi.

Directional Pattern: Omnidirectional

Frequency Range: 40 Hz to 20 kHz.

Transducer Type: Pressure condenser.

Model KM-84 Assembly

Capsule Model No.: KK-84.

Preamp Model No.: KMi.

Directional Pattern: Cardioid.

Frequency Range: 40 Hz to 20 kHz.

Transducer Type: Pressure gradient condenser.

Model KM-85 Assembly

Capsule Model No.: KK-85.

Preamp Model No.: KMi.

Directional Pattern: Cardioid.

Frequency Range: 40 Hz to 20 kHz, L/F roll-off.

Transducer Type: Pressure gradient condenser.

Sensitivity: 10 mV/Pa = -40 dBV/Pa (may be reduced 10 dB by switch on preamp).

Output Impedance: 200/50 ohms.

Noise Level Expressed as Equivalent Sound Level (The frequency bandwidth is not stated): Approximate values, IEC

179, 18 dB; DIN 45-405, 25 dB.

Max. SPL for 0.5% THD: With sensitivity switch set at -10 dB, 133 dB.

Power required: 48, +6, -8 V d.c.

Phantom Powering: 0.4 mA.

Operation Time with Battery Supplies: Approx. 200 hours.

Dimensions: 7/8 in. (2.2 cm) D x 4 3/8 in. (11.1 cm) L.

Weight: 2.82 oz. (80 gms).

Accessories Supplied: MKV swivel mount and WNS21 (foam) pop screen.

Price: KM-84 microphone system, \$260.00; KK-83 capsule, \$110.00; KK-85 capsule, \$110.00, and the N80 power supply, \$50.00.

80

The Neumann fet-80 microphones are high-quality condenser units designed for professional broadcasting and recording. The advanced amateur who has invested \$1,000 plus in a tape recorder, not to mention other accessories such as preamps, mixers, and equalizers, will also want to acquire professional grade microphones.

We first learned of Neumann microphones in the 50s when we read a "Target Report" by the U.S. Forces who occupied Germany at the end of World War II. They had "captured" the Neumann labs in Gefell and moved them to Berlin before the Russians arrived. They learned from Mr. Neumann himself about double-membrane, switchable directivity condenser microphone... which was unknown in the U. S. at that time. We had an opportunity to test an early U-47 microphone with a Telefunken logo which was the commercial version of Mr. Neumann's invention. The U-47 had a wide range frequency response with a rise at 10,000 Hz. It was very popular with recording studios, and an fet version of it is in the latest catalog.

Today, the Neumann name is synonymous with high-quality studio microphones, just as RCA and Western Electric were in the 30s and 40s.

We evaluated three microphones of the fet-80 series, all 22 mm (7/8 in.) diameter components. The KM-84 was received as a system, consisting of a flat response cardioid capsule, FET preamplifier, "pop" screen, and swivel mount. Two additional capsules were supplied separately, the KK-83 omnidirectional and the KK-85 cardioid with low frequency rolloff. The N80 power supply was furnished, which provides 48 V d.c. "phantom" powering for two microphones. (Readers of our review of an AKG microphone in the August, 1977, issue will recall that phantom powering is a means whereby an ordinary two-conductor shielded microphone cable carries both the audio signal and the d.c. power.)

Moving-coil and ribbon microphones may be interchanged with phantom-powered condensers on the same microphone line without turning off the power supply.

No microphone cable was supplied as part of the KM-84 microphone, as the fet-80 series is a "component" microphone system where the user must separately order the capsules and power supply needed for his particular application. The preamp and power supply employ U.S. standard Switchcraft 3-pin connectors. The supply output is via two short cables which terminate in Switchcraft adaptors. These adaptors have male and female 3-pin connectors and are inserted in the output lines of one or two fet-80 microphones.

The capsules are easily unscrewed from the preamp and interchanged. Some care has to be taken not to bend the long gold-plated contact pin which protrudes from the capsule. The head-end insulator on the preamp is a teflon hemisphere which provides a long electrical leakage path to minimize humidity effects. The shape also provides a smooth (and non-resonant) transition from the back part of the capsule to the atmosphere. The mechanical design and workmanship are flawless, and the nickel plated finish appears to be very durable. The sensitivity switch is recessed and can only be *intentionally* operated by a pointed instrument.

No individually drawn frequency response curves were supplied, even though other European manufacturers, such as AKG and Beyer, supply curves with their higher priced microphones, at least. This did not make us very unhappy because the instructions contain curves on each capsule with rather tight production tolerance "envelopes" indicated.

The instruction pamphlets supplied include data on many different models of microphones, power supplies, and powering methods. However, they are printed on rather thin paper, and we feel that Neumann should, for the benefit of audiophile users, print individual simplified instructions for each model of equipment in larger type and on heavier paper.

Laboratory Tests

Our first impedance test indicated a low Z value and the microphone appeared dead. We consulted the instruction pamphlet entitled "Compatible Central Powering... fet-80

series" and failed to find a reference to the N80 Power Supply which we were using. Fortunately, individual circuit schematics were supplied separately for both the preamp and power supply. We learned that the N80 contains no output isolation transformer, so grounding either microphone line (a must for our impedance test) shorts out the d.c. power. The instructions show some (slightly complex) modifications for unbalanced operation, as required for some tape recorders, etc. We opted to use a high quality 1:1 isolation transformer for all tests. The UTC HA-108X is a well-shielded unit that will accept line levels without distortion. Gotham offers such a transformer as Model BV-40134.

Neumann states that in order to use their microphones with a grounded center tap input transformer, the center tap must be lifted from ground, which they state will do no harm. However, the user should be cautioned that in some applications, particularly with long microphone lines, increased hum and noise may result due to lack of cancellation of "common mode" interference. Then the user will have to add an isolation or input transformer that rejects noise without a center tap grounded. (For example, the Shure line and input transformers do not require a grounded center tap. *Editor's Note: Neumann states they have used mike cables several hundred feet long and encountered very few common-mode difficulties.*)

Having solved this problem, the impedances shown in Fig. 1 were measured. The impedance is, for practical purposes, equal to that of a 200-ohm nominal value resistor.

The axial frequency response of the KM-84 is shown in Fig. 2. The "plane-wave without pop screen" curve fits within the envelope in the instruction pamphlet. The 12-inch data represents a normal proximity effect for a cardioid microphone, and an external roll-off equalizer is required for flat low-frequency response at distances closer than about two feet.

The pop screen does not live up to Neumann's claim of -1 dB at 10 KHz as our test shows a 3.5 dB loss. They may be experiencing some quality control problems, as we have used these WNS-21 screens for many years on sound level meter mikes and with a GR ceramic mike where they exhibit no more than 1.5 dB loss at high frequencies. For voice applications, the new screen should cause no problem.

Our sensitivity numbers are 5 dB less than nominal. Neumann does not state the tolerance on sensitivity, and our numbers will be at least 1 dB low due to our transformer. We are pleased with the -55 dBV/Pa value with the switch at -10 dB because it agrees with values for many moving-coil and ribbon mikes.

The cardioid directional pattern of the KM-84 (Fig. 3) is essentially uniform with frequency. (We consider the 180° response to be a perfect null if 15 dB or more below the 0° response.) Thus, the KM-84 is virtually a perfect cardioid mike and is the best one we have tested.

The response of the KK-85 capsule (Fig. 4) is similar to the KK-84 except for the low-frequency roll off. The KK-85 is suited for use close to the source or for attenuation of low-frequency noise on distant sources. Our data falls within the specifications envelope.

The KK-83 capsule response at 0° (Fig. 5) is slightly above the specification envelope at 50 and 8000 Hz, possibly due to differences between laboratories. Note that the KK-83 must be used at grazing incidence for direct sound waves or high frequencies will be boosted. When used for pickup of direct plus reflected sound, such as a single mike above an orchestra, the sound will be natural, because the response to random incident sound will be similar to the 90° curve. We believe that Neumann has made the correct choice in tailoring the response of the KK-83.

The one-third octave self-noise levels (Fig. 6) indicate a flat

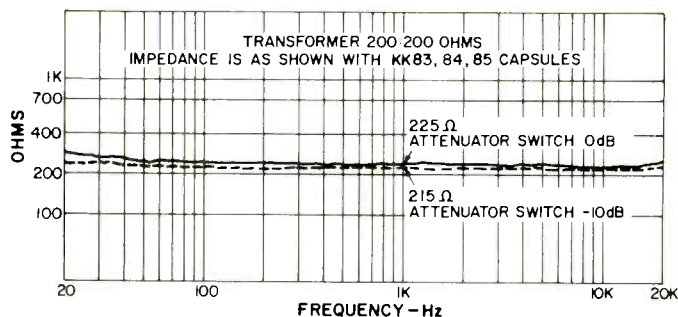


Fig. 1— Impedance of the Neumann KM-84 microphone system, including the UTC-HA108X isolation transformer.

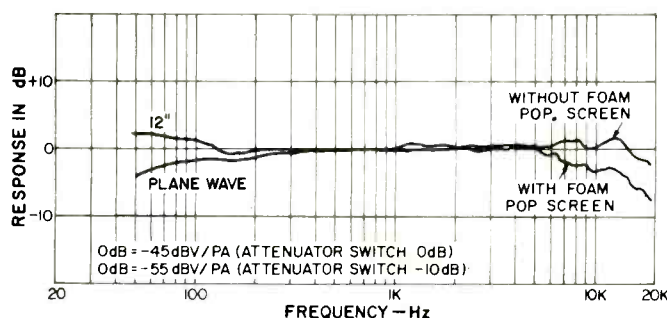


Fig. 2— Frequency response of the KM-84 mike system.

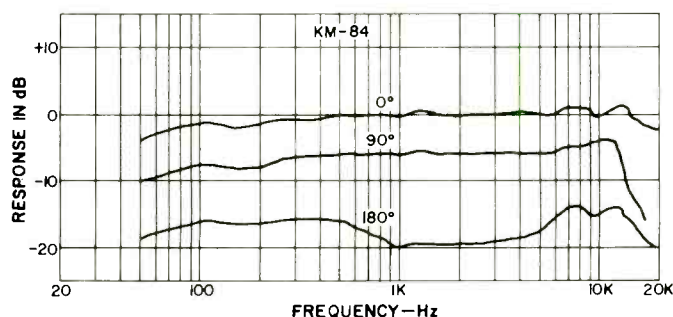
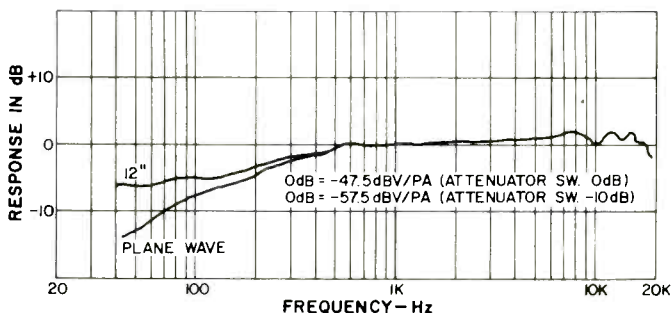


Fig. 3— Frequency response versus angle.

Fig. 4— Frequency response with the KK-85 capsule and the KM i preamp.



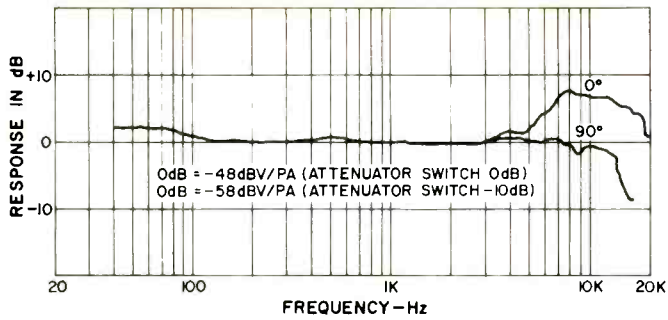


Fig. 5—Frequency response with the KK-83 capsule and the KM-i preamp.

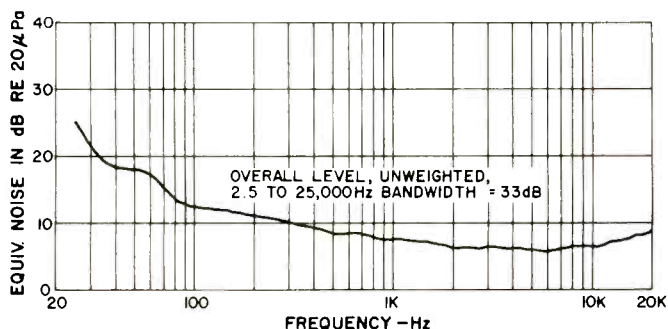
or "pink" noise characteristic at high frequencies, but the noise at low frequencies follows a 1/f characteristic. The low-frequency noise will cause no problems, unless you're recording distant earthquakes. The one-third octave values in the important mid and high frequencies are as low as 6 dB equivalent SPL. This will be below ambient in most rooms. (The KM-84 would be good for acoustic noise measurements, as the lowest third-octave level we've been able to measure with lab equipment is about 18 dB SPL!)

We recently constructed and calibrated a "sound proof" box for another project and thought it would be an interesting experiment to attempt to measure the absolute self-noise of the Neumann mike system. In this test, the ambient noise inside the box was at least 10 dB below the self-noise. Our measured overall noise level of 33 dB was higher than the (approximate) Neumann values of 18 or 25 dB, but our bandwidth extended down to 2.5 Hz, so that the overall measured level was controlled by infrasonic noise. (The IEC or DIN methods roll off the low frequencies.)

The 60-Hz magnetic hum sensitivity of the KM-84 is much greater than our BK-5B reference ribbon mike is undoubtedly due to the preamp output transformer. There is little room for shielding but our experience indicates that carefully balanced hum bucking windings will yield adequate performance. We had to move the mike and test box away from electrical equipment to avoid a 60-Hz peak in the noise graph, Fig. 6. Recording studios minimize electro magnetic noise (as well as acoustic hum) by using incandescent instead of fluorescent lighting and by keeping non-essential electrical equipment out of the studio. Thus, hum will not be a problem with the KM-84 in most studios, but the audiophile could encounter problems in the field while recording weak sound levels in a room with strong electro magnetic interference. (Editor's Note: Neumann states that they have concentrated on r.f. interference problems and feel the mikes are nearly immune to these.)

We observed clipping at 132 dB with the KM-84. This is close enough to the spec value and adequately high for most voice or music applications. The "pop" sensitivity of the

Fig. 6—Noise spectrum of the KM-84 microphone system in one-third octave bands, unweighted.



KM-84 (with screen) was just a little higher than our BK-5B with its large 4-inch diameter windscreen. This good "pop" immunity apparently results from the trade-off of high frequency response and is caused by the high air-flow resistance of the foam screen.

Vibration sensitivity of the KM-84 was quite low, and equal to our BK-5B. Phasing was Pin 2 positive, in agreement with the proposed revision to the EIA Standard.

Subjective and Listening Tests

The fet-80 series microphones were used without the "pop" screen for this portion of the review.

The KM-84 with speech or music at two feet or more sounded very similar to our BK-5B reference mike (M-flat response) except for a distinct lack of "presence." The BK-5B has a slight rising response trend from 50 to 15,000 Hz, and the response in the 2,000-5,000 Hz region rises a few dB above the trend. A similar result was obtained by comparison of the KM-84 to a 77-DX, except the top octave of the 77-DX was missing compared to the KM-84. The essentially flat response of the KM-84 may be acceptable without equalization in many applications. With pipe organ, for instance, all three mikes sounded identical, but for voice, brass, guitar, strings, and woodwinds, we would boost the "presence" region of the KM-84 2 to 6 dB with an external equalizer.

We obtained similar results with the KK-85 capsule in the high frequency region. The bass roll off is quite noticeable for distant sources, and the KK-85 must be placed at 6 to 12 inches from the source to obtain a natural bass sound. The KK-85 has obvious utility for close pickup of voice or music, as well as suppression of low-frequency noise in rooms or outdoors.

A proper A-B test of the KK-83 capsule would require comparison to a lab condenser mike. We did not do this because a change of the reference mike would require retraining our ears, as well as adding confusion to this report. Besides, in the real world, pressure mikes are compared to pressure-gradient mikes. For distant voice (in our dead room), the KK-83 yielded similar results to the KM-84 when compared to the BK-5B reference. Its lack of proximity effect is a great advantage for close pickup of voice or music. For voice, the mike may be used "on axis," but for certain high-pitched instruments the top octave is exaggerated and the mike must be oriented perpendicular to the axis of the source for a natural sound (if the mike is used close to the instrument). We feel the KK-83 would be excellent for classical recordings where a pair of mikes is suspended above the orchestra, if the room is not excessively reverberant. We'll leave this as an exercise for the audiophile and hope to receive some reports of their results.

Except for the slight possibilities of hum problems, the fet-80 series has excellent performance. The price is competitive with high quality ribbon and dynamic mikes, and we think the price is moderate for a top quality condenser mike. We feel that the audiophile who has an octave band or preferably one third octave band equalizer will obtain maximum performance in varied field situations with these microphones.

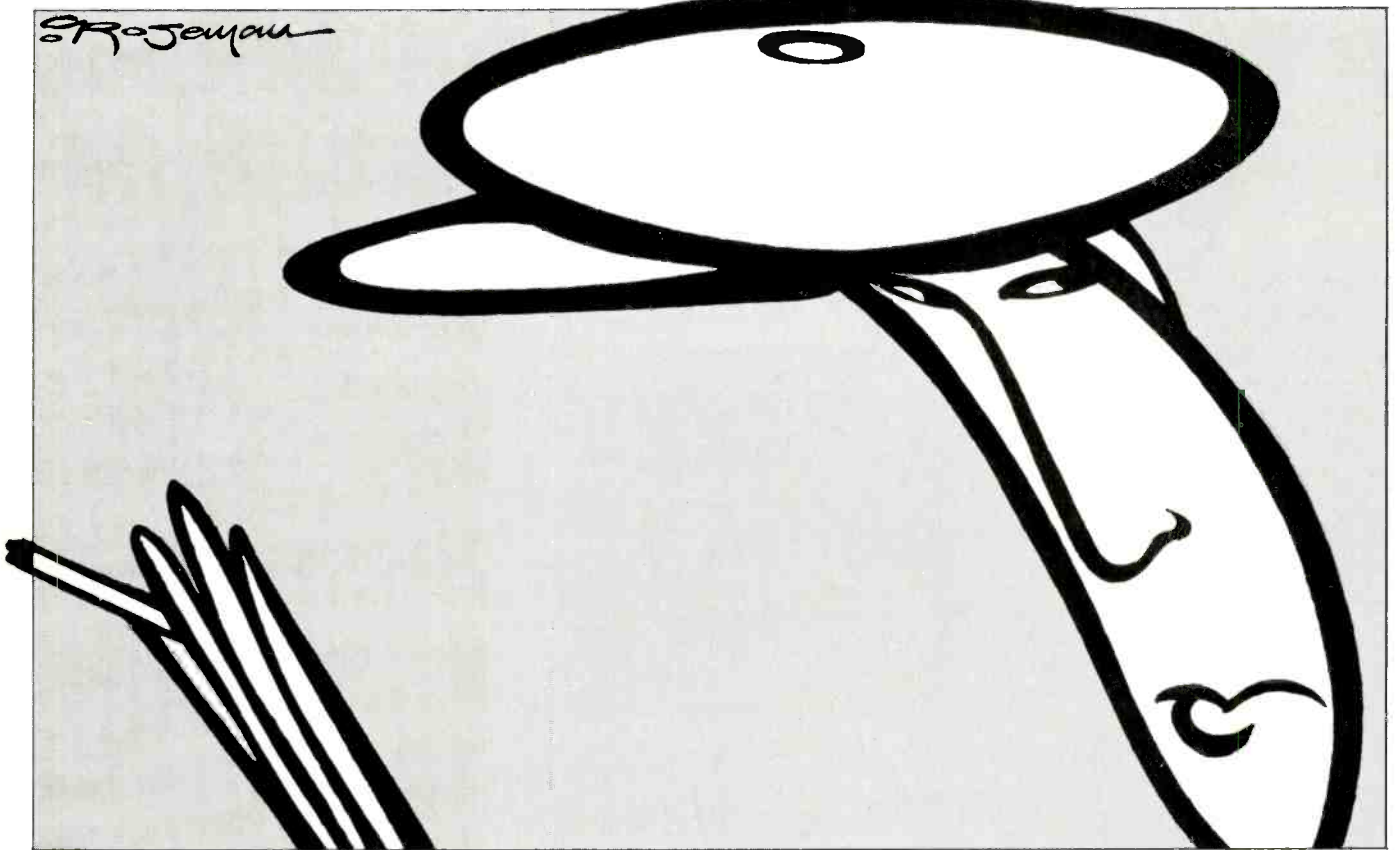
We mentioned that improved instruction books would be desirable for the audiophile. We also feel that Neumann should incorporate an isolation transformer in the power supply which would prevent the shorting problems found with some mike inputs. This would save the audiophile from having to perform circuit modifications on mikes, mixers, or recorders in the event that shorting problems are encountered.

Jon Sank

(Editor's Note: Neumann feels that for the audiophile the fewer transformers, the better, and recommends their KM-883 mike which is similar to the KM-83 but has an unbalanced output and requires no transformer.)

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The column



83

Foreign Affairs: Tom Waits
Asylum 7E-1117, stereo, \$6.98.

Tom Waits somehow keeps on creating compelling music and stories when many keep expecting him to burn out. His fifth album **Foreign Affairs** is in many ways his most ambitious album so far. For one thing his voice has regained its tone and texture after it had receded to a growl on **Small Change**. This alone makes his ballads and tender material that much better and more believable. In fact, he's singing beautifully on **Foreign Affairs**.

Produced by Bones Howe this album, like **Small Change**, was recorded live in the studio direct to two-track stereo tape without the benefit of overdubs or re-mix, and completed in only five sessions. The orchestrations are even fuller this time around which makes the record all the more impressive. As for the sound that this recording technique achieves, if it isn't direct-to-disc sound, it is as close as commercial recording is likely to get.

The lengthy murder mystery story *Potter's Field* that opens side two is a

thrill-packed adventure with stunning washes of orchestra arranged and conducted by Bob Alcivar. *Jack & Neal*, apparently Kerouac and Cassidy, is another recitation piece half-sung, half-spoken, and all sheer acting. It takes place out on the road to California with a crazy nurse in tow. *Barber Shop* is another funny kaleidoscope of shop talk, circa 1964, when hair was just getting out of control and passing a whole generation by as they were losing theirs.

Waits' hand on an emotional slow song has never been surer. The duet with Bette Midler on *I Never Talk to Strangers* is charming. That one, *Muriel*, the story of an affair with a girl and a cigar, and *Burma Shave* are as taut and sharp as anything Waits has done.

Raconteur, balladeer, or whatever you call him, Tom Waits shares the space he occupies with no one. He's a peculiar kind of unnatural resource. When **Small Change** appeared a year ago, I called it something like the clearest roadmap yet to the Waits ter-

rain. Well, **Foreign Affairs** is clearer yet. It's more approachable, less militantly iconoclastic, and a great album. The kid just keeps topping himself. I call that growth. *M.T.*

Sound: A

Performance: A

Little Criminals: Randy Newman
Warner Brothers BSK 3079, stereo, \$7.98.

Randy Newman's last album *Good Ol' Boys*, released in 1974, correctly predicted the country's political Southern drift. Awfully prescient, that.

The new one deals in small time scams and perpetrators. Randy Newman's brilliant edge is honed sharp as ever. His songs are almost never to be taken at face value, for the person singing the song is usually as much a character as anyone in a Newman song. Consider the desperate fellow trying to stave off a loan shark in *You Can't Fool the Fat Man*. The title song follows in which a family of big-

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time crooks take a young one to task for dealing dope and other small-time operations such as sticking up gas stations. Next is a little vignette called *Texas Girl at the Funeral of Her Father*, a poignant scene indeed. *Jolly Coppers on Parade* follows, a tale of a star-struck little boy goggle-eyed at parading police (the day after I first heard the song I chanced on the Philadelphia German-American Police Association parading, a truly scary example of synchronicity). Another disturbing vignette closes that side, *In Germany Before the War*. And I've not even mentioned *Short People*, the song that opens the side ("They wear platform shoes on their nasty little feet/Well, I don't want no short people round here.")

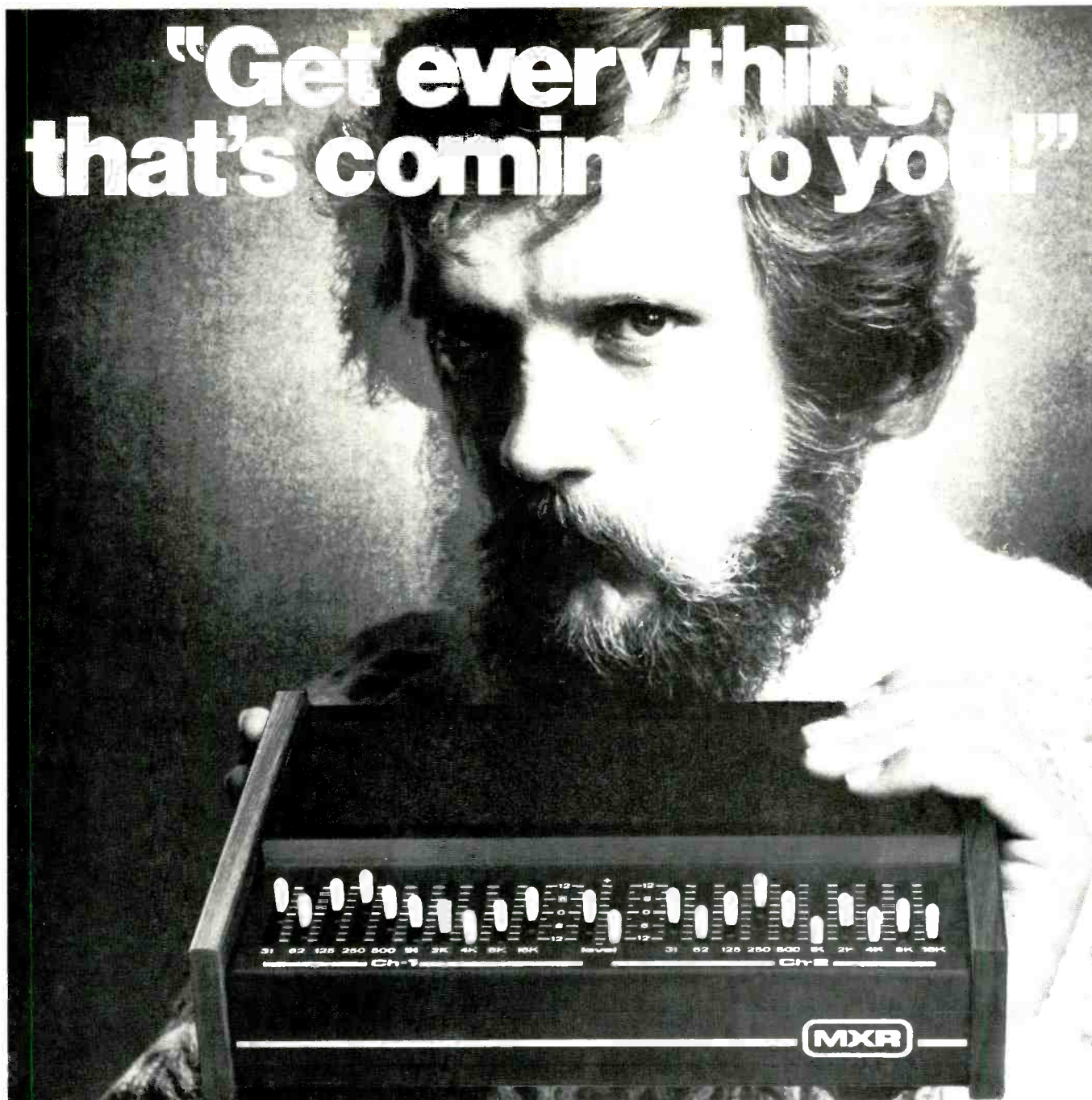
The other side includes *Baltimore* a picture of the grey life of that drab city, my home town. *I'll be Home* is one Randy wrote about eight years ago and never got around to recording until now. *Rider in the Rain* is really a cowboy song for a Sergio Leone spaghetti film, or if it isn't it should be. *Kathleen (Catholicism Made Easy)* has the immortal line "I've always been crazy about Irish girls." And then there's *Sigmund Freud's Impersonation of Albert Einstein in America*, a song so tautly written it's stunning. In one verse Newman eloquently sums up America's hopes and dreams as discerned by an outsider:

Americans dream of gypsies, I have found
And gypsy knives and gypsy thighs
That pound and pound and pound and pound
And African appendages that almost reach the ground
And little boys playing baseball in the rain.

The album is well produced, with but one anomaly. Because of Randy's admittedly froggy voice, he gets pushed way down in the mix, especially on the more fully backed, rocking numbers that feature Eagle-styled harmonies sung by Eagles' Glenn Frey and Don Henley, with their friend J.D. Souther. At times they even drown him out completely. Still, with the lyrics provided, there is really no problem. (Except that it's a poor, muddy mix. —Ed.)

Little Criminals is an album which is still unfolding before me. Those weird characters that Randy Newman conceives and writes about are totally intriguing. Repeated listening, only brings new insights into both songs and writer. Randy Newman is at once one of the most fascinating and important

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85

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writers we have, and **Little Criminals** is an album that is very difficult to either ignore or forget. *M.T.*

Sound: C Performance: A

Twilley Don't Mind: Dwight Twilley Band

Arista AB 4140, stereo, \$6.98.

Compared to just about everything else around, the Twilley band is rock 'n' roll heaven. They've got the gift of melody, a unique sense of rhythm, strong voices, a youthful spirit, and an

attitude toward recording which in the past has proven most effective. They are, in every sense, the ingenues of the music world—but **Twilley Don't Mind** will probably stand throughout their career as their worst record ever. Not that it's bad, but it's as bad as they could ever be, given their respective talents.

The album doesn't breathe life—it reeks of calculation. Instead of experimenting, they are simply trying to make hit records, and although songs like *Looking for the Magic*, *Tryin' to*

Find My Baby, *Chance to Get Away*, and *Rock 'n' Roll 47* are potential classics, the versions recorded here sound stale and bland. Phil's vocals carry nowhere near the emotional impact that they bring to these songs onstage; the overall production sound is more geared toward a consistent approach than a refreshing one, as it's as flat as their first album's was spacious.

I can understand that these guys want to be successful today, and they probably think that by co-opting their style into something which, to their ears, is more FM is a shortcut to America's hearts. However, the result is a record which doesn't sound like it was a joy to make, so what's the point?

J.T.

Sound: C+ Performance: B

My Aim Is True: Elvis Costello
Columbia SEEZ 3, stereo, \$6.98.

Stick to Me: Graham Parker & the Rumour

Mercury SRM1-3706, stereo, \$6.98.

The best thing about Bruce Springsteen is that without him, it's very likely neither of these albums would have happened. Both of these artists are touted as the "British Springsteen," a comparison which, though it has a certain amount of feasibility, doesn't give either enough credit.

Parker is a master performer with a commanding presence on album which buoys mediocre material to high standards of listenability and, when confronted by a truly great tune (he writes about three per LP), shines. His third record, produced by Nick Lowe, is his best and most consistent to date.

Also, under the wing of said Lowe is Elvis Costello, currently the rage in the land of lobsterbacks and a fine artist in his own right. Costello's debut album carries with it an incredible amount of style and charisma, in addition to four or five of the best songs recorded all year. There's a certain amount of crudeness to **My Aim Is True**—possibly due to their use of an eight-track machine to record it on. However, the guitar sounds shrill and trebly but not necessarily in a bad way. There's a heavy debt to Van Morrison, Phil Spector, and just about everybody except the Beatles here, but all in all a very pleasing and inspired record, a must for any true rocker.

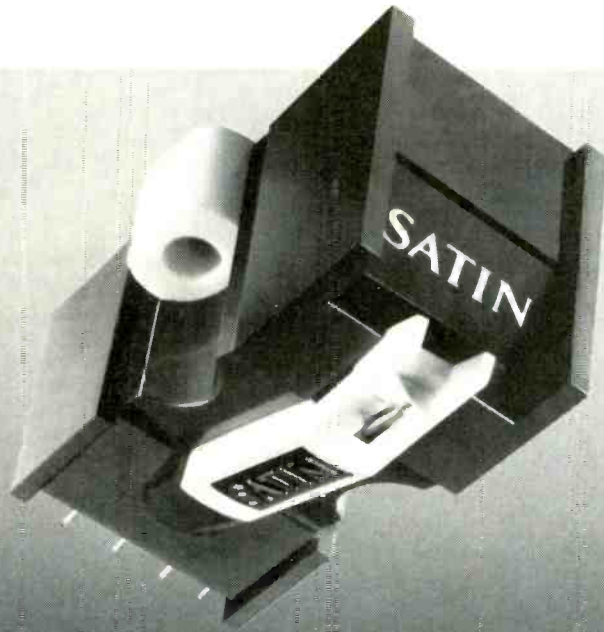
J.T.

Parker

Sound: B Performance: B+

Elvis

Sound: B Performance: A



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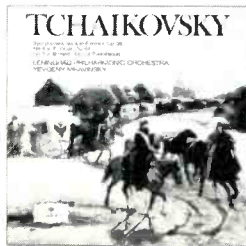
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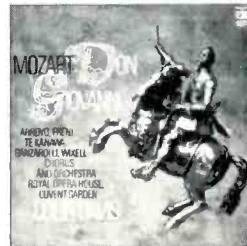
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Never Letting Go: Phoebe Snow Columbia JC 34875, stereo, \$7.98.

In a comfortable and personal groove now, Phoebe Snow is merely continuing, not innovating. Her best new originals are *Ride the Elevator* and *Electra* while 1928's *Garden of Joy Blues* is the best cover song of the album. Phil Ramone's production is his typically "beautiful" job, marked by fine craftsmanship. **Never Letting Go** is good, but in no way extraordinary. *M.T.*

Sound: B — Performance: C +

Young, Loud & Snotty: Dead Boys Sire SR 6038, stereo, \$6.98.

It's hard to tell who you're listening to here—instead of capturing the excitement of the group, producer Genya Raven injected her own ideas of pop punk to buoy an album which is essentially not very terrific or representative of the group. The drums are lost and the vocals lacking in personality, but it sounds like hours were spent on special effects. It's a shame because the group is at the very least exciting, although they are not the most sterling instrumentalists in the world. They've got a lot of energy live, and a few of their songs (*What Love Is* and *All This & More*) actually are real neat. You can't quite tell from this album, though—maybe next time. *J.T.*

Sound: D Performance: C +

Show Time: Ry Cooder Warner Brothers BS 3059, stereo, \$6.98.

Except for the opening track *Show Time* is a live recording of the amazing Tex-Mex band Cooder toured with last winter. It featured accordion legend Flaco Jimenez. As ever, Cooder presents a joyously eclectic experience on the disc.

The opener is a Gary U. S. Bonds oldie, *School is Out*, which was released as a single at the start of summer and sank without a trace. It is a bright, fun calypso-tinged number.

The live show opens with a rousing *Alimony* from Cooder's first album, a spirited romp. *Jesus Is On the Mainline* is next. This standard of his repertoire gives Ry a chance to stretch out on some of his patented acoustic bottleneck work. Cooder lets his backing singers Eldridge King, Terry Evens; and Bobby King take lead vocals on *Dark End of the Street* while he plays some bone-tingling, eerie electric bottleneck leads as the whole band slides back in.

Flaco shines on the medley that opens side two. *Seguin* written by his

father is a standard showdown number in Flaco's native circles in the Southwest and his is the current definitive version. The quirky jump Seguin has leads into Woody Guthrie's *Do Re Mi*. Excellently played, the segue is still somewhat forced. *Volver, Volver* is a Cajun piece followed by a surprisingly somber reading of Alfred Reed's *How Can a Poor Man Stand Such Times and Live*, another Cooder standard. The album closes with a smoking *Smack Dab in the Middle*.

Ry produced **Show Time** himself. The sound is good if not exceptional. The music is spirited and fun, slightly stronger on the first side. Most of all, though, it is true to Cooder's own special vision and identity in a Big Mac world. *M.T.*

Sound: B Performance: B

Bad Reputation: Thin Lizzy

Mercury SRM-1-1186, stereo, \$6.98.

On the verge of busting out for several albums, **Bad Reputation** may finally be "The One" for Thin Lizzy. The songs are solid and the production has never been better thanks to the sharp ear of Tony Visconti who is one excellent man to have behind the board. Tony V. is known for being able to crystallize the sound of difficult bands like Bowie, Osibisa, Strawbs, T. Rex, Caravan, Gentle Giant, and many more. Here he's done it again.

Phil Lynnot, Irish born leader/bassist/singer, again has had a hand in writing all of the material. It is better stuff than their last one, **Johnny the Fox**, which suffered from the aftermath of a Lynnot bout with hepatitis. They sound lean, hungry and ready for the big leap this time. *Dancing in the Moonlight* could be the elusive hit they've been seeking, an erotic, slithery Van Morrison style song. *Southbound* and *Downtown Sundown* are a similar tuneful pair wisely placed a side apart. *That Woman's Gonna Break Your Heart* and *Killer Without a Heart* have robust, beefy guitar power lines at the spine. *Killer* and *Soldier of Fortune* represent Lynnot's continuing concern with the violence of his home. The finale *Dear Lord* is something of a production number that opens with an ethereal angel chorale sung by multiples of Tony's wife Mary Hopkin and segues to a roaring conclusion.

Lizzy knows how important **Bad Reputation** is for them. If it flops, it could conceivably rend the group asunder just as they are getting mean. Up to release this album has everything right. Now it's in your hands. *M.T.*

Sound: A- Performance: A

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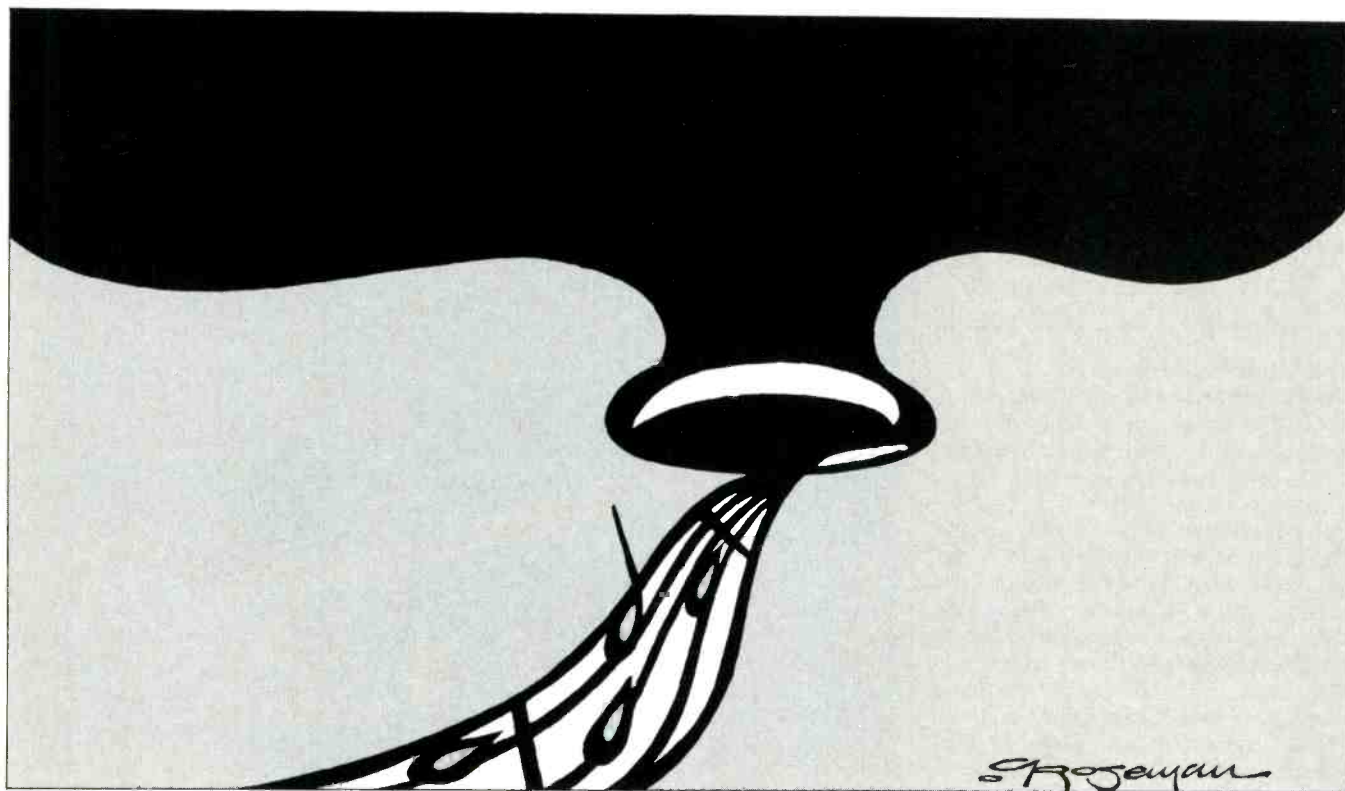
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Jazz & blues



90

The Quintet: V.S.O.P.
Columbia C2 34976, stereo, \$9.98.
Piccolo: Ron Carter Quartet
Milestone M-55004, stereo, \$9.98.
Bundle of Joy: Freddie Hubbard
Columbia JC 34902, stereo, \$7.98.

V.S.O.P. began a little over a year ago as a one-off concert followed by an album (Herbie Hancock-V.S.O.P.), all highlighting the career of Herbie Hancock. The quintet sides of that album were only an approximation of the power this group had in the days of its original exploratory conception. It may have turned people on to their original ideals, but for many it was a reminder of how far removed they were from their heritage.

The subsequent tour and this album culled from it, **The Quintet**, casts still another shadow on the honesty of these musicians with their music. There is an uneasiness which pervades this album taken from live concerts on the West Coast in mid-July. It's a feeling of discomfort and hesitancy as to just how far they can go. Never a

virtuoso like Cecil, McCoy, or Jarrett, Hancock depends on touch, shading, and spacing for his sound. Where he used to pick the perfect note every time, Hancock now slips into pop-classical arpeggios and facile glissandos. His new style coupled with odd miking make the piano sound flat and electric. Tony Williams is still surging, trying to equal his peaks with Miles and Lifetime. He is tighter and more confined than his previous pulsating technique. Here he overplays in his ensemble work and is technically deficient and void of ideas on solos like *Lawry*. Half-formed ideas lead to clashing sticks and flustered execution.

Wayne Shorter pays the penalty here for rarely stretching out with Weather Report. Given the freer extended context of the Quintet, he plays close to the melody with brief unattached riffs. Freddie Hubbard blows hot and cold. Sometimes he falls victim to the same unconnected riffing as Shorter. Other times he plays a

warm, flowing flugelhorn or fiery, compact trumpet. On *Darts* his solo charges, stops, dips, and swells again. Ron Carter is the only one who consistently portrays himself with his strong, throbbing bass lines.

The album is poorly recorded with uneven miking and mixing, which has Williams' drum set at varying levels and Hubbard's trumpet sometimes fading in and out of the ensemble.

One question raised by V.S.O.P. was what they would do afterwards. Would they pick up from the early 70s and go on, or would they return to the formula music they had been playing before? Based on two post-V.S.O.P. albums, it appears both. Ron Carter never left the mainstream of jazz, as did Hancock and Hubbard, but has kept his feet in both worlds. He, along with Richard Davis, is everyone's bass player. His newest album features his unusual working ensemble with Ben Riley on drums, Kenny Barron on piano, and Buster Williams on double bass. Carter himself plays the leading soloist with

AUDIO • January 1978

his piccolo bass. The combination of Williams and Carter creates a dark, rich atmosphere. Because of Riley's fleet propulsive drumming and Kenny Barron's long overlooked piano, it never becomes oppressive.

Recorded earlier this year at Sweet Basil in New York, the Carter quartet runs through standards, ballads, and cookers with an ease that makes their unique instrumentation seem natural. The album has an immediate impact with the strong melodic variations of *Saguaro* or the Latin tinged *Tambien Conocido Como* that bears a striking similarity to Chick Corea's *La Fiesta*. While Carter's leads are continually inventive with twists thrown into his liquid improvisations, it's the contrasts between the two basses that holds the most interest. Carter's steady flow is set against Williams' brooding full-bodied tone. On *Little Waltz* Williams' pizzicato supports Carter's sweeping arco, while on *Blue Monk* they trade off a flurry of exchanges that blend smoothly into one another. Carter's Quartet is deep but crisp, and recorded here with a clarity that accentuates the many subtle shadings.

Freddie Hubbard is lost forever. *Bundle of Joy* is so smooth that it might even slip past the disco audience he seeks. Hubbard's horn is swathed in plush strings and velvet voices that are more in tune with a Bert Kaempfert production. After listening to his sentient solo on *Darts*, *Bundle of Joy* sounds like breathing lessons.

Like most cross-over records, this one is immaculately recorded with a spotless satin sheen. There are no rough edges here, only a vacant glow. If V.S.O.P. meant anything for Hubbard, it was a sharp message that he could not return home. *John Diliberto V.S.O.P.*

Sound: B — Performance: B —
Carter

Sound: A — Performance: A —
Hubbard

Sound: A Performance: D —

One Night Stand With Les Brown

Joyce 1008, mono, \$5.98.

One Night Stand With Les Brown, Vol.2.

Joyce 1038, mono, \$5.98.

One Night Stand With Les Brown & Doris Day

Joyce 1020, mono, \$5.98.

The Best of Les Brown

MCA 4070, mono, \$7.98.

Les Brown and His Band of Renown

EMI Electrola 1C 054 81 712, "Duo-phonics", \$6.98.

How Brown Sounds Now

BASF G 22840, stereo, \$6.98.

Sessions, Live: Les Brown, Harry James Calliope Cal 3005, mono, \$6.98.

Many leaders never recovered from the slump that flattened the big bands after World War II, but despite the almost complete indifference of the music business, and particularly the all important recording industry, Les Brown and his splendid Band of Renown have survived with the help of Bob Hope, television appearances with Dean Martin and on the Hollywood Palace, the recent "nostalgia" surge, and the bright arrangements and crisp musicianship Brown has always insisted on. Les Brown has not recorded with a major label for over 10 years, and that's why this spate of specialist collector's releases are most welcome. Apparently there is a big audience in Germany for the kind of middle of the road big band swing Brown represents, because both the BASF issue and the EMI Electrola "Masters of Swing" reissue are imports from West Germany.

What Les Brown has always done best is to skillfully translate jazz into rhythmic, beautifully modulated dance music. Listening to Joyce's **One Night Stand With Les Brown** is to catch the Band of Renown at the peak of its commercial success, just at the close of World War II. Despite the muddy sound of these airchecks from the Baker Hotel in Dallas, one can savor the bite and inflection of the band's superb brass, and the rich blend of its resonant sax section. **One Night Stand With Les Brown Vol. 2** is from 1949 radio transcriptions and live broadcasts produced by the US Marine Corps in which Brown shares the spotlight with Billie Eckstine. Buddy Rich had joined Brown early in 1949, and his presence is felt in the powerhouse, swinging assault of *Carioca*, a fine piece of big band jazz which reflects bebop's tight tempos and strident harmonies. Rich also drives the Brown ensemble along in a vigorous performance of the band's theme, *Leap Frog*, and a bright, zestful reading of *I've Got My Love To Keep Me Warm*, a 1948 best seller for Brown, and the only hit recording made by a big band during the period of post war decline. **One Night Stand With Les Brown Vol. 2** also offers authoritative, slightly boppish solos from trumpeter Frank Beach, tenor man Dave Pell, altoist Ronnie Lang, and clarinetist Abe Most that offer fresh evidence the Les Brown band was a swinging dance



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orchestra founded on jazz principles. Even on the broadcasts featuring Doris Day (incidentally, one of the best band singers ever), Day's intimate, mellifluous voice is set off by vibrant orchestral voicings and by the extensive use of improvising soloists. A good example is Day's blithely swinging *Taint Me* which offers us Ted Nash's pulsing tenor and the solidity of attack of a powerhouse trumpet section.

The cleanliness and clarity of the Brown ensemble are beautifully captured on MCA's **The Best of Les Brown**, a collection of 20 monaural sides made for the Decca subsidiary, Coral, in the early 50s. By 1950 Brown had replaced Buddy Rich with Jack Sperling, a Bunny Berigan discovery, who had been a mainstay of the Tex Beneke rhythm section. Sperling, who knows how to swing a big band, has remained with Brown, off and on, for the past 27 years. By the early 50s the pattern of activity that permitted Brown to survive in an age of Eddie Fishers and Johnny Rays, and later through the rock explosion, had begun to emerge. The band remained California-based, playing weekend dances, making recordings, allowing its men to do freelance studio dates; there were, of course, the trips to entertain US troops in Korea and Vietnam as part of the Bob Hope entourage.

The Brown band recorded entirely on the west coast for Coral, from 1950 until 1954, and then for Capitol, from 1954-1957. Some of this extremely well-recorded material is available in the MCA double set and in the EMI reissue. Both the Coral/MCA and the Capitol/EMI albums contain high fidelity re-recordings of Brown hits and standards. The MCA set includes many Frank Comstock arrangements (*Lullaby in Rhythm, the Gal From Joe's*) that utilize the piano-guitar voicings popularized by George Shearing in the 50s. There's a rousing performance of *From This Moment On*, and several excerpts from a Hollywood Palladium concert that Coral recorded live in 1953. The musical content of this concert is of a very high standard; it includes a surging solo by Dave Pell's tenor on *Montona Clipper*, and Ronnie Lang's lustrous alto on Sonny Burke's *Midnight Sun*. The EMI/Electrola albums spotlight the lively surge and attack of the Brown ensemble on *Just You, Just Me; Melancholy Baby; Swinging Down the Lane; Leap Frog*, and the Piccolino and trumpeter Don Fagerquist is a standout with a mellow solo on *Stardust*. The EMI Brown lp is an outstanding big band collection if you can find it (check specialist stores that handle jazz and pop imports like

Rose's in Chicago or King Karol in NYC); the ear-bursting highs achieved in the sound transfer job by the German engineers can be compensated by adjusting the treble controls. The German BASF sides, cut in Hollywood in 1974 by the Brown band, offer well balanced stereo sound, but, with the exception of the swinging *Thanks for the Memory*, rather pallid performances.

The recently issued **Calliope Sessions Live**, which devotes one side to Les Brown and the other to Harry James, is quite another matter. It offers big band excitement together with a terrific sonic punch. These are monaural tapes, recorded in 1958, and the Brown band swings like hell on such numbers as *Ridin' High* and *Taps Miller*. Les Brown once told this writer during an interview how, even today, at dances he steadfastly refuses to play rock and roll, informing his audiences what to expect from the band: "As a general rule, I tell them—we're still a swing band." Amen to that, brother.

One Night Stand With Les Brown

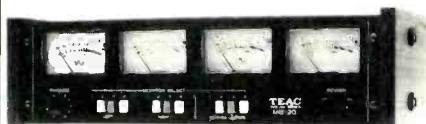
Sound: B- Performance: A

One Night Stand With Les Brown Vol. 2

Sound: C+ Performance: A+

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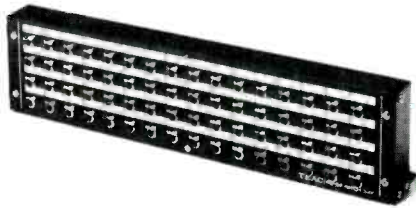
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One Night Stand With Les Brown & Doris Day

Sound: B - Performance: A

The Best Of Les Brown

Sound: A - Performance: A

Les Brown & His Band Of Renown

Sound: B + Performance: A +

How Brown Sounds Now

Sound: A + Performance: C

Sessions: Live

Sound: A + Performance: A +

Captain Fingers: Lee Ritenour Epic PE 34426, stereo, \$6.98.

Lee Ritenour is one of the busiest studio guitarists in L.A., a must-have participant on countless jazz, jazz-rock, soul, and disco sessions. Thus, it's not altogether surprising that **Captain Fingers** is basically in the same jazz-rock-funk fusion vein as on dozens of other studio-musicians-gone-solo albums.

Indeed, the title track and *Margarita* could very easily serve as representative samples of this genre. All the usual ingredients are there—multiple

keyboard textures, tight, super-crisp drumming (by Harvey Mason; who else?), "hot" syncopated bass lines, tricky instrumental interplay lending an illusion of well-rehearsed spontaneity, and of course melodies and structural hooks inspired by Return to Forever and Jan Hammer—all manipulated with above-average skill and taste. Naturally, it never hurts to throw in a couple quieter tracks for variety—one spacey, with a powerful, quasi-symphonic interlude (*Dolphin Dreams*), the other more reflective and acoustic (*Sun Song*).

The only familiar element missing is a wretched, omnipresent background chorus. Replacing it, we have a wretched foreground vocalist (Bill Champlin of the Sons of Champlin), thankfully appearing on only one cut, an overly literal rendering of Stevie Wonder's *Isn't She Lovely*, sung with more effort than feeling. Not only does the arrangement add very little to a song already over-exposed, the vocal severely damages the mood created by the rest of the album.

The one thing that effectively sets this album above so many others of its type is Ritenour's tasty guitar solos. Amid the electronic technology (including his frequent use of a 360 Systems Polyphonic Guitar Syn-

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thesizer to subtly alter his clean timbre, plus a wah-wah and similar attachments), stock rhythm patterns, and tunes obviously designed for maximum airplay, one hears a well-developed personality in the modern jazz-guitar tradition of Wes Montgomery, Pat Martino, and pre-*Breezin'* George Benson. Unlike too many talented jazz-rockers who should know better, Ritenour takes care to consider what he's playing, instead of churning out the exhausted so-what clichés that pass for improvisation these days. He injects some originality and believability into the proceedings, and the album is much better for it.

This is not to say that there's anything so complex, adventurous, or astounding here that soars above the heads of the "average record buyer" (at least that's whom I presume this barrage of "fusion" albums is directed to, not to the "serious" listener). Nonetheless, interest actually increases with familiarity, if only because Ritenour's inventiveness is not immediately apparent in his hackneyed surroundings. In any case, this is one of the better recent albums in this genre.

The recording is excellent, with beautifully defined synthesizer overlays, an incisive snap to the drums, and

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an effective mix that keeps sight of the fact that this is a *guitar* album. The strings (on three cuts) are a little constricted, though. The surface is average. *Tom Bingham*

Sound: B+ Performance: B+

Nova: Steve Reid
Mustevic Sound MS 2001, stereo, \$6.98.

Despite its Arabic and Latin rhythmic input, Steve Reid's debut album, **Rhythmatism** was a welcome throwback to the semi-avant-garde post-bop purveyed by Blue Note in the late 60s. **Nova** magnifies the Third World influences and extends them into an area which, while still derivative, would seem to hold great potential for future development.

Reid is joined by members of his early-70s collective band, the Legendary Master Brotherhood. Ahmed Abdullah is one of the most imposing trumpeters to emerge in recent times, with a piquant, incisive tone, and an ear for perfectly calculated melodic constructions, logically relating each well-chosen note to its predecessors and successors. He plays especially well on his own compositions, *Lions of Juda* and *Long Time Black*. Joe Rigby is a promising reedman, with a playful soprano solo on *Free Spirits—Unknown*, plus a surprisingly pastoral turn on *Long Time Black*, where he's reminiscent of Arthur Blythe.

Les Walker is a dramatically emotional and vigorous pianist (note his own *Free Spirits—Unknown*), while his organ work is the most mature evolution from Sun Ra's space-warp style ever assayed. Listen to his jabs, wails, swirls, and whines on the Arabic-flavored *Lions of Juda*, where he effects bizarre, razor-sharp, other-worldly organ registers, grounded in Sun Ra's discordant Venusian diapasons.

Reid is a buoyant drummer, contributing jangling cymbal splashes which ride all around the music, as well as a highly-developed accenting sense on *Long Time Black*. Reid gives the band direction without being pushy. The album's most powerful track, *Sixth House*, recalls vintage Pharoah Sanders. The dignified processional theme is earnestly stated by Abdullah and Rigby over a kinetically rumbling background.

The recording is far below the quality of the music. Though Abdullah's trumpet has a well-rounded bite, Rigby's soprano is noticeably pinched. But at least the horns sound like horns;

Walker's piano sounds more like a gypsy cembalon! While you can make out the fact that there are two bassists (Richard Williams, electric; Luis Angel Falcon, acoustic), their lines are too murkily mixed to follow with any real certainty. Reid's cymbal timbre sounds unnaturally squashed together.

Available from Mustevic Sound, Inc., 193-18 120th Ave., New York, NY 11412. *Tom Bingham*

Sound: D+ Performance: A

Ellington '55: Duke Ellington
Capitol SM-11674, mono, \$3.98.

This is a landmark album. The concept back in 1955 was to free Duke Ellington and his orchestra from the restrictions of time and to let the material set its own pace. As a result the seven selections run from four minutes to over six minutes. The performances are unusually emotive and sensitive, even for the great Ellington outfit. Even better, the recording is of brilliant quality with the subtle colorations of Ellington's music shining clearly.

The album includes classical Ellingtonia like *Black and Tan Fantasy* and *Rockin' Rhythm* plus such favorites as Fats Waller's standard *Honeysuckle Rose* and Basie's *One O'Clock Jump*. The only drawback of the reissue is that one or two numbers were omitted from the original.

However, this classic album has been out of print far too long. This reissue is an **Audio Best Buy**.

Michael Tearson

Sound: A Performance: A+

Basie & Zoot: Count Basie & Zoot Sims
Pablo 2310 745, stereo, \$7.98.

This album has been out for quite a while; don't miss it, it is one of the stellar jazz releases of the past year and a half. This is the first time Basie has been paired with a tenor saxophonist and a rhythm section only—it is, indeed, a pared-down rhythm section consisting of Louis Bellson on drums and John Heard on bass. Producer Norman Granz has cleverly deprived Basie of the use of his long-time guitarist Freddie Green, and without this rhythmic "feed" from the guitarist Basie is forced to open up with his left hand, playing with more of the two-handed striding style that he had all but abandoned over the past two decades.

Honeysuckle Rose, one of the many outstanding tracks, rockets along with

AUDIO • January 1978

plenty of two-fisted Basie and with Zoot easing in with a supple, rhythmic solo that lifts the performance with tremendous momentum and vigor. The same feeling of empathy, inspiration, and swinging *joie de vivre* are evident on *I Never Knew* and *Paper Moon* with both musicians in their element. Basie is, of course, one of the best chordal accompanists and rhythm feeders in the business, and he is particularly fine on the up-tempo *Nat Cole*, a pulsing tribute to that singer's piano-playing days. Zoot is at his very best in this Pablo session, revelling in his musical partnership with Basie. Over the years he has developed a formidable tone and technique, which combined with expressive melodic gifts, rank him with the greatest of mainstream jazz tenormen.

Unalloyed swing is the Count's and Zoot's business, and if, like this writer, it's your pleasure in jazz, you too will revel in these splendid performances.

John Lissner

Sound: A Performance: A+

Best Friends: Cleo Laine & John Williams

RCA APL1-1937, stereo, \$7.98.

The voice of Cleo Laine has been placed in the jazz category; at times this vocal virtuoso sounds like a jazz singer, not far removed in timbre from her husband John Dankworth's expressive alto saxophone. Ms. Laine's vocal gymnastics can be impressive as she ranges across barriers of register with fearless abandon and, at the same time, with astonishing flexibility and freedom.

Alas, on this recent RCA recording teaming her with classical guitarist John Williams, a string quartet, rhythm section, and Dankworth's sax and clarinet, Ms. Laine is not only unadventurous, but downright dull. The Laine-Williams combination is very disappointing; two major talents converge and nary a spark flies. Williams, a fine guitarist, plays pleasantly throughout, and Cleo has her best moments on *Charms*, a song she co-authored with Dankworth, and on the Beatles *Eleanor Rigby* (also highly recommended is a fine version of *Send in the Clowns* Laine recorded on one of her previous RCA releases). One number that Cleo Laine and all singers, jazz or pop, should drop from their repertoire is the sappy *Feelings*, an enormously popular saccharine dirge that is the opening cut in this lackluster, but extremely well recorded album.

John Lissner

Sound: A Performance: B-

Time for a Change: Monnette Sudler
Inner City IC 2062, stereo, \$6.98.

Monnette Sudler has been one of the few descendants of the Wes Montgomery school to translate his playing style into 70s contemporary and avant-garde jazz. Though she has played with avant-garde figures like Sunny Murray, Sam Rivers, and Khan Jamal, her debut recording, *Time for a Change*, is very straight ahead, with a fleet, fast changing rhythm section of Philadelphia musicians, including Oliver Collins, piano; Gerald Benson, bass; Newman Baker, drums; with the addition of William Duke Wilson on congas, bongos, and percussion for the three quintet tunes.

The performance is tight and supportive, pushing Monnette's guitar to the fore. The first side consists of three cookers, with Monnette playing fast, punchy lines that dart through the rhythms. Particularly on the opener, *Easy Walker*, Monnette establishes herself with a fast, buzzing head over the tension of congas and drums. Her solo shows the influence of Sonny Sharrock with its unpredictable slashing notes coupled with the harmonic logic of Wes Montgomery.

The second side becomes more introspective with a beautiful unaccompanied staccato solo which leads into the tremulous *Let Us Love*. Monnette builds her solos around a simple melodic and rhythmic framework but expands carefully constructed substructures within it.

The recording is captured raw and alive with the sparse accompaniment setting off Monnette's guitar. If anything, Monnette could use a stronger counterpart to share the lead work and thicken her group's sound. But *Time for a Change* should place Monnette Sudler in the forefront of new jazz guitarists.

John Diliberto

Sound: B Performance: B+

Look to the Rainbow: Al Jarreau
Warner Bros. 2BZ 3052, stereo, \$8.98.

Al Jarreau is one of the most striking club performers to emerge in the last few years. He is a vocalist in the King Pleasure tradition, gifted with great ability, who has the range to caress a ballad or scat hellfire. His first two albums, both studio jobs, give no real hint of the man's demon abilities. The third one corrects this situation with a double-disc live recording from an early 1977 European tour where, from the sound of it, he wowed 'em.

His voice is a fine horn soloing, or a sneaky, clever sound effects machine as in the brilliant opening passage on his version of the late Paul Desmond's



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Take Five. Mostly Jarreau's voice is a chameleon bound only by his own imagination. He backs it with a basic jazz quartet featuring Lynn Blessing on vibes and Tom Canning on keyboard, pros who do the job.

Each of the four sides has a pair of Jarreau originals and a cover. The material proves the album's chief weakness. Jarreau is a much better vocalist than composer. His covers nearly always feature his most thoughtful and moving performances. He is growing and that is a good sign, for he is also young and hopeful, which adds up to a lot.

The record is a good live recording technically. The main focus is appropriately right on Jarreau where it should be. It misses none of his dynamics, from a flutter to a scream.

So far the only ways to catch the real Al Jarreau are on **Look to the Rainbow** or to see him in person yourself.

Michael Tearson

Sound: A— Performance: B+

Duo 1, Duo 2: Anthony Braxton/Derek Bailey

Emanem 3313 & 4, stereo, \$6.98 each.

Volume Two, Solo Acoustic Guitar: Eugene Chadbourne

Parachute P-002, stereo, \$6.98.

The guitar is a latecomer to the improvised-music avant-garde, perhaps because until recently all modern jazz guitar styles (even the rock-influenced ones) could be traced back to Charlie Christian. It took the far-sighted genius of British guitarist Derek Bailey to ultimately free the guitar from its melodic straightjacket by applying techniques and concepts resembling those of the "classical" avant-garde to the instrument.

Duo 1 and **Duo 2**, live recordings of one spontaneous-interaction concert which pitted Bailey with multi-reedman Anthony Braxton (originally issued as a double album in England), are among the relatively few examples of Bailey's work to reach these shores. His startling, totally innovative style strings together disjointed plucked textures, electronic hums, percussive rappings and scratchings, dissonant chordal splashes, and the like. He extracts such unique timbres from both electric and acoustic guitar in a manner which seems anarchic at first, but which reveals its own original system of logic when examined *in toto*.

Anthony Braxton's playing is, of course, much more familiar to followers of improvised music. His approach

to **Duo 1** consists of extended trills, harmonic squeals, angry growls, disarming honks, controlled reed squeaks, and phrases constructed from notes that are more spit out than cleanly articulated. On **Duo 2**, he adds blowing into his flute without notes coming out, plus melodic fluttering that sounds like the "Afternoon of a Hyperactive Faun" to his bag of tricks. As usual, all these elements become not only meaningful but musical in Braxton's hands.

Both **Duo 1** and **Duo 2** evince an extremely high level of inspiration and counter-action throughout. Braxton has a much better developed sense of humor than the colder, virtually emotionless Bailey. Still, their innovative instincts are supremely compatible, making both albums classics of their genre. Though the two records are most effectively heard as a unit, **Duo 1** may be slightly more accessible to the uninitiated listener.

Both Braxton and Bailey are very cleanly and closely recorded, with the balance barely favoring the reedman. **Duo 1** is plagued by a surfeit of surface crunches and bursts of static which interfere with a careful scrutiny of the music. **Duo 2** has a much quieter surface.

Eugene Chadbourne is one of the first of what may be a new wave of post-Derek Bailey guitarists. Though I would be incredulous if the Canadian musician professed an ignorance of Bailey's advances, Chadbourne has developed his own sonic world, which takes the acoustic guitar even further than his English model.

After hearing the other-worldly sonorities that emerge from Chadbourne's modified instruments, in some cases with the frets removed and cello and harp strings added, one must wonder if Chadbourne hasn't reached the ultimate in non-guitar-like guitar music. Though some of the sounds on **Volume 2, Solo Acoustic Guitar** (Volume 1 is currently out of print) parallel Bailey's shredded timbres, others are quite unlike anything I've ever encountered. Chadbourne is fond of using a slide to bend notes into eerily dissonant, quasi-electronic extensions. He also beats his instruments percussively (most notably on *Sufficient Space*), moans dementedly on *Rocket*, and generally shows a marked disdain for meter, structure, and propriety. Oddly enough, though, he shows a greater inclination toward melody (or a semblance thereof) than Bailey, besides possessing a waggish wit (hear *The Shreeve* and *Ginger Shelp* for examples) that ren-

ders his music far less formidable than it may appear on paper.

The recording captures everything with a vivid, very explicit sound. Alas, a generous helping of surface noise threatens to drown out the quietest moments.

Emanem's address is P.O. Box 46, Shady, N.Y., 12479, while the Chadbourne can be ordered from Buckdancer's Choice, 330 10 St. N.W., Calgary, Alberta, Canada. All three albums should also be available through the New Music Distribution Service, 6 West 95th St., New York, N.Y. 10025; write for their catalog.

Tom Bingham

Duo 1

Sound: B— Performance: A

Duo 2

Sound: B+ Performance: A

Chadbourne

Sound: B+ Performance: A

Pipedream: Marc Charig
Ogun OG 710, stereo, \$8.98.

Marc Charig's album is another chapter in the Ogun labels continual search for experimental sound forms, from Lol Coxhill's side-long solo on **Diver** (OG 510) to Elton Dean's large ensemble **Ninesense** (OG 900) to the unaccompanied vocal quartet making up the album **Voice**, (OG 110). Now trumpeter Marc Charig, best known here for his work with Keith Tippett's Centipede and King Crimson, has moved his music into a church in the countryside of England.

With pianist Keith Tippett and vocalist Ann Winter, his music grows out of the church's environment. He utilizes the musical aspects of the church with its organs and bells, and then he teams this with the acoustical depths of the church's solemn atmosphere. The opening is particularly inspiring with the tolling bell supporting the ominous trumpet clarion. All the music is freely improvised with the musicians obviously responding to their surroundings. The organ and voice drone throughout as Charig sputters, moans, and creates airy whistles through his trumpet. Everyone is restrained with a thick cushion of space surrounding their voicings.

Pipedreams is an ethereal album recorded in fine detail which detects every nuance but places it all in a large ceremonious expanse. *John Diliberto*

Sound: A— Performance: A—

Tape & turntable

Direct from Cleveland—Lorin Maazel the Cleveland Orchestra (Falla, Bizet, Tchaikowsky, Berlioz). **Telarc Direct-to-Disc 5020**, stereo, (Available through Discwasher Group dealers).

As the first "classical" direct-to-disc offering, this record made a considerable impact—I ran into it in England last summer, for sale at a horrendous price. The sound itself confirms all that the informative notes by our own Burt Whyte tell of the direct-to-disc procedures used. Even the surfaces are good. Yes—you can really hear the difference. An unaccustomed shininess, a certain simplicity of sound, minus extra coloration, a cleanness of cymbals, and brass and percussion. It's all there, true to life. I do not think you will be disappointed if you are insatiable in your search for fi.

It remains merely to comment on the fi/music aspect. If you want super-music, by all means start with side 2, the Berlioz—the *Overture Le Corsaire* and the *Hungarian March* from the *Damnation of Faust*. Here, Lorin Maazel's nervously rapid tempi, plus a certain very audible nervousness in the orchestra itself (after all, this was a nerve wracking occasion!) fits perfectly with Berlioz' extremely high-tension music, and the fi does splendid things for the Berlioz orchestra, always highly colorful. This side should please even the lowest-fi music lover, and delight the audio buff.

The first side, however, I found problematical. The same nervously fast tempi are not as good for the final dance from Falla's familiar *Three Cornered Hat*—that starts too abruptly as an opener—while both Bizet and Tchaikowsky sound hurried and forced to this old-hand musician. Well, you can't have everything.

The two band-separation breaks on side 1 and one on side 2 are well managed, a quick fade-down (while the musicians hastily cough and rearrange their music) and fade-up after around 12 seconds. As for acoustics, you will find them a bit dead for optimum effect. The hall is that way, and of course no reverb is added. For some reason, this is more

noticeable on side 1 than in the Berlioz on side 2, probably a by-product of the music itself.

Playing time is disconcertingly short you should be warned, that is in part the consequence of direct-to-disc recording without the tape-recorder automatic advance groove separation—also, of course, the wider the spacing the safer the fi. If you want longer play, there are plenty of standard LPs awaiting you. E. T. C.

Charlie Byrd

Crystal Clear CCS 8002, stereo, 45 rpm, \$12.00, \$3.00 extra for air mail shipment from 225 Kearny St., San Francisco, CA 94108.

Direct-to-disc recording is the latest tool audiophiles have in their search for perfect sound reproduction. In essence, it consists of the elimination of tape from the recording process. The music is cut directly onto the disc which becomes the master for plating. Theoretically, it's goodbye to much sound deterioration and tape hiss, and hello to crispness and presence.

At its present technological development, direct-to-disc recordings seem to only work with a very select style of music and performance situations. Charlie Byrd, with his clean, precise, classic jazz guitar, is in that group. His quintet runs through five selections with brisk accuracy on this white vinyl disc. This process does not allow for error. If the performance contains a flub, then the entire album must be recut. There can be no overdubbing, electronic manipulation, or lengthy improvisations in the direct-to-disc method. The sole reason for it is accurate, clean sound reproduction, and with this record they succeed.

The surface is free from noise, hissing, pops, and other maladies of contemporary record production. The mix is even with the drums spread across the stereo spectrum. The cymbals are crisp, the definition of the tom-toms is distinct, and the bass drum kicks. The trombone and flute are mixed into the left and right channel respectively. While neither player has a distinct sound, nuances, such as the breath-

iness from the flautist and an unfocused, flat tone by the trombonist, are accurately reflected. Only Charlie's brother, Joe seems to suffer. While his sound is well defined and his function supportive, he does get lost during the ensemble passages.

At present, the widespread future use of direct-to-disc recording seems to me to be questionable. While it works fine for impeccable artists, such as Byrd, and with small groups, it seems too limiting and restrictive on the spontaneity of most jazz music. The improvisations of avant-garde jazz frequently exceed the length of one side, and the decision as to the cut-off point would now be determined by the duration of the side rather than the artistic discretion of the performer. Can you imagine a producer in the middle of Ornette Coleman's double quartet *Free Jazz* sessions signalling "Wind it down Ornette, we're coming to the end of the side."

It also eliminates overdubbing, making it unfeasible for the works of people like the Carpenters, Mike Oldfield, electronic composer Ralph Lunsten, and ECM artist Terje Rypdal, if a pure approach to the direct-to-disc method needs be maintained. The aesthetic ideal behind the direct-to-disc method, is appealing, but the possibilities it eliminates make it seem to me to be a regression. John Diliberto

Sound: A

Performance: C

Charlie Byrd,

Crystal Clear Records CCS 8002.

Charlie Byrd is Mr. Class. Mix his impeccable taste and the wonders of modern direct-to-disc recording, and you have something really special, particularly when it is specially pressed on heavy white vinyl and plays at 45 rpm.

The sound is frighteningly good. Turn your back, and Charlie and his quartet are in your living room. Byrd's delicate classical guitar is always prominent in the Crystal mix. The upright bass and drums are perfectly present. Wayne Phillips' brief drum solo in *Old Hymn* is musically and sonically riveting. It's a lyrical

showpiece in which he lays down the sticks for the special expression hand percussion allows. The project is a total success on all levels. Musically, it is absorbing. The recorded sound is a standard against which you measure everything else.

For additional information, write to Crystal Clear Records, 225 Kearny St., San Francisco, CA 94108.

Michael Tearson

Sound: A +

Performance: A

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Moussorgsky/Ravel: Pictures at an Exhibition. Ravel: Pavane pour une infante defunte. Tokyo Metropolitan Symphony Orch., Louis Fremaux. **Denon PCM OX-7072-ND**, stereo, \$12.00. (Available from Discwasher dealers.)

This pulse coded *Pictures* is far from a demo-type recording in the musical sense, though the sound quality is as good as this PCM tape technique can make it, which means superb. The young European conductor and the Tokyo musicians put out a modest and non-bombastic version of the famous Ravel orchestration—though, to be sure, the big moments are suitably loud. I have the feeling this man was deliberately avoiding the overblown effects too often given to the music, which remains one of the masterpieces of sheer orchestral subtlety of this century. The sound, then, is more French than Russian or Japanese.

The well known *Pavane*, by Ravel himself, is done with impeccably French ambience, quite beautifully. Talk about "beautiful music," that slushy stuff you hear on too many FM stations! Here is the original source for many of its by-now tired effects, fresh and new as of 1899. The original music was for piano; the orchestration dates from 1912, and should make Montovani sigh with envy. He probably did sigh, long since. E. T. C.

The Organ Concert at Holmens Church. Martini, Telemann, Boyce, Walther, Pachelbel, J.S. Bach. Jorgen Ernst Hansen, Holmens Church, Copenhagen. **Denon PCM OG 7001-ND**, stereo, \$12.00. (Available from Discwasher dealers.)

J.S. Bach: Orgelmeisterwerke (Organ Masterworks). Toccata and Fugue in D mi., G mi. Fantasy and Fugue, Pasacaglia in C mi., etc. Helmuth Rilling, Organ Gedachtniskirche, Stuttgart. **Denon PCM OX-7027-ND**, stereo, \$12.00. (Available from Discwasher dealers.)

These are two of the finest Baroque organ recordings I have yet to hear judging in terms of hi-fi sound. They are part of a batch of discs that came to us unheralded—this Japanese label has been recording over much of the world since 1972, with a classical catalogue that a year ago already had well over 50 releases plus jazz, pops, movie scores, and more—and every last disc from the beginning tape-recorded via pulse code modulation. The label was still not listed in Schwann as of a recent month and is distributed through American Audioport. The copies we have are basically for Japanese consumption with

the characteristic mix of titles and names in English and descriptive detail in Japanese characters. The discs themselves are out of Nippon Columbia, production is handsome, and yet only notable "faults" I have yet to discover, other than occasional disc noise, are some tell-tale misspellings—*Il Pastol Fido* by Vivaldi; some "contemporary" music by Varess, that is, Edgard Varese; a Handel opus called *The Harmonious, Blacksmith*, and a batch of *Virtuosos for Strings*. All but a few of the artists are non-Japanese and the roster of names recorded is impressive and musically well-informed, including such as Jean-Pierre Rampal; Josef Suk; the Smetana Quartet; Janos Starker, cellist; Robert Veyron-Lacroix, harpsichord, and the Ensemble Baroque de Paris... one could almost plot the recording itinerary, from Tokyo to Sofia, via the release artists.

So you think that direct-to-disc is the only answer to problems of noise and distortion on tape? So you also think that tape is the present bottleneck? I think you are wrong. It is the disc which is quite rightly the present weakest link. That, of course, via PCM, a "binary coding" approach to tape recording that boasts the very same virtues as those of pulse-modulated laser light through glass fibers. The Denon system, interestingly, uses video standards and video-type tape for its pulse recording, to provide the same ample "ceiling" of bandwidth and the same elimination of noise that we find in these two advanced systems. I do not think that the keenest ears will hear *tape* noise on these discs—just disc noise. And the rendering of high overtones, the very essence of musical sound, is simply beyond experience, not to mention other equivalently important elements of true hi-fi recording.

Of all musical sounds, the Baroque organ has perhaps the most demanding spectrum of intense and complex high tones, shiny, steamy, brilliant, and extremely powerful. These two organs display that sound as I have not heard it except in the "flesh," the solid tin and seasoned wood of the best instruments built in the 17th and 18th centuries. J. E. Hansen's Danish concert, Bach on side 2, earlier Baroque on side 1, is the best playing in terms of color, phrasing and sensitive musicianship; Helmuth Rilling's more ambitious big Bach, on a more distant and somewhat bigger sounding instrument, has superb values in spite of a certain Germanic plodding. I turned both recordings up to top volume and almost blew the roof off. Not a trace of distortion, even so. PCM seems to make your system work better. E. T. C.

A. Vivaldi: Il Pastor Fido. Six Sonates pour Flute et Clavecin. M. Larrieu, flute, R. Veyron-Lacroix, hps. **Denon PCM OX-7005-ND**, stereo, \$12.00. (Available from Discwasher dealers.)

The most heartening thing about this PCM label, for the record reviewer, is that it does not flaunt "demo" pieces to display its digital recording virtues but, instead, is simply a solid classical label—who needs fifty-plus digital demos in the classical area? That's what they have. Audio in the service of music. This mild and gentle recording, not a demo at all in the usual sense, is just as clean and quiet in the tape as its more spectacular brothers. It should be *Il Pastor Fido*, the Faithful Shepherd, and the music is simply a series of Baroque flute sonatas with harpsichord, beautifully played by this French team. Veyron-Lacroix played for years with the famed Jean-Pierre Rampal—Denon also records him—but the two operate separately now, on this and on other labels including RCA.

The Denon catalogue includes specs for the PCM tape recording, which run, partly, like this. Dynamic range over 89 dB, no interchannel cross talk, frequency range d.c. to 19 kHz ± 0.2 dB, no IM, 2-, 4-, or 8-channel capability, half-speed cutting capability, 2-channel advance head for variable cutting pitch, virtually no loss in tape

duplication (digital), no ghosts (print-through). The recorder uses a 4-head VTR configuration, 2-inch videotape, the PCM has a 14-bit binary coding, clock frequency 7.1826 MHz, waveform basically a standard TV signal; audio sampling frequency is 47.25 kHz, the tape speed (metric!) is 38 cm., the head-to-tape a relative 40 mS. That should impress the experts.

Laurindo Almeida-Virtuoso Guitar. (Direct to disc, 45 rpm). **Crystal Clear CCS 8001**, stereo. (225 Kearny St., S.F. CA 94108)

Sonic Boom. Music for Percussion Ensemble. Sonic Boom Perc. Ens.

Crystal S140, stereo, \$6.98.

Oddly, these two turned up next to each other in a pile, and one thing is crystal clear—that record is opaque white! The other one is black, normal speed, normally taped. Crystal Clear is direct-to-disc, and why hasn't somebody made use of the 45 speed before this? Connoisseur tried it briefly many years ago but nobody bit. Really a very useful hi-fi speed for any sonics that are not overly long and require super quality. I trust that more outfits will experiment with it.

Crystal's **Sonic Boom** makes a fine comparison to the Almeida disc since both feature a lot of melodious

marimba/electric-piano sound and both, too, feature what one might call mellifluous classic. I played **Sonic Boom** first, just to put things in perspective, and indeed it is an excellent recording of assorted percussion sounds, well up to high standards for remix type production.

So I went back from this directly to Crystal Clear, for one modestly jazz side and another side modestly classical—Almeida himself is featured but by no means prominently and exclusively, playing along with a group of interesting side men and side sounds. Went back, because as you can guess I absent-mindedly started the white record off at 33, and didn't wake up for a couple of cuts.

At the right speed, 45, things instantly picked up to brisk, and I must say, without prejudice to Crystal's **Sonic Boom**, I could easily detect an added smoothness—the very best word. Like that smoothness they advertise in old Scotch whiskey. Precisely that! Comfortable, natural sounding, minus any bite at all. Direct-to-disc, you see, isn't necessarily sensational. More often it is just quietly good. Which is what it should be, assuming the software is played right. You can get more info on the opaque crystal clear records from San Francisco, address above. *Edward Tatnall Canby*

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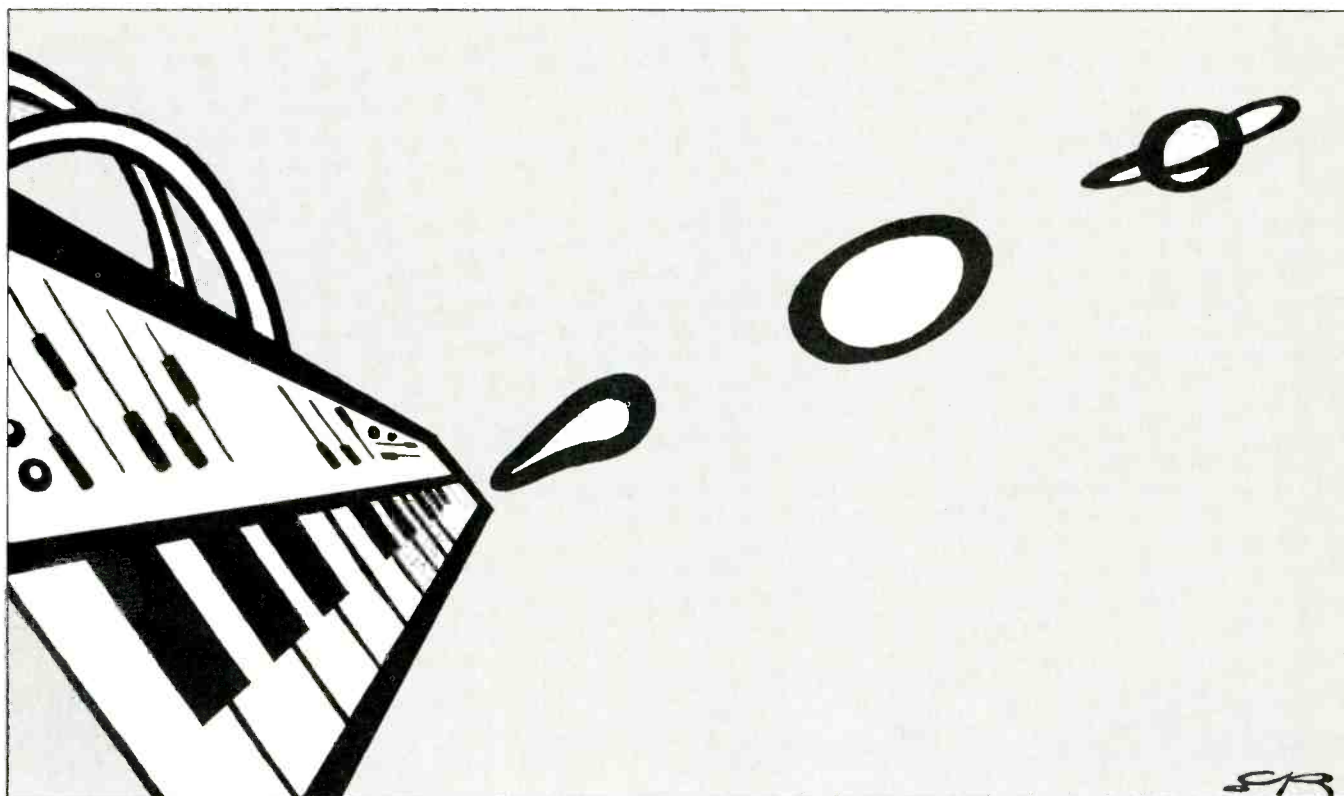
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Classical reviews

Edward Tatnall Canby



100

Beyond the Sun (Holst: The Planets). Patrick Gleeson, Eu Polyphonic Synthesizer. Mercury SRI 80000, stereo, \$6.98.

Patrick Gleeson hopped from 18th century English Lit. into electronic music via Buchla and Moog, and in short order was playing along with big pop outfits and jazz people. All this from the record liner notes and audio people will also find Gleeson's own account there of the Eu Polyphonic (it plays more than one note at a time) unusually lucid. This machine is apparently state-of-the-art, its voltage-controlled elements in turn controlled by "programmable devices," including, of course, those versatile sequencing affairs that carry out a whole series of operations in all sorts of variable configurations....

How does one judge a recreation of a known orchestral work? Each man for himself, I can tell you! Description is better than opinion in this case. I have not heard Tomita's rendition of the same work into electronic format,

but I suspect that if you want high drama, extremely virtuoso use of sound effects over and above the original "acoustic" realization of the music by Holst himself, you will turn that away. Gleeson's is a relatively restrained and "pure" version, though that does not mean any lack of sensational effect—there is plenty built into the musical sense of the original score. Gleeson sticks rather strictly (for electronics) to the given notes with a minimum of whooshes and fire sirens and tinkles not in Holst's own repertory of sonics. Also, Gleeson sticks to somewhat rigid tempi, derived straight from the score's indications (where many a standard conductor takes liberties right and left for rhythmic flexibility)—I noticed this before reading Walter Carlos' introduction in which he takes mild issue on this subject.

What seems to me remarkable in this version of **The Planets** is the ease with which assorted "real-instrument" sounds are synthesized, not self-con-

sciously but with a fluent sort of casualness, the "real" sounds mixed in with those which, as we say, are purely electronic. Excellent approach! If we are, in fact, to imitate the acoustic instruments, it must be in this fashion, as simply so many useful effects that the synthesizer can now produce. Some of these "real" sounds here are absolutely startling. A cello solo, for instance, that is more real than many a cello recording. Trumpet sounds with the bite of real brass. Big drums that rattle loosely, like the biggest bass drums of orchestra and marching band. In another direction, there are even thunderstorm-like sounds which for a moment I thought must be non-electronic, so random was the rumbling. I also like the over-all "orchestration," as derived from the original score; the mix and overlay is always clear and very little detail is lost. Remember that the assembling of electronic sounds into compound mixtures is no less demanding that the same in terms of standard musical instruments. Either

way, the results can be clearly defined or a muddy mess.

Considering that much of this work is the product of extreme and extended "overdubbing," mixing and copying, the finished music is clean and uniform in sound. If you don't think so, just try a bit of **Sgt. Pepper**.

Beethoven: The Five Piano Concertos. Artur Rubinstein; London Philharmonic Orch., Barenboim. **RCA Quadradiscs ARD5 1415**, 5 discs, CD-4 quadrophonic/stereo, \$39.98.

There is a stereo version of this, if Schwann reads correctly, same price, same number of discs. (The stereo cost is up, instead of the Q cost coming down.) I thought it important to play the album in normal stereo, to judge its compatibility, and am glad to say that I found no problems—no distortions, especially no sudden lowered levels, thin bass, and so on, as has occasionally been the case with CD-4 of earlier vintage. Evidently RCA still did not quite want to go over to an all-out single release, like Columbia's—so few and far between. They could have.

That man Rubinstein is the phenomenon of the age in music. These were made, I think, just before his 90th birthday. I saw and heard him later, on

the arduous television specials aired last year—absolutely astonishing. At 90 the man had the strength and endurance of a pianist of 30, an absolutely infallible technique and a sense of musical style that is beyond any compare. All of these astounding qualities—and the unflappable urbanity of the man's playing, so relaxed, so easy going, yet so masterful, are right in these concerti, every last one of them the most satisfying version I have ever heard—and that includes many of the other "greats." Matter of choice and opinion, of course; but any way you listen, this is among the top offerings. Beautiful piano sound too.

RCA, or RCA's English aides, have put the piano forward and the orchestra distinctly a bit behind, an old RCA habit—but in this case the orchestra, while entirely adequate, is in no way the star performing agent under the accomodating Barenboim. Just as well that it is mildly played down in the recording.

Beethoven: The 9 Symphonies. London Philharmonic Orch., Haitink. **Philips 6747 307**, 7 discs, stereo, \$55.86.

All the Symphonies! A proper listening is a week's undertaking (and better if more widely spaced out) but

Schwann usually lists about 17 complete sets these days, not counting Toscanini and Bruno Walter out of past history. For listening, Beethoven is the most uncompromising music of all—more so than Bach; it is really difficult to force this man into the background category, what with the irrepressible energy and violence of his writing! Nor is there any composer who suffers more from sudden stops and starts of the hi-fi machinery. *Continuity* is the name of the Beethoven game! There is no other way of listening.

These Haitink renditions, done in a forthright Dutch manner with English musicians, are surely top level in terms of responsible musical performance, as well as in the splendid (if rather distant) Philips sound. As I listened, I kept telling myself this. Nothing wrong. Plenty right. And yet—instead of growing excited, I found myself mildly bored. Speaking in general—what else?—these are outwardly warm, inwardly cool performances. They smoulder, they heat up on many occasions, but they seldom take fire. Everything but the large soul of each work is there. I *don't* feel that the musicians have been lifted out of their seats by the sheer power of this music

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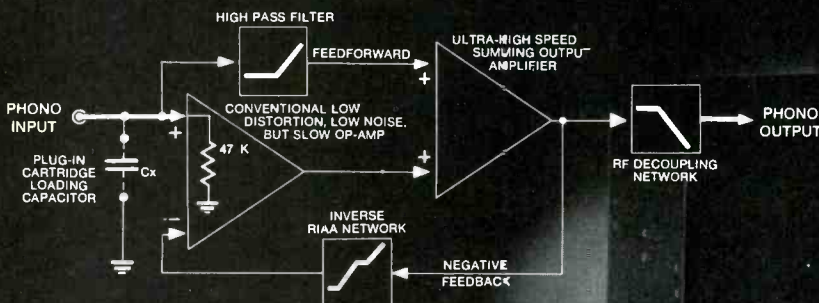
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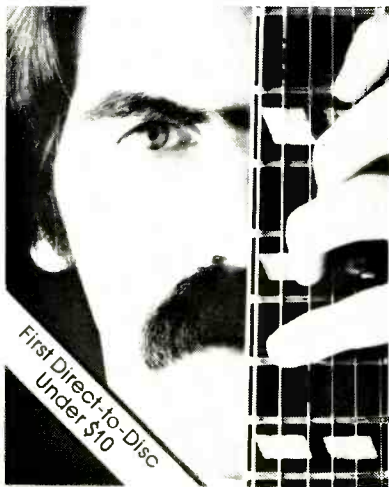
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and the magnetism of their conductor in conveying this to his operatives. These men and women are doing an excellent job . . . Period.

I could be a lot more specific if we were listening together. Somehow, Haitink fails to point up those special places which anyone who has heard much Beethoven knows so well—the dramatic changes of key, the sudden gleaming dissonance (it startled in his day and still does if rightly played), the points of rest and change, the vast shapes, involving, the precise tiny shaping of each rhythmic motival idea, and that devilish Beethoven gleam of triumph one can almost see in the big climaxes, to match the *pianissimo* hush of the opposite dramatic moments. This man is curiously insensitive to these things. He even rushes one harmony into another for an acoustic blur when clarity of harmony is the essence. None of this is grossly mismanaged—far from it. But the cumulative effect is distressing.

Now, if you please, go out and try Vanguard's Beethoven, via Sir Adrian Boult (*Audio*, Nov., 1977). Not all the Symphonies but, as they say, the price is right. Everything that is lacking in Haitink is *there*, to perfection. I will always believe that, given half a chance, music speaks to any intelligent hi-fi ear. If you are curious, if your ears are as good as they must be, you surely will hear these differences, and in the end it should be an exciting experience. Especially on good equipment.

Albinoni Adagio (Vivaldi, Gabrieli, Jannequin). La Grande Ecurie at La Chambre du Roy. *Odyssey Y 34605*, stereo, \$3.98.

This French import of Italian Baroque has a split personality. The first number (see title) is one of those "big tunes" that in hyped-up sentimental arrangements often catch the ear of the larger populace—an old phenomenon going back even before the *Air for the G String* and *Elvira Madigan*. Recently it was a canon by Pachelbel, dragged through icky gallons of musical honey and molasses. Now it is Albinoni, and we need go no further for those who will rejoice in the same.

But the rest is something else. Four works by G. Gabrieli for assorted winds and a concerto for soprano recorder by Vivaldi which will make amateur recorder players turn blue in their listening seats. What is unusual about all of these is the (French) use of authentic instruments of the time, in this case played with intelligence and expertise. Here is the *right* sound for the famed Gabrieli "brass" music (a

good deal of it for wood), not that shiny, big-bottomed modern sound that has been so popular these many years. It is maybe not as powerful a sound, but you will find it much livelier, lighter, more varied, and far superior in rhythmic verve—a big factor—than the often soggy versions by unknowledgeable modern brass players. You will hear the curious breathy music of the wooden cornetto (with finger holes) and if I am right such buzzy crow-call delights as a choir of crumhorns—or is it maybe a raquett? (Hmmm—is that the source of our word "racket"?) One work (*Jannequin*) is a Gabrieli arrangement of the popular battle music (*Bataille de Marignan*) for voices—not much of a battle but good fun.

Sound? Not ideally clean, but serviceable for the music and not at all a listening impediment.

Glazunov: Symphony No. 5; Suite from the Middle Ages. The Large Symphony Orch., Moscow Radio and Television, Fedoseyev. *Columbia/Melodiya M 34522*, stereo, \$6.98.

The late-Romantic "background" literature continues to expand on disc—those "other" works by composers best known for one or two concert favorites played everywhere. In Glazunov's case you may know the *Raymonda Ballet Music* and the *Violin Concerto in A*, famous if only because Heifetz, Milstein, Ricci, and Oistrakh have all recorded it. Glazunov bridged the Revolution and lasted until 1936 but his big music was done back at the turn of the century and before.

No less than eight symphonies (a ninth unfinished) are among the non-recorded works and hereby they are sampled via the *Fifth*, a good sampling if we credit one critic's judgement that they all sound more or less alike. Easy to believe! Also on this disc, a program-type orchestral suite (1902) of the then popular type, complete with story.

It's pleasant listening, on a vast orchestral scale, though the mind does tend to wander. Glazunov is one of those composers who pour forth music in torrents with what seems to be no effort at all—not the best reason for bothering with economy and tightness of organization. How the man does talk. Vast, genial climax after climax, a thousand folk dances in one and a hundred soulful melodies; 50 brass bands, a dozen string orchestras, all playing at once with the greatest of ease, an immense ending to end all endings—yet when you come down to it the whole is no more than a small work, oddly unassuming and un-

complicated in expression. A little man making big noises, but not pompously. It's friendly music, straight through. If you can keep your mind on it.

As for musical style, you'll find the man most like Dvorak, without that composer's profundity of mood. Same period, same approach to the very large and thick-textured orchestra of the late last century. Same exuberance and length and melody and lushness. As for fi, this Russian recording is hi enough and clean enough for anybody, but the mike technique, opposite Columbia's own, it distant and minus the accent color, the kind you keep turning up louder to hear the details. Sounds like basically a two-mike (or one stereo mike) deal to me.

Anton Rubinstein: The Four Violin Sonatas. Robert Murray, vl., Daniel Graham, pf. **Musical Heritage MHS 3385/86**, 2 discs, stereo. (Mail order only: 1991 B'way NYC 10023)

Musical Heritage Society continues year after year to build its huge mail order catalogue with more budget recordings, still packaged in budget black and white—against the times, but more power to them. Some people continue to want good music at prices less than "affordable (which means too expensive). The mail order deal keeps alive, I suspect, not only because of careful economics but more vitally thanks to intelligent musical policy, the music itself and the performances, recognizing that though the big-company star system may sell (not very well these days!) it does not reflect the whole of the record buying market. Far from it. Enterprising, out-of-the-way music well presented to the ear will always find a market in this country.

Anton Rubinstein was the more famous of two Russian brothers, a superb pianist and fluent composer trained, however, in strictly West European terms. The Rubinsteins' association with Tchaikowsky helped brand that composer at home as non-nationalist—certainly not the truth. But Anton Rubinstein's music is indeed as non-Russian as you can imagine, the whole sound redolent of the German Romantic school with only a faint flicker of French coloration now and then. He might just as well have come from Hamburg with Brahms, or Dusseldorf with Schumann, and in fact lived extensively in the West. Even toured America.

These Sonatas are really lovely. If not absolutely top Romantic, then only a peg or two below. How we do neglect such good things! Though they are probably the best out of a much too vast mass of his composition. The

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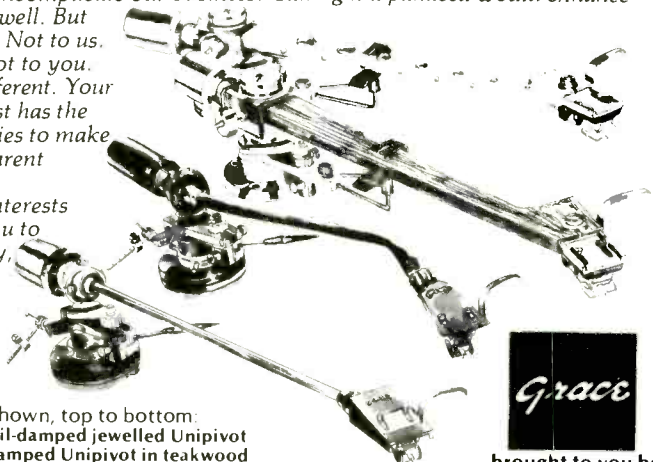
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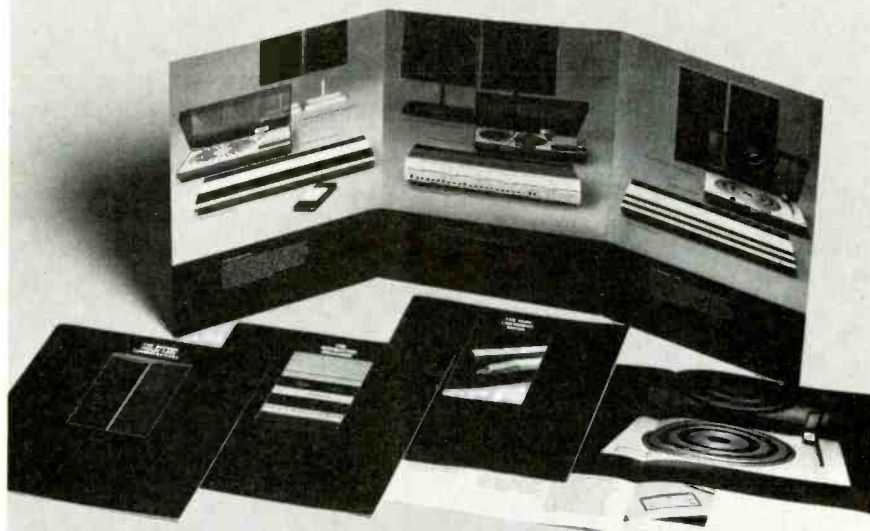


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early Sonatas here are heavily Mendelssohnian but of a later, more lush expression as of the 1860s. The late *Fourth Sonatas, Op. 98*, is far closer to Brahms, a more weighty and passionate style. Two young American artists do an excellent and serious interpretative job, Robert Murray's violin (Guarneri) rather small in tone and a bit blurred in detail but highly musical, and Daniel Graham's piano full of energy, reflecting Rubinstein's own masterful pianism.

Curious piano sound, rather non-resonant and thin in the bass; is this a (properly) oldish piano? The recording is good for the violin but puts the piano somewhat in the background, not ideal for such an energetic element in the partnership. It often happens—aren't these, after all, listed as "Violin Sonatas"? Better to call them Sonatas for Piano and Violin, to reflect the proper sonic priorities for the benefit of our engineers.

Beethoven: Settings of Irish, Scotch and Welsh Folk Songs. Academia Monteverdiana. Dir. Denis Stevens. Vanguard Everyman SRV 356 SD, stereo, \$3.98.

These many songs, together with another large batch by Joseph Haydn, were composed in the salon style of the early 1800s, for well-bred home music making—not concerts. Much "chamber music" of the sort was so intended, and that is where the name came from. For present day folk enthusiasts, the music will be an odd surprise. The idea, then, was to take folk songs, or prettied-up folk songs (taken down in notes, not via recorder!) and civilize them, set them as so many art songs, fit for milady's front parlor. So Beethoven did, with the then-stylish optional accompaniment of violin and cello to aid the piano, which can play without their aid just as well.

Denis Stevens is a very well-known musicologist and conductor with—for my mind—one enormous blind spot, always reappearing. He invariably is associated with big, operatic, professional voices, and apparently sees no musical need for any other sort; at least that is my sonic experience of his work to this date. Thus, the modest and lovely Beethoven songs, perfect for a small, quiet, simple voice, are belted out here with all the operatic panache you could want from Puccini. Good musicians! But their instruments are simply unsuitable for this music, as you will probably decide for yourself rather quickly. If you like the voices—then you'll enjoy the music, all four instruments. Many of the tunes are familiar ones.

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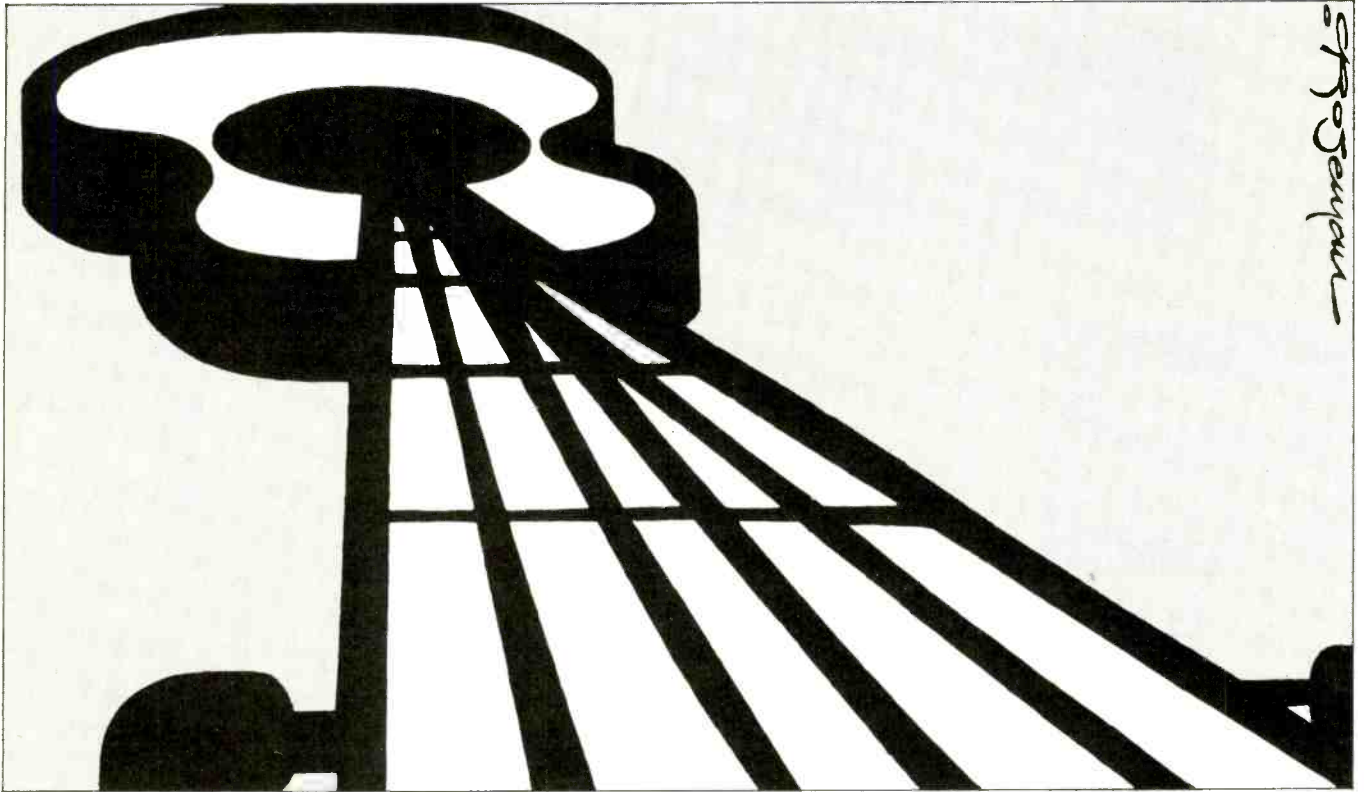
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AUDIO • January 1978

Folk bag

Tom Bingham



105

Mike Auldridge
Flying Fish FF 029, stereo, \$6.98.

After first attracting attention with Cliff Waldron, Mike Auldridge became a major force in the newgrass revolution as a founding member of the "Seldom Scene." He consolidated his reputation as the most influential dobro stylist of the 70s with his first solo album, **Dobro**, then went on to extend the instrument into pop and contemporary country—with touches of jazz and rock—on **Blues and Blue Grass**.

Mike Auldridge continues the artist's expansion of the resonator steel guitar into both familiar and relatively uncharted realms. Aiding in this project is top Nashville engineer Garth Fundis, who has fully captured the burnished metallic warmth of Auldridge's inimitable tone and the smooth fluidity with which he manipulates his slide, this laying bare the dobroist's amazing versatility and tasteful sensitivity.

Several tracks are what might be tagged "typical" dobro showpieces,

with somewhat derivative—though hardly trite—themes. *Southern Rain* is a carchy tune reminiscent of the Stringalongs' *Wheels*, while *Mountain Slide* sounds a lot like *Colorado Turnaround*. Phil Rosenthal's *Indian Summer* is one of those songs perfectly tailored for the dobro, though it also gives the sorely-underrated sparkletoned banjo picker Vic Jordan a chance to shine.

Tennessee Traveler tends toward the jazzy end of bluegrass, with dazzling fiddle by Vassar Clements (including a fast-paced pizzicato solo that I first mistook for a mandolin), brittle banjo by Bobby Thompson, and tasty dobro variations. *Blues for Barbara* is a wistful Auldridge original, seemingly based on *Nobody Knows You When You're Down and Out*, with superb rhythm guitar by singer-songwriter Dick Feller and Panama Red, plus fiddle by Jim Buchanan, a dead ringer for Clements. *Georgia On My Mind* is also given a pensive, laid-back blues-jazz treatment, including David Bromberg's best guitar work of the set.

Auldridge invades rock territory for

Last Train to Clarksville and *California Dreamin'*. The Monkees' oldie has a marvelous banjo solo by Jordan, though Clements relies too much on his familiar clichés. *California Dreamin'* features a skillful blend of Auldridge's dobro and Lloyd Green's pedal steel, two obviously compatible instruments rarely encountered together.

Side two has a bit of a Latin flavor, with the Mexican-tinged *Spanish Grass* and *Lloyd's of Nashville*, the latter a dobro duet by Auldridge and Green. *All Thumbs* is an appealing Thumbs Carllile composition, featuring sensitive soloing by Dick Feller. The album also includes two Don Williams-flavored vocals by Auldridge, with Emmy Lou Harris adding a Dolly Parton-like harmony on *Dreaming My Dreams*.

The rhythm section is suitably fleshy, but the lead instruments (excepting Auldridge) could have been mixed more prominently. *Tom Bingham*

Sound: B+

Performance: A-

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The Beaudoin Family Philo 2022, stereo, \$6.98.

The Beaudoin Family plays dance music, mostly reels, on this delightful album. The acknowledged star is Louis Beaudoin, one of the finest fiddlers on either side of the Canadian border.

Like many Philo albums, **The Beaudoin Family** was recorded at their Earth Audio Techniques studio. It is a totally relaxed and flowing album. Paul Wells informed liner notes add a whole lot to this delightful package.

Michael Tearson

Sound: A

Performance: A

Swingtime In Springtime: Lew London Philo 1032, stereo, \$6.98.

Lew London (formerly of the bluegrass-fusion band, Bottle Hill) is the latest in a long line of folk-swingers who've carried on Dan Hicks and his Hot Licks' revival of 30s swing in string-band clothing.

London sounds quite a bit like Steve Goodman vocally, and is just as adaptable within a comparatively less eclectic range of material. He's appropriately sensitive on the three contemporary singer-songwriter-type tracks (*Rodeo Rider*, *Randy*, and *Green Peach Blues*, all worthwhile songs, well-performed, even though hard-core swing addicts will no doubt consider them intrusive), suitably flippant on *Crazies* and the title song, and consummately "hep" on *Gimme That Wine* and *Nagasaki*.

London's guitar work is amazing, with a taut, secure, yet elastic touch and a fertile imagination, as *Crazies* and the super-exciting *Lady Be Good* (with swooping Grapelli-esque fiddle by Jay Ungar) instantly demonstrate. His flashy, finger-picked intros and solos are most closely based on Django Reinhardt, injecting chunks of bluegrass and country into his sterling, swinging jazz improvisations. Significantly, the instrumental *Jennie's Fault* almost sounds like the David Grisman Quintet, who have a similar set of influences.

Just as impeccable as London's leads are Mark Josephs' supple, steady rhythm guitar and Jim Tullio's flat-toned, ultra-flexible acoustic bass. This tight little trio meshes beautifully with London's arch-top guitar on the title cut and *Lottery Ticket*, using several other first-rate musicians and backup singers.

The most notable of London's originals is the old-timey *Sooner Or Later*, a variation on the time-honored "if the river was whiskey" theme. And, of

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course, he includes an obligatory Bob Wills tribute, *Home In San Antone*.

The whole album is permeated with a good-time spirit that keeps you coming back for more. It may not be the most intellectual music you'll ever hear, but it's loads of fun!

The recording captures the reverberant qualities of the acoustic stringed instruments, the crispness of the drums, and the deep timbre of the clarinet. The remix engineers fortunately recognized the importance of Josephs and Tullio to the music, and have spotlighted them accordingly.

Tom Bingham

Sound: A — Performance: A —

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Import IMP 1013, Stereo, \$6.98.

The sticker on the front cover defines morris not as a finicky cat but as "a vigorous English dance performed by men wearing costumes and bells."

Further down on the front cover the names "Ashley Hutchings, Simon Nicol, John Tams, Phil Pickett, Michael Gregory, Dave Mattacks, Shirley Collins, Martin Carthy, John Watcham, John Rodd, Albion Morris Men, Ian Cutter, Adderbury Village Morris Men" appear. With such a stellar cast what should appear but a panorama of music from the morris tradition. This is dance music with the occasional bit of jollity. It is a bright and cheery album of mostly instrumentals.

As the title suggests, *Son of* is a follow-up to an equally wonderful album issued in England similar to that caused here by Joshua Rifkin's Scott Joplin recordings. Both of the morris albums are excellent. Michael Tearson

Sound: A — Performance: A

Going Up On the Mountain: Jody Stecher

Bay 210, stereo, \$6.98.

On this fine album, virtuosity takes a back seat to some fine songs recorded in a warm, living room-like studio situation by friends. Among them John Herald, Fred Sokolow, and Hank Bradley stand out.

Several songs stand out too. Jody likes Gordon Bok's evocative *Hills of Isle Au Haut* so much that two different versions appear. The classic *Golden Vanity* has a spirited reading. Jean Ritchie's *Black Waters* is a "superb piece of songcraft," a telling song of the after effects of strip mining. *O The Wind and Rain* is a traditional ballad Bob Dylan borrowed to



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mutate into *Percy's Song*. The original is a horror story about a lover who turns into a fiddle.

Going Up On the Mountain is easy going as an album, a real part of his life shared openly. *Michael Tearson*

Sound: B Performance: B+

Old Friends: Mary McCaslin
Philo 1046, stereo, \$6.98.

Easily her best record yet, **Old Friends** is a welcome visit from Mary McCaslin singing a singer's choice of

favorites. Clarity, grace, and wit are the album's hallmarks. Mary's varying unusual guitar tunings are an integral ingredient allowing out of the ordinary sounds to emerge regularly. In addition, the recording is ungimmicked and clean, well-suited to the material.

McCaslin's choices are consistently fresh and cleverly arranged. The Beatles song that opens the album *Things We Said Today* is an excellent song not often covered. The Supremes' *My World is Empty Without You* is another good one. *Wendigo* is a superb song based on an Indian legend of the howl of Death. The harmonies of McCaslin with Jim Ringer are riveting. The four cowboy songs are lighthearted and perfectly done. Mary sings the rarely heard prologue in her version of Cole Porter's *Don't Fence Me In*. The frailed mountain banjo that plays the famous opening riff on *Pinball Wizard* is a dare that pays off handsomely. The one original song gives the album its title and adds perspective and depth to a most personal collection of favorite songs.

Old Friends is warm and pleasing and honest. From the first, it sounds like an album that already is a long-time favorite, an old friend itself. *M.T.*

Sound: B Performance: A

Peru: Music From the Land of Macchu Picchu

Lyrichord LLST 7294, stereo, \$7.98.

The music of the Peruvian Andes most recently broke through to American consciousness with Simon and Garfunkel's *El Condor Pasa*. While vocally this was a thoroughly inauthentic American-folk-pop adaptation of a Peruvian original, the instrumental interludes—played on native flutes called *queñas*—did convey a genuine, exotic Andean flavor.

This collection of mostly instrumental music from the mountainous regions southeast of Lima includes a few selections with melodies more

than little reminiscent of *El Condor Pasa*. The distinctive bittersweet cadences of that song are likewise recalled on several other tracks.

Andean music derives from a variegated blending of Spanish and Inca cultures. Through the past 400 years, two factions have intermixed so thoroughly that it's virtually impossible to tell where one begins and the other ends. In a few cases, one of these two strains is instantly identifiable. For example, *Churyacase Yampuyov* (the language is Quechua), with its gruffly blaring cornet and Nilda Quinta Gonzales' odd falsetto vocal yelps, is obviously Indian-influenced. Conversely, Juan Zarate Solier's flamenco-derived guitar solo, *En el Hospital de Amores*, is decidedly Spanish in origin.

Most tracks are less easy to pin down. The brass band of side one, track five is predominantly European in instrumentation, though their jumping dance rhythm is probably an Indian variation on a march. Likewise, Jorge Velazquez' guitar solo, *Despedida de Cotahuasi*, played in what sounds surprisingly like a Mississippi blues-guitar style, is neither exclusively Spanish nor Indian.

The two instruments most people associate with Peru, the Indian quena and the Spanish harp, are of course represented. The quena is heard on Carlos Valderrama's mysterious *La Pampa y La Puna*, which almost sounds Japanese, and a bird-like, untitled tune by Roba Corazen. The harp is heard in solo and duo contexts, and as part of a rather funky festival orchestra which also includes violins, clarinet, and a couple saxophones—the tenor saxist sounds amazingly like Gato Barbieri!—arranged with a delightfully off-kilter sense of coordination.

Also included is an example of black Peruvian music (*Festejo*) by a percussion band playing in an Afro-derived pattern; plus a *Marinera* dance, sung and played on the guitar by Patricia Ghumbiavca in a manner close to the mainstream of Latin American popular music.

Whatever the roots of each selection, **Peru: The Land of Macchu Picchu** is filled with entertaining and unusual music, highlighting a variety of musical idioms and instruments. *El Condor Pasa* may have illustrated one aspect of Andean music, but it hardly told the whole story.

The recording has a refreshing, convincing outdoors ambience. Lyrichord pressings are often disturbing, but tape hiss is a greater problem than the surface here. *Tom Bingham*

Sound: B— Performance: B to A

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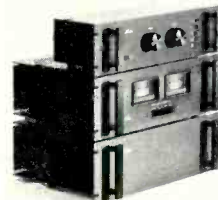
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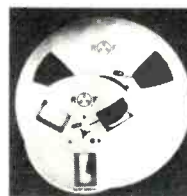
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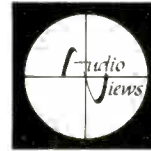
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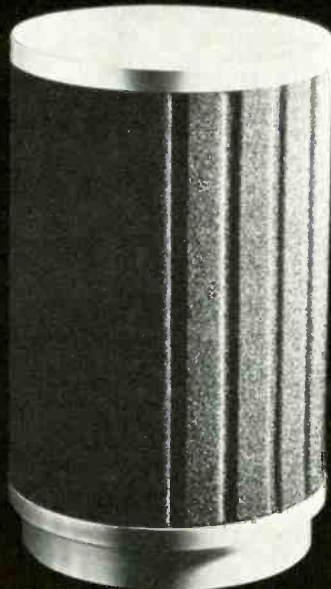
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Ultimately

Marantz goes beyond THD to lower TIM (transient intermodulation distortion).

Because TIM doesn't show up on conventional amplifier testing equipment, most manufacturers and their engineers aren't even aware that it exists in their amplifiers. Even if they were, they probably wouldn't know what to do about it.

But because Marantz builds for the music and not just the specs we know how destructive TIM can be to pure sound reproduction. And we've developed a revolutionary new circuit design to eliminate it.

The reduction of TIM can be the single most important element in making an amplifier sound better. For instance, two amplifiers with identical total harmonic distortion (THD) specifications should sound the same when compared... but the one with low TIM will sound audibly better! That's because TIM adds an unnatural harshness to the music. It's not only detrimental to pure sound reproduction, but it can have an emotional effect that you experience as "listening fatigue!"

TIM is caused by an improper design of "negative feedback circuitry" by other manufacturers. Every modern amplifier uses it to lower THD. But *excessive* negative feedback coupled with an insufficient slew rate* can lead to gross internal overloads under the constantly

changing transient and sound levels of music. That distortion is TIM.

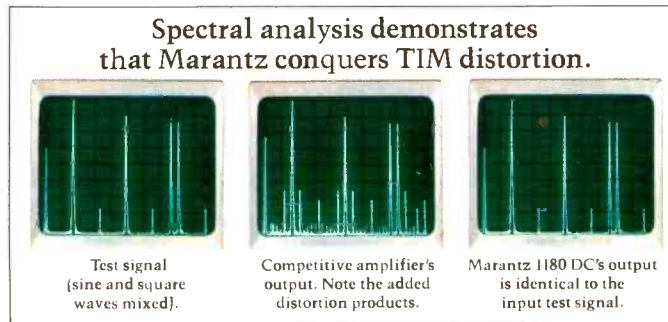
The gentle slopes of continuous sine wave test signals normally used to test an amplifier simply cannot detect TIM distortion. It requires the type of extremely sophisticated spectrum analysis equipment developed by the space industry to analyze radio frequencies.

Our answer to TIM is a circuit design that ensures the widest bandwidth and the lowest obtainable THD *before* negative feedback is applied. The Marantz 170DC Stereo Power Amplifier (the 1152DC, 1180DC and 1122DC also use this circuitry), for instance, needs only 1/100th (-40 dB) the amount of negative feedback commonly required by other amplifiers to yield the same low total harmonic distortion figures.

Incredibly, Marantz amplifiers with low TIM design can deliver flat frequency response from 0 Hz to 20 kHz *without* the use of negative feedback. And this same circuit design provides the optimum slew rate for minimum TIM and maximum reliability.

Result: Marantz reduces TIM to an inaudible level, which means you get clear, clean sound from all your records and tapes. Think of Marantz with low TIM as a window to the original performance.

If you truly want the best reproduction of musical sound available anywhere—and are willing to spend a little more to get it—then go for it. Go for Marantz.



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We sound better.

*The maximum change of voltage per unit time. © 1978 Marantz Co., Inc., a subsidiary of Superscope, Inc., 20525 Nordhoff St., Chatsworth, CA 91311. Prices and models subject to change without notice. Your Marantz dealer has the full line of Marantz amplifiers. Look for him in the Yellow Pages.

It's Marantz. Go For It.





There are certain other instruments every serious musician should know how to play.

The implements used in every art form except music both create and preserve the art. If music isn't captured at the time it's created, it's gone forever.

But the instruments used to capture music can also be used to alter, refine and improve it.

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Instruments like the Model 2A Mixing Console with an

MB-20 Meter Bridge for control of volume, tone, blend and spatial positioning. There are also microphones for every recording need along with accessories like the PB-64 Patch Bay and cables to help organize the process.

TEAC is the leader in multitrack. Less than a decade after multitrack equipment was introduced to the professional industry, TEAC introduced it to people serious about their music. Today, thousands of musicians and recordists are getting many of the important elements of the studio experience but without the studio bill. And TEAC continues its

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