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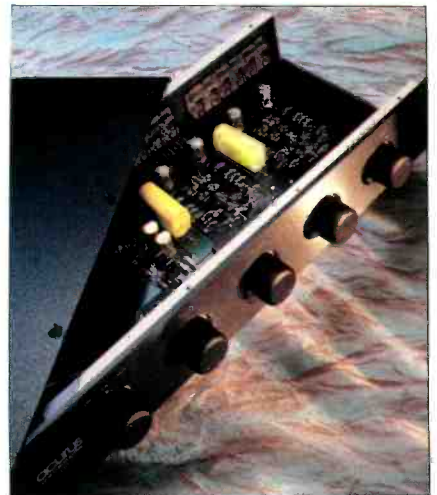
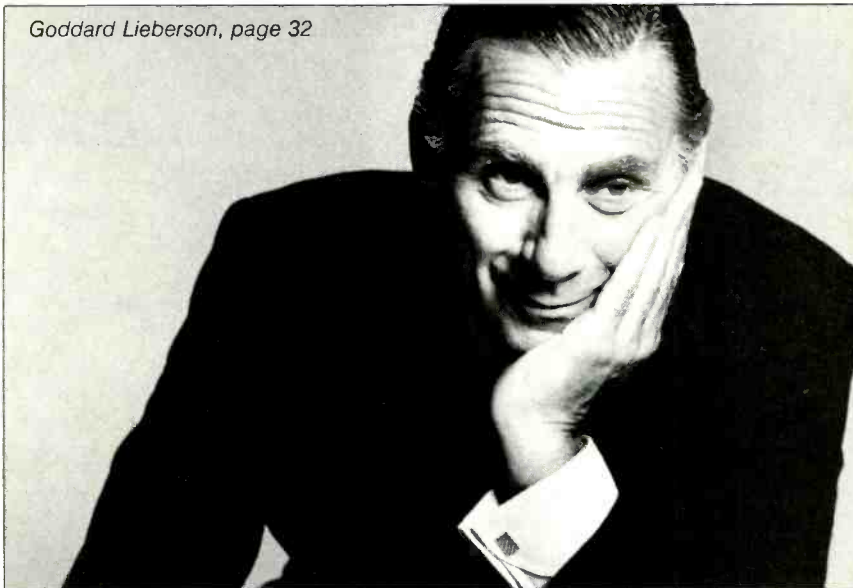
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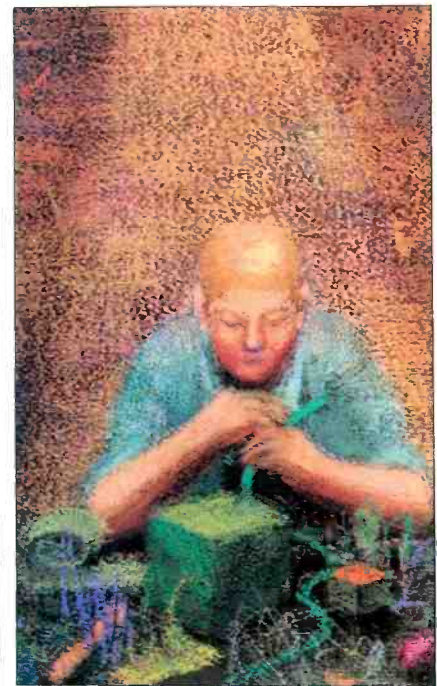
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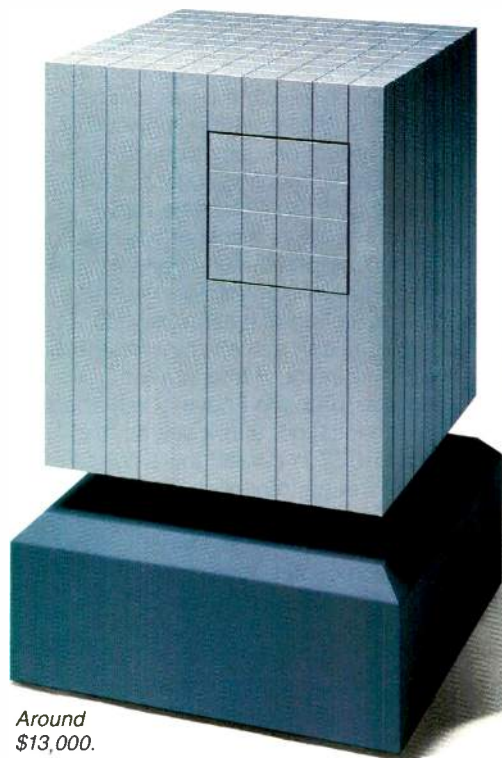
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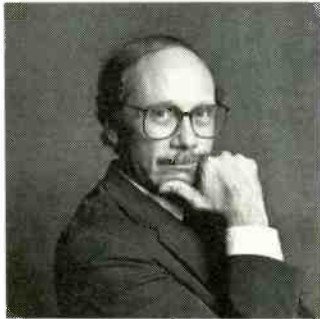


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I have been silent too long. I think so. My boss thinks so, and so do quite a few readers, editor-watchers whose opinions I respect. There are a lot of issues and events that need the full light of public discussion, and someone lucky enough to have my place from which to view things ought to tell those not so fortunately placed what's happening and something about the issues.

Let me start with the most recent Summer Consumer Electronics Show, held in Chicago over the unprecedentedly early period of May 28 through 31. The last day and a half were Consumer Days—that is, you didn't have to be associated with a magazine, manufacturer, or a store to get in. Just pay your money, and...

The folks who put on the Show say that over 98,000 consumers attended, along with 51,000-plus others from the trade side. Now that ratio is nearly two to one, but in all honesty, it just didn't look like that to me, neither up at the Hilton, where most of the High-End group was, nor at McCormick East, where most everything else was. In fairness, I heard a rumor that there were big crowds during the consumer days at the Nintendo and Sega booths in McCormick North, and I'm certain that if I had taken the heaviest consumers of electronics in my family, my 9- and 11-year-old boys, I would never have gotten away from the Nintendo or Sega booths.

Now don't get me wrong. I am in favor of audio shows for consumers. In fact, a few years ago I lobbied in favor of this magazine and our brother, *Stereo Review*, putting on consumer hi-fi shows. I think they are a great way to promote the Sport of Audio,

and while I like the *Stereophile* Shows, for me they don't replace the shows that were being put on when I broke into the industry, those by the Institute of High Fidelity and by Teresa and Bob Rogers. I'm just not certain that an industry trade group is the right group to put on such shows. A reasonably good argument can be made that such shows ought to be put on by people other than the equipment makers, and I like the idea of it being an outfit whose main constituency is the final consumer. However, the basic argument I'm making here is that we ought to have—especially in these times of difficulty for our industry—pure trade shows and pure consumer hi-fi shows, rather than a hybrid.

Further, it seems difficult to put on both a trade and a consumer show using the same booths at the same time. There is the problem of shrinkage, that is of, say, cassettes suddenly sprouting legs and walking away. And how is someone who's manning a booth supposed to carry on two conversations, one with a consumer and one with a retailer, at the same time?

The biggest difficulty, however, is sales of equipment from the floor. I had one cabdriver claim he had bought a receiver last year, despite the absolute prohibition on such things. But consumers will come to a show expecting at least to be told where they can actually purchase the equipment being demonstrated.

Another problem I have is with the Chicago location, and it seems the Summer CES is pinned there by the sheer acreage they need for the exhibits. Consumer shows need to get all around the country, to every major population center, for maximum exposure. I'd say three different cities each year on a four-year cycle.

Anyway, let me know what you think about the stuff above and whether there are other items you want me to pontificate on.

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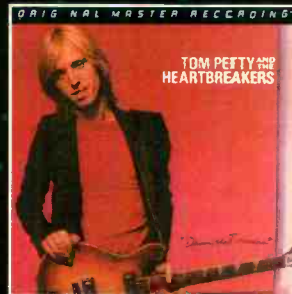
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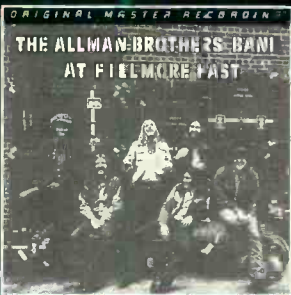
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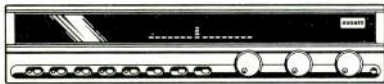
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Cards and Trouble Shooting

Q. I have been attempting to repair a multi-track tape recorder. I thought it would be a simple job because I immediately found a couple of open pass transistors in the power supply. Upon replacing these, I expected the machine to come alive. It didn't. I now had voltage, but some resistors were running very hot, indicating that something was drawing too much current. My next thought was to remove one card at a time till I found the defective one, but this did not work either. Now what?—Name withheld

A. You've given me a lot of good information; I hope it's enough.

When I see something like this, I begin by asking myself what components failed first. Here, it was the pass transistors. You're lucky they opened when they failed, or the power supply's full, unregulated voltage could have been fed to many components. Still, the full voltage could have been fed to some or all of the circuits just before the transistors opened.

Since you didn't get lucky by pulling cards one at a time, it's most probable that more than one card has a problem. I'd suggest pulling out all the cards, turning the recorder on again, and checking for any overheating components. This will detect or rule out failure of any components on the main board.

Turn off the recorder, and insert just one card into its slot. (Unless you're sure all cards are identical, right down to their trimpot settings and capacitors, mark each board and slot to make sure you return all cards to their original places.) Let's hope this card does enough things to let you determine, once power is back on, if the circuit associated with it is not operational. Check for component heating, both on the main board and on the card. If all is well, keep the card in its place, and add another one. Repeat the testing procedure for each card.

When you find a card that does not work or causes component heating, turn off the machine and remove the card. But continue trying the other cards to see if any of them has shorted components. Your original test was not adequate to find multiple problems; the test suggested here covers that possibility.

The annoying task will be to find the defective components on each of the defective cards. You must check between the appropriate voltage and ground. Hopefully, there will only be one or two electrolytic capacitors, so finding the one which could have shorted out will be relatively easy. If it's just a capacitor, you're lucky. If a transistor or an IC has shorted out and you only have the recorder manufacturer's part number, tracking down the correct replacement part will be more difficult, especially if the model you have is an old one.

If you can't fix the defects on the cards, you probably can send the cards to the maker of the recorder. It's cheaper than sending him the entire machine. If the company is no longer in business, you must try to find a firm that specializes in the repair of professional recording gear; they just might have the right replacement parts.

Using Limiters

Q. I am prompted to write because of something you mentioned in a response to a question in the July 1991 issue. You referred to a correspondent who had incorporated a limiter in his system, making soft passages as loud as loud ones. With a number of my recordings, I find that if I turn up the volume high enough to hear the soft passages, then the loud passages are much too loud. I have neighbors to consider.

Do you think a limiter would help me? If so, how is it used?—James Bliss, Bartlesville, Okla.

A. Yes, a limiter can help reduce the dynamic range of your program sources. It can be installed in the tape loop, between the output of a preamplifier and the input of a power amplifier or in the "pre/main" loop of a receiver or integrated amplifier.

Actually, there are two types of devices to restrict dynamic range, limiters and compressors. A true limiter will pass all dynamics without change until the signal level reaches some critical value. Beyond that point, further in-

If you have a problem or question about audio, write to Mr. Joseph Giovanelli at AUDIO Magazine, 1633 Broadway, New York, N.Y. 10019. All letters are answered. Please enclose a stamped, self-addressed envelope.

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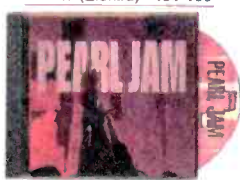
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creases in input cause no significant increase in output—the output reaches a limit and maintains a constant level until the input signal falls again.

Compressors also pass dynamics unchanged up to a critical point. After that point, output continues to rise as input level does, but at a slower rate (for instance, a 1-dB rise in output for each 2-dB rise in input). Often, compressors are designed to act as limiters too, once some further signal threshold is passed. A compressor should interest you more than a limiter, because it leaves some semblance of dynamic change rather than rendering the music lifeless.

Compressors and limiters are more common as professional equipment than as home audio components, so you may have to try a pro audio dealer or a large musical-instrument store to find one.

Channel Leakage and Balance Controls

Q. After hooking up my new system and checking the balance control, I noticed that when I turned that control to favor the left channel I could still hear some music in the right-channel loudspeaker and vice versa. I checked all wiring and all seems well. Is this a normal situation or could something be wrong with my preamplifier?—Robert Sherman, Walnut, Cal.

A. Many preamplifiers that I have worked with operate as you have described, so this is probably a normal situation. I cannot conceive of any imbalance condition that could not be corrected by such circuits, despite the slight amount of signal leakage that you have noticed.

Leaving CD Players Turned On

Q. Should I leave my CD player turned on when it is not being used? I average about one hour of listening to CDs daily. Somebody told me to leave it on, because power surges that are present when turning it on and off are worse than just leaving it on. Yet if I leave it on continuously, the player gets fairly warm and I'm concerned that this heat may not be the best thing for it.—Sam Steinmetz, Dallas, Tex.

A. I really do not believe that the power surges produced when the player is turned on or turned off are

significant. I think that the heat which builds up when the player is left on all the time will tend to shorten the lives of electrolytic capacitors more than power surges will. These players require small amounts of power, so the d.c. resistance within the windings of the power transformer should be sufficient

to minimize the effects of power surges.

If you play a disc and walk out of the room for a couple of minutes, and then come back to listen some more, leave the player running during your absence. Otherwise, turn it off when it is not in use.



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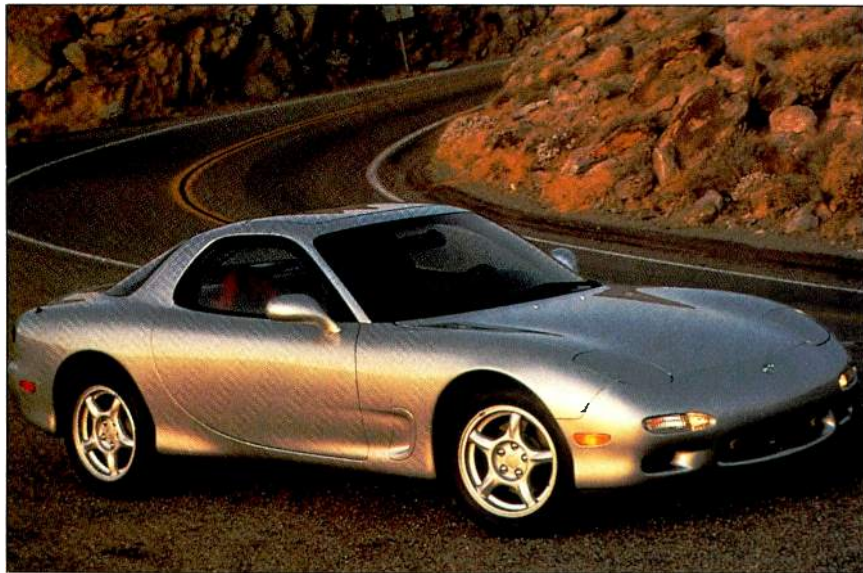
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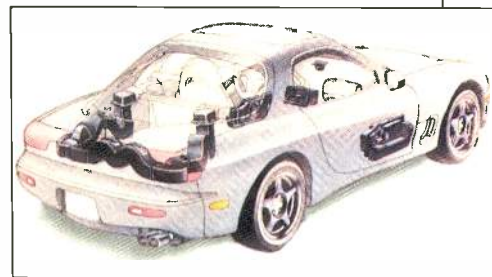
Beaucoup B.Q., Mazda, Beaucoup B.Q! Seconds after this new RX-7 was delivered to my driveway, my yard was filled with *all* the boys from two blocks around, all so enthusiastic (so was I) that I had to invent a new rating scale, Boy Quotient (B.Q.), to describe how hard they fought just to lay on the rear deck of this two-seater. "Cool!" and "Most excellent!" were just a few of the adjectives they shrieked about this slick redesign, which looks like a Baby Ferrari from the late 1950s. So Beaucoup B.Q., Mazda, for this sweetheart of a car, a definite 20 on a scale of 10. Beaucoup B.Q.

Unfortunately, the RX-7 was just there so I could test Bose's \$3,000 upgrade car stereo system for it. Bose has done quite a job of their own with this, applying their Acoustic Wave technology to a 110-inch long waveguide for the bass frequencies. The Laws of Physics being what they are, a speaker system designer usually has to choose between low bass, efficiency, or a big box hung on the back of the bass driver. At least that's how it works for standard home boxed systems. Bose's technique here is to place two 6½-inch woofers asymmetrically inside the curved tubular waveguide in the trunk. My favorite CD for



testing speaker low end is Gary Karr's *Adagio D'Albinoni* on King/Firebird (available from Acoustic Sounds in Kansas); a creditable job in reproducing the string bass and organ here, though the sense of ambience of the recording location, a large church, wasn't accurate. This piece of music includes a scale on Karr's bass that soundly exercises the low and the midrange drivers of almost any system. The Bose system did a good job with this difficult run, and was able to handle the organ with good weight, thanks to the switching amps that are part of the speaker modules in the doors of the RX-7.

Two other CDs, *Make We Joy* (Nimbus NI5098), and *West of Oz* (Sheffield CD-15), had good voice and instrument timbre, but only fair ambience. Two cassettes, *Mountain Dance* by Dave Grusin (JVC MDS-7), and *Cantate Domino* (Proprius



CP7762), seemed to have reduced treble.

The drivers in the door enclosures are 4½-inch cones in ported enclosures specifically tuned for the RX-7. Part of the tuning comes from an active equalization network located in the module with the amp, together with compression circuitry intended to provide concert sound levels over a wide frequency range without audible distortion. I played the system rather loudly, particularly running up and down the Garden State Parkway, and heard no obvious distortion.

The last speaker is a 2½-inch unit covering the midrange and treble from a center-fill location in the instrument panel and firing upward at the windshield. This driver helps with localization and staging, which are difficult problems for car stereo designers because so many cars' speakers are down low in the doors, where they're blocked by the passenger's legs and where the relative angles from speakers to listener force you to localize almost entirely on the nearer one. I didn't really have a great sense of stage depth with this system, but the image was up and in front of me.

The signal sources for this system include an AM/FM tuner with CD and cassette players; this was the first time I've had the opportunity to have all these sources together in one car. I loved it! The sound quality was best from the CD, with cassette second.

The ergonomics were better than average, I feel, though I never got completely familiar with the set-up even after about 20 hours of test driving. I could find what I wanted by feeling around, but my hand didn't just go directly to the switch in question. But the tape and CD

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Would I pay \$3,000 to add the Bose sound system to a Mazda RX-7? I wouldn't hesitate a minute.

transports turned on as soon as they were loaded, while the radio was turned on by pushing the volume control knob. Night operation could be adequately done by touch, since illumination and lettering aren't strong points.

The tuner section will memorize six AM and 12 FM stations. Reception of AM was better than my home tuner's—cleaner, better DX, and flatter response—but there's no stereo. The FM didn't impress me as much, since my home tuner is better there, but it's much more than simply adequate. I didn't find any picket-fencing, even when there were quite a few semi rigs around, and neither was I bothered by multipath. The Scan mode isn't satisfactory, something I've noted in other car radios. The problem is that the station doesn't actually play long enough before the tuner jumps to the next station. And when it jumps, the tuner is silent too long before

sound begins. I found myself manually hunting backwards to find that station, one or three ago, that had what I'd wanted—too slowly.

The tape system was Dolby B noise reduction as well as DNR, which also works on AM and FM. There's autoreverse as well as automatic selection of the proper equalization for two tape types. The music search is accurate and effective but isn't particularly quick.

The bass and treble EQ circuitry seems to me to go too far into the midrange, and the flat position on both, to my ears, seems to be a compromise. That is, the detented "flat" positions on both don't sound flat.

The toughest question I can ask about upgrade systems sold by the car maker is would I pay the price—in this case \$3,000? The answer is easy: Sure, I wouldn't hesitate a minute. Beaucoup B.Q, Mazda and Bose!—E.P.

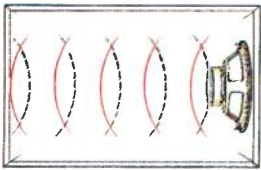
Process Servers

A few years back, I suggested that road-noise compensators should not only raise volume level but boost the bass and compress the sound a bit. Several companies use the level-compensating approach, but Alpine's 7525 head unit and Harman Kardon's CSP-1 analog surround processor are the first to add bass boost to the mix. Compression, anyone?



What happens to sound in a box?

ORDINARY SQUARE SPEAKERS DON'T JUST PLAY MUSIC. THEY PLAY PING-PONG. WITH TRAPPED SOUND WAVES THAT BOUNCE BACK AND FORTH OFF PARALLEL WALLS. RESULTING IN DISTORTION. WHICH IS PRECISELY WHY OUR ENGINEERS BUILT THE NEW



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The seven-sided HP loudspeaker produces dramatically lifelike imaging. (You'll discover pure sound doesn't come in a box).

Signal processors that used to stand alone are being built into amplifiers—and vice versa.

Signal processors that used to stand alone are, more and more, being built into other components. Crossovers and equalizers have long been built into amps (and Pioneer's Premier line now includes a crossover with a parametric equalizer built in). The BBE signal-sharpener is being built into several Aiwa head units and Jensen's new A432 BBE amp; the latter lets you vary the BBE effect—or turn it off—for each of its two channel pairs.

Amplifiers are being built into signal processors, too. Audio Control's System 90 components combine the Epicenter bass synthesizer, a subsonic filter, and a crossover with an amp. The Model 20 has one crossover and two 70-watt channels, while the Model 40 has two crossovers and four 40-watt amps.

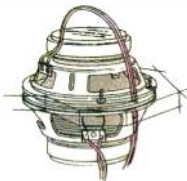
The noise gate, a new processor for cars (though not for studio use), combats a specialized problem: Competitors in IASCA and other car stereo



contests have to turn their systems way up to get good readings of maximum volume, which makes high-powered systems sound very noisy during other tests. Noise gates shut

off the input to the amplifiers when there's no real signal. Autosound 2000, Crunch, and Quixotic are among the companies now offering such gates.

Sound inside a box. What happens to speakers that



The Double Chamber Bandpass is made from two bass drivers mounted together. (It's impressively loud & impressively quiet at the same time).

MOUNTED TOGETHER, THE DCB DELIVERS INCREASED POWER THAT'S VIRTUALLY FREE OF HARMONIC DISTORTION.

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SYNERGISTIC SYSTEM

Few audio companies have been able to attain synergy between their consumer and professional divisions, and certainly no company has done it longer than JBL. From its formation in 1946, the company has offered loudspeakers for the home as well as for a wide array of professional applications, and about a decade ago JBL theater systems provided the hardware basis of THX systems for the motion picture industry. It has been a decade of overall improvement in theater sound—and also for home video by way of a new set of consumer system standards drafted by THX.

its price—about \$40,000—and the fact that it is virtually two systems in one—a horn system for video, and a traditional cone and dome system for normal stereo listening.

In the theater mode, the left and right channels each consists of an 18-inch subwoofer, which makes a transition into a pair of vertically arrayed 8-inch cone drivers. Between these two drivers is a Bi-Radial horn with nominal coverage angles of 40° in the vertical plane and 90° in the horizontal plane. This is the preferred coverage in the theater, and it is matched pretty well by the vertical spacing of the 8-inch

horn is switched out and replaced by a pair of 5-inch cones and a 1-inch dome tweeter.

I recently discussed details of Synthesis One with Eli Harari, a former high-end audio/video dealer now on JBL's staff, who co-developed the system with engineer Dan Sieffert. Our conversation follows.

Why two systems in one?

In the motion picture industry, music, dialog, and sound effects are mixed over horn speakers and played back over identical systems in theaters. For the most part, music mixes [standard recordings] are made over near-field monitors that aren't too different from what most consumers have at home. Theater speakers are directional and don't stir up much reverberation. Even in the living room this can be used to advantage in creating a sonic trait that matches the "close-in" nature of video presentation. For music, most of us want a more diffuse sound, which is what cones and domes will provide.

In what other ways does Synthesis One differ from the usual THX home approach?

There are two aspects here. JBL will set standards for system setup and provide actual measurement specs for dealers using state-of-the-art testing methods. We realize that most of these systems will be installed in large spaces. Synthesis One was designed for rooms up to 22,000 cubic feet, which is two to three times the room size most home THX systems are capable of handling.

What about the stratospheric price of Synthesis One, and what will be the next products in the line?

When you do a no-holds-barred product you shoot for the very best, and this is what we are delivering. We intend to produce two more systems of the same general type, one priced at about \$25,000 and another at about \$15,000. All three systems will incorporate the dual approach used in System One, with horns for cinema and direct radiators for music.

There has been much discussion of surround loudspeakers. How do you compare the THX pair of dipole speak-

JBL's Synthesis One has one set of speakers for home theater and another for music.



Most companies who have THX licenses for home video sound have opted for traditional high-fidelity componentry as their basis for developing loudspeakers for that application. When JBL began its home video program about a year and a half ago, the company took the approach of adapting traditional *theater hardware* to the home environment, and the first of a new group of systems was formally shown to the industry at the Summer Consumer Electronics Show this past May. This system, Synthesis One, sets the fundamental direction for what JBL intends to accomplish in the field. What is truly noteworthy about the system is

cones. The center channel, placed below the screen, consists of just the 8-inch pair and the horn. Thus all three "screen channels" are matched in both spectral and directional characteristics. The left and right surround speakers are dipoles, and, as such, contribute to diffuse acoustical power in the listening space, which predominates over their direct sound at the listening position. Electrically, the systems are biamplified, and detailed third-octave equalization is used to match the entire system to a given listening environment.

In the music mode, the system reverts to only the left and right units. The

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- 6 **JAZZ:** Dave Grusin, Yellowjackets
- 7 **HEAVY METAL:** Mötley Crüe, Skid Row

Mr. Mrs. Ms. _____

First Name Initial Last Name (PLEASE PRINT)

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City _____ State _____ Zip _____

Telephone, please (_____) _____

Area code

Signature _____

We reserve the right to request additional information or reject any application. Limited to new members. One membership per family. Local taxes, if any, will be added.

⁽²⁾ Members who choose CLASSICAL as their listening interest will be serviced by the BMG Classical Music Service, whether they choose CDs or cassettes.

⁽³⁾ Cassette members will be serviced by the BMG Music Service; current Music Service members are not eligible.

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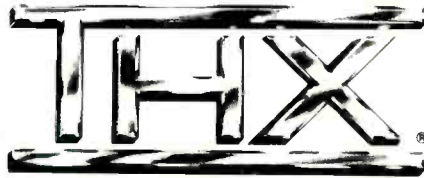
Synthesis One is better than the standard systems used by most film post-production houses in their dubbing rooms.

ers, which JBL uses here, with the traditional JBL theater approach, which uses up to 12 standard speakers for surround?

The film producer's use of surround channels is to further envelop the audience in the film experience. You are not expected to turn your head and focus in on a surround loudspeaker. In the movie theater, this calls for many speakers, all operating at a low level so that all patrons get the right sensation. In the home, the viewing position is fairly restricted. This lets us use a single pair of speakers, one on each side. These have dipole radiation patterns that tend to project the sound strongly to the front and back of the room, creating a pattern of reflected, non-localizable sound at the listening position.

The Synthesis One system easily out-classes the systems in most video post-production houses where films are routinely processed to VCR and LaserDiscs. Can you comment on this for me please?

Gladly. We are beginning to get requests—and orders—from post-production houses, and this seems to be driven by an interest in THX require-



ments in the field. Their concern is basically that Synthesis One is better than the standard systems in their dubbing rooms, and many people in that business would like to make it their reference system.

With JBL's tradition of high efficiency, is biamplification really necessary in the home environment?

First of all, this system was not designed to meet necessity, but to advance the state of the art. Today, most soundtracks are very wide range and are intended to be played back at high levels. Biamplification assures us that the system will handle it all in stride. Another point should be mentioned: There is no "need" for two subwoofers.

However, they do help us overcome certain low-frequency, room-mode problems—and the object was, and still is, ultimate home performance. I think I can sum this up quite well by saying that this is not just a home-theater system; it is a theater system for the home.

What future improvements do you see in Synthesis One?

We are looking into many areas, and the two that we are most focused on at this time are equalization and dividing networks. We would like to replace their analog circuitry with digital, and of course we intend to introduce digital technology into all phases of system control.

How are your marketing plans being shaped by the lingering recession?

System One is relatively recession-proof because it makes such a powerful technological statement. I am more concerned that if the recession lingers through 1993, System Two, and to an even greater extent System Three, will be impacted. At the same time, even if the market shrinks I believe we will be successful, just because our product is the best in the market. *A*

Why Horns Are More Effective Than Direct Radiators In The Theater

Direct radiators can be stacked vertically to produce a narrow, vertical radiation pattern. There is a penalty here, and that is the inevitable dip in off-axis vertical response. With a pair of midrange drivers and a pair of tweeters there will be two such dips (Fig. B1).

When a high-frequency horn is used, its inherent directional control will give the desired radiation pattern with smooth off-axis response. In the case shown here, the midrange cones still produce their response dip. The trade-off here is one of size. A large horn, such as would be used in the theater, covers the range from 500 Hz up to 12.5 kHz with very smooth off-axis response, but it is about 3 feet long! In adapting horn technology for the home, the Synthesis One uses it above 1,200 Hz, letting direct radiators cover the range from there down to about 125 Hz. The single off-axis dip is an acceptable consequence of this size constraint.

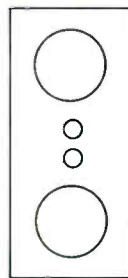
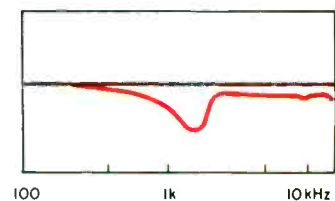
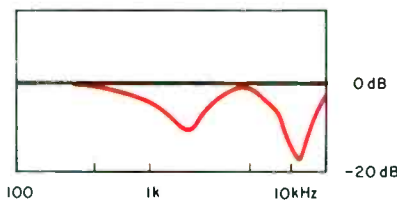
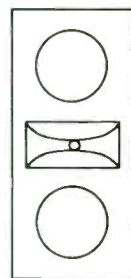


Fig. B1—Stacked drivers (left) control vertical dispersion but create response dips above or below axis. Using a horn rather than stacked tweeters to control treble dispersion (right) eliminates the upper-frequency dip.



— ON AXIS

— 15 DEGREES DOWN OR UP

Listening in the 90's

Today people have become more and more space conscious. Many apartment dwellers don't want to give up valuable floor space for large speaker systems. Others who are planning a surround sound or home theatre system simply don't have the room for more speakers in their listening rooms or hesitate to commit the floor or wall space to a good sounding pair of speakers.

Until now, serious music lovers have had little, if anything, to choose from that would produce a large, bigger-than-life sound in a small, compact size. Systems that fit one's space requirements have been woefully disappointing in sound quality.

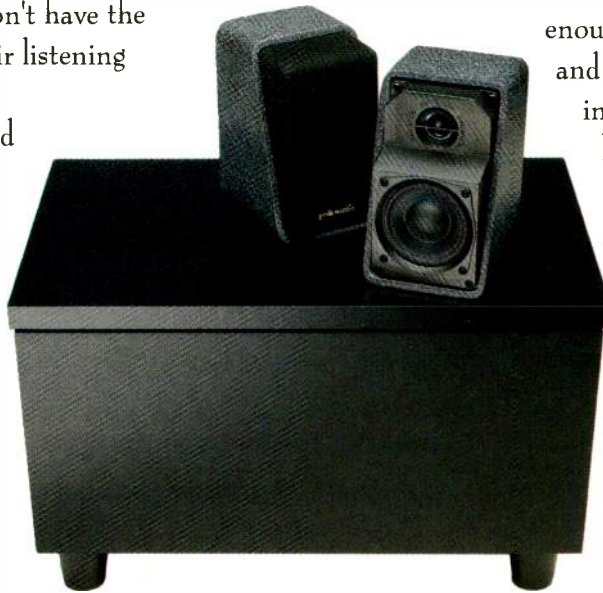
The RM 3000 Three Piece System

Polk's engineers had determined long ago that there were indeed certain technical advantages in

sonic performance.

The small satellites can be located on shelves, mounted on a wall or placed on their own floor stands. They are very attractive and yet small enough to be hidden from view if desired.

The RM 3000 subwoofer is also small enough to sit behind your furniture and can be used on its side to fit into tight spaces. And since it is beautifully finished, it can be used as a piece of furniture.



The RM 3000's satellites measure 7"H x 4 1/4"W x 5 3/8"D and are available in black matrix, gloss black piano or paintable white. The subwoofer is 12 1/2"H x 20"W x 12 1/2"D and is available with black wood grain sides and a black, mar-resistant top.

The Legendary Sound of Polk

In the tradition of Polk Audio, Matthew Polk and his team of engineers were determined to make the RM 3000 sound better than any other speaker of its type.

Initial reactions have been filled with superlatives including Julian Hirsch of

Stereo Review magazine who says, "...they sound excellent...spectral balance was excellent—smooth and seamless."

Sound as big as life from speakers

small speaker systems. Both high and mid frequencies could be faithfully reproduced with superior transient response and dispersion characteristics, and the convenient, more flexible placement of small enclosures within the listening area could create an ideal sound stage. Unfortunately, reproducing the life-like, full body of the lower frequencies could not be achieved in a truly compact enclosure.

Polk's RM 3000 replaces the traditional pair of speakers with three elements, two compact midrange/tweeter satellites and one low frequency subwoofer system. This configuration makes it easy to properly and inconspicuously place the system within your listening room while offering superior

Behind these accolades is an impressive technical story.

The Technical Side

The big sound of the RM 3000 is due, in part, to the unique arrangement of the tweeter and midrange elements. This "time aligned system" delivers the high and mid frequencies at precisely the same instant. The result is a clear, lifelike and expansive presentation.

The cabinet materials selected for the satellites are over four times as dense as typical enclosures. The black matrix finish is a non-resonant polymer aggregate (FOUNTAINHEAD®). The gloss black piano and paintable white finishes are rigid ABS



Polk's RM 3000 Series Passive Speaker System easily fits into any home decor.

small enough to live with.

surrounding a mineral filled polypropylene inner cabinet. Polk engineers have all but eliminated any "singing" or resonating of the satellite enclosure. You hear the effortless, free sound of a much larger system.

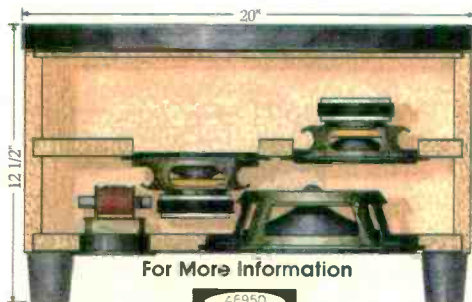
Most subwoofer systems look alike on the outside, but the Polk is worlds apart on the inside. Utilizing twin 6 1/2" drivers coupled to a 10 inch sub-bass

radiator, the bass is tight and well defined. There is no tuned port to create "whistling" or "boominess" of the bass frequencies.

You Have To Hear It To Believe It

You really won't believe how good the RM 3000 sounds until you hear it. We invite you to your nearest authorized Polk dealer for a demonstration. You'll hear sound as big as life...from a speaker you can live with.

You'll hear the next generation of loudspeakers.



For More Information



Call 1-800-992-2520

For deep, well defined bass, Polk uses twin drivers coupled to a sub-bass radiator. Normally, one subwoofer system is used for both channels. For those desiring even greater low frequency performance, a second subwoofer can be added, one fed by the left channel, the other by the right channel.

polk audio

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WHAT'S NEW



Custom Autosound Head Units

How do you blend modern audio gear into a classic car? Custom Autosound supplies modern head units converted to fit the original dash openings of cars from the '50s, '60s, and '70s, including Corvettes, Mustangs, and Chevelles. Some models are the company's own units, others are adaptations of Kenwood and Pioneer units. All models include appropriate chrome or plastic knobs and dash bezel, brackets, and wiring

Yamaha Crossover/Equalizer

Flexible filtration and switching allow Yamaha's YEC-500 to be used as a crossover, equalizer, or a combination. As a crossover, it can divide the spectrum up into as



many as four bands, with independent frequency selection and level control for each band. If fewer than four crossover bands are used, these same frequency

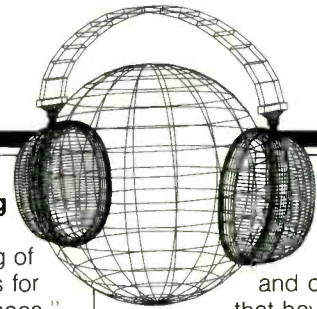
to plug into the car's existing wire looms. Prices: \$149 to \$399. For literature, circle No. 100

and level controls can be used for equalization. Three of the four outputs have independent polarity-reversal switches, as does the L + R center-channel

output. The subwoofer cut-off slope is 18 dB/octave and the high cut-off slopes are 12 dB/octave. The subwoofer output is switchable as mono or stereo. Price: \$299. For literature, circle No. 101

Binaural Source Recordings Catalog

Billing itself as the "world's only catalog of exclusive recordings for headphone experiences," The Binaural Source is operated by *Audio* Contributing Editor John Sunier. Included in this free booklet are dozens of CDs



and cassettes that have been recorded binaurally and provide a startling increase in three-dimensionality or spaciousness when listened to with headphones. Unlike any encode/decode system, binaural recordings only require a set of headphones for enjoyment. For literature, circle No. 103

Denon Equalizer/Crossover

The Denon DCE-2190 is a nine-band graphic equalizer with an electronic subwoofer crossover. The



equalizer's center frequencies, optimized for car audio, are at 50, 120, 200, 400, and 800 Hz, and at 1.5, 3, 6, and 12 kHz. The subwoofer crossover points are at 80 or 100 Hz with a slope of 18 dB/octave on the subwoofer output and 12 dB/octave for the high-pass output. The subwoofer output is adjustable to +10 dB over the high-pass. Frequency response is 20 Hz to 50 kHz, and S/N is 97 dBA. Price: \$220. For literature, circle No. 102

Casio In-Car TV

Compact because of its 3-inch LCD color screen, the TV-7700 comes with mounts that allow its attachment to the front-seat headrest for viewing by rear-seat passengers. The screen is a high-luminance fluorescent backlit type. Also included are a VHF/UHF rod antenna and built-in speaker. The TV is 4 5/8 in. W x 2 1/2 in. D x 4 1/8 in. H, weighs 12.7 ounces and can be powered by car battery, AA batteries, or an optional a.c. adaptor. Price: \$799.00. For literature, circle No. 104



THROUGH THE PAST several years PARADIGM speakers have gained an international reputation for superb musical performance and exceptional value!

This has come about by strict adherence to a single objective: *design speakers capable of performance that is second to none, at a price with which none can compete!*

The Mini-MkII and 3seMkII exemplify Paradigm's relentless pursuit of this design objective... *each represents the best performance/value in it's class!*

CRITICAL ACCLAIM

PARADIGM speakers offer a level of performance unmatched at the price. In national dealer surveys, conducted by a leading trade publication, PARADIGM ranks #1 in price / value! Magazine reviews also confirm this. PARADIGM has received numerous "Best Buy" recommendations, Critic's Awards, and consistent rave reviews with comments such as...

"...no more colored than speakers costing up to two or three times its price..."

"...a consistently musical presentation..."

"...excellent performance at a very competitive price..."

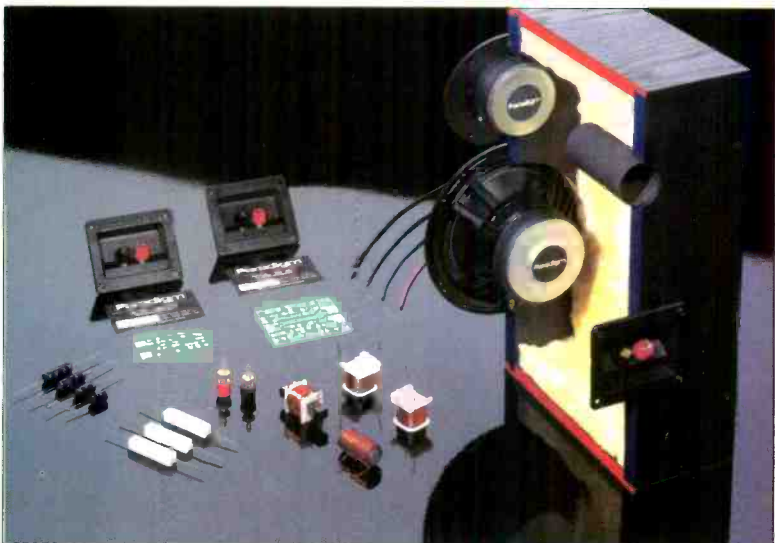


M K I I P E R F O R M A N C E S E R I E S

"Very open, uncolored, neutral... the Paradigm hung in there, outscoring some larger competitors many times its price... For sheer performance for your audio buck, this Paradigm's no "mini." Call this one a "maxi." - Sound & Vision Magazine

"We can't think of another speaker at or below this price that manages to match the Paradigm's overall sense of balance and competence... exceptional value... STRONGLY RECOMMENDED." - Hi-Fi Heretic Magazine

"The [Paradigm's] have a free and uncoloured character wholly out of keeping with their humble price... These would be a good value at considerably more money; at their selling price they are brilliant." - Stereo Buyer's Guide



Enclosure and dividing network components



THE SIMPLE APPROACH

The Mini-MkII and 3seMkII offer *stunning* value, and with them PARADIGM's reputation for building loudspeakers of unsurpassed performance/value continues.

PARADIGM's design commitment means that each component's contribution to the sonic performance of the system must be carefully studied. Only when the best possible combination is achieved will the whole exceed the sum of its parts. This "simple approach", though requiring many extra hours in R&D, pays off with speaker systems capable of superb musical accuracy. The result is better performance... *well ahead of the class!*



Components in MkII Series high-frequency drivers



Components in MkII Series bass/midrange drivers

BETTER BY DESIGN

The Mini-MkII and 3seMkII are 2-way designs displacing 12.5 and 25 litres respectively. System enclosures are bass reflex with critically tuned resistive ports. The port is on the back of the Mini-MkII to maintain correct bass balance even when placed near-wall.

❖ PARADIGM MkII-SERIES high-frequency drive units have...

- treated-textile dome radiating elements for smooth, extended frequency response. Treated-textile combines the benefits of low mass and high internal damping, allowing for changes in direction of more than forty thousand times per second without the "ringing" and "overshoot" problems inherent in cheaper materials.
- a unique faceplate design that couples to the dome to promote very wide dispersion for superb musical performance and three-dimensional imaging throughout the listening room.
- high-temperature voice coils, aluminum formers, ferro-fluid cooling/damping and oversized magnets to further reduce distortion and ensure long service life. Beware of inexpensive cone-type tweeters used in many speakers in this class; their performance capabilities are substantially inferior.

❖ PARADIGM designed and built bass/mid-frequency drive units have...

- non-magnetic, high-pressure diecast aluminum chassis - a vast improvement over conventional stamped steel - to minimize mechanical vibration, ringing and flexing.
- polypropylene cones specially designed for smooth response, extended bass performance, and freedom from unwanted resonances and distortions.
- high-temperature voice-coils, kapton voice-coil formers and heavy magnet structures - all adding to musical accuracy and long term reliability.

❖ Dividing networks are time-corrected designs utilizing close tolerance, high power components in quasi-Butterworth configurations for maximally flat frequency response. The result is a smooth frequency balance with a very large "listening window".

❖ Enclosures use inert high-density hardboard to control unwanted panel resonances. The larger enclosure and 8" bass/mid driver of the 3seMkII provides deeper bass extension and more sound power output.

BEST BUY!

Based on the vast body of research conducted by the world-renowned National Research Council of Canada and utilizing extensive in-house R&D facilities,

PARADIGM engineers evaluate many generations of prototypes before a design is put into production. The goal of this enormous commitment to research and development is to offer a performance vs. cost ratio that is second to none! Sophisticated manufacturing and quality control techniques ensure superb musical performance for many years to come. The Mini-MkII and 3seMkII represent extraordinary and unprecedented value... they are *the* "best-buys" in their class!



Available in Oak and Black Ash

GUARANTEED PERFORMANCE

PARADIGM guarantees the performance of these speakers for a full 5 years from the original date of purchase. Within this period PARADIGM will correct any defect in materials or workmanship that causes deviation from original performance (see owners manual for details).

SPECIFICATIONS

	MINI-MkII	3seMkII
• DESIGN	2-driver, 2-way bass reflex. Quasi-3rd order resistive port.	2-driver, 2-way bass reflex. Quasi-3rd order resistive port.
• CROSSOVER	2nd order electro/acoustic at 2.0kHz. Frequency- and phase-corrected.	2nd order electro/acoustic at 2.5kHz. Frequency- and phase-corrected.
• HIGH-FREQUENCY DRIVER	25mm (1") treated-textile dome with less than .28gm moving mass. Unique coupling faceplate for wide dispersion. Vented aluminum voice-coil former. Ferro-fluid damped/cooled. Barium ferrite magnet. Replaceable diaphragm.	25mm (1") treated-textile dome with less than .28gm moving mass. Unique coupling faceplate for wide dispersion. Vented aluminum voice-coil former. Ferro-fluid damped/cooled. Barium ferrite magnet. Replaceable diaphragm.
• BASS/MIDRANGE DRIVER	165mm (6-1/2") with high-pressure diecast aluminum chassis, polypropylene cone, high compliance suspension and kapton voice-coil former. Barium ferrite magnet.	210mm (8") with high-pressure diecast aluminum chassis, polypropylene cone, high compliance suspension and kapton voice-coil former. Barium ferrite magnet.
• PERFORMANCE		
<i>Low Frequency Extension*</i>	48Hz (DIN)*	38Hz (DIN)*
<i>Frequency Response</i>		
<i>On Axis (0°)</i>	±2dB from 70Hz-20kHz	±2dB from 60Hz-20kHz
<i>Off Axis (30°)</i>	±2dB from 70Hz-15kHz	±2dB from 60Hz-15kHz
<i>Sensitivity-Room/Anechoic Suitable Amplifier</i>	89dB/86dB	91dB/88dB
<i>Power Range</i>	15-100 watts	15-150 watts
<i>Maximum Input Power†</i>	80 wattst	100 wattst
<i>Nominal/Minimum Impedance</i>	8ohms/4ohms	8ohms/4ohms
<i>Recommended Stands</i>	PREMIER™ w-50, m-50, w-60 or bookshelf.	PREMIER™ w-40, m-30, m-40 or bookshelf.
• PHYSICAL		
<i>Internal Volume</i>	12.5litres/ 44cuf	25litres/ 88cuf
<i>Height</i>	38cm/14 ³ / ₄ in	52cm/20 ¹ / ₂ in
<i>Width</i>	21cm/8 ¹ / ₄ in	26cm/10in
<i>Depth</i>	25cm/9 ¹ / ₂ in	30cm/11 ¹ / ₂ in
<i>Weight</i>	16kg/35lbs per pair	22kg/48lbs per pair

* DIN 45 500. Listening rooms reinforce bass. Thus, in most listening rooms, this reasonably indicates the audible (approximately -3dB) low frequency performance that can be achieved.

† Maximum Input Power indicated is with typical program source, providing the amplifier is clipping no more than 10% of the time.

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KEEP THE CUSTOMERS SATISFIED

Visit any audio retailer and you will be confronted by a mind-boggling diversity of glittering artifacts from modern audio technology: Preamps, power amplifiers, CD players, receivers, cassette recorders, D/A converters, digital signal processors, surround sound processors, even the latest manifestations of phono playback equipment. And of course, there are loudspeakers of every size, shape, and operating principle, along with a vast array of audio accessories.

Observing all this, it is hard to realize that these are the products of an audio components industry that has been a distinct entity for a little over 40 years. Beginning around 1950, there was a proliferation of hi-fi equipment manufacturers and retailers offering an ever-increasing variety of hi-fi components for the reproduction of music. The hi-fi hobby of those early days rapidly became a business, fueled by ever-more sophisticated audio technology.

As a growth industry, the hi-fi business was a phenomenon, enjoying expanding sales year after year despite several mini-recessions and assorted military "police actions" and conflicts. With the advent of the transistor and IC technology, and the entrance of Japanese electronic firms, audio became a big-business, mass-market entity with distinct low-fi and mid-fi product categories. American and, to an extent, European audio component manufacturers dominate the so-called high-end audio market.

By 1990, the deepening recession had a profound effect on audio component manufacturers and retailers alike, and they fell on parlous times indeed. Unfortunately, in the general scheme of things, audio equipment occupies a very low position on the economic totem pole. After years of sustained growth, many in the audio business are finding it very difficult to cope with the realities of this ongoing recession.

The audio components industry doesn't need any sermonizing from me. I wish I had some panacea for the economic woes of the audio community. However, I am bound to say that well before the recession began, I heard rumbles of discontent and dissatisfaction from hard-core audiophiles. These long-term practitioners of the art felt that hi-fi had become too



commercialized and had lost much of its fresh appeal, glamour, mystique, and its commitment to the realistic reproduction of recorded music.

Admittedly, many in this group are older people, generally categorized as the "doctor, lawyer," type of affluent audio consumer. Many of these consumers decry the lack of meaningful, truly concerned service; they are irritated by blasé indifference of store personnel and are frustrated by inadequately trained sales people who can't convey accurate technical information on audio products employing new technology. A few of my closer friends sigh wistfully for the "good old days" of audio retailing. I know what they mean, for I was part of that scene.

Back in 1955, I entered into a partnership with a brilliant young electrical engineer and radar expert who was also well-versed in audio. We opened the House of Hi-Fi, in Manhasset, Long Island, an affluent suburb of New York. As you might expect, both by inclination and through our training, our wives were fully conversant with the latest audio technology. We decided from the beginning that we did not want another cluttered, haphazard display of equipment, which was the norm for hi-fi stores of that era. We wanted to simulate the living-room environment

typical in most homes. So, our main salon was fully carpeted and we used heavy, sound-absorbing drapes. There were upholstered chairs and a sofa, tables with decorator lamps, and soft, indirect lighting. The cabinetry for equipment display was weathered surf-wood. We had a very advanced comparator switchboard that enabled us to put together any combination of components.

A good-sized room in the rear of the store served as our recording studio. We had a piano and assorted mikes, a mixer and, as we were the only professional Ampex dealer on Long Island, we used Ampex 300 studio tape recorders. For very modest fees we recorded aspiring singers, pianists, and instrumental groups. Of course, we played the tapes through the fancy hi-fi gear in our main salon, which proved to be a very potent sales tool!

We carried both McIntosh and Marantz preamplifiers and power amps, Rek-O-Kut and Fairchild turntables, and arms and phono cartridges from GE, Pickering, Fairchild, and Audak. We specialized in the Weathers FM phono system, which tracked at 1 gram! We sold H.H. Scott, Fisher, and Browning. The then-ultimate FM tuner, the REL (Radio Engineering Laboratories), was an outrageous \$600! Tape

Why This Ad Is Making The Other Loudspeaker Company Nervous.

We think the Ensemble II speaker system by Henry Kloss is better than the BOSE AM-5 Series II. And because Cambridge SoundWorks sells direct...it's half the price.

Audio Hall of Fame member, Henry Kloss

All Cambridge SoundWorks products are designed by our co-founder and chairman, Henry Kloss, who created the dominant speakers of the '50s (AR), '60s (KLH) and '70s (Advent). Our high performance, high-value speakers and systems are all manufactured in our factory in Newton, Massachusetts.

Ensemble II performance for half the Bose price.

Ensemble® II is the latest version of the subwoofer-satellite speakers *Audio* magazine said "may be the best value in the world." Unlike the Bose® system, it uses two-way satellite speakers and acoustic suspension subwoofers (with 35% more cone area). It can sound identical to our original Ensemble system.

Audio experts on call 365 days a year.

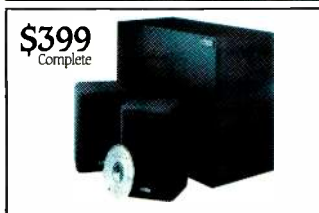
Our helpful, knowledgeable audio experts (not clerks) are on duty for advice, hook-up information or orders, 8AM-midnight, *every* day, including holidays. They don't know the meaning of the phrase "hard sell." A customer wrote "The quality of your product is matched by your attitude towards your customers."

We've eliminated the expensive "middle-men."

All Cambridge SoundWorks components and systems are sold factory-direct to the public, eliminating huge distribution expenses. Don't be fooled by our reasonable prices—our products are *very* well made, with premium quality components throughout. With our 30-day satisfaction guarantee, you can't lose.

FREE catalog—Pioneer, Philips, Denon and more.

Our full-color catalog is loaded with systems and components from top name brands, including our own. Our systems deliver a lot of performance for the money, especially our Dolby Surround systems, which we feel are the best values in the country. For your free catalog, call 1-800-AKA-HIFI, 24 hours a day.



Many audio consumers decry the lack of educated and concerned salespeople and are irritated by their blasé indifference.

machines were the Ampex and the Berlant Concertone. Speakers ranged from JBL all the way to the huge Hartsfield, and we specialized in all models of Bozak up to the Concert Grand.

Stan White was a maverick loudspeaker manufacturer in those days, given to constructing 32-foot concrete exponential horns. He had a behemoth loudspeaker called the General that was about 6 feet in height, 38 inches wide, and 26 inches deep. It was a back-loaded horn and used JBL 15-inch theater woofers, JBL 375 theater horn midrange, and JBL acoustic lens tweeter. The efficiency and bass power of this monster was positively intimidating.

Through my dealings with Loew's/MGM and 20th Century Fox for Bob Fine's "PerspectaSound" process, I got them interested in using Bozak's General to improve the sound quality in their CinemaScope movies. They turned over to us an idle movie theater in the North Bronx, and for weeks we auditioned CinemaScope productions while comparing the Generals to the standard Academy theater speakers. The Generals had far better, more extended bass than the C-5 bassbins, and the Generals won handily in all parameters. Ultimately, the movie moguls decided the Generals were too expensive to re-equip their theaters. One of our Generals finally wound up in the private dining room of a Chinese restaurant in New York, where for many years the New York Audio Society held their meetings!

At the House of Hi-Fi, we had our own cabinet maker and audio technicians since we specialized in custom installations in the home. Having determined the customer's choice of components through demonstration in our salon, we visited the home, surveyed the room chosen for system installation, checked wiring and acoustics, and made modifications to improve sound (if we could convince the lady of the house and fight-off her interior decorator at the same time).

Even in 1955, we knew the value of custom TV installation, and we carried the professional 27-inch (big tube then!) Conrac TV monitor, which had a wired remote control. It was monophonic of course, but there were quite a few live music broadcasts on TV then,

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In the House of Hi-Fi, my partner and I offered personal service, a good attitude, and enlightening audio demonstrations.

and our customers were astonished at the high quality of sound heard through their hi-fi systems.

As noted, decor was a very important factor with our affluent customers. This was especially the case with speaker enclosures. We worked very closely with Rudy Bozak and eventually utilized his 305 speaker system (two 12-inch woofers, 4-inch midrange, and tweeter array) with cabinets of Colonial, Moorish, and French Provincial styling, using superb fruitwoods. As a companion equipment cabinet, we found a furniture manufacturer who made a high-quality "home bar" with French Provincial styling. Our cabinet-maker modified it to accept a turntable and arm, vertically mounted preamplifier and tuner, and a power amplifier in the base of the unit.

There were several hi-fi retailers not far from our place who sold at discount some of the same equipment we handled. We never gave as much as a dime in discounts, but our customers bought from us because of our personal service, attitudes, and philosophies in respect to audio and music. Many cited our carefully structured, musically interesting, and enlightening demonstrations as key factors in their buying decisions.

The front part of our store was devoted to audio accessories, and in the main area there were carefully selected LP recordings mostly from EMI, Decca, and Mercury. We normally were open until 9:00 p.m., but on Thursday nights we would stay open until 11:00 p.m. During the extra hours we served wine and cheese, and we would play and discuss new LP recordings. We pioneered stereo playback, using the Ampex 600 portable tape playback machine with companion powered loudspeakers. We also carried the Ampex stereo console—a fine furniture unit complete with tape machine, amplifiers, and speakers. Of course, we were using and selling the RCA two-channel in-line stereo open-reel prerecorded tapes, with such things as Fritz Reiner's famous Chicago Symphony recording of Richard Strauss's "Also Sprach Zarathustra."

Much of our business came from word-of-mouth referrals, and we did quite a bit of business outside of our immediate area. For example, Herb

Shriner was a well-known TV entertainer who had a love affair with big theater organs. He lived in a huge mansion in Larchmont, in Westchester County, many miles away from us. He had bought the big Wurlitzer pipe organ that once graced the Chicago Theater. Pipe by pipe, it was being installed in the great high-ceilinged living room. In fact, two organ technicians were in residence there for over a year to do this work. We built in a recording system for Herb with a pair of U-47 Telefunken mikes, fixed in an optimum position, feeding into mike preamps connected to an Ampex 300 stereo tape recorder. We furnished a remote control so he could record himself playing the organ, then, still seated at the organ console, play back the tape through four Bozak Concert Grand speakers and McIntosh amplifiers we had installed.

We also did a lot of promotional lectures and hi-fi demonstrations for Rotary and Kiwanis clubs, church social groups, doctors' associations and many other organizations.

While we certainly were in the hi-fi business to make money, there was a significant element of shared experiences we had with our customers. They were not just customers, but friends, and we even socialized with them.

Mainly it was exciting—hi-fi was still new, and there was the shared love of great music. Sadly, it is something that we are unlikely to see again.

Initially, Harry Belock was a valued customer and a friend. As the head of Belock Instrument Corp., which was an ultra high-tech manufacturer of inertial navigation systems and advanced military electronics, he was fanatically interested in recording. In 1958, Harry and I founded Everest Records and I sold my interest in the House of Hi-Fi. I brought along Ted Gosman, our audio engineer, who was with me on many recordings abroad. He ultimately became Bob Fine's chief engineer at Fine Recording in New York. My partner went on to prominence with a number of aerospace companies and was on the development team of the Sidewinder Missile as well as airborne radar systems like AWAC.

The House of Hi-Fi passed into history as we went our separate ways, but it will always evoke fond memories of the way we were.



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Goddard Lieberson

When Goddard Lieberson (1911 to 1977) first went to work at Columbia Records in 1939, it's doubtful that anyone could have foreseen the triumphs that lay in store for either the man or the company. Lieberson was hardly the archetypal up-and-coming young executive, and Columbia's prospects for commercial greatness were even less encouraging.

It was Edward Wallerstein who hired the 28-year-old composer to help him build the sort of artist and repertoire ("A & R") foundation Columbia would need to compete with the far more prestigious and successful RCA Victor Division, of which Wallerstein had been the general manager until the previous

year. Lieberson, who had attended the University of Washington before entering the Eastman School of Music, had come to the conclusion that composing could earn nobody a living in Depression America and had been subsisting partly on reviews he wrote for *Modern Music*, though he had some 100 compositions to his credit already.

When those who knew him describe Goddard Lieberson, they almost invari-

ably cite three characteristics: Charm, intelligence, and elegance, often in that order. "He would have been a member of the aristocracy in any civilization," one former Columbia employee said. He also was a witty and resourceful polymath.

He had the ability to move gracefully among people and ideas—and to manage both. His abilities as a man-

ager were to prove sterling both in the studio (as a producer) and in the executive office, where he eventually succeeded Wallerstein as president.

The talent acquired by Columbia Masterworks over the course of Lieberson's first decade there is a tribute to his talents and industry. The 1948 cat-

R O B E R T L O N G

alog listed the Metropolitan Opera, four major U.S. symphony orchestras, the Budapest String Quartet, at least five world-class conductors, and a score or more of major vocal and instrumental soloists, none of whom had recorded for U.S. Columbia before his tenure.

More important, perhaps, Lieberson had begun the recording of important modern works that was to give Columbia Masterworks a prestige boost that

A Classic



P H O T O G R A P H : R I C H A R D A V E D O N

At Columbia



Lieberson began recording important modern works that gave Columbia Masterworks a prestige boost Red Seal could not match.

RCA's Red Seal could not match. Among the most important were the Berg violin concerto with Louis Krasner and the Cleveland Orchestra under Arthur Rodzinski and Schoenberg's *Pierrot Lunaire* with Erika Stiedry-Wagner. The latter recording was conducted by the composer, a pattern Lieberson was to follow with definitive recordings by Stravinsky, Copland, and Bernstein, among others.

Also important throughout his career were what might be called creative documentary recordings. An early example is the *I Can Hear It Now* set with Edward R. Murrow: Recreations of historic events, based on his radio show. The finest documentaries were in the Legacy Collection book-and-record packages. The best remembered of these were probably those on the Civil War (*The Confederacy* and *The Union*), though Lieberson's favorite is

said to have been *Medicine, Mind, and Music*.

Most of his early recordings were made on 16-inch acetates, rather than directly on wax or even acetate master blanks as had been the universal practice both at Columbia and elsewhere. Use of acetate masters had begun about the time that Wallerstein arrived at Columbia. They had the advantage that, unlike wax, they could be played and checked aurally without serious damage should a question of the master's viability arise.

By 1940, Columbia was using 16-inch blanks running at 33 $\frac{1}{3}$ rpm and cut with a 3-mil stylus—electrical transcriptions (ETs), or simply transcriptions as they were called in radio. Once the specific takes were cleared for issue, the acetates were dubbed to 78-rpm acetate masters for plating. When a master was damaged, it could

be redubbed; companies that stayed with wax had to either rerecord the side or dub it from a noisy pressing or a worn "mother" (the intermediate plating stage between the matrix and the stampers, from which records are pressed).

These technical details may not have interested Lieberson at first, but they were to prove crucial to his development as a producer. Wallerstein, on the other hand, had witnessed Victor's attempt to market a long-playing disc that revolved at 33 $\frac{1}{3}$ rpm. Like Edison's earlier long-players, Victor's bombed in the marketplace. Depression-era customers were unenthusiastic about having to buy a new player for these discs, even at Victor's cost-price of \$9.95.

What was worse, for the classics at least, was that most of Victor's recordings were dubbed from the 78-rpm issues, with obvious pauses every four minutes or so where the breaks between record sides occurred in the originals. And the heavy pickups of the era could destroy the surface of Victor's vinyl compound after only a few playings. This induced Wallerstein to withdraw the discs from the market in 1933 in his first official action as general manager.

Wallerstein seems to have been determined from the beginning that he and Columbia would succeed where Victor had failed, and a joint research project to that end—involving Columbia, CBS, and engineers hired away from Victor and GE—began almost immediately. Incidentally, the man who finally headed the project was, like Lieberson, a musician turned executive: Peter Goldmark. Though Goldmark was often billed as the inventor of the Columbia LP, he did none of the actual development work himself, according to Wallerstein.

By 1948, following a hiatus imposed by World War II, the team had suc-

Goddard Lieberson with fellow Columbia producer John Hammond.



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ceeded. Using an elaborate and recalcitrant mechanical cueing system, they could cut relatively seamless 12-inch LP masters up to 29 minutes long by assembling them from the elements they had been storing on acetate for the past decade. The fundamental difference between Columbia's LPs and Victor's discs was not only in their continuity but in the longer sides made possible by the finer (1-mil) tip radius of Columbia's Microgroove styli.

The opportunity for musical integrity unknown in earlier recording media would not be wasted in Lieberman's hands. In retrospect he often has been credited as a force behind the scenes in keeping development work moving forward. To what extent this view is an artifact of his later promotion of the company's triumphantly successful medium is now hard to assess, though his acknowledgment of the LP's importance to the Masterworks repertoire obviously was sincere.

In the meantime, he had begun the series of Broadway albums on which, more than anything else, his reputation as a record producer would rest. Broadway albums as a genre had been created almost single-handedly by Decca Records (now MCA), but they still tended to be little more than collections of hit songs, sometimes not even sung by the original performers. They seldom contained much sense of theater and rarely any of dramatic development. Lieberman was to change all that.

Lieberman began the change with drama. In 1944 he recorded Shakespeare's *Othello* in its entirety in the Broadway production starring Paul Robeson, José Ferrer, and Uta Hagen. This was an extremely ambitious project for its time, but it would become the prototype for several other projects including recordings of George Bernard Shaw's *Don Juan in Hell* and Samuel Beckett's *Waiting for Godot*.

Hail (and farewell), Columbia!

Sometimes designated the first record label because of the entertainment cylinders it issued, the Columbia label actually originated in the company's primary function, as sales rep for Edison dictation equipment in the District of Columbia. In the mid-1890s, it was already on its way to being a household name when Emile Berliner was still raising the capital to launch the Gram-O-Phone records that, as flat discs, were to put the phonograph cylinder out of the record business over the next quarter of a century.

The enterprises launched by Berliner soon became the Victor Talking Machine Company in the United States and the Gramophone Company in Europe. Their use of the wax-master technology (which actually derived from Columbia's practices) and their energy in attracting major stars to the recording horn left Columbia, and the various corporate identities to which it belonged, playing catch-up by the time the world emerged from the First World War. In those palmy days, however, even a "me too" could turn a profit.

Then came radio. America was fascinated by its ability to hear people speaking, singing, and playing from hundreds of miles away with just the flick of a "cat's whisker" across the crystal, and record sales dropped off alarmingly. Victor was stunned. Columbia was very nearly done in.

It was at this time that Western Electric began demonstrating its electrical disc-cutting system to the Victor Company. Eldridge Johnson, Victor's president, was bitter about radio's competition and was loath to accept its electrical technology as a way out of his woes. While he temporized, and his subordinates fidgeted in the knowledge that the Western Electric system might get away from them, news of it began to leak out.

At Christmastide of 1924, Louis Sterling sailed into New York Harbor in search of a license to use the Western Electric system at his company, European Columbia. Western Electric declined, saying it would license only to an American company. Sterling agreed and bought a controlling interest in Columbia Graphophone to act as his intermediary.

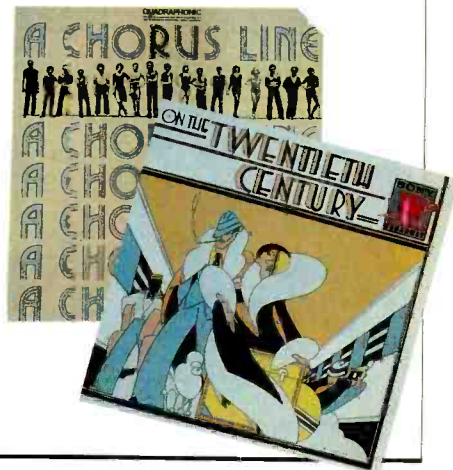
The ties between the European and American Columbia labels, which

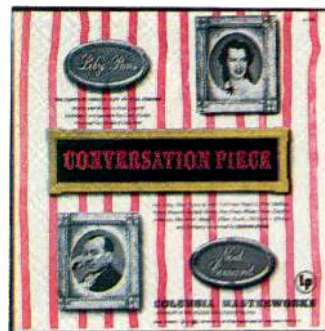
lasted beyond Sterling's ownership of the latter, netted it an infusion of major classical recordings, some of them phonographic firsts of now-revered modern scores, and a good deal of Middle European dance music of interest in U.S. ethnic markets. But they bolstered its prestige more than its solvency. Sterling had paid \$2.5 million for his interest, which was sold again in 1931 to a company that was broke by 1934. The American Record Company was able to pick up Columbia at that time for a mere \$70,500.

In 1938, Edward Wallerstein persuaded William Paley, the CEO of the Columbia Broadcasting System, to pay \$700,000 for the record company and install Wallerstein as its president. At some 10 times the previous selling price, that may not have been a bargain, but Wallerstein knew that the lessons he had learned from the technical and marketing mistakes imposed on him by RCA during his years at Victor could be turned into advantages at Columbia.

Building on the foundations laid by Wallerstein, Goddard Lieberson saw the Columbia label into an unprecedented era of prosperity as a titan (some would insist, *the* titan) of the industry. He put Mitch Miller in charge of the pop wing, which proved as sensationally successful as his own Masterworks offerings. The Columbia catalog, and the pre-emptive success of Columbia's LP, allowed it to cast a shadow across RCA Victor that had never before been possible.

Following the difficulties of the Clive Davis administration, Lieberson came out of semiretirement to reassume the helm at Columbia Records, but the times were already changing, and things continued to change. Even the company name is changed today. Columbia Masterworks is gone; hail, Sony Classical!





Broadway albums seldom contained much sense of theater and rarely any dramatic development—Lieberson changed all that.

Since Lieberson was the director of Columbia Masterworks, these discs appeared on the Masterworks label. According to Didier Deutsch—a producer and annotator for the Sony Broadway reissue series—the label next recorded excerpts from the 1946 revival of Jerome Kern's *Show Boat*. That also was a Masterworks release and, though not officially a Lieberson production, evidently convinced him he could compete on Decca's turf, as well as Red Seal's.

The following year, the Broadway producers of *Finian's Rainbow* came to Lieberson. Decca had refused to take the show as a package, preferring to exercise its habit of substituting house artists wherever expedient. Would Lieberson buy it as is? He would and did, spreading his unusually complete musical coverage over six, 10-inch records and catching the flavor of the

stage production with exceptional panache. Kurt Weill's *Street Scene*, also recorded in 1947, ran to six, 12-inch discs. As an ensemble show, rather than a stars' vehicle, it was a particularly startling choice for such lavish treatment.

Rodgers & Hammerstein's *South Pacific*, in 1949, won Lieberson his first Gold Record and his golden age was properly launched. In 1950 came his first "recreation": Cole Porter's *Anything Goes* with Mary Martin. There were four show albums that year and five the next. The count would stay at least that high throughout the '50s.

There were two projects of 1951 that deserve special mention. For Noël Coward's *Conversation Piece*, Lieberson had Coward write rhymed couplets to serve as narration but kept much of the dialog of the main characters, as well as the music. This permit-

ted him to suggest the Regency setting and retain most of the play's action, in a sense, translating a very stagy stage work into phonographic terms. It was literally "produced for records" as no show had been before.

Even more brilliant was his production of George Gershwin's *Porgy and Bess*. He chose Camilla Williams (one of the first black stars of the New York City Opera) as Bess, and Laurence Winters (also a member of that company) as Porgy. Under Lieberson's direction, Avon Long's breathy crooning as Sporting Life was captured in "close-ups" that co-existed comfortably with the bigger, rounder sound of the other two principles.

When the crap game begins, the listener finds himself on the stage and within the eager circle of players, hearing every click of the dice. The fight that ensues is observed from a barely safe distance. Lieberson used the microphones as a film director might use his camera, moving in and out of the action as each moment demanded.

The closest parallel to this technique at the time was to be found in radio. At CBS (of which Lieberson was once a vice-president), radio drama had been given new depth and meaning by such writers as Norman Corwin and Arch Oboler—and Orson Welles, whose *War of the Worlds* dramatization on CBS caused a national panic. It was called "theater of the mind." To what extent Lieberson may have heard and been inspired by radio is impossible to tell, but the similarities of technique are undeniable.

Another project that, like *Street Scene*, is a darling of Broadway collectors is *The Most Happy Fella* of 1956. Although Frank Loesser stayed within accepted musical-comedy style in most respects, the sheer quantity of his music and the way it contributed to dramatic development were quasi-operatic. How was such a show to be

From The Apple Tree, Lieberson (second from left), Jerry Bach (middle), and Barbara Harris (second from right).



D A V I D G A H R



treated on records? Lieberson's answer was to record it essentially complete on three LPs. *Porgy* had required that much space, but *Porgy* had full-scale operatic recitatives where *Fella* relied on accompanied dialog. Lieberson retained the essential dialog and, with it, an exceptional feeling of the stage.

According to those who worked with him, Lieberson actually avoided spoken dialog wherever possible, believing that it would not wear well in repeated hearings. Just as he had no qualms about padding out the pit band for a fuller orchestral sound in the recording—even adding chorus parts to the opening of *A Little Night Music*, for instance—he conceived all facets of these productions as translations to the phonographic medium. His function in the recording studio therefore was analogous to that of a movie-studio production team that must translate a book or play into cinematic terms.

The importance of this approach cannot be over-emphasized. He was perhaps the first producer to understand fully that the phonograph record is a unique medium of communication. It can, and should, in most instances, make reference to the values of the theater, concert hall, movie sound-stage, opera house, or lecture hall. But the intimacy that exists between the recorded performance and the listener at the moment of listening makes it unlike any of these. Of all audio media, only radio comes close, but radio is produced essentially for a single hearing at the broadcaster's discretion. Records are an on-demand sonic medium controlled by the listener.

In tailoring a Broadway score to the opportunities and constraints imposed by that view, Lieberson's practice was to begin watching and timing the musical numbers before the show even opened, according to composer Elizabeth Lauer. She was his secretary and,

Lieberson's Broadway

Revisited

Goddard Lieberson's Broadway musical and operetta discography runs to some 40 recordings and remains his most significant achievement in the studio because of the way his qualities mesh with these recordings. It's therefore no surprise to find that they constitute the bulk of Sony Classical's first reissue release in its Sony Broadway series—nor is it a surprise that Sony expects to issue most of his list as the series continues.

The remastering, using Sony's 20-bit digital technology, is directed by one of the project's two producers—Didier Deutsch and Thomas Z. Shepard. They go back to the best available material, which in some cases may be the original studio tapes rather than the equalized and mixed master tapes from which the original LPs were cut. CDs' longer running times permit the inclusion of material that was omitted from the original issue because of time constraints, and since Compact Discs don't have to be turned over, Sony can revert to the show's actual musical sequencing, whereas the LP break dictated a different order.

The Sony Broadway project is expected to take years to reissue all (or almost all) of the shows in the vault—some of them rarities that, precisely because they were not blockbuster hits in their time, may be of the greatest interest to collectors today. In this category are two 1962 Lieberson productions: *All American* (Charles Strouse) with Ray Bolger, Eileen Herlie, Ron Husmann, Anita Gillette, and Fritz Weaver, and *Mr. President* (Irving Berlin) with Robert Ryan, Nanette Fabray, and Anita Gillette.

In addition to two recordings not produced by Lieberson, the first CD releases included:

The Most Happy Fella (Frank Loesser, 1956) with Robert Weede, Jo Sullivan, Art Lund, Susan Johnson, and Shorty Long; SK 48010 (2 CDs).

Gentlemen Prefer Blondes (Jule Styne, 1949) with Carol Channing, Yvonne Adair, Jack McCauley, and Eric Brotherson; SK 48013.

A Tree Grows In Brooklyn (Arthur Schwartz, 1951) with Shirley Booth, Johnny Johnston, Marcia Van Dyke, and Nathaniel Frey; SK 48014.

Miss Liberty (Irving Berlin, 1949) with Eddie Albert, Allyn McLerie, Mary McCarty, and Ethel Griffies; SK 48015.

Candide (Leonard Bernstein, 1956) with Barbara Cook, Max Adrian, and Robert Rounseville; SK 48017.

Irma la Douce (Marguerite Monnot, 1960) with Elizabeth Seal, Keith Mitchell, Clive Revill, and Elliott Gould; SK 48018.

(All are available on analog cassette as well, with ST prefixes instead of SK prefixes.)



later, associate producer in the late '50s and early '60s. In the end, Lieberson sent her to tryout performances to make these initial findings. On the basis of these findings, he would develop his plans for translating the show to the phonographic medium.

Thomas Z. Shepard, who also was hired and, to some extent, groomed by Lieberson (and was later to be both a director of Columbia Masterworks and an outstanding producer of Broadway cast albums) remembers his manner in the studio as suggesting, much more

than demanding, the performance values he hoped to get from the cast. He could be scathing when pushed to the limit, but his gentlemanliness was hard to dent under other circumstances.

Lieberson's apparently inherent theatrical sense came out, Shepard believes, in the way he might suddenly be "inspired" during the session to change something in the interests of a more telling phonographic product, even when it seemed evident that he had planned to make the change all along. It was his exceptional self-



No one before Lieberson was so keenly aware of the unique relationship that exists between records and those who listen to them.

awareness that led him to be "on stage" much of the time.

Once the sessions were over, he generally left the post-production to other hands. In the '50s, that meant primarily editing and possibly equalizing the tapes before mastering. Mixing became a standard technique only after the introduction of stereo. Teo Macero, who did the post-production on most of Lieberson's Broadway recordings, is afforded an important share of the credit for their success by those who were around at the time. Lieberson remained in charge and might send the product back to Macero for yet more polishing, but Macero did the actual work.

When Lieberson became president of the record division, he felt it a bit unseemly to continue producing. Worse, his limited time in the studio meant that he would have to play favorites among the available shows and inevitably bruise egos. But, Didier Deutsch says, having built Columbia into the most important original-cast label, he continued to exercise control even when his name did not appear as producer.

This was a business decision as well as an artistic one. The two considerations were intimately connected, because Lieberson induced Columbia to invest in shows as a way of securing recording rights. Columbia is believed to have been the first to offer some form of cash outlay in return for the recording option, as early as *Finian*, and the pattern grew steadily until 1956, the year of *My Fair Lady*. Lerner and Loewe had been unable to find backers for anything as *outré* as a musical version of a Shaw play, so Lieberson got Columbia to act as sole "angel"—for \$360,000, a hefty tab back in those days.

So great was the undertaking's success that Lieberson had *carte blanche* from that time on. But he ultimately

came to regret the financial involvement in the shows themselves. According to Lieberson, show business and the record business are separate entities with separate priorities that should be pursued independently by specialists in each.

Incorporation of the show albums into the Masterworks catalog was one reason for the outstanding bottom line of the label, whose growth after Lieberson took over was unparalleled among classical labels of the time. For this reason, Lieberson became a sought-after interview subject among business reporters—a role he truly savored. He was fond of saying that being a musician required a kind of intelligence that is easily converted into executive skills, but that trying to convert an executive into a musician has far less chance of success. This delighted the reporters and became a staple of the Lieberson executive persona.

Both Tom Shepard and Elizabeth Lauer were beneficiaries of Lieberson's attitude. He chose her as his secretary over her own objections that her stenographic skills were inadequate for the task. Actually, he assigned the routine work to others and relied on her for the subtler skills of a "gal Friday." And he hired Shepard (a composer as well as a producer) "off the street" to become a producer despite his lack of extra-musical qualifications.

Shepard remembers that a battery of tests was required before he was accepted, so it seems that Lieberson did not rely on musical intelligence alone. It has even been suggested that Columbia later fell into decline precisely because Lieberson failed to remain true to his principles in this respect. According to one colleague, as division president, Lieberson turned over more and more power to the psychological testers, to accountants, and to lawyers, distancing himself and the

division ever farther from his creative roots.

That Lieberson's pre-eminence might have aroused jealousy among those around him must be admitted. Still, it is hard to find evidence of it even among those on whose work Lieberson relied but to whom official recognition might be denied. Yet, he could be ungenerous to others—in both credit and remuneration—and as president seemed unwilling to believe that others could do things as well as he. Had he been less charming and less of "an enormous force for the good," as one employee put it, more voices might have risen in dissent.

Perhaps a certain ruthlessness is a necessity of any creative personality, and Lieberson's creativity is beyond question. No producer in the history of the medium has had a more profound influence on what we can hear on records because none before him was so keenly aware of the unique relationship that exists between records and those who listen to them.

Walter Legge (the *doyen* EMI producer from the 1930s to the 1950s) disparaged the work of his predecessor and sometime boss, Fred Gaisberg, on the ground that Gaisberg simply let the artists loose in the recording room and took "aural snapshots" of whatever they did. Legge himself strove to create the ideal performance of the music at hand and pickle it, so to speak, for all time, imposing his "definitive" view on artist and listener alike.

Lieberson's approach implied more respect for both. In place of Legge's almost disembodied ideal he created a very specific sonic reality that could be as much a work of production artifice as of musical art. What was ideal in the abstract, he realized, might be far from ideal in the listening room. In the final analysis, the integrity of the listening experience was his sole criterion, his legacy. A



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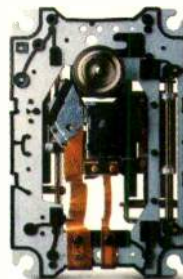
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With A Little Help From My Friends



Richard J. Kaufman

Really, I had no intention of buying a new speaker system. I only sat down one Sunday afternoon to design the perfect subwoofer with a combination passive/active crossover network and a unique method of bass equalization.

After a few hours the design was ready, leaving me with just one problem: I now need a speaker system with very specific characteristics, such as second-order bass roll-off, and high damping. My present speakers just won't do. I find myself haunting stereo sound rooms on weekends, but I'm not satisfied with what I've heard so far.

YOU'VE GOT TO HAVE FRIENDS

I work with a friend I'll call the Engineer. When I tell him I'm looking for new speakers, the Engineer introduces me to George, a leading salesman at a downtown electronics emporium with high-end aspirations. I tell George I want to listen to the Snell K11s and compare them to another speaker that was the most impressive of the dozen or so I'd heard uptown. (I mention the brand name only because much of what follows is so specific to this particular speaker. This is not meant as an endorsement of the Snells—though they are, indeed, fine speakers. Bear in mind my needs were

very specific, if not peculiar. You will not be constrained as I was. By all means listen to Snells, but listen to other speakers as well before you buy speakers.)

At the mention of the Snells, George says "Good! Let's escape from mid-fi hell," and he leads the Engineer and me to the first sound room towards the back of the store. (There is a series of sound rooms, off a hall leading back through the block-long store, each with more expensive equipment than the last. Someday I'll visit the last room and attain audio nirvana, but it won't be today.)

The Snells blow away the speaker that had been my first choice. The Engineer concurs. Being a man who considers it unethical to make a sale without working at least a little, George suggests we listen to a new British import at a slightly higher price. The price range is already more than what I'd intended, but what the heck?

I wait as George fiddles with the sound levels till the speakers are matched, so we can hear the real differences between them. Then we listen. Both speakers sound good. I find the British speakers seem "sweeter," more musical . . . they also have a peak in the mid-bass due to a Thiele-Small alignment with a Q of 0.9 or so.

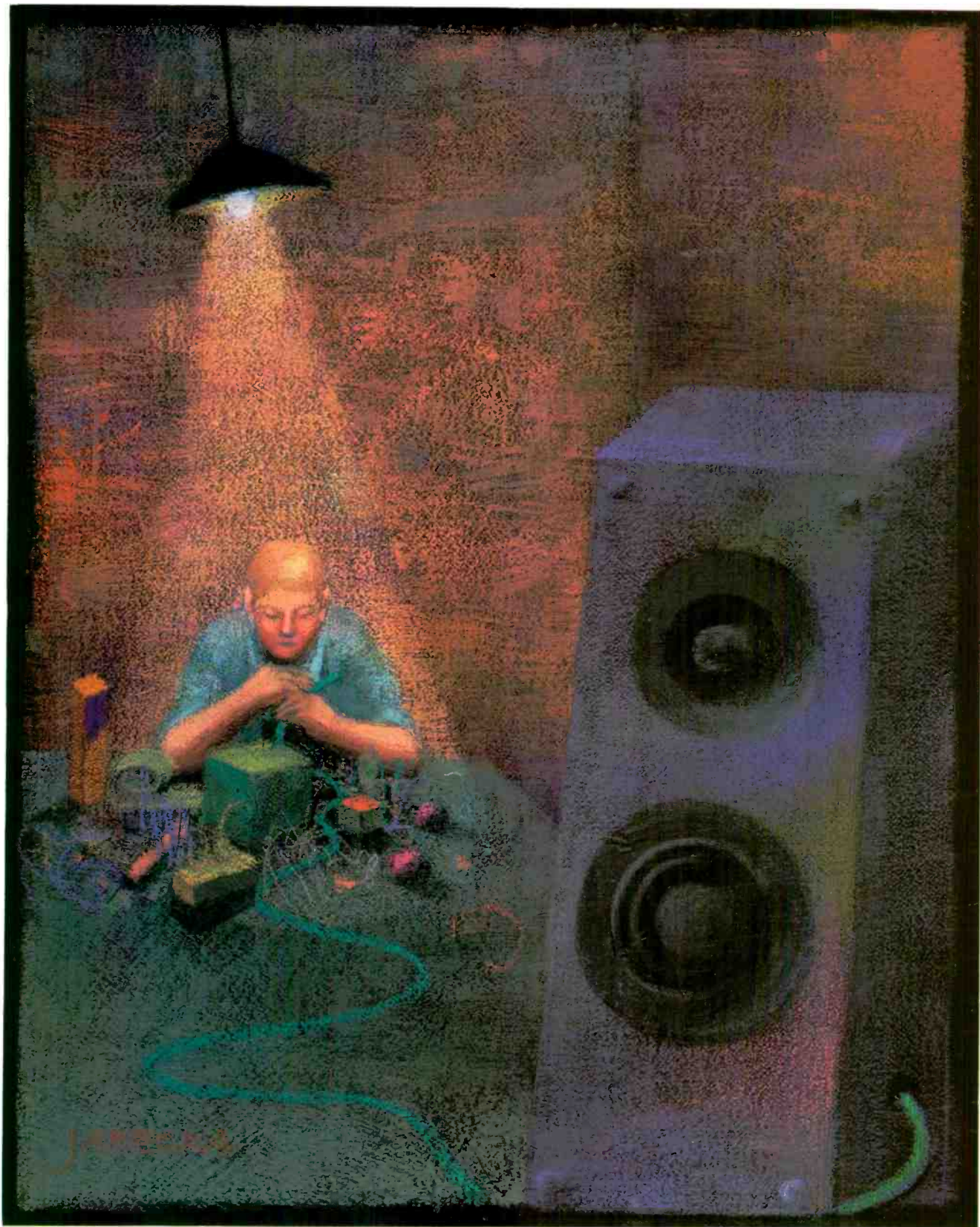
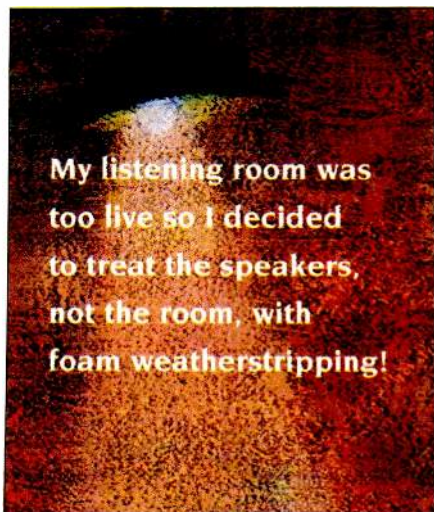


Illustration: Danuta Jarecka

The Snells sound as if they have a Q of 0.7, for a B2 alignment. (Later measurements confirm this.) This makes the Snells' bass sound tighter and more natural, and the low midrange less chesty and resonant. Also, bells and cymbals have a treble edge that is utterly captivating. I find the Snells are more analytic, but also, I think, more accurate.

The Engineer finds the British speakers more analytic and the Snells more musical. He is surprised I prefer the Snells, though they would have been his choice. He used to have a job in a



CD factory checking the final product before it was "pressed," so I think that makes his opinion professional. I am pleased we agree, though I would have been happier if our subjective reasoning were the same.

I tell George I have a few more speakers I want to audition but promise to call him. That weekend, I listen to some more speakers in midtown. Then I call up George and make an appointment to listen with him again.

THE ENTHUSIAST

This time I bring my friend the Tube Enthusiast. The Enthusiast does not own a CD player, and electrostatic speakers and tube amps are his preferred equipment. He can also pinpoint even the most minute defects and distortion in an otherwise functional system. He's the one who first remarks that the channels are reversed or that the system seems to be playing in mono. He's the one who notices that a tweeter isn't functioning while other audiophiles are commenting on how sweet and smooth the sound is.

We listen. My unspoken decision to purchase the Snells is confirmed by what I hear. But the Enthusiast is not enthusiastic. "It's as if reality is here," he says, pointing straight ahead, then

gesturing from side to side, "and one speaker is to the right, the other to the left, of what you want." I ask him to be more specific. "The British speakers are tubbier, and the Snells' tweeter has too much zing."

I know the Enthusiast's horn-loaded electrostatics roll off sharply as they approach 12 kHz, so I politely attribute his criticism to an unfamiliarity with true treble material, and announce my intention to purchase the Snells. George offers to let me audition both pairs of speakers in my own home—he likes the British boxes—but I refuse: I know I want the Snells.

"I'm sure you'll be happy with them," says the Enthusiast. "And if you decide they have too much treble, you can always put a penny over the tweeter." He does know how to put the worm of doubt in my ear.

REARRANGING AND REDECORATING

It is a week later. Only twice have I rearranged the furniture in my office/listening room. Now I can sit comfortably at the proper distance, midway between the speakers. I am quite pleased with the sound on most material, but sometimes there is too much treble. I am not imagining it. The treble seems at once too bright, yet deadly accurate. With measuring equipment and laboratory-quality microphones, I find that the speakers are flat as far as half an octave beyond the highest frequency I can hear, but they still sound too bright. How am I to explain this paradox?

My listening room is too live, no doubt. I get a bigger rug from another room. It helps the room, but there is no effect on the perceived brightness of the tweeters. I idly contemplate placing acoustic foam on all vertical sur-

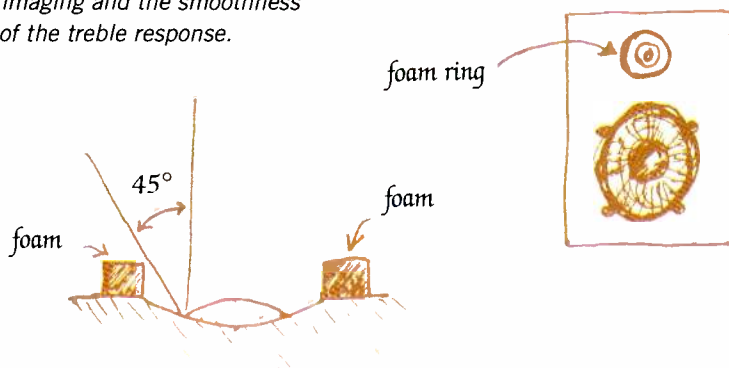
faces. My wife has been very tolerant about rearranging furniture, but I know she'll draw the line at covering the glass on the French doors with textured foam. I am not really very eager to do this anyway.

I have an inspiration. Instead of treating the room, I'll treat the speakers. After a trip to the hardware store to purchase some foam weather-stripping, I remove the grilles and make foam circles about the tweeters. The idea is to block the dispersion of treble sound, limiting it by means of the foam barrier to a cone of sound 45° off-axis to the speakers (see Fig. 1).

It works! The unpleasant edge of the treble is gone! I sit back to enjoy my handiwork, and make a surprising discovery. The imaging is uncanny. Each instrument and voice takes on an exact physical and solid presence at some point between the speakers. The image is extremely stable and never wavers. With some material the sound even seems to come from the right of the right speaker or to the left of the left. Such imaging is not uncommon with electrostatics, but only twice before have I heard it so pronounced with dynamic loudspeakers. I get a pair of ancient Advents (the original model) I'd been using with my TV, hook them up to my system, then treat the tweeters with the foam tape. Their imaging is improved. Not as good as the Snells', but much more defined than before. I note the same effect with a pair of the original EPI 100s my wife had when we got married. What have I discovered?

I spend the next few weeks modifying friends' speakers. In every case they prefer their speakers with the foam treatment. Where the image is very well defined to begin with, there is less improvement because there's less

figure 1
Adding a foam ring about your tweeter can greatly improve stereo imaging and the smoothness of the treble response.



room to improve. Even so, no one has removed the foam rings. Hundred-dollar boxes or \$4,000 towers—it doesn't matter. Everyone agrees the sound is better. I return to the stereo store, and George lets me put foam rings on his demo speakers. We listen. "I like it" he says, then calls in his manager and makes him guess what's going on. They must like the sound, because the foam rings are still on the demo model when I stop by some weeks later.

I have brief fantasies of going into manufacturing, but the device is not patentable. Without a functioning distribution network, imitators would flood the market before a profit could be made. Nor would a manufacturer want to pay royalties or buy such a simple idea. Yet I can still share my discovery with the audio community. A magazine article would help finance my continued experiments.

There is one last test before sharing my discovery with the world. I call up the Critic. The Critic makes his living from sound, reviewing and passing judgment on music and equipment. If he believes in the tweeter rings, they are ready for the world.

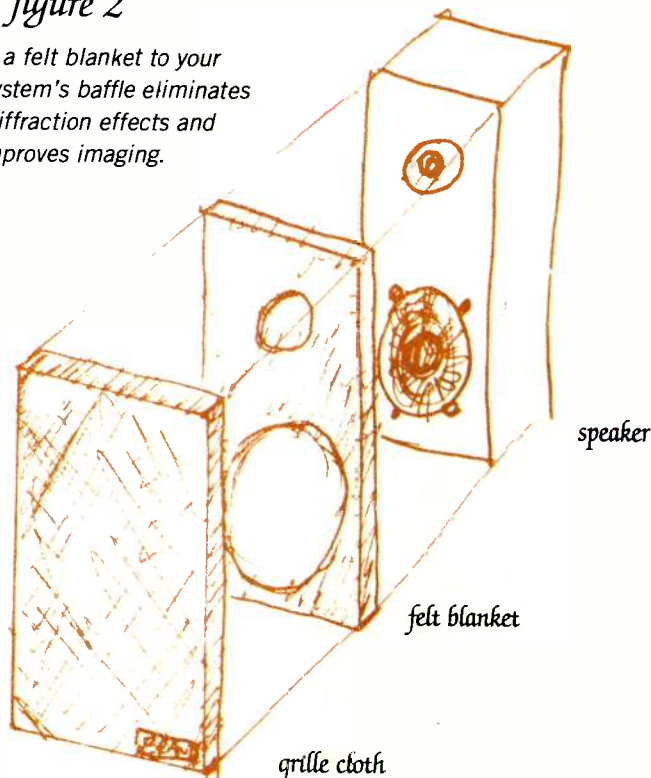
THE CRITIC

I've gotten an invitation to visit the Critic in his home, despite having revealed that I intend to modify his speakers. I've come with my wife because we have a dinner party that evening in the neighborhood, and as a former musician she's interested in my audio activities. "I'm just afraid that after listening to your system, he'll go out and buy a couple of hundred dollars worth of records," she says to our host. "I'm afraid you'll just have to watch him carefully," the Critic replies, his eyes twinkling.

His listening room is deceptive. It seems small and narrow, but it's not. It's a converted sun porch that runs the length of the house. It's nearly 11 feet wide, and about three times that in length. What makes the space acoustically difficult is the glass windows that run the length of one long wall. They reflect every sound, creating the same overly bright effect I had been struggling with. On the positive side, the length of the room helps sustain an illusion of spatial depth to the sound reproduction that I have seldom heard on other systems.

"What would you like to hear?" the Critic asks. The problem will more likely be that he has misplaced and can't find our selection, than that he doesn't have it. The walls are lined with CDs, many with Japanese and German labels. Low shelves under the windows hold hundreds of vinyl records. We lis-

figure 2
Adding a felt blanket to your speaker system's baffle eliminates edge diffraction effects and improves imaging.



ten and listen: Vivaldi and Bach; Rolling Stones; Cajun Zydeco, and religious choral works. Somewhere in all this music I remember to get technical and pry the grilles off his speakers. I carefully place and position the foam around the tweeter, forming a ring.

We continue to listen. The Critic is showing off rare and unusual polycarbonate (that's what CDs are made of) he has collected in his travels. We try a few vinyl records, too, then switch back to CDs. Reluctantly, for I am enjoying just listening, I steer the conversation back to the sound quality: Specifically what improvement the foam tweeter rings have made. "I think it's better," the Critic demurs. "Have you tried felt?"

"Felt?" I wonder.

"Felt" says the Critic. "Cover the baffle with carpet felt. It will eliminate much of the baffle acoustically. Write about that, too, and I think you've got an article."

We listen some more, and talk about food and houses and children and running and knee injuries, and promise to get together sooner rather than later, then say goodbye.

On the way to the dinner party my wife insists on stopping at a mall, where she buys a couple of hundred dollars worth of CDs. She is looking for something the Critic played for us, a European issue of some Viennese cho-

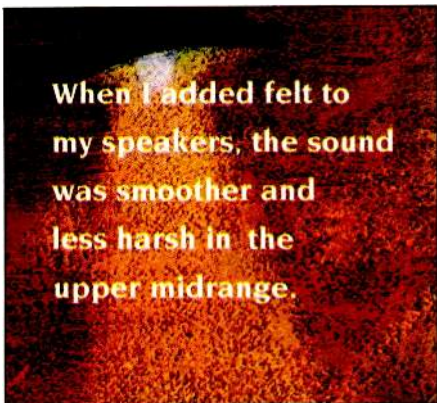
ral group, not likely available in this country. She looks anyway, and keeps finding other recordings she wants. I help her and surreptitiously add a few boxes to the pile she has already put in my arms.

FELT

The next weekend I ask the man at the local carpet store for a yard of scrap carpet felt. He finds a left-over piece. I offer to pay for it, but he gives it to me when I tell him it's for a magazine article on improving stereo equipment. I do have to give him advice on buying equipment. He already knows what he wants, and I reassure him he is making the right choice.

There is enough felt for several speakers. This is a good thing, because it is not obvious to me how to fit the felt to the speakers or how to attach it or cut speaker holes of the right size in the right places: A false start or two seems likely. The material is about 3/8-inch thick with an embossed pattern on one side and loosely pressed-together fibers on the other. It shifts shape slightly as it is handled, so it isn't easy to work with. Through careful measuring I somehow get the holes in the right place on the first try. I've had the foresight to cut the sides slightly large and the holes slightly small so I can trim for an exact fit. (See Fig. 2.)

The next problem is attaching the felt to the speaker baffle. I double up heavy-duty masking tape, stick it to the baffle, and then press the felt on. Before I can listen, the felt begins to sag. I don't want to use glue because the result would be irrevocable. I notice the speaker grilles are made from an elastic cloth stretched over a wooden frame. Perhaps if the felt were trimmed to fit within the frame, pressure from the cloth fabric would hold the felt in place? It works. I trim the felt for the other speaker, then sit down to listen.



I expect the results to be exactly the same as with the foam rings—but no. The precise imaging is there, as are the clear but not harsh highs. To describe the effect in terms of perceived sensation rather than by measurements, it seems the sound is slightly smoother, not so harsh in the upper midrange. Perhaps calling it a liquid clarity, rather than a dry clarity, conveys the sensation. In any case, the improvement is subtle but obvious, offers everything the foam rings did, plus a little more. (The felt is still on my speakers. It sagged after several weeks, covering the tweeter and destroying the highs. I affixed it to the grille frame with two pieces of Mylar strapping tape at the top. Hanging in this fashion, it has held its shape ever since.)

WHY IT WORKS

A search of literature turned up several articles in the *Journal of the Audio Engineering Society* concerning imaging in speakers, as well as distortion caused by cabinet shape and interference between adjacent drivers.

For clear stereo imaging, the frequency response of a pair of speakers must be precisely the same, differing by no more than half a decibel. Unless a speaker has properly mitered or rounded corners and edges, there will be a waver in the frequency response curve. Instead of a straight line, the response becomes a line of peaks and

valleys. The location of these peaks and valleys varies with listening angle, and this is sufficient to interfere with a speaker pair's imaging capabilities. Another source of response irregularities is the cavity of the woofer's cone.

A second requirement for precise imaging is that a speaker's off-axis response match its on-axis response. The Snells I purchased have an 8-inch woofer and a 1-inch dome tweeter. The crossover is at 2.7 kHz and is very sharp. The immutable Laws of Physics dictate that an 8-inch speaker with a 2.7 kHz input signal, where the wavelength of sound is less than two inches, will beam its sound forward, whereas a 1-inch tweeter will diffuse its sound in all directions. Clearly, the on- and off-axis response of this or any other two-way speaker system will not be the same in the vicinity of the crossover point. Three-way systems should have an easier time of it, if their crossover points are chosen so the lower range speaker isn't beaming at the crossover frequency.

This is why, I think, the foam rings create such precise imaging. They limit the tweeter's dispersion in the crossover range to more nearly match that of the woofer. The rings also eliminate reflections from the side walls of the room, reducing the perceived brightness of the sound, without affecting the direct-arrival sound, so the perceived frequency response is still accurate. The felt probably does a better job of attenuating sound at lower (but still high) frequencies than does the foam. By eliminating edge-diffraction effects at these frequencies, it gives a further (if slight) improvement, while still providing the benefits of the foam rings.

MAKING YOUR OWN

If you wish to experiment with your speakers, I would suggest starting with foam. I used 3/8-inch thick Foam King weatherstripping tape. Other brands, materials, and thicknesses should also work. Best results seemed to be had when a line between the top inside edge of the foam and the base of the tweeter formed a 45° angle to the front panel of the speaker system (Fig. 1). With my speakers, which use a Vifa tweeter, the internal diameter of the foam ring was just slightly shy of 3 inches. No great precision seems necessary, and considerable variation still gives good results. The felt carpet padding is about the same thickness (it's hard to measure a material that deforms as you handle it), so you can make the tweeter holes the same size as the interior of the tweeter rings, if you want to continue to experiment. Another option,

which I have not as yet tried, would be to cover the edges of the speaker cabinet with a very thick adhesive foam material, say 1½-inch thick. Such thick weatherstripping, with an adhesive backing, meant for sealing air conditioners in windows, can be found in some hardware stores. It should be easier than using felt.

I don't know of a simple and effective, yet reversible, method for attaching felt, unless your speakers have a frame and stretched grille-cloth system that happens to hold the felt in place. Hot-melt glue comes to mind as a possibility, but I would fear damage to the drivers if one were to slip during the application process. Perhaps a system of fasteners such as Velcro would work, if enough fasteners were used to support the weight of the felt.

WHY DON'T MANUFACTURERS DO IT?

Some manufacturers have used rounded or bevelled edges on their cabinets to eliminate diffraction effects. This greatly increases their fixed costs. The speaker becomes priced out of its market category, since for the same expenditure a larger cabinet can be made or better quality drivers can be used. The edge-rounded cabinet is hard to sell on the sound room floor. People still go for 10-inch woofers over 8 inchers, and zingy treble over accurate sound. Foam rings are inexpensive enough to avoid this price problem. Some manufacturers have used them, though none I know use my recommended configuration to control lateral dispersion as well as to eliminate edge diffraction. Speakers equipped this way have enjoyed no great particular success; perhaps the look of plastic foam turns buyers away. I also don't know of a currently produced commercial speaker that uses a felt blanket on the baffle. These materials may be looked on as too shoddy, for people make audio purchasing decisions with other senses than their ears. Marketing is everything. I would be pleased if readers' experiments with foam and felt eventually led manufacturers to include them in their products, for it would be a definite improvement in sound for everyone. A

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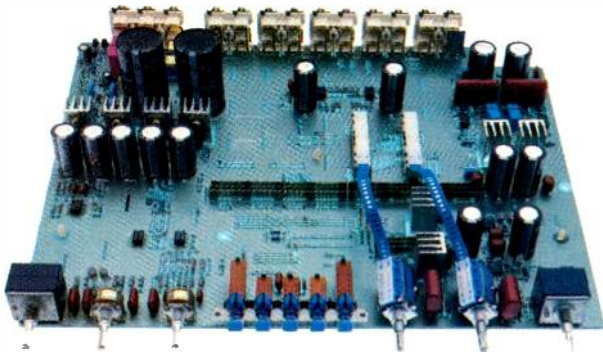
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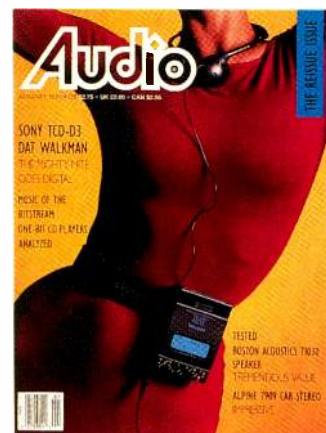
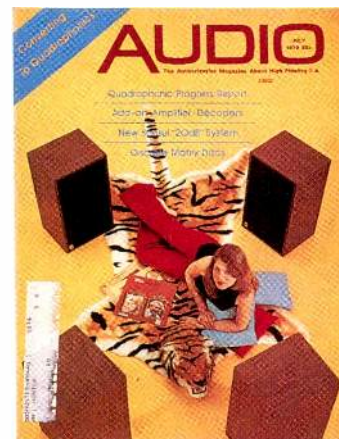
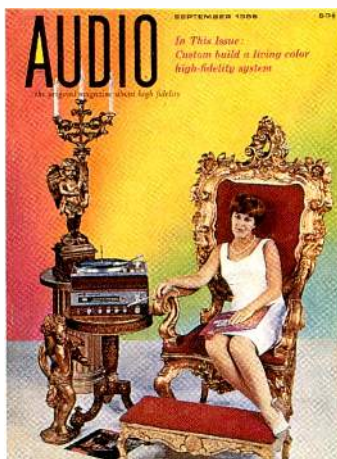
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In May, 1947, a magazine called *Radio* was superseded by another with editorial content devoted to “the sadly neglected audio engineering field.” This new publication, appropriately called *Audio Engineering*, was created to cover “developments in sound engineering as it relates to commercial broadcasting, transmitter and receiver manufacturing, sound-on-film equipment, recording (disc, wire, and tape), public address, industrial sound, and acoustics,” Editor John H. Potts commented in his introductory column.

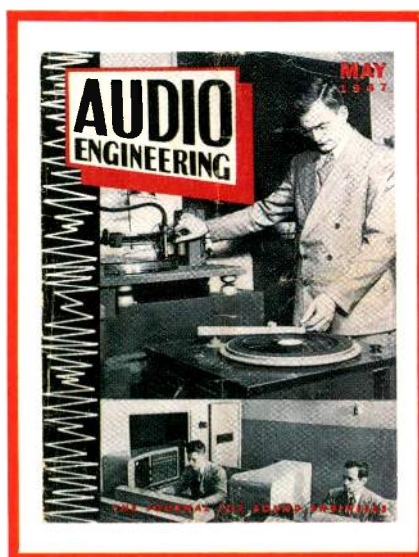
Recording itself, which Potts found drew little journalistic attention, would also be covered. Moreover, he chose to include record reviews, “unique in a technical magazine.” After introducing his record critic, one Edward Tatnall Canby (who also covered recordings for the *Saturday Review of Literature*, albeit from a less technical viewpoint than he would adopt in this new journal), John Potts moved on to the subject destined to become the publication’s focus. “No discussion of audio engineering gets very far before the matter of fidelity is brought up,” he commented.

The State of Audio When *Audio* Was Born

When the May, 1947 issue of *Audio Engineering* appeared, the seeds of home hi-fi had already been planted across America.

In a small New York City factory, Avery Fisher was turning out expensive, high-performance radio phonographs. The previous year, these had caught the attention of *Fortune* magazine, which surveyed the state-of-the-art and singled out the Fishers as “best...in price and performance.”

In the little Texarkana town of Hope, Arkansas, not far from the spot where Jim Bowie is said to have forged the first of his eponymous knives, speaker pioneer Paul Klipsch was



beginning to carve out his own future in high fidelity with an innovative corner horn speaker.

On the West Coast, a former signal corps major named John T. Mullin was demonstrating the magnetophon, two of which he had dismantled and shipped home from Germany at the war’s end. Harold Lindsay of Ampex, who was to become project engineer for the firm’s magnetophon-based tape recorder, had already heard the remarkable German machine. Singer Bing Crosby, whose radio show Mullin would soon be taping for delayed broadcast, was about to audition it as well.

Your average everyday genius would have rested on his laurels after creating this startling cube amp. Fortunately for you, Bob Carver is no average everyday genius.

Just over a decade ago, a little 9-pound bundle of 400-watt power turned the audio industry – if you'll pardon the expression – on its ear.

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Naturally, the name-calling started: "Audio Guru." "Innovator Extraordinaire." "Wunderkind." Accolades that might send the average genius down the leisurely road of complacency.

But the Cube was just a warm-up. Today, Bob Carver's compact,

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Since then, our overachiever genius has launched a series of new technical wonders, which, quite frankly, speak more of the next century than our own.

Like the magic of Sonic Holography®, which

reintroduces the ambience and space of a live performance. Creating a spectacular image that engulfs your room in an envelope of 3-dimensional sound.

Like ACCD, which actually rebuilds weak and scratchy FM radio signals. Wow! Clean, quiet, perfect FM.

Like Dipole Ribbon Speakers, whose space-age linear form is as stunning visually as musically.

Like dramatic new Home Theater Audio for video systems.

With speakers, for example, that project a huskier and far more chilling Darth Vader than you'll hear in many

movie houses, yet are virtually invisible in your living environment.

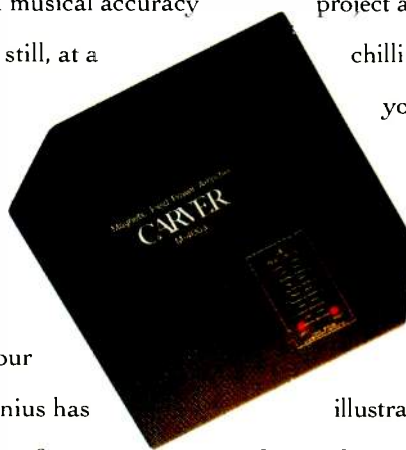
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illustrate both Bob's and Carver Corporation's commitment to

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to hear. After all, the true test of genius is your own ear. So, stop by your Carver dealer today for an

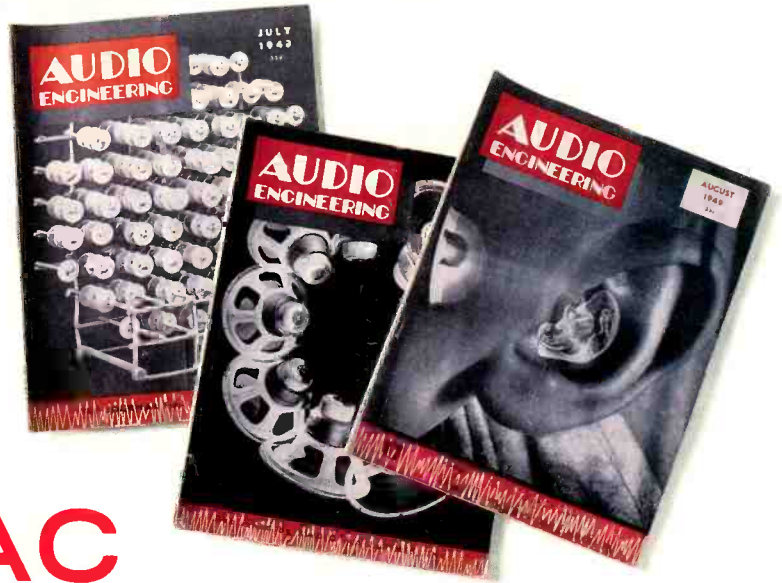
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NEW MAC Management

In March, 1949, John Potts died, and the editorial helm at *Audio Engineering* was assumed by Managing Editor C.G. "Mac" McProud. McProud proceeded to produce more and more content geared to the "audio buff," the dedicated hobbyist who, he later recalled, "might be a surgeon, dentist, lawyer or college student during the major part of his day."

By that time, the AES was up and running. "The first 'feeling out' of readership on an Audio Engineering Society was in the form of a 'planted' letter" in *Audio Engineering* early in 1948, McProud noted in a retrospective article penned for the magazine's 20th anniversary issue. Moreover, "*Audio Engineering* was represented on the steering committee that did all the

early work, and later on the board of governors." McProud himself became Vice President of the AES in 1951 and President the following year.

For some time, *Audio Engineering* also carried a regular section that served as the first *Journal of the Audio Engineering Society*. As the AES grew larger and more self-sufficient, its *Journal* became a stand-alone publication, one which McProud felt was better-suited for highly technical articles than its mother magazine. *Audio Engineering*, he felt, could now serve "to furnish good reading, accurate technical information, and general help to the dedicated audio buff."

On the March, 1954 cover, McProud's pride carried a new logo with the word *Audio* dominant. Under it, in much smaller type, were three terms—Engineering, Music and Sound Reproduction—that together defined the new editorial direction.

There's No Business Like Show Business

In the late 1940s, no one could have predicted that high fidelity would become a household term. However, as the seminal 1946 *Fortune* article indicated, America's ears were open to developments in audio.

Audio Engineering's staffers were determined to take advantage of the fact. To do so, they ventured beyond print and conceived the first-ever public hi-fi exposition. In 1949, Harry N. Reizes, the magazine's Advertising Manager, presided over the first of a series of Audio Fairs at Manhattan's Hotel New Yorker. The event's official sponsor was the AES, and the show was held in conjunction with the group's first convention.

For hi-fi manufacturers like Avery Fisher, who always valued customer contact, such exhibitions were more than product showcases—they were market research. "We learned a great deal from them," the man whose name now appears on one of New York City's two major concert halls later recalled. "We didn't have to send out a bunch of college boys with questionnaires to find out what we should be making. I was able to speak to the actual



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consumers, or potential consumers, to find out what they liked about our present products and what they would like to see in our future products."

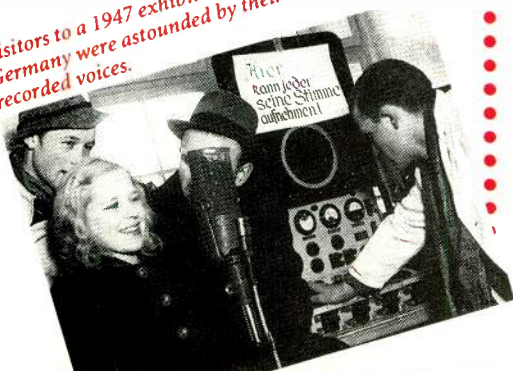
For Audio Fair attendees, these events afforded personal contact with equipment designers and manufacturers. They were rare opportunities to meet and speak with the men whose names graced the nameplates of components owned or coveted. "For them to be able to come into our rooms and talk to the man whose name was on the product meant a great deal to them," Fisher commented in a 1990 *Audio* interview. "They felt they were talking to headquarters, and they were."

In May, 1952, an Audio Fair opened in Chicago, and in February, 1953, a similar event was held in Los Angeles. By 1954, the concept had reached Japan. From November 27 to December 5 of that year, the Nippon Audio Association sponsored an event that featured 49 manufacturers, all of whom manned booths at Matsuya, one of Tokyo's largest department stores.

The '54 Tokyo Audio Fair included a three-channel stereo broadcast for which radio stations JOKR, JOFR and JOQR joined forces. The stereocast was made on standard broadcast frequencies, and it was conveyed to Japanese show-goers by means of three receivers and loudspeakers spaced around a listening room.

An *Audio* correspondent reported on the Japan Fair in the February, 1955 issue. Given 20/20 hindsight, some present-day readers would find hints in his story (an attendance figure topping 55,000 was one) to suggest the influence that nation would later assert on hi-fi.

Visitors to a 1947 exhibition in Koblenz, Germany were astounded by their own tape-recorded voices.



HI-FI BUG BITES IN JAPAN

In his February, 1955 report from Japan, Warren Birkenhead noted that LP discs had begun "to emerge in quantity from the pressing plants of certain Japanese record companies" just a year earlier. He went on to state that more than 50,000 "hi-fi sets" were assumed to be in use there. Though their cost was estimated at \$90 each on average, the fact that "more than 95 per cent of the Japanese hi-fi enthusiasts build their own amplifiers and assemble their own hi-fi systems" coupled with the much lower price of parts in that nation put the average system value at "several times that figure."

"In the Kanda area of Tokyo," Birkenhead marvelled, "one can browse through more than a hundred retail stores that sell hi-fi parts. Loudspeakers, amplifiers, amplifier parts, pickup cartridges, turntables, preamplifiers and equalizers are all in abundant supply...and are hawked..."

throughout the day and night."

"One enterprising Kanda hi-fi [merchant] has set up a coffee shop on the second floor above his establishment. There, prospective hi-fi customers, while drinking coffee, may listen to LPs reproduced through the various [components] on sale in the store below."

"There is always a demand in Japan for parts and equipment made in the United States," the

writer observed. "If a store manager can display a Stateside item, he can always be sure of a higher price and a quick turnover. For this reason, there is a tremendous temptation to market Japanese-made articles with a Stateside label. This practice is definitely deplored by the Japanese government and stopped when detected."

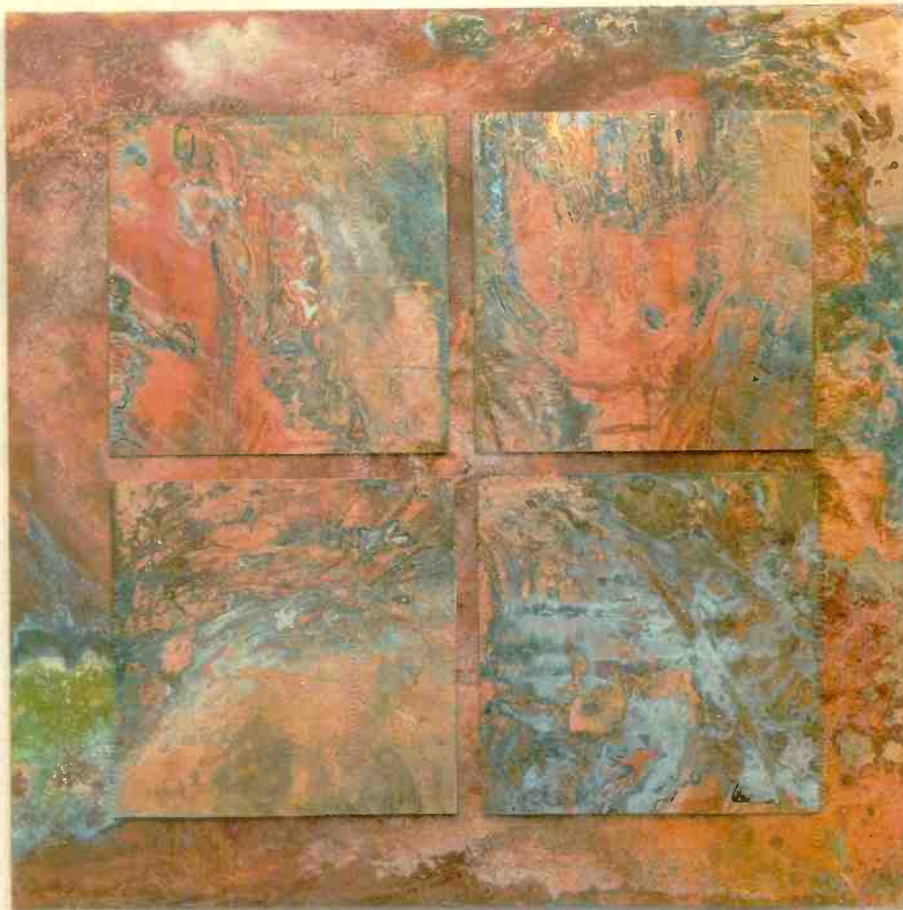
That deception, Birkenhead added, was bound "to remain a factor until the Japanese-manufactured components of Japanese design are more widely accepted by the Japanese themselves."



The last observation merits a footnote. While the role Japan's own engineers and corporations have since played in hi-fi history is formidable, American equipment's most avid fans continue to include Japanese *aficionados*.

In recent years, our nation's industrial community has faced mounting criticism, much of which has been di-

rected at mediocre product quality. Yet American high fidelity equipment has never reflected mediocrity, largely because love, as much as or more than money, has been its principal impetus. As Paul Klipsch, one of hi-fi's founding fathers, put it just a few years ago, "audio was a hobby and then a profession, but I still consider myself an amateur in that an amateur is one who practices his art for love."



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The Krell KRC preamplifier introduces a new era in high-end audio by integrating remote control with classic Krell performance and build quality.

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MAN WITH A HORN



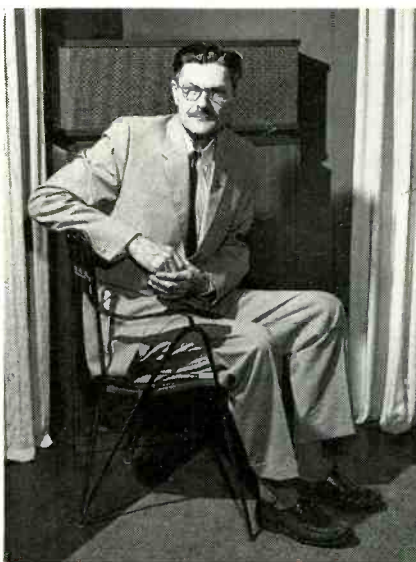
Even in the company of his fellow hi-fi pioneers, strong-minded individualists driven by a passion for music and good sound, Paul Klipsch stands out. A cross between Ben Franklin and Daniel Boone, the six-foot-three-inch speaker maker has, for the last half century, holed up in the southwest-Arkansas town of Hope. He was sent there by the army during World War II and, in 1946, purchased a 3,000 square-foot building from the government to manufacture a horn loudspeaker of his own design.

Musical instrument makers have long known that horns, for the sake of compactness, can be curled. Klipsch folded the horn in his speaker into segments connected by acute angles. He also split the horn into two lengthwise sections that rejoin at the mouth. And, by specifying that it be placed in the corner of a room, he effectively extended his horn. All this makes the Klipschorn extremely efficient.

Today, in an industry where an annual crop of new products springs up as inexorably as crabgrass, the venerable Klipschorn lives on, an audio evergreen. Not unlike its creator. Though Klipsch sold his company to a cousin three years ago, he still appears there nearly every morning—in spite of the fact that he turned 88 in March.

Paul Wilbur Klipsch favors martial music, oxymorons, trains and vintage planes. For much of his life, he has tracked gold mining stocks and other economic data, making notations in ledgers kept for that purpose. An instrument-rated pilot (who gave up flying only at age 77), Klipsch is known for travelling with three watches, one set to the time at his destination, one to the time at home and the third to Greenwich mean time. Friends and associates recall his crack marksmanship with small bore weapons, and many in the industry remember his typical reaction to extravagant hi-fi claims. He would expose a small button pinned underneath a lapel. On it was printed a single word: Bullshit.

Many who live there think of Hope, Arkansas as the source of the world's largest watermelons. In the 1930s, legend has it, a local farmer grew one that weighed just under 200 pounds. He called it the Hope Triumph. But that was before Paul Klipsch came to town. Clearly this audio industry original, who named a speaker Heresy then sold it to churches, has since earned the right to that title.



Paul Klipsch poses with his pride and joy.



In 1951, Audio columnist Bert Whyte was a Concord Radio sales executive.

Testing Then and Now

Even *Audio's* first Equipment Reports (the ancestors of today's comprehensive product reviews), published during the early 1950s, were illustrated by graphs containing performance data. Producing such graphs was a lot harder in those days than it is now.

Users of early test gear, made available by Heath and, somewhat later, Boonton, had to make measurements at various frequencies by doing individual calculations at each. Then, every graph had to be plotted point by point and drawn manually. Today, an audio tester can generate 15 or 20 graphs and laser-print them in the time it once took to produce just two or three.

More importantly, today's measurements can be as much as 100 times more accurate. There is a downside, of course. While a 1950s lab might have cost a few thousand dollars, today's state-of-the-art facility requires an investment closer to the six figure mark.

One crucial piece of equipment not always considered in the early days of hi-fi testing was the ear. However, as Gene Pitts, this magazine's Editor since 1973, points out in his Epilogue, *Audio* has always advised that listening and measuring go hand in hand.

It was designed to play LPs with a laser beam so as not to harm them. Its production price, we were told, would be relatively high but acceptable to serious hobbyists.

The months came and went, but the incredible light-bearing Finial turntable never went into production.

The time was the late 1980s, and the LPs that Finial's rainbow was to play were becoming an endangered species. This very fact probably saved the machine, which is now in limited production in Japan. Not as a hobbyist diversion but as an archival tool.

Its cost is that of a mid-priced Japanese sports car. High but acceptable to serious archivists.

WHAT EVER HAPPENED TO THE FINIAL TURNTABLE?



Second in a series

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recognized for ultimate quality. Through the years, McIntosh's unparalleled record of design innovation has enabled it to flourish, without compromising its founding purpose. Each McIntosh component still is crafted by people in the USA. to deliver superior sound reproduction and unfailing reliability. So it should not be surprising that Audio magazine says of the MC2600: "...just perfect operation."

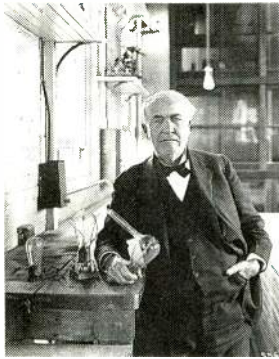
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Some Daring Young Men & Their Hi-Fi Machines



Thomas Alva Edison: Giving shape to the 20th century

In the late '40s and beyond, Paul Klipsch and his fellow audio entrepreneurs worked diligently to distill better sound from their components, widening frequency response and lowering noise and distortion an increment at a time. Though many feared it would happen, hi-fi fever never broke out among the large manufacturers of the era. (If it had, they could have pummeled the smaller firms into the ground.)

One notable exception was a development that occurred at General Electric: the invention of a phono cartridge that reduced tracking

force, previously in the 30 gram range, to just five grams.

The variable reluctance cartridge was conceived by William Bachman, who worked at GE during World War II. At that time, company engineers spent their days on projects with military goals while nights were devoted to endeavors the company hoped would result in saleable postwar products.

Bachman's name is associated with another late-1940s innovation crucial to the growth of high fidelity. From GE, he moved to the slot of Chief Engineer at Columbia Records Research Laboratories and worked with Peter Goldmark of CBS Laboratories (a sister research facility) to develop the LP. The 33 $\frac{1}{3}$ RPM vinyl record soon became the fountainhead of high fidelity sound and continued to spew music for some four decades before being capped by the Compact Disc.

Bachman's patent on the variable reluctance cartridge was later invalidated due to the existence of prior art, but this detracts neither from his creativity nor his importance to hi-fi. Edgar Villchur's patent on the acoustic suspension speaker was also invalidated after the Acoustic Research co-founder lost a suit against rival Electro-Voice in the late 1950s. (In this instance, a court cited disclosures by Harry F. Olson, who was granted over 100 patents in his lifetime.) Yet it was Villchur's company that actually produced a high fidelity speaker small enough to make stereo viable in the home.



Peter Goldmark shows off the new 33 $\frac{1}{3}$ RPM LP record.

In discussing Villchur's suit, his former partner, Henry Kloss, has underscored the importance of those who hammer the ideas and

inventions of others into workable product formats. Kloss's own remarkably prolific career in audio illustrates this point dramatically.

Villchur first described his acoustic suspension speaker to Kloss when the latter, then serving in the Army Signal Corps at Fort Monmouth, New Jersey, was enrolled in a New York University night course in high fidelity that Villchur taught. Kloss already had a small speaker cabinet manufacturing facility in Cambridge, Massachusetts. He also had two friends, Malcolm Low and J. Anton Hofmann, who kicked in \$2,500 each and joined him and Villchur as founding partners in Acoustic Research.

While Villchur labored at his home in Woodstock, New York, Kloss worked at the company's Cambridge facility, first on low-frequency driver designs for the AR-1 and, after that, the smaller AR-2. After parting ways with Villchur and going on to found KLH Research and Development with Low and Hofmann, Kloss designed the legendary KLH Six. Later, at his third company, he produced the Advent loudspeaker, another best seller.

It was Hofmann, a physicist (and son of acclaimed piano virtuoso, Josef Hofmann), who codified the key variables of acoustic suspension design—bass response, box size and efficiency—deriving formulae that governed the low frequency response of sealed-box speakers. Kloss delineated what he called "Hofmann's Iron Law" in the March, 1971 issue of *Audio*, stating that he could, and would, "make perfectly rigorous statements of proportionality which will permit us to *precisely* predict the performance of any new speaker as a function of the change in parameters of a prototype speaker."

Kloss later built products that stemmed from ideas other than those of Villchur (or Olson). In 1960, KLH introduced his Model Eleven, a portable stereo record player with detachable speakers that folded together to form its own carrying case. This was one of the first successful audio industry products to employ transistors.

In 1967, Kloss heard about Ray Dolby's noise reduction system, initially intended for professional applications. It was Kloss who pushed for a consumer version of Dolby, which he originally saw as a boon to home open-reel users. Somewhat later, he linked the system with a previously unsuccessful DuPont product, chromium-dioxide tape. Thanks to the magical midwifery at which Henry Kloss excels, these inventions helped make the Philips cassette, introduced for dictation purposes, a music storage medium that went on to surpass the LP in sales.



C. Robert Fine and Wilma Cozart Fine were the forces behind Mercury's now-legendary Living Presence series of recordings.



Henry Kloss: Fusing others' ideas into innovative hi-fi products



While still a college student, Ray Dolby (3rd from left) helped develop the video tape recorder.

S

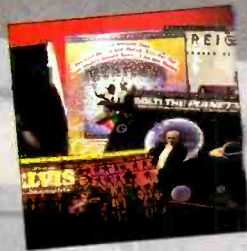
ince the inception of Mobile Fidelity Sound Lab in 1977, the world has witnessed astonishing developments in the recording industry. Profound breakthroughs, both in recording formats as well as delivery systems, have been introduced on a mass market scale. Unfortunately, this rapid, shot-gun approach to mass market technology has left the discerning listener in the dark when it comes to truly superior reproductions of their favorite music.

For the past fifteen years, Mobile Fidelity has been committed to fulfilling the need for faithfully reproduced high fidelity recordings, regardless of the time and cost involved. In the late '70s, Mobile Fidelity introduced the first Original Master Recording LPs, half-speed mastered from the original master tape and pressed on virgin vinyl. We continued to set new standards of excellence in 1986, pioneering the development of an audiophile quality gold-plated compact disc—the ULTRADISC. More recently, we applied our technical expertise to high-end audio components with the development of the UltraAmp Series.

Throughout the changing phases of the audio industry, Mobile Fidelity has remained true to its original goal—making recorded music sound its absolute best. We continue to improve upon industry standards in order to provide you—the selective listener—with the quality you well deserve. For more information, please call our toll free number, 1-800-423-5759.

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Herb Belkin
Herb Belkin, President



1977 Introduced Original Master Recording LPs, half-speed mastered from the original first generation tape and pressed on virgin vinyl. Included performances by some of the world's greatest rock, pop, classical and jazz musicians.

1980 Introduced first high fidelity Original Master Recording cassette, recorded in "real time" on superior quality tape. Highlighted popular rock and jazz performances.

1980 Devised Geo-Disc and Geo-Tape, phono cartridge and audio cassette deck alignment device for consumer use.

1981 Introduced the UHQ - Ultra High Quality Record - a superior quality analog Original Master Recording LP pressed on 200-gram virgin vinyl in limited, numbered editions of 5000 copies per title.

1982 Released "The Beatles: The Collection" - a numbered, limited edition boxed set consisting of 12 Original Master Recording LPs.

1984 Introduced the Original Master Recording compact disc featuring popular rock, jazz, blues, gospel, comedy and soundtrack titles exclusive to MFSL.

1986 Introduced the ULTRADISC - a limited edition, audiophile quality 24 Karat gold-plated CD representing classic rock, jazz and blues performances.

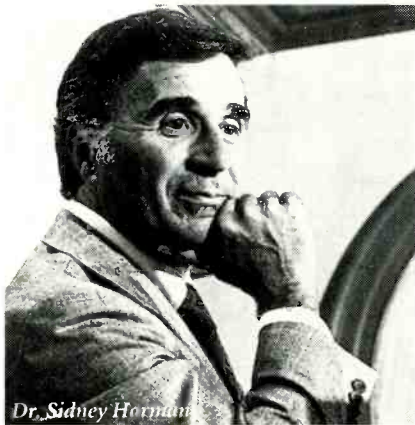
1989 Established Art & Electronics (A&E) - a Soviet/American joint venture featuring new recordings by classical Soviet artists.

1992 Introduced the UltraAmp Series - a fully-integrated high-end audio system of revolutionary design consisting of a power amp, line amp and digital-to-analog converter.

FAST FOR- WARD



Sidney Harman is the hi-fi industry's Renaissance man. He founded Harman-Kardon 40 years ago and today serves as Chairman and CEO of Harman International Industries, parent of JBL, Infinity, Harman-Kardon and several other companies. (At press time, Wall Street analysts who follow the stock estimated Harman International sales for fiscal 1992 would total approximately \$600 million.) He has an earned doctorate from The Union Institute, was for three years President of Friends World College, a worldwide experimental Quaker college, and served as Deputy Secretary of Commerce of the United States in 1977 and 1978. Below, Dr. Harman comments on the future of the industry he helped mold.



Dr. Sidney Harman

I grew up in an era when the forecasts of David Sarnoff, the fabled Chairman of RCA, were awaited with the excitement now reserved for Academy Award night. Those predictions were invariably of products and services which he alone could visualize. And numbers of them were ultimately realized. I leave that kind of prediction to others. It is *the way* in which we proceed into the future that I would emphasize.

This is a new world—a different world. The emphasis cannot be on product visions but on consumer needs and it cannot be mere rhetoric. This industry can surge if we behave as marketing anthropologists—respectful of the differences in markets and cultures and mindful that our job is to respond to real consumer needs.

The view that a confluence of computers and home entertainment is inevitable may be correct, but we had better make sure that it is a vision which resonates with real consumer needs rather than being only an expression of what we are able to do technically.

The old Barnum saw that “there is a sucker born every minute” was a reference to the consumer. If we don’t have our wits about us, the sucker may prove to be us.



WHAT EVER HAPPENED TO ELCASET?

Or for that matter, the 8-track cartridge and open reel? The lowly Philips cassette, introduced as a dictation medium, was improved enough to replace both those formats in the home and car. It also made the elcaset (a mid-70s development that, for improved fidelity, employed a speed of 3¼ ips and, like a video cassette, pulled the tape from its shell during play) redundant even as it was being introduced.

Now, precisely 50 years after the first trial production run of magnetic recording tape spun off the machines at BASF, many wonder whether Philips’ newest development, the digital compact cassette (DCC), will become the next home recording medium of choice. Or if a recordable optical medium (such as Sony’s new mini disc) will relegate tape to museums. Stay tuned.



WHAT EVER HAPPENED TO SQ, QS AND CD-4?

In the early 1970s, many industry forecasters predicted the demise of two-channel stereo. One problem was that a trio of four-channel systems vied for attention. RCA touted a discrete system called CD-4 while recording industry rival CBS beat the drum for its SQ technology, which matrixed signals. At the same time, Sansui promoted its own QS.



Four channels of music could be stored on a single eight-track tape.

Ultimately, the consumer voted for none of the above. It seemed that quad (as it came to be called), which required additional speakers and channels of amplification, was just too complicated for the American public.

Or was it? Home-theater systems that require five speakers, with a channel of amplification for each, are now on sale in most audio stores. Moreover, a new Dynaco decoder that incorporates David Hafler’s original multi-channel system (which feeds out-of-phase information to the rear channels) was recently unveiled.

Perhaps the writer of *Ecclesiastes* was correct in stating that “there is nothing new under the sun.”

OUR AUDIO COMPONENTS HAVE THE UNCANNY ABILITY TO PRODUCE INCREDIBLE FEEDBACK.

"I am not aware of an amplifier, anywhere, that delivers this much usable power at such a modest cost."

HCA-800II AMPLIFIER, BOUND FOR SOUND, DECEMBER 1990, U.S.A.

"... internal appearance definitely suggests that of some far costlier high-end components. ... first rate sound at a truly affordable price."

P/FET-900II PREAMP, STEREO REVIEW, JANUARY 1992, U.S.A.

"Parasound comes out on top in the areas of fine detail, clarity and timbral accuracy."

HCA-800II AMPLIFIER, FALL 1992, THE SENSIBLE SOUND, U.S.A.

"From the very first sounds—even forgetting this price—we noticed unsurpassed spaciousness and detail enveloping us."

P/FET-900 PREAMP AND HCA-800II AMPLIFIER, HOMESTUDIO, DECEMBER 1989, HOLLAND

"... a product that's basically untouchable by the competition."

HCA-2200 AMPLIFIER, BOUND FOR SOUND, DECEMBER 1991, U.S.A.

"It offers more than just a touch of high-end sound at a very affordable price."

HCA-800II AMPLIFIER, STEREOPHILE, OCTOBER 1990, U.S.A.

One thing is coming through loud and clear. A consensus that our audio components are a resounding success.

And it's no accident. Because we take a uniquely pure approach to music reproduction. You see, we put our money into elegant audio engineering and acoustic design. Not into fancy decorations that don't add any sonic value.

On the surface, this may not seem like such a big deal. But, as you can see, we've built quite a reputation

by making high-end audio components at affordable prices.

To learn more about our complete family of audio products, give us a call. And discover for yourself why we're generating so much positive feedback.



PARASOUND

Affordable audio for the critical listener.

History And Concepts Of Velodyne Acoustics, By David S. Hall

I founded Velodyne in order to formally explore concepts developed by Brad Culkin, PhD, an audiophile who had done intensive research into speaker technology while at Johns Hopkins University.

Culkin had concluded that accelerometer-based feedback had tremendous potential for reducing distortion in loudspeakers. As a mechanical engineer, my task was to make those concepts a reality. Velodyne was launched in January of 1983 to explore just how much loudspeaker performance could be improved by a well-engineered servo control, and just how much distortion could be eliminated. We focused on the low bass frequencies, where the highest levels of distortion were to be found. We covered our bases with the patent bureau, and we finally introduced our first product – "The ULD 18 Powered Subwoofer" – at the June, 1984 CES Show.

Interestingly enough, our initial marketing concept, which concentrated on the benefits of reduced distortion, was dismissed as "technical jargon without merit." This response resulted from the fact that loudspeaker distortion specifications had previously been ignored by the industry. The bias was so significant that we decided to down-play our technical achievements and promote our product on performance alone.

Well, now that "technical jargon" is once again fashionable, and distortion specifications are now relevant, consumers are at times misled by various descriptive terminology. So I'd like to clear up some misconceptions regarding "servo" as it applies to Velodyne and other powered speaker systems. Most of these systems use the signal that results from the electrical interaction of a voice coil with a magnet structure as the basis for correction. While there's value to this concept, it's not as precise as the signal that comes from the totally independent, highly linear accelerometer transducer that's employed in the Velodyne system. While other "servo" systems can at best reduce distortion by a factor of 2 or 3, the Velodyne system can reduce distortion by a factor of 10 times or more. Upon comparison, these advantages are very apparent.

Knowing that more and more people are enjoying a previously unattainable level of audio reproduction is immensely rewarding to all of us at Velodyne. We're committed to improving the quality of what the world is hearing. We believe our subwoofers are the very best available at any price. And it appears that you, the consumer, agree.

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Thank you for your support,

David S. Hall
President, **Velodyne Acoustics**

Velodyne
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THE FUTURE OF AUDIO



"High fidelity is a serious hobby to those who pursue it," Mac McProud wrote in conclusion to his 20th anniversary retrospective, published a quarter century ago in these pages. "These audio buffs put a lot of time and money and heart and soul into it, and they expect a lot of satisfaction in return. We at *Audio* have the same hobby, really, and we enjoy being of whatever help we can to our fellow hobbyists. So we pledge...to carry on in the same vein—improving whenever we can, but always trying to help the reader."

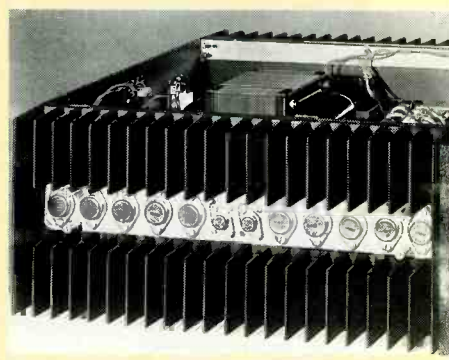
To this, on the occasion of our 45th, we add a sonorous Amen.



WHAT EVER HAPPENED TO KITS?

"The innovations which came after our 15th anniversary [in 1962] include some marvellous improvements in kit packaging," editor C.G. McProud recounted in a long, retrospective article published in 1967 to mark *Audio's* 20th. At that time, McProud pointed out, Harman-Kardon took to employing "some pretty fancy cardboard-box containers which made it easy for the novice to identify the parts in the order in which they were to be used. Scott led with instruction books in which the actual colors of the wires appeared in the diagrams" while "Fisher's innovation appeared in the form of a soft plastic bag packed with a number of bits and pieces which would be used for the steps on a given page of the instruction book."

Exactly 30 years later, in 1992, the audio kit industry experienced a cataclysm so momentous that it was commemorated not in a hobbyist journal but on the front page of the *New York Times*. Heath, long a leader in the business, closed its doors.



EPILOGUE

by Eugene Pitts III, Editor



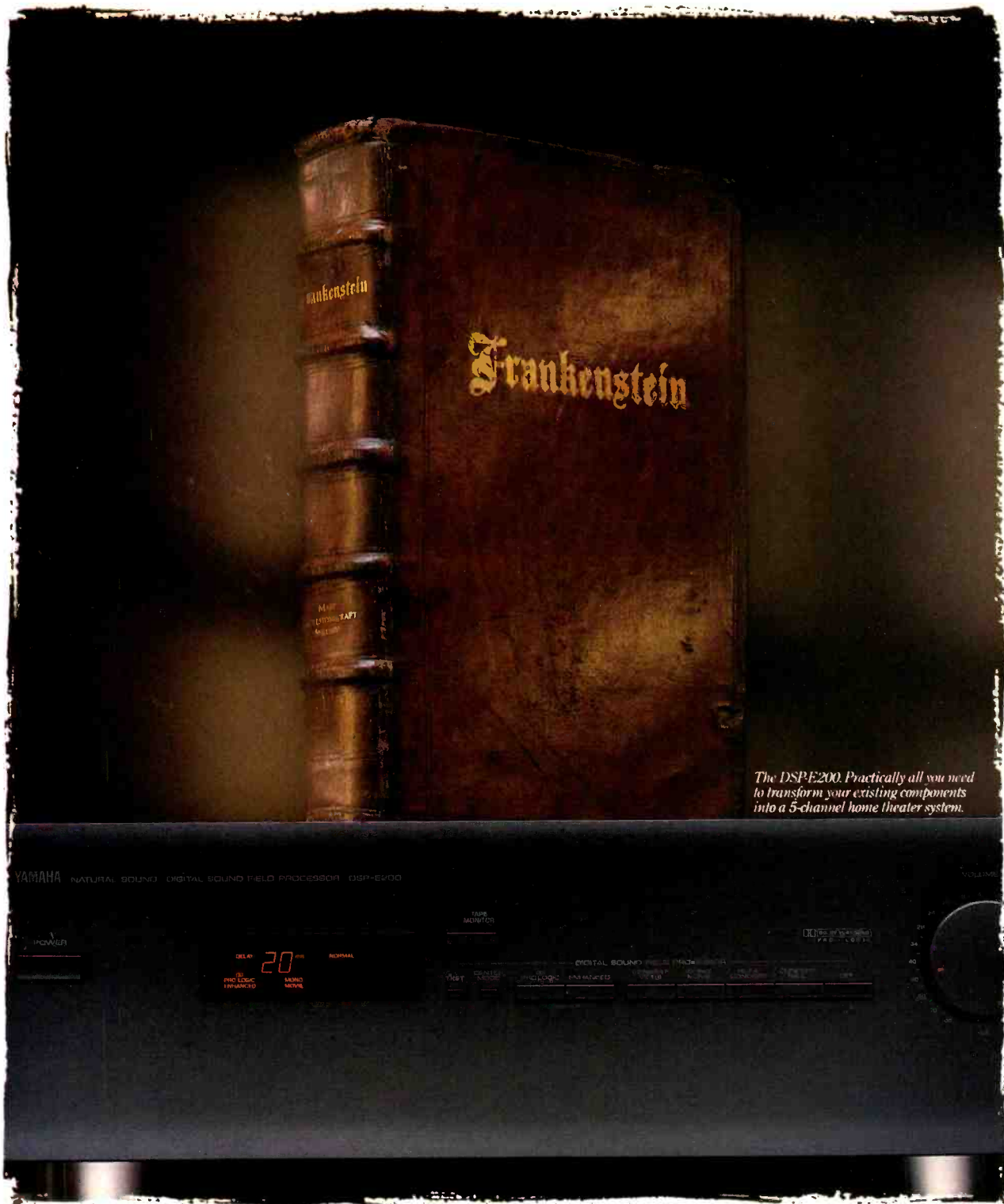
Gene Pitts (left) has been *Audio's* Editor since 1973.

Very few magazines last as long as 45 years, and I believe it is a gauge of the strength of our industry (or is it our collective mania?) that *Audio* is so much stronger now than when we began. Still, we are a relatively esoteric magazine, and the peculiar language we speak—half science and at least one quarter a jargon specific to our cult—is the price of admission.

Oddly, for us at least, there is at least as much joy in the equipment as in the music it makes. There is, as well, a curious pride of ownership of very physical and expensive pieces of electronics, which are ultimately judged in a very personal way, despite what the measuring meters say.

Audio's first Editor, John Potts, said it quite appropriately: If it measures well and sounds good, it is good. But if it measures well and sounds bad, it is bad. I would add only this—that we put science in the service of listening. Because it's all too easy to listen with our dreams and not our ears.

Once again, science has old parts and bring



*The DSP-E200. Practically all you need
to transform your existing components
into a 5-channel home theater system.*

YAMAHA NATURAL SOUND DIGITAL SOUND FIELD PROCESSOR DSP-E200

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NORMAL

TONE
ADJUST

PHASE

DRY

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WET

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DIGITAL SOUND FIELD PROCESSOR

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VOLUME



created a way to take them back to life.

INTRODUCING HOME THEATER COMPONENTS DESIGNED TO BREATHE NEW LIFE INTO THE EQUIPMENT YOU ALREADY HAVE.

A good story has always been a great form of entertainment. It still is. Only now the best stories of our time come in a slightly different format.

Namely video tapes and laser-discs. Movies that come to life right before your very eyes. With soundtracks every bit as riveting as the pictures themselves.

Assuming, of course, you have the equipment that can play them.

Which is precisely where Yamaha enters the picture.

Thanks to a team of dedicated Yamaha engineers, you won't have to wait for some kind of manna from heaven to save your old components from an early grave.



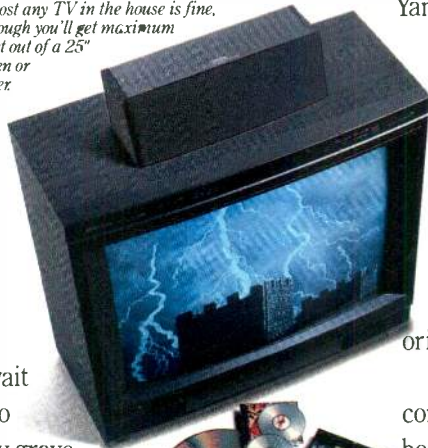
If you're starting from scratch, you owe it to yourself to consider the RX-V660. It's the newest member in Yamaha's renowned line of 5-channel audio/video receivers.



The DPS-E1000. A 5-channel audio/video amplifier that can literally bring down the house. Add it to your existing system to create a 7-channel home theater that can push DSP, Dolby Pro Logic and Cinema DSP to the limit.

A specifically designed three-channel amplifier. The DSP-E200. A remarkable new amplifier that plugs into

Almost any TV in the house is fine, although you'll get maximum effect out of a 25" screen or larger.



Our engineers started with parts a lot of people already have — a good color TV, a Hi-Fi VCR, maybe even a receiver and speakers — and created a fairly miraculous way of bringing them back to life.

Which leads us to one of our more exciting new products.

your existing amplifier/receiver and can give you the same sound placement, depth and intensity, that until recently, one could only find in the finest movie theaters.



What makes this overwhelming experience possible is something Yamaha calls Cinema DSP. A unique Yamaha development that actually combines Digital Sound Field Processing (a technology Yamaha invented) with Dolby Pro Logic.*

What's so great about that?

Digital Sound Field Processing (DSP) recreates the acoustic properties of an actual movie theater in the relatively cramped quarters of your living room. While Dolby Pro Logic places sound effects and dialogue around the room just how the director originally intended.

Cinema DSP combines the best of both technologies. Simply stated, it's the part of the system that creates a spacious movie theater experience in the confines of your living room.

There you have it. An exceptionally simple approach to home theater.

Which when you think about it, proves a couple things.

You don't have to spend a fortune to experience the latest trend in home entertainment.

You just need to breathe a little life into the equipment you already have.



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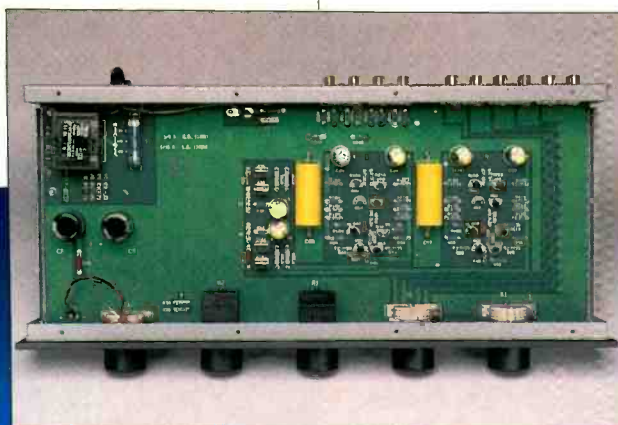
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*Dolby Pro Logic is a registered trademark of Dolby Laboratories Licensing Corporation.

1

ACURUS L10 LINE PREAMP

Manufacturer's Specifications
Frequency Response: 20 Hz to 20 kHz, +0, -0.15 dB.
THD: 0.06%.
S/N: 95 dB, A-Weighted.
Input Sensitivity: 60 mV.
Voltage Gain: 18.8 dB at full volume.
Maximum Output Voltage: 8 V rms.
Input Impedance: 10 kilohms.
Output Impedance: 47 ohms.

Dimensions: 17 in. W × 3½ in. H × 8 in. D (43.2 cm × 8.9 cm × 20.3 cm); 19-in. (48.3-cm) front panel optional.
Weight: 15 lbs. (6.8 kg).
Price: \$595; 19-in. panel, \$100.
Company Address: Mondial Designs, Two Elm St., Ardsley, N.Y. 10502.
For literature, circle No. 90



The Acurus L10 is one of a number of products manufactured by Mondial Designs Ltd. under the Acurus brand name. Other products in this line include the A250 stereo power amplifier and the P10 MM/MC phono amplifier.

The L10 is a minimalist design, to improve the odds on maintaining signal integrity. Functionally, the unit has a high-level signal selector with a balance and volume control and a line-output amplifier. Additionally, a tape-output selector permits recording a source different from that selected for listening. Like the dual selector systems on many other preamps, however, this one allows the user to accidentally interconnect the output and input of a tape deck or external processor by selecting the deck or processor as both the listening and recording source. The feedback resulting from this could damage one's speakers and even one's ears. The manual does at least warn of this possibility, saying that the design was done this way to avoid putting another switch contact into the signal path.

The L10 features six signal inputs, plus dual outputs to simplify blamping; connectors are gold plated. The output amplifier uses discrete, matched transistors. Metalized polypropylene capacitors are used in the signal path, and resistors are 1% metal-film types. The volume and balance controls are custom designed, with die-cast cases and large swept areas for low contact resistance. The unit also has dual-mono d.c. supplies with separate, discrete regulation for both the positive and negative rails of each channel.

Five rotary controls grace the front panel, all equally spaced, which create a very attractive overall look. From left to right, the controls are: "Off/On/Mute," "Volume," "Balance," and the "Listen" and "Record" signal selectors. On the rear panel are the signal input and output connectors and the a.c. line cord.

The large p.c. board that takes up the entire interior of the L10 is a study in beauty and simplicity of layout. The power supply (to the left, as seen from the front of the unit) takes up about 20% of the board, 60% more is taken up by the discrete output-amplifier circuitry and power-supply regulators, and the 20% between the output and power supply is empty. All front-panel controls are mounted to the p.c. board. All in all, a very neat and tidy unit, with excellent components and construction.

Circuit Description

The six inputs are all routed to the two selector switches. The "Record" selector feeds the two tape output jacks through individual buffer resistors. The "Listen" selector

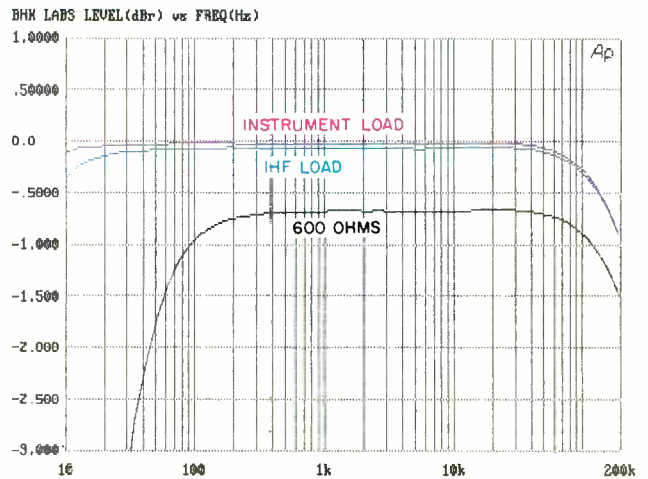
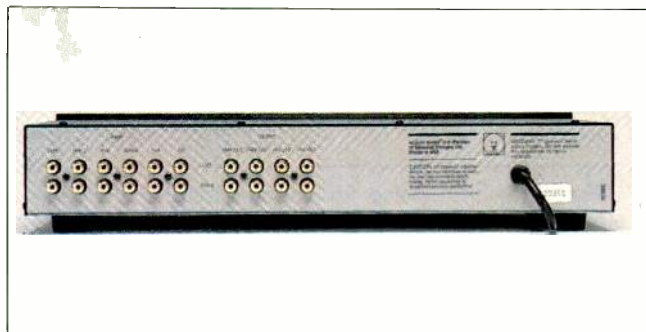


Fig. 1—Frequency response.

feeds through the balance control into the volume control, which in turn feeds the line amplifier through two resistors in series. The muting switch works by shorting the junction of these resistors to ground, in both the "Off" and "Mute" positions. The preamplifier is designed to be powered all the time, and the "Off" position does not actually turn its power off.

The input stage of the line amp is composed of a complementary differential amplifier using bipolar transistors. There is some emitter feedback, and emitter-supply current is through resistors instead of active current sources. The input stage is directly coupled into the second stage, a complementary circuit of common-emitter amplifiers that

Table I—Gain and Sensitivity, all inputs.

	Gain, dB			
	Left Channel		Right Channel	
	Instr. Load	IHF Load	Instr. Load	IHF Load
To Line Out	18.4	18.4	18.5	18.4
To Tape Out	-0.21	-2.1	-0.21	-2.1
	IHF Sensitivity, mV			
	Left		Right	
To Line Out	60		60	
To Tape Out	637		638	

also uses bipolar transistors. The collectors are tied together and direct-coupled to the output stage, which consists of large-junction FETs connected as source followers. Overall negative feedback is taken from here back to the inverting input of the input differential amplifier. Signal output is coupled through a 10- μ F film capacitor and individual, small-value buffering resistors to the two output jacks. This basic circuit topology is fairly common in solid-state power amplifiers, and I have seen it used in some preamps as well.

The power supply consists of a full-wave capacitor-input plus and minus supply. Resultant filtered d.c. voltage is

The L10's square-wave performance is excellent indeed, and distortion at realistic working levels is vanishingly low.

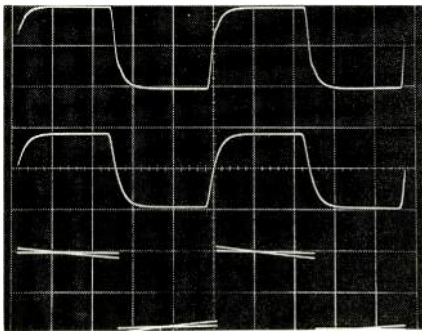


Fig. 2—Square-wave response, for 100 kHz into IHF load at full volume (top) and with volume about 6 dB down (middle), and for 20 Hz with both instrument and IHF loads (bottom). Scales: Vertical, 5 V/div.; horizontal, 2 μ S/div. for 100 kHz, 10 mS/div. for 20 Hz.

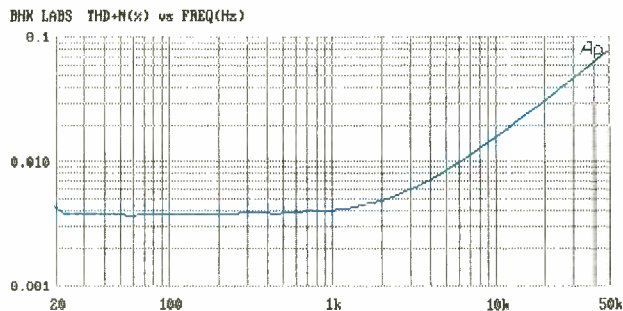


Fig. 3—THD + N vs. frequency, for 10 V output into IHF load.

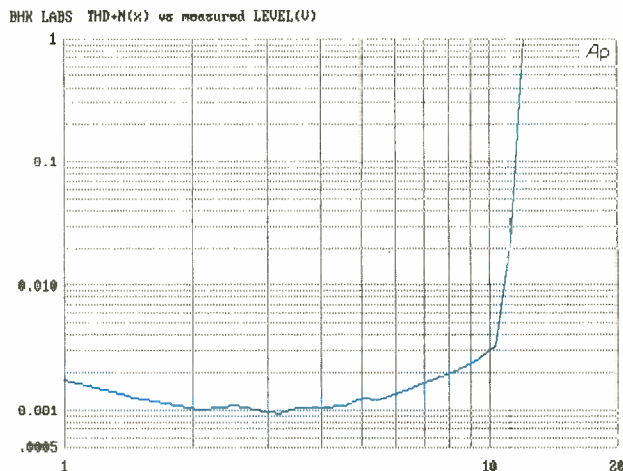


Fig. 4—THD + N vs. output voltage into IHF load, at 1 kHz.

regulated down to the working supplies of ± 18 V by zener regulators feeding emitter-follower pass transistors. There is an individual pass transistor for the positive and negative supplies to both channels.

Measurements

Gain and input sensitivities as a function of output loading are presented in Table I. No surprises here except for the relatively high loss into the IHF load at the tape output jacks, due to the 2.5-kilohm value of series buffer resistors used.

Frequency response at the main output jacks with the volume control at maximum and balance centered, is shown in Fig. 1 for instrument, IHF, and 600-ohm loads. With the volume control set at the -6 dB point, which usually rolls off the highs more, the response was substantially the same in the measurement bandwidth shown. With the 600-ohm load, low-frequency response is rolled off due to the value of the film output-coupling capacitor.

Square-wave response is illustrated in Fig. 2, and its first rate. The top and middle traces are for a frequency of 100 kHz. In the top trace, with the volume control at maximum and an output level of 10 V peak to peak, the beginning of slewing is apparent. Rise- and fall-times are about 0.8 μ S here. Taking off the IHF load doesn't materially change the waveform. Driving the output to a higher level yielded a slew rate of about 30V/ μ S. In the middle trace, the volume control was set at about -6 dB and the input level was increased to again produce about 10 V peak to peak. Rise- and fall-times have increased to about 1 μ S. Low-frequency tilt for instrument and IHF loading is shown in the bottom trace for a frequency of 20 Hz. Square-wave performance of the L10 is excellent indeed.

Total harmonic distortion plus noise versus frequency at an output level of 10 V rms into the IHF load is shown in Fig. 3. The measurement bandwidth used here was 500 kHz, to best illustrate the way distortion increases with frequency. The steady reading of approximately 0.4% at frequencies below 1 kHz is mostly out-of-band circuit noise. Figure 4 shows how THD + N at 1 kHz increases with output voltage into the IHF load. Here, measurement bandwidth is 22 kHz, to portray distortion more accurately. Distortion at realistic working levels is vanishingly low.

Table II—Noise levels vs. bandwidth. The IHF S/N ratios were 92 dBA for either channel, with 500-mV input signal and volume control set for 0-dB gain.

Bandwidth	Referred Input Noise, μ V	
	Left	Right
22 Hz to 22 kHz	2.1	2.0
400 Hz to 22 kHz	1.8	1.8
A-weighted	1.4	1.4

Referred input noise for various bandwidths, and IHF signal-to-noise ratios, are enumerated in Table II. Noise is low enough to be inaudible in most situations.

The volume controls tracked within 1 dB down to levels of -70 dB. This is reasonable for a control that Acurus calls an undetented stepped attenuator and is presumably

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Affordable audio for the critical listener.

Using the Acurus L10 with my little switching amp, the sound was quite clean and musical, with good space and dimension.

executed with film technology instead of with discrete resistors.

Interchannel crosstalk was measured with the undriven input terminated in 1 kilohm. With the volume at full rotation, crosstalk was at least -90 dB or better at frequencies up to about 1 kHz, and then increased at 6 dB per octave to reach -60 dB at about 35 kHz. With the volume turned halfway down, which reduces this preamp's gain by 20 dB, crosstalk was about -85 dB up to 1 kHz, again increasing at 6 dB per octave to about -60 dB at 35 kHz. These results were just about the same for either right-to-left and left-to-right crosstalk.

Output resistance measured a low 48 ohms for both channels. Input impedance depended on the volume control setting; it was lowest at about 9.8 kilohms with the volume full up and increased to about 12 kilohms with the control at mid position. The overall input-to-output phase is noninverting.

Use and Listening Tests

Signal sources used to evaluate the Acurus L10 line-level preamplifier included an Oracle turntable fitted with a Well Tempered Arm and Spectral Select MCR pickup, a Krell MD-1 CD transport used with VTL Reference and VTL Straight Line converters, a Nakamichi 250 cassette recorder, a Technics 1500 open-reel recorder, and a Nakamichi

ST-7 tuner. Vinyl records were played using a step-up tube phono preamp fed into one of the inputs of the L10. (This circuit can drive the L10's 10-kilohm inputs pretty well, as far as distortion and low-frequency response are concerned.) Other preamps on hand during the review period included a Quicksilver and a First Sound Reference II passive unit. Power amps used included an experimental, 50-watt/channel switching amp designed by a friend of mine, prototype Quicksilver 135-watt mono tube units, and a pair of Carver Silver Sevens. Speakers used were Win Research SM-10s.

Most of my listening was done with the little switching amp. Overall sound was quite clean and musical with good space and dimension. When things got loud and complex, I noted a bit of congestion in the sound that I didn't hear with the First Sound passive unit. When I paired the L10 with the Crown and Quicksilver amps, the resulting sound wasn't as good as with the switching amplifier, which is unfortunate as this is an experimental amp.

Be all that as it may, when I stop playing Supercritic and bear in mind that the Acurus L10 is less than one-third the price of the other preamps, then I must say that the Acurus performs pretty well. It gave me good musical satisfaction when paired with the right amp, with a clean, musical sound that included good spatial characteristics. "Completely satisfactory" is the opinion that I'm sure many listeners will form when they audition this preamp.

Bascom H. King

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2

ONKYO INTEGRA TA-207 CASSETTE DECK

The Integra TA-207 is, in a sense, a summation of Onkyo's approach to cassette deck design. Its Accubias system to fine-tune recording to the particular tape at hand has been an important feature of the company's decks for years. The "three-head" de-

Manufacturer's Specifications Frequency Response (± 3 dB):

Type I tape, 30 Hz to 17 kHz; Type II, 30 Hz to 18 kHz; Type IV, 30 Hz to 19 kHz.

S/N: 60 dB with metal tape, noise reduction off.

Input Sensitivity: 80 mV.

Input Impedance: 50 kilohms.

Output Level: 500 mV for 0-dB recorded level.

Power Consumption: 25 watts.

Dimensions: approx. 17¹⁵/₁₆ in. W x 5³/₁₆ in. H x 14⁷/₁₆ in. D (45.5 cm x 13.1 cm x 36.8 cm) including projecting controls and back-panel jacks.

Weight: 15 lbs. (6.8 kg).

sign permits off-the-tape monitoring during recording and, as a by-product, relatively easy adjustment of the Accubias. The dual-capstan drive system uses three motors and has an anti-resonance pad to damp shell vibration and minimize mechanical disturbances.

Price: \$529.95.

Company Address: 200 Williams Dr., Ramsey, N.J. 07446.
For literature, circle No. 91



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Accuracy from the U.S.



“...this new Acurus stuff from Mondial must be heard to be believed – fabulous sound for the price of Japanese Mid-Fi.”

– Lewis Lipnick, *Stereophile Magazine*, August 1991, Volume 14 Number 8

“The sound of the amplifier is nothing short of astounding. With the Acurus preamplifier it becomes an impressive system.”

– *The Inner Ear Report*, Spring 1992, Volume 4 Number 4

America has just eliminated any reason to buy a foreign made product from the brands listed below. Acurus is made in the U.S. by Mondial Designs Ltd., recipient of the 1992 Grand Prix Award from Asia. The Acurus A250 was reviewed in Germany at 314 watts per channel into 8 ohms/580 watts per channel into 4 ohms and placed in the same category as amplifiers selling for twice the price. If you want the best quality and value in audio components, do what the Europeans and Asians do...buy American...buy Acurus.

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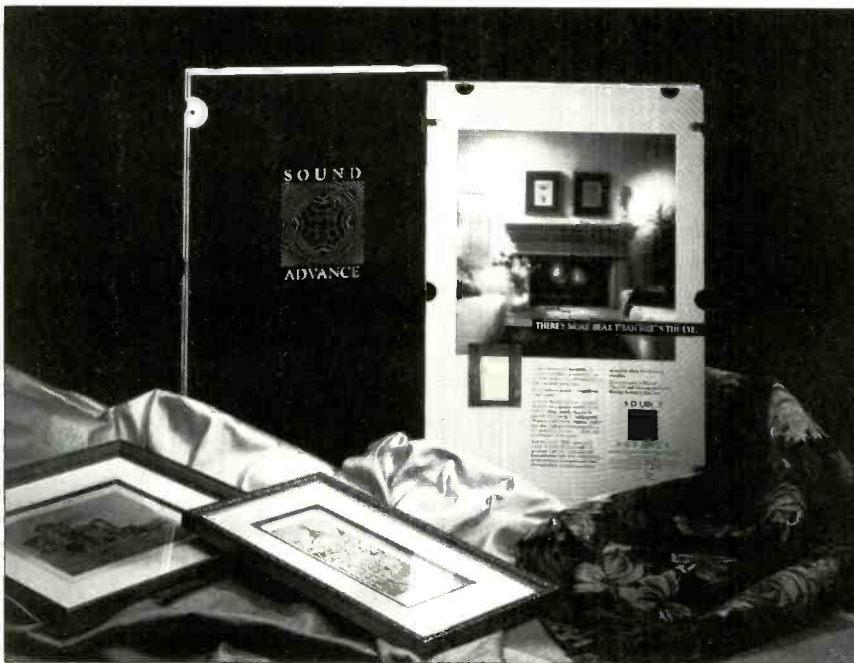
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Oh, and, of course, the finest speakers. The expected, enormous box speakers are fine for the media room, but how do you wire the rest of the house for sound? Wouldn't it be great if you could install speakers throughout your home that sounded fantastic...but were completely invisible?

Well, now you can.

The Sound Advance II is an aesthetic speaker designed for invisible, in-wall application. The 14" x 21" x 3" speakers are easily installed into any wall or ceiling by a professional or with the help of an instructional video cassette that can even take the do-it-yourselfer through the installation process easily, step-by-step. The speaker

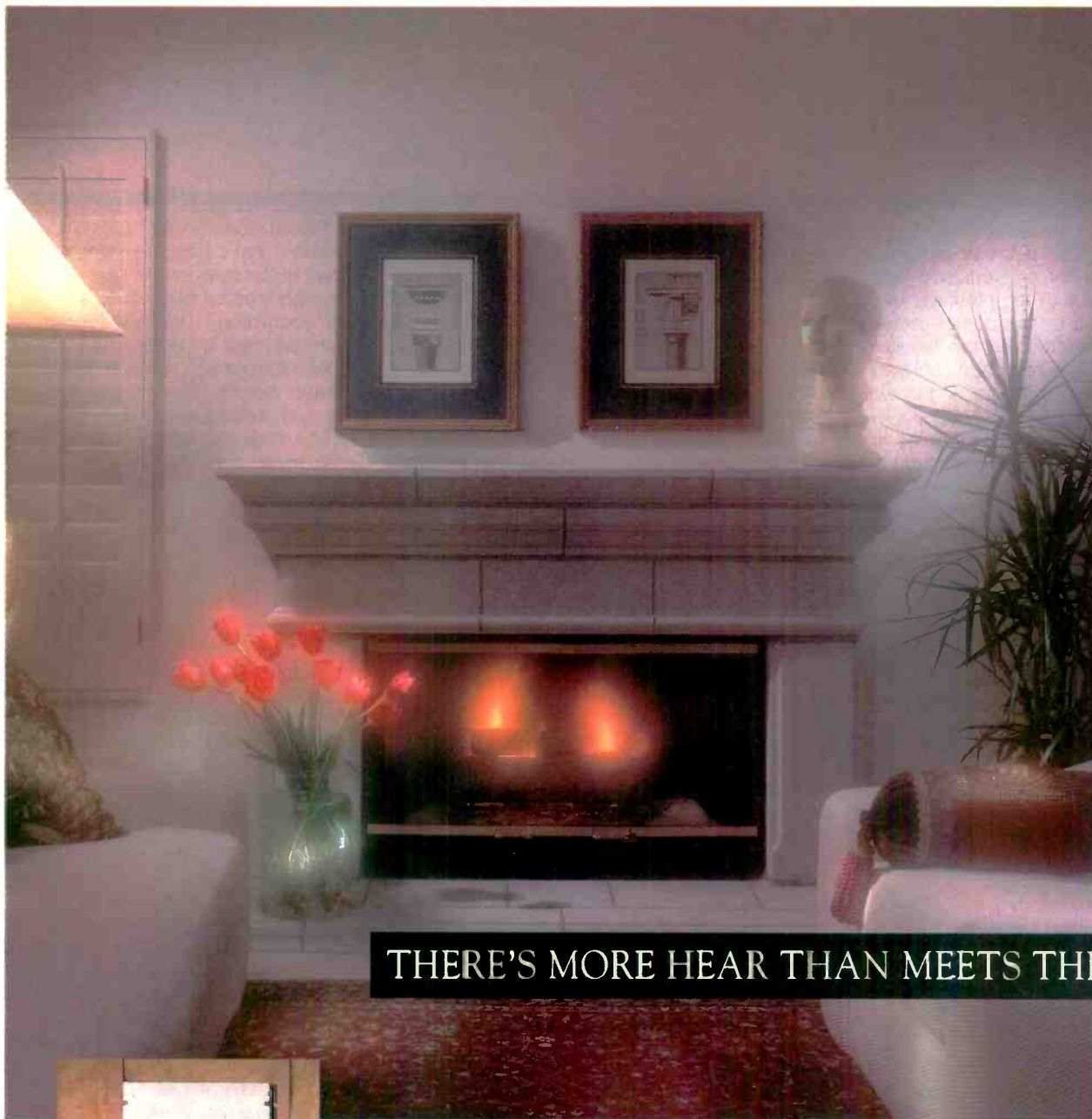
can then be covered with paint, wallpaper or fabric without so much as a visible seam.

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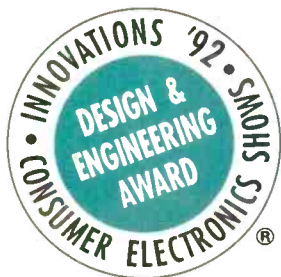


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The Onkyo TA-207 deck includes the most popular conveniences as well as technical features for relatively serious use.

At the same time, the design incorporates a cross section of the most popular convenience features consistent with the relatively serious use implied by the basics mentioned above. In addition to the familiar timer functions, auto-space (to insert five-second silences ahead of the selections you record), and AMCS (Onkyo's label for a function that samples about 10 seconds from the beginning of each selection on a tape), there are repeat and time-display functions comparable to those commonly found in Compact Disc players. The real-time counter can be set to show elapsed or remaining time. The repeat can be set to play any portion of the tape that you choose, and it stops automatically after the fifth playing.

The TA-207 is supplied with a wireless remote and can be used (via back-panel connections) with Onkyo's other Remote Interactive (RI) control-system components. The recorder incorporates both Dolby B and C noise-reduction options, Dolby HX headroom extension, and defeatable FM-multiplex filtering.

Control Layout

The transport, counter-mode, "Repeat," and monitoring controls all are grouped below the central display panel. The transport controls are larger than the others, with the "Play" button the largest of all. At the extreme left, beyond the transport door, are the main power switch, headphone jack, "Eject" button and remote-control sensor. Just to the right of the display are switches for "Display" brightness ("On/Off," "Dim/Normal"), noise reduction, and multiplex filter. The recording-level control is a single knob at the extreme right; channel "Balance" is controlled separately by a smaller knob below it. The two remaining knobs are for the "Timer" modes and "Accubias."

The "Tape Size" indicator in the counter group sets the time counter to match the tape currently in use. It has options for C-46, C-60, C-90, and C-120 cassettes. In-between lengths presumably use the nearest available option, but the interesting element is the inclusion of C-120, whose very existence is all but denied by many a deck-maker.

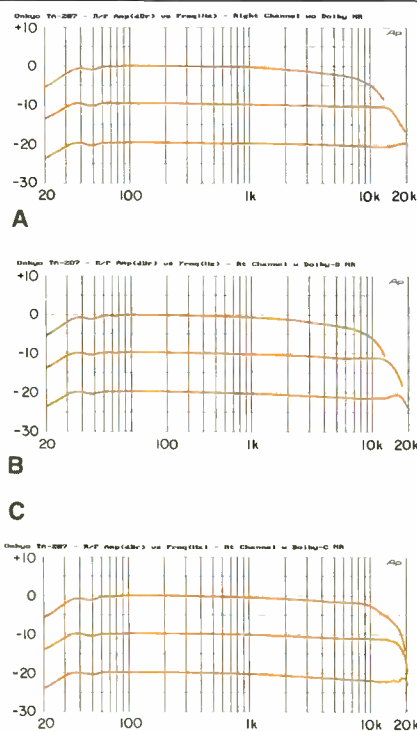


Fig. 1—Record/play frequency response with Type II tape, at levels of 0, -10, and -20 dB on the meter, with noise reduction off (A), with Dolby B NR (B), and with Dolby C NR (C). Only the left (worse) channel is shown; right-channel performance was very slightly better.

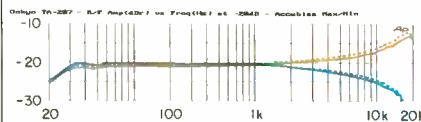


Fig. 2—Record/play response with Type II tape, no NR, at maximum and minimum Accubias setting. Left channel is solid curve, right channel is dashed.

Equalization is set automatically by sensors that detect the keyways in the shell of the cassette in use. The same sensors control basic bias adjustment for recording. The "Accubias" can then be used to "tweak" bias above or below the median value at the control's center detent; the manual lists suggested settings for specific tapes. When in doubt, says the owner's manual, leave the "Accubias" set at the detent. It was therefore set that way for all record/play measurements except the curves documenting the adjustment range).

The meter portion of the display is calibrated at 1-dB increments between -3 and +3, at 2-dB increments from there to -7 and +7, at +10 (the top of the scale), and at -10, -20, and -30 dB. The styling of the scale suggests that finer divisions can be read, but the elements light in blocks centered on each calibrated point.

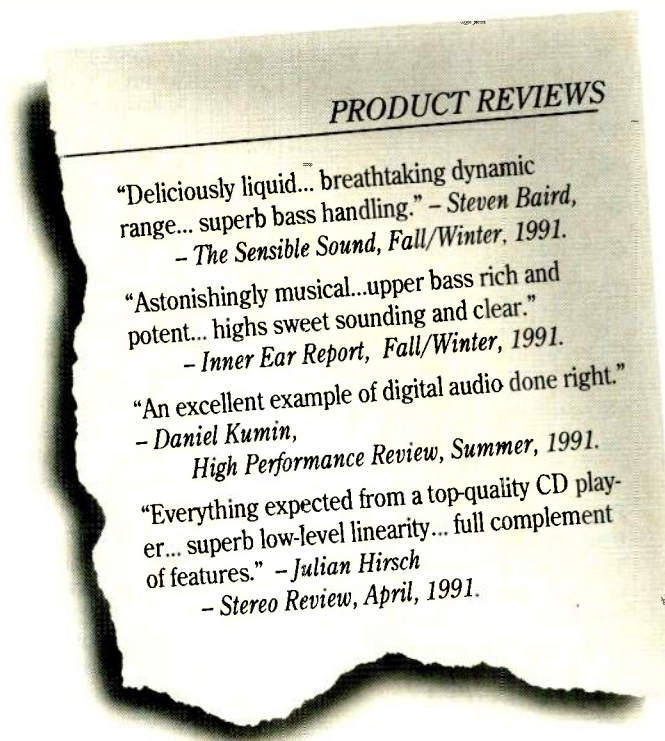
The supplied remote is designed for use with other Onkyo models as well. It includes a "Monitor" switch, buttons to control the counter-display functions ("Tape Size," elapsed/remaining time, and "Reset"), AMCS and auto-space buttons, and the basic transport controls, including recording. They don't work exactly like the front-panel controls—the remote combines recording and pause in a single button and includes a non-functioning reverse-direction play button—but these disparities should not become a source of confusion when using the TA-207.

Measurements

The measurements, by Diversified Science Laboratories, take the DIN/IEC/EIA standard of 250 nanowebers per meter of recorded flux as the 0-dB reference. Past *Audio* reports by the late Howard Roberson used 200 nWb/m, which is Dolby reference level, as the benchmark. Keep this in mind if you compare our findings with earlier reports. The present reference level is about 2 dB higher, which makes signal-to-noise ratios look a little better and overload figures look a little less generous.

For the record, all the tapes used for record/play measurements were Maxell formulations specifically suggested by Onkyo. Except as noted, the measurements were made with Type II

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Response with Type II tape is exceptionally flat and very extended at -20 dB, with only moderate treble compression at 0 dB.

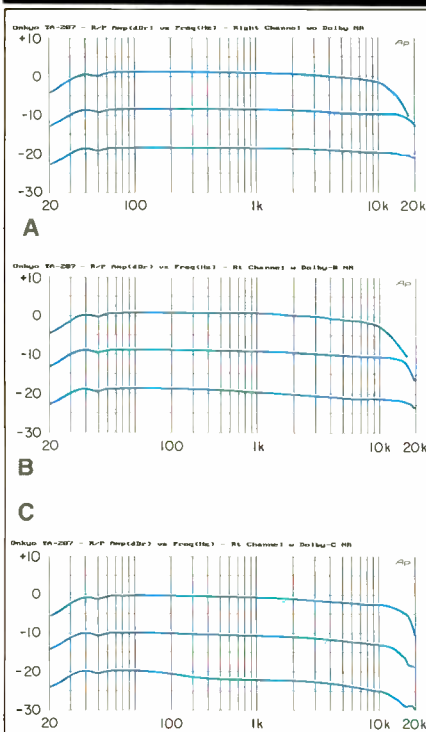


Fig. 3—Record/play frequency response with Type IV tape, at levels of 0 , -10 , and -20 dB on the meter, with noise reduction off (A), with Dolby B NR (B), and with Dolby C NR (C). Left channel shown.

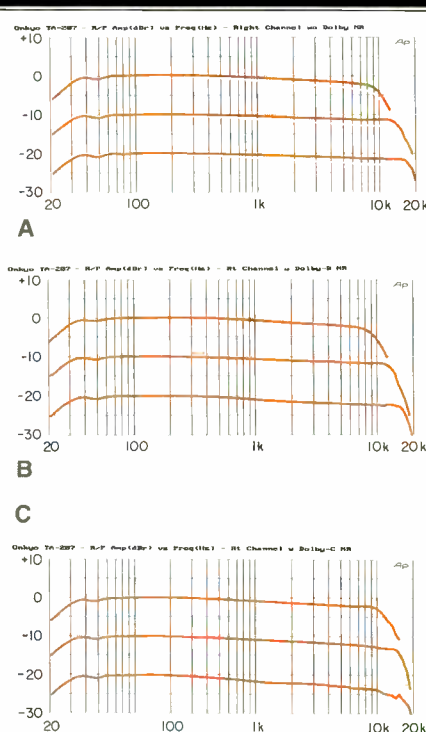


Fig. 4—Record/play frequency response with Type I tape, at levels of 0 , -10 , and -20 dB on the meter, with noise reduction off (A), with Dolby B NR (B), and with Dolby C NR (C). Left channel shown.

tape (Maxell XLII), which seems to be by far the tape type of choice for most purposes by many serious recording enthusiasts these days. As Fig. 1 demonstrates, response is fundamentally excellent with this tape. Without noise reduction (Fig. 1A), the -20 dB curve is exceptionally flat and very extended. There is only a tiny peak at the top end of the curve and almost no "head bumps," attributable to contour effect, at the bottom end. Even at -10 dB the curve is textbook-flat to well above 10 kHz, which presumably is a tribute to the Dolby HX Pro. There is only moderate high-frequency compression at 0 dB.

Adding noise reduction (Figs. 1B and 1C) introduces a slight treble sag, suggesting that the test tape may offer a little less output than the internal sen-

sitivity adjustment of the playback Dolby circuit is set for, but the effect is slight. Response still can be characterized as excellent.

Figure 2 suggests that tweaking the Accubias might have flattened the mid-treble a bit, though not without exaggerating the little peak near the top end of the response curves shown in Fig. 1, which were all measured with the Accubias at its detent. The improvement would be so slight, and so little needed, that I'd second Onkyo's advice to keep the control at the detent unless there's a real reason for doing otherwise.

The Type IV tape (Maxell MX) appears to be a bit overbiased (Fig. 3), judging from the slight, gradual roll-off toward the top end of the -20 dB response curves. Adding noise reduc-

tion increases the roll-off; the response curves' shapes further suggest a sensitivity mismatch—that is, the deck's internal Dolby level adjustment was based on a tape of higher output than MX. In other respects, the Type IV response curves remain excellent.

There is no Type IV Accubias graph, incidentally, because Onkyo says that Accubias is ineffective on Type IV tapes. (I was unable to detect any significant change in response, in fact, when I exercised Accubias with MX during the listening tests.)

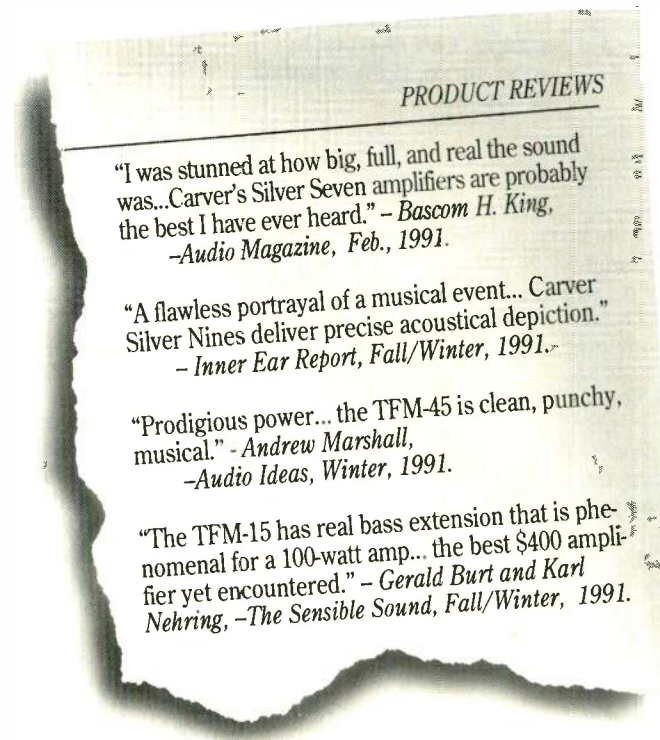
Type I response (Fig. 4, measured with UDI) follows the pattern of Type IV except that it doesn't have quite the bandwidth at the top of the spectrum, where it also lacks the metal formulation's excellent headroom. On the other hand, it doesn't pay as much of a roll-off penalty with Dolby C, possibly because of better sensitivity tracking. And Fig. 5 suggests that Accubias could be employed to good effect in bringing up the Type I treble.

Figure 6 shows that distortion at a recorded level of -10 dB remains below 1% from below 40 Hz to above 3 kHz with the Type II tape, which is the best performer of the three except in the extreme bass. Over the working frequency range, there's little to choose between the three tape types; all come in at no worse than about 1.3% between 50 Hz and 5 kHz (our usual assessment range), but the differences in the shapes of the curves are interesting.

Distortion at higher levels is examined in Fig. 7. Again, the differences between formulations aren't huge, but the way the Type I tape resists going into overload as signal level increases is instructive. It is one reason for choosing Type I and Dolby C (to compensate for Type I's noise penalty at its $120\text{-}\mu\text{S}$ EQ) over Type II or IV and Dolby B, if you're faced with that choice. With many a tape brand, the best Type I formulation has the lowest distortion.

Figure 8 shows minor high-frequency roll-off in playback when measured with the BASF test tape. These curves are fairly typical of cassette equipment these days. In addition, the lab ran tests for interchannel phase angle, which suggested that the roll-off is due primarily to a slight azimuth disparity

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The TA-207's ergonomics are very well thought out, including its recording level controls and the indicator LEDs in the buttons.

between the deck and the test tape, although documentation supplied with the test sample suggests that the BASF tape is used in checkout by Onkyo as well. The superiority of the Type II record/play curves over the corresponding playback curves seconds this assessment, because the electrically independent record and play heads share a common shell, which keeps the recording and playback gaps mutually aligned even when overall azimuth is misaligned.

Table I supplies basic information that should raise no eyebrows. Things get a little more complex in Table II. Its primary message is that if you habitually record so that the peaks just hit your meters' 0-dB indication, you'll be wasting 3 to 5 dB of headroom with the TA-207—or, conversely, that you will have 3 to 5 dB of "pad" to prevent overload on those peaks you didn't bother checking out. Since +5 dB is above the meter's range of greatest (1-dB) resolution, Onkyo evidently expects you to do your fussing lower down and leave the actual overload point as protection.

The noise figures (also in Table II) are very good: Typical of top deck models and blank tapes these days. The disparities between the two sets of noise measurements reflect the differences between the weighting schemes. Though A-weighting is fairly standard, the CCIR curve may offer a better simulation of human aural acuity.

The meter-response figures in Table III indicate that the cursor will respond to the current maximum within about 5 mS and that the most recent maximum

Table I—Input and Output Characteristics (re: 250 nWb/m recorded level at 315 Hz).

Line Input Sensitivity	86 mV
Line Input Impedance	60 kilohms
Line Input Clipping Level	more than 10 V
Line Output Level	585 mV
Line Output Impedance	825 ohms
Headphone Output Level	710 mV
Headphone Output Impedance	90 ohms

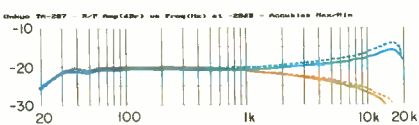


Fig. 5—Record/play response with Type I tape, no NR, at maximum and minimum Accubias setting. Left channel is solid curve, right channel is dashed.

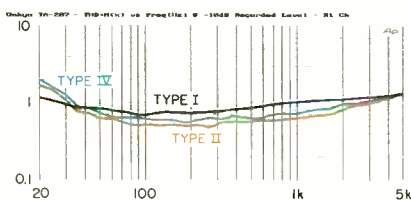


Fig. 6—THD + N vs. frequency at -10 dB recorded level, no NR.

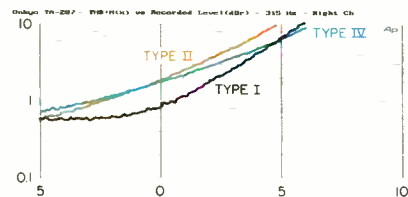


Fig. 7—THD + N vs. level at 315 Hz, no NR.

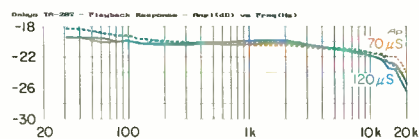


Fig. 8—Playback response for BASF 120- and 70- μ S calibration tapes; 0 dB equals 250 nWb/m at 315 Hz.

will stay illuminated for some 700 mS. As with many meters, only the top element (or block) of the meter remains illuminated if the signal then drops more than one element to the left on the meter. Like virtually all non-mechanical meters, it exhibits no overshoot on transients.

The interchannel phase-error figures near the end of the table are very good (and confirm again that playback azimuth does not affect record/play behavior). The vibration-damping pad behind the cassette shell should help keep jitter low. The multiplex filter is not exceptionally vigorous, though a response plot shows that it actually takes about 10 dB more out of the signal at frequencies slightly higher than the crucial 19 kHz of the measurements. Other data in this Table document admirable (if not necessarily exceptional) behavior.

Use and Listening Tests

Most of the practical tests centered around Type II tapes. I was able to make very good recordings with them. Predictably, from the lab data, I was a little less satisfied with the results using Type IV or I tapes. Playback fidelity is harder to judge, because any minor loss of sparkle is as easily blamed on the equipment used in making the recording (be it commercial or home-grown) as on the deck under test. The TA-207 is, at minimum, well within the acceptable range in this respect.

The Accubias makes a significant difference with Type II tapes, of which I used several in addition to the Maxell. The owner's manual offers a diagram of suggested settings for a long list of Type II and Type I tapes, many of which are available on the U.S. market. It does not take up the question of vintage, however, and some tapes demonstrably will produce best results at different settings if you are working with samples from different years of manufacture.

The suggested method of setting Accubias is to detune your FM tuner (disconnecting its antenna helps) and defeat its muting. Recording interstation noise at -10 dB, you can monitor from the tape to hear the effect produced by rotating the Accubias knob. Using the monitor switch, you can then compare the taped sound to the

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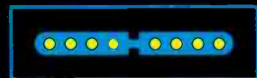
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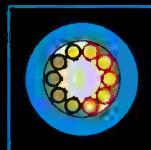
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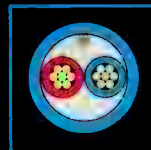
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Like all Onkyo equipment, the TA-207 is solidly built and generously supplied with features for its price.

Table II—Indicator Characteristics. Tape Overload, and Dynamic Range.

	Type II	Type IV	Type I
Meter Reading (source) for DIN 0 dB Recorded Level	+2 dB	+3 dB	+1 dB
THD + N at DIN 0 dB	2.1%	1.9%	0.91%
Meter Reading (source) for 3% THD + N	+3 dB	+5 dB	+5 dB
Recorded Level at 3% THD + N	+1.3 dB	+2.2 dB	+3.3 dB
A-Weighted Noise (Record/Play, re: DIN 0 dB)			
No noise reduction	-61.1 dB	-59.0 dB	-56.5 dB
With Dolby B	-69.8 dB	-67.7 dB	-65.8 dB
With Dolby C	-78.7 dB	-77.4 dB	-75.5 dB
CCIR/ARM-Weighted Noise (Record/Play, re: DIN 0 dB)			
No noise reduction	-59.1 dB	-56.7 dB	-53.9 dB
With Dolby B	-69.3 dB	-67.2 dB	-64.3 dB
With Dolby C	-79.7 dB	-78.2 dB	-75.4 dB

source and adjust Accubias for closest possible replication of the latter's high-frequency balance. This is a little tricky because (depending on tape sensitivity) the output isn't always precisely matched to the source's level, but it works.

In general, the settings that seemed best to me were somewhat lower than those recommended for the same brands in the owner's manual, but that may be because some of my samples are not of very recent provenance. Of the three vintages of TDK SA that I tried, two sounded best with the knobs at about the 10 o'clock position, and one at about 9 o'clock; the manual places SA at 12 o'clock, the detent.

Ergonomically, the design is generally very well thought out. I particularly appreciated the individual recording knobs for level and balance; clutched concentric elements for the two channels seldom are satisfactory. Also of note: The tiny in-use LEDs in the "Record," "Pause," and "Play" buttons, so you don't have to search for mode indicators buried in the display.

On the down side, there is no level control for the earphone output. While Onkyo's earphone drive level is well chosen, you may not consider it ideal, depending on both your taste and the sensitivity of your headset. Also, the earphone jack is just above the main power switch, which I tended to trip when I withdrew the phone plug. Unless you use the TA-207 for live recording—a use to which no current home

Table III—Other Characteristics.

Meter Response	
Time	approx. 5 mS
Meter Peak-Hold	
Duration	approx. 700 ms
Playback Speed	
Accuracy (105 to 127 V a.c.)	0.1% slow
Record/Play Wow & Flutter (IEC)	±0.085%
Fast-Wind Times (C-90 cassette)	approx. 90 S
Record/Play Channel Separation (315 Hz)	51.9 dB
Erase (Type IV Tape, at 100 Hz)	66.8 dB
Record/Play Interchannel Phase Error (at 10 kHz)	
Average	+1.4°
Jitter	±4.4°
Multiplex Filter (at 19 kHz)	-31.0 dB

deck I'm familiar with is well adapted—these caveats will be of little importance, however.

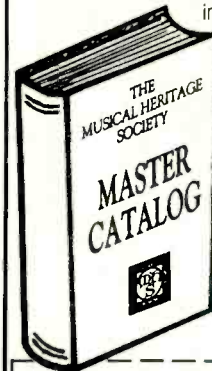
The concept of the TA-207 will be familiar to anyone who has been keeping an eye on Onkyo's progress in the cassette-deck field. Its design presents no surprises—which is to say that it's an evolutionary, rather than revolutionary product. Like all Onkyo equipment, it is solidly built and generously supplied with features for its price group.

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Sensitivity: AM, 1 μ V for 10-dB S/N; SSB, 0.5 μ V; CW, 0.25 μ V; FSK, 2.0 μ V.

Automatic Gain Control: AM, carrier-derived; SSB, CW, and FSK, car-

rier- or audio-derived; fast attack and hold.

Image Rejection: 90 dB.

First I.f. Rejection: 80 dB.

Second I.f. Rejection: 100 dB.

Antenna Input Impedance: 50 ohms.

Audio Outputs: Line, 600 ohms; speaker and headphone, 8 ohms.

Power Requirements: 11 to 16 V d.c., 1 ampere (nominal, 12 V, 320 mA) from external power supply.

Price: \$1,495; Model DA100D antenna, \$216.

Company Address: 4521 Campus Dr., #113, Irvine, Cal. 92715. For literature, circle No. 92



It's been widely acknowledged that computers are beginning to control our lives, but the Dymek DR333 is the first radio receiver I've encountered that is totally controlled by an IBM-compatible personal computer. As a result, its front panel carries only a BNC antenna connector, a 600-ohm line output jack, a speaker jack, a headphone jack, an input terminal for 12-V power, and a nine-pin RS-232 female connector for the computer cable. A nine-pin to 25-pin RS-232 adaptor is supplied, but users must provide their own cables and power supply.

Along with its new technology, the Dymek carries a proud old name. Fellow audio old-timers may remember the McKay Dymek AM tuners; their fidelity rivaled that of FM, with virtually flat audio response to 9 or 10 kHz. The name's just Dymek now and belongs to Stoner Communications, but the product is just as different, in its way, as the old hi-fi AM tuners were.

Unlike those old broadcast-band tuners, the DR333 is a general-coverage receiver likely to find favor with serious amateur radio operators, short-wave buffs, and others who

need a high-quality, sensitive receiver capable of tuning all frequencies from 10 kHz to nearly 30 MHz. Besides conventional AM, it can receive single-sideband (SSB), unmodulated continuous-wave (CW), radio teletypewriter (RTTY), fax, and frequency-shift keying (FSK) transmissions.

Because it works from an external 12-V supply, the DR333 can be used as a portable or mobile unit (presumably with a laptop computer). It can even be operated remotely from its controlling computer via a hard-wire, modem, or r.f. link to the unit's RS-232 female connector.

You might think that the receiver might pick up interference from the computer. The receiver itself is completely shielded, however; according to Stoner, interference is only a problem when the antenna is near a VGA monitor. Since I mounted the antenna outdoors, I had no problem. Stoner also says that if a problem occurs, putting a grounded metal-mesh cover over the monitor will usually solve it.

The computer requirements are modest: At least 256K of RAM and one 5¼-inch floppy-disk drive, and DOS 3.1 or higher. The DR333 can be used with computers having

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But, Onkyo's new DX-C909, DX-C606, and DX-C206 6 Disc Carousels don't accomplish this by just being "one better" than conventional 5 disc players.

The Integra DX-C909, for example, incorporates design elements usually reserved for only the most costly single play components.

It utilizes Onkyo's proprietary Single Bit D/A Converters and AccuPulse Quartz System for unsurpassed linearity and stability, resulting in musical reproduction that's indistinguishable from the original performance. Onkyo's AEI Transformer eliminates electro-magnetic flux leakage (a hazard common to other players) that can cause distortion. A copper plated chassis provides greater shielding and lower noise levels, while optical outputs insure the purest possible signal transmission.

With Onkyo's new six disc carousels, optimum engineering joins breakthrough convenience for the first time as well. Onkyo's Next Selection Function lets you change the next track programmed without interrupting the track that's playing. No other carousel, magazine changer or single play machine has this ability.

So, if you're purchasing a CD changer, Onkyo's new carousels are really the only choice you have.

Unless you're into antiques.



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Both frequency response and sensitivity are better than I usually get from the AM sections of "hi-fi" tuners and receivers.

Fig. 1—Printout of text on secondary "Channel Menu" screen with several channels stored in computer memory.

```

MEMORY AVAIL: 46574
660.000 kHz AM CHAN0001 SIG 192 DYMEK DR333
0 PBT
=====
UTC 21:41:39
DAY 09-14-91
LOC 09:41:39
First Chan.
RADIO ON
a AGC SLOW
b BW 6.0

CHANNEL MENU
R-Read O-Output N-New E-Edit D-Delete
-Scroll-up -Scroll-down P-Pick T-Scan Z-Exit
CHAN FREQUENCY AUDIO MODE BW IF COMMENT
1 660000 10 AM 6.0 30 First Chan.
2 710000 10 AM 6.0 30 WOR-AM
3 880000 10 AM 6.0 30 CBS Radio
-> 4 1010000 10 AM 6.0 30 WINS
5 1560000 10 AM 6.0 30 WQXR
6 5000000 10 AM 6.0 30 WWV
7 10000000 10 AM 6.0 30 WWV
8 15000000 10 AM 6.0 30 WWV

h-LSB j-AM k-USB l-CW c-CHANNELS f-FREQ u-UTC s-SCANS w-WWV
  
```



Fig. 2—Simulated front-panel display, with Special Purpose Program.

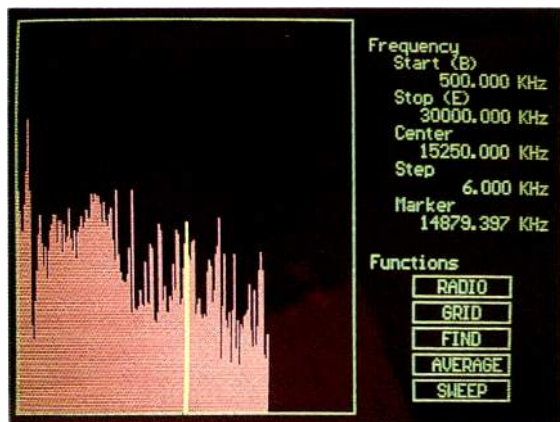


Fig. 3—Spectrum-analysis display.

monochrome or color monitors, though one of its two software programs requires CGA or VGA graphics monitors, which are usually color. The operating software is written in Turbo C, a common computer language, so users can rewrite it to fit their own requirements.

The DR333 comes with two operating programs on 5¼-inch, double-density floppy disks. The Standard Operating Program (SOP) works with monochrome or color systems, while the Special Purpose Program (SPP) works only on CGA, VGA, or Hercules display systems. The Standard Operating Program is an all-character display that has no graphics. It starts by putting a menu of four main options on the screen. "Read Radio Settings" reads in the file that has been set up to make the receiver turn on at a specified frequency, bandwidth, mode, audio level, and i.f. gain. "Save Radio Settings" places all current radio settings in that file. "Set Up Communication Port" lets you choose your computer's COM 1 or COM 2 serial ports, if it has more than one. Finally, "Exit" maintains the receiver's current settings while letting you use your computer for other purposes (as I did, to operate the Audio Precision test gear that I used for the measurements).

Single keystrokes call up the various options—numbers for those just mentioned, letters and other symbols for the rest. Most options carry on into other screens. For instance, pressing "c" for "channels" replaces the center-screen information with the channel menu shown in Fig. 1, a printout from my computer screen. The items at the top and bottom are the same as in the Main Menu screen. The upper left shows the date and both the Universal Time ("UTC," formerly Greenwich Mean Time) and local time. The upper right shows the current signal strength ("SIG," on a scale from 0 to about 200) plus current settings for "AUDIO" level, "IF" gain, "Mute," "AGC," and bandwidth as well as the keys used to change these settings. The bottom line of the screen lets you select the type of reception (lower or upper sideband, "AM," or "CW"), set the UTC and the local offset from that time, call up the channel or scan menus, input a desired station frequency from the computer's number keys, or tune directly to the five frequencies of the Bureau of

With the DR333, I received every AM station in my area during the day and several clear-channel AM stations 800 miles away at night.

Standards' station WWV, which carries super-accurate clock signals.

The channel menu shown in the center of Fig. 1 is one that I created for AM broadcast stations in my listening area. The currently tuned station, shown at the top, is 660 kHz, channel 1 on my menu, but pressing "p" (for "pick") would switch to the channel indicated by the small arrow—in this case, channel 4 (1010 kHz). Press "s," enter a range of channel numbers, and the receiver will scan continuously through those channels, stopping for a few seconds at each until "q" (for "quit") is pressed.

Figure 2 shows the display when using the Special Purpose Program, which requires CGA or VGA graphics in your computer and monitor. The colors of the display's sections can be changed by using the computer's function keys F5 through F8. Virtually all of the functions previously available from the keyboard with the simpler standard program are now available using cursor arrow keys, the "Enter" key, and in the case of station frequencies, either by turning the "tuning knob" at the center of the display with the arrow keys or a mouse or by typing in the desired frequency.

The chief benefit of this software (aside from the fun of seeing a radio control panel created graphically on your computer screen) is its r.f. spectrum-analysis display, called up from the "Options" menu. By specifying the start and end frequencies and the frequency steps you want, you get a display like that in Fig. 3. Each spike represents a received signal in what you can see is a pretty crowded band in the New York City area. To find the frequency of any signal shown, you use arrow keys to move the cursor to that signal's spike and then read the frequency at the far right.

Measurements

I should point out that the sample I tested offered a maximum bandwidth of 6 kHz. I could have gotten better audio fidelity with the optional 10-kHz bandwidth filter, which costs \$15, but it is in short supply and ordering it can delay delivery. As I stated earlier, however, the prime purpose of the DR333 is not to provide high-fidelity AM reception but to serve as a sensitive, general-purpose receiver covering a wide range of frequencies and reception modes. Just the same, I could not resist measuring AM frequency response, using the 6-kHz bandwidth (Fig. 4). The -6 dB cutoff points are at 43 Hz and 3.2 kHz, actually somewhat better than I usually get from the AM sections of high-fidelity tuners and receivers.

Dymek quotes a rather unusual AM sensitivity specification, using 10 dB as the criterion for S/N rather than the usual 20 dB. With that figure, sensitivity was indeed 1 μ V, as claimed. However, it took some 4.5 μ V to obtain 20 dB of S/N, far and away a better reading than I usually obtain. Overall image rejection was 92 dB, and overall i.f. rejection was better than 75 dB. Harmonic distortion was under 0.5% for a test signal of 1 kHz at 30% modulation.

Use and Listening Tests

Although I was not able to put the optional DA100D powered antenna on my rooftop, its 50-foot coaxial cable allowed me to place it at ground level outdoors. I listened to a wide variety of broadcast and shortwave programming

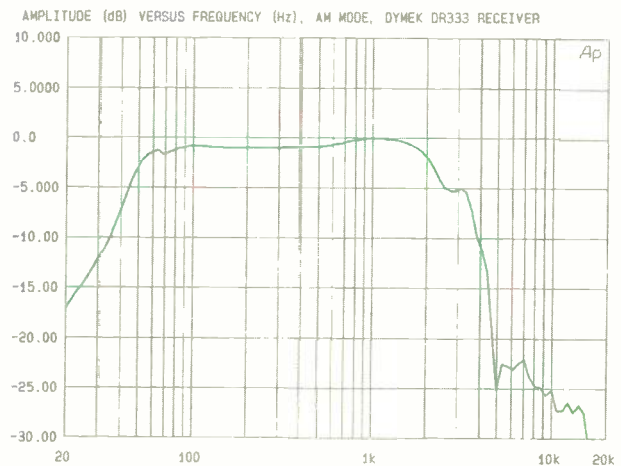


Fig. 4—AM frequency response, including new standard 75-S pre-emphasis and de-emphasis, using 6-kHz bandwidth.

from the DR333. On the broadcast AM band, I received every station in the New York metropolitan area during daylight hours as well as a number of clear-channel AM stations from as far off as Chicago (nearly 800 miles away) in the evening. The 6-kHz bandwidth setting, although not ideal for music, made for very intelligible reception of speech programming, especially when I tuned to overseas channels. I liked having the ability to call up several WWV frequencies for time checks without having to punch in their frequencies.

The software did not measure up to the receiver's own performance or to the graphic elegance and ease of use one expects from computer software today. The initial version of the Special Purpose Program I had did not permit use of a mouse, though I was later sent a revised version, which does support it. I felt that the original operating manual could have benefited from some rewriting for people like me who are more familiar with computers than with sophisticated general-purpose receivers. However, by the time you read this, Stoner should have a new manual that, judging from the pages I've seen, should make the DR333 much easier to use.

As for the DR333's price, unfortunately I do not have a real basis of comparison with other similarly configured receivers. I examined the internal construction and was impressed at the density of parts, the number of LSIs, and the layout of the p.c. board. Still, a price of just under \$1,500 seems rather high to me. However, those skilled in the art of amateur radio and the other applications for which this receiver is intended usually feel the same way about stereo equipment we audiophiles consider reasonably priced.

Leonard Feldman

4

SNELL TYPE B SPEAKER

Manufacturer's Specifications

System Type: Four-way, floor-standing, closed-box system with rear-mounted subwoofer and tweeter.

Drivers: 10-in. rear-mounted cone subwoofer, 10-in. cone woofer, two 5¼-in. cone midrange drivers, one 1-in. metal-dome tweeter, and one rear-mounted ¾-in. tweeter.

Frequency Response: 20 Hz to 20 kHz, ± 1.5 dB, with fifth-octave averaging; 100 Hz to 15 kHz, ± 2 dB, 45° to either side of axis.

Total Radiated Power: 600 Hz to 18 kHz, ± 1 dB; 20 Hz to 18 kHz, ± 3.5 dB.

Sensitivity: 86 dB at 1 meter with 1 watt (2.83 V rms) applied.

Acoustic Crossover Frequencies and Filter Slopes: 40 Hz (12-dB/octave low pass), 275 Hz (24 dB/octave), 2.7 kHz (18 dB/octave), 5 kHz (6-dB/octave high pass) for rear tweeter.

Impedance: 8 ohms average, 4 ohms minimum, 20.5 ohms maximum. Maximum phase of $+45^\circ$ at 20 Hz.

Recommended Amplifier Power: 40 to 400 watts per channel.

Dimensions: 17½ in. W \times 48 in. H \times 17½ in D (44.5 cm \times 121.9 cm \times 44.5 cm).

Weight: 125 lbs. (56.7 kg) for single system.

Price: \$4,490 per pair. Available in light or dark oak, walnut, and black-finished veneers.

Company Address: 143 Essex St., Haverhill, Mass. 01832.
For literature, circle No. 93



Snell has garnered a good reputation over the years for producing accurate-sounding systems with honest value for the money. Snell's first system, the Type A, the precursor of the Type B reviewed here, was placed on the market shortly after Peter Snell founded the company in 1976. That system, currently in production as the Type A III and at the top of Snell's lineup, was one of the first systems to seriously consider the effects of room boundaries on low-frequency response.

When the company's founder passed away suddenly, in 1984, the Snell family turned management of the company over to its current president,



Dr. William Osgood, who had long been a management consultant to Snell. The Type A's designer, Kevin Voecks, joined the company in 1985 and currently directs its engineering and design efforts.

The Type A is unique in that it utilizes two woofers mounted at widely different cabinet locations; this is said to smooth the bass response of the system in typical listening rooms. One forward-facing woofer is mounted on the front, bottom half of the cabinet, while the other is mounted on the top of the cabinet's rear and faces 45° to the side (toward the center of the room, not the walls). The front woofer has flat response from crossover down to about 50 Hz, while a separate low-pass filter lets the rear woofer fill in the response below about 50 or 60 Hz. At the low frequencies where both 10-inch woofers operate essentially in parallel, they have approximately the air-moving capability of a single 15-inch driver.

Because the woofers are different distances from the room's boundaries, the total radiated acoustic power should be smoother (at least in theory). For example, if one woofer has a null in its response at the listening location, the other woofer should partially fill this null because it operates from a somewhat different source location, with a different effect on its room response.

The Type B's cabinet is five-sided and is formed by essentially lopping one corner off a conventional square-shaped cabinet. The "cut" surface is used to mount the front-facing drivers. The rear woofer and tweeter are then mounted on one of the remaining 45° rear-facing panels. The resultant structure is stronger than the original box and potentially has fewer problems with internal standing waves.

The front driver complement includes one 10-inch woofer, plus a dome tweeter centrally mounted between two 5¼-inch midrange drivers, in a "D'Appolito" configuration (named after Joseph D'Appolito, a contributing editor of *Speaker Builder* magazine, who first gave a detailed description of the configuration). The major benefits claimed for this configuration include greater vertical directivity (which reduces floor and ceiling reflection effects), an absence of lobing error, symmetrical up-down polar response,

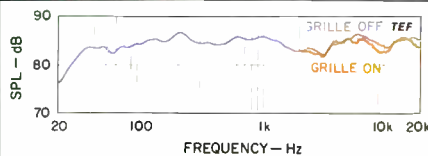


Fig. 1—One-meter, on-axis frequency response.

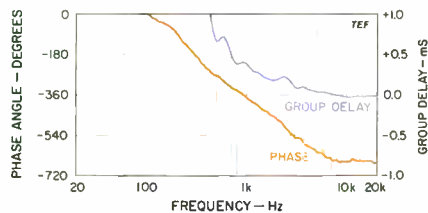


Fig. 2—On-axis phase response and group delay.

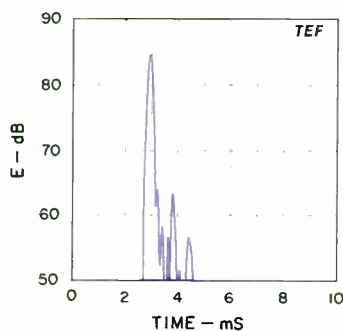


Fig. 3—Energy/time curve.

greater acoustic output capability, and lower distortion. The rear tweeter, which can be turned on and off with a rear-mounted switch, provides fill in the top octave of the system. This is to flatten the power response, which would otherwise roll off due to the front tweeter's narrowing coverage.

A rear connection panel provides mounting for a pair of bi-wirable, five-way input binding posts (with a pair of heavy copper straps for single input

connection), a tweeter fuse, a level control for the front tweeter, and the switch that controls the rear tweeter. Each Model B has two grilles, a top-to-bottom unit for the front and a smaller one for the rear. The front tweeter and midranges are surrounded by strips of felt that minimize diffraction when the grille is mounted.

High-slope crossovers are used throughout to minimize driver interaction. The system has been optimized not only for flat on-axis response, but for uniform off-axis response and power response as well. This uniformity ensures that the reflected and reverberant sound fields have the same tonality and spectral content as the direct sound.

Snell is one of the few American companies to use the facilities of Canada's National Research Council (NRC) in the design and measurement of their systems (see *Audio* Sept. 1989 for a description of the NRC facilities). Extensive NRC double-blind listening tests were used in designing the Type B, which evolved over a three-year period. Snell provided a complete set of the NRC test results, and my test measurements were quite close to the NRC results.

Measurements

The Type B presented a significant measurement challenge due to its large size and odd shape. Because the speaker cannot be laid flat on its side (in this orientation, the speaker's two lower sides are each at 45° to the ground rather than flat against it), I had to make up wooden test jigs just to hold it in this position for the ground-plane and vertical off-axis curves. The speaker's size and weight also forced me to run the vertical off-axis curves on the ground plane, rather than with the speaker raised to its usual height.

The on-axis anechoic frequency response of the Type B, with and without the front grille, is shown in Fig. 1. The tweeter level control was in the straight-up position, as Snell recommends. Measurements were taken on the tweeter axis, at a distance of 2 meters with 5.66 V rms applied, and then referenced back to 1 meter. The response below 300 Hz was derived from 2-meter ground-plane measurements with input reduced to 2.83 V rms

Snell's design ensures the same tonality and spectral content in the reflected and reverberant sound as in the sound on axis.

to compensate for the ground plane's 6-dB boost. Sensitivity was a bit low, at an average 84.3 dB (1.7 dB lower than specified) over the range from 250 Hz to 4 kHz.

The on-axis curve is well behaved and quite extended. The response does not meet its very narrow ± 1.5 dB specification, but it still fits within a tight ± 2.3 dB window from 30 Hz to 20 kHz. In the Type B, the 12-dB/octave roll-off typical of sealed-box speakers occurs below 30 Hz, and response at 20 Hz is down only about 10 dB from the 1-kHz level. Other than minor response irregularities, the only distinguishing feature of the curve is a slight depression in the response around the upper, 2.7-kHz, crossover. A separate measurement of the rear tweeter revealed that its output rises at 6 dB per octave and attains the same level as the front tweeter above 12 kHz.

Above 100 Hz, the right and left systems were matched within ± 1 dB. The front grille only caused minor irregularities in the axial response above 2 kHz. Measurements show that the tweeter level control provides approximately ± 2.5 dB of adjustment range above 2 kHz. All the following measurements were taken with the grilles off and the tweeter level control in the straight-up position, unless otherwise noted.

The phase and group delay responses of the Type B, referenced to the tweeter's arrival time, are shown in Fig. 2. The phase curve rotates a significant 280° between 1 kHz and 20 kHz due to the midrange/tweeter acoustic-center offset and the crossover design. The group delay is quite well behaved but increases as frequency decreases.

Figure 3 shows the system's energy/time response (ETC), measured at 1 meter on axis for a 2.83-V input. The test parameters were chosen to accentuate the response in the region from 1 to 10 kHz, which includes the upper crossover region. The main arrival, at 3 mS, is quite compact and is followed by only a single significant delayed arrival, about 22 dB down.

In Fig. 4, the horizontal "3-D" off-axis responses of the Type B are shown. The bold curve at the rear of the graph is the on-axis response. Because the on-axis ripples in the response are carried over quite faithfully into the off-axis

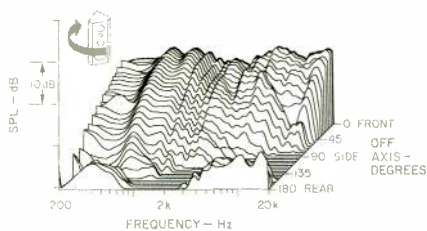


Fig. 4—Horizontal off-axis frequency responses.

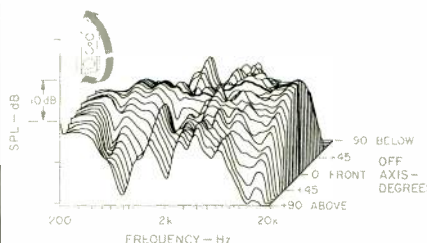


Fig. 5—Vertical off-axis responses.

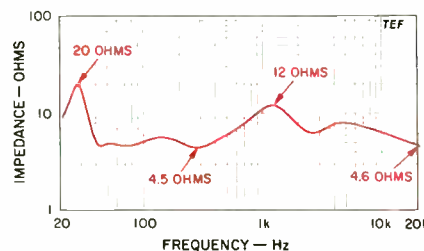


Fig. 6—Impedance.

curves, the horizontal coverage of the Type B is excellent. However, a moderate peak in the off-axis response at about 16 kHz indicates broadening tweeter coverage in this range.

The rotation direction included the rear panel containing the rear tweeter. Its contribution can be seen in the right front of the graph between 150° and 180° . The rear tweeter's level looks

somewhat reduced in the figure because the time window chosen for the measurement attenuates signals that don't coincide in time with the direct sound from the front tweeter. Normally, this just reduces the effects of undesired reflections in the measuring environment, but here it also reduces the reading from the tweeter whose signal follows a longer path.

Figure 5 shows response above and below the vertical axis. The bold curve halfway back, marked 0° , shows response on the tweeter's axis. The system exhibits very good behavior in the main coverage window, within $\pm 10^\circ$ of the axis. A top-down contour view of the curves (not shown) revealed that the system's vertical coverage above 600 Hz is extremely symmetrical about the tweeter's axis, a highly desirable trait. This symmetry is a direct result of the tweeter's central mounting between two identical midrange drivers. The off-axis curves are rougher and not as well behaved as the corresponding horizontal off-axis curves, due to the more complex directional behavior of the two vertically stacked midranges.

No significant cabinet resonances were evident when the system was subjected to a high-level, low-frequency sine-wave sweep. However, some motion of the angled panel holding the subwoofer and tweeter was noticeable between 170 and 250 Hz at high levels. The woofers handled a healthy 20 V rms (50 watts) below 30 Hz without any stressful noises and did not exhibit any dynamic offset effects. The excursion of the woofers, with 20 V rms at 20 Hz applied, was a substantial 1 inch, peak to peak! But when the level was raised significantly higher, the woofers bottomed, with unpleasant cracking and snapping sounds. At excursion levels out to about 0.6 inch peak to peak, the woofers were quite linear.

The sine-wave sweep revealed that the excursion of the rear-mounted subwoofer reached a maximum at 35 Hz, where its displacement actually exceeded the front woofer's by about 20%. At higher frequencies, the rear woofer's excursion was much less than the front woofer's. Below 30 Hz, the excursion of both woofers was constant with frequency, with the rear's amplitude slightly less than the front.

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Excluding one room-effect peak, the Snell's response fits into a ± 3.75 dB window from 100 Hz to 20 kHz.

Near-field woofer curves (not shown), disclosed the front woofer was flat down to about 40 Hz where it rolled off at 12 dB/octave. The rear subwoofer exhibited a moderate-Q (Q is 2.1, which equals center frequency divided by the 3-dB bandwidth), 38-Hz fourth-order bandpass response that rolled off at 12 dB/octave at higher and lower frequencies. At 38 Hz, the subwoofer's level was about 2.5 dB higher than the front woofer's. The near-field phase curves indicated that woofers were essentially in phase with each other below 40 Hz; this will result in increased total output.

The cabinet is divided into two chambers. The front woofer and crossover are mounted in the bottom cavity, which is about twice the volume of the top chamber where the rear subwoofer and remaining components are mounted. In addition, the midranges are mounted in separate, tubular sub-enclosures, each 6 inches long and with a 4½-inch inside diameter. The sealed-back tweeter needs no separate enclosure. The larger bottom chamber is strengthened by an internal shelf brace formed of a ¾-inch panel with large holes cut out for passage of air. The front panel of the Type B is a substantial 1¼ inches thick. The remaining portions of the cabinet are made from ¾-inch multi-density fiberboard. The inside of both of these sub-enclosures are completely filled with a quantity of fiberglass or some similar absorption material.

The crossover of the Type B is composed of three separate subassemblies mounted in the larger bottom enclosure. The five-way crossover (three for the front speakers and two for the rear) is fairly complicated and consists of 22 components: Six inductors, eight capacitors, six resistors, a tweeter level control, and a rear tweeter switch. Actual parts count was significantly higher due to paralleled capacitors. Mylar capacitors are used to bypass all the higher-value, non-polarized, electrolytic capacitors. The subwoofer inductor is a huge 35-mH iron-cored part. The quality of all parts is high. All driver connections use heavy-gauge Monster Cable wire and are soldered. All crossover parts are wired point to point without the use of printed-circuit boards.

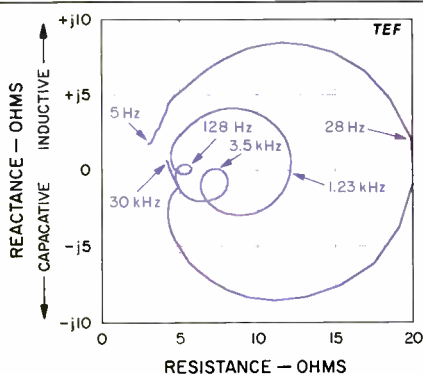


Fig. 7—Complex impedance.

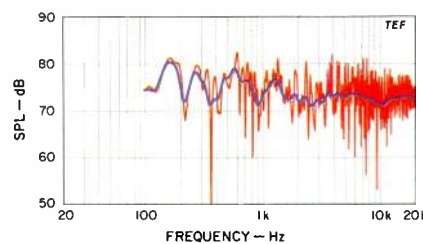


Fig. 8—Three-meter room response.

The crossover consists of second-order, 12-dB/octave low-pass filters for the two woofers (at 40 Hz for the rear woofer and 275 Hz for the front one), a midrange bandpass composed of a third-order, 18-dB/octave high-pass filter cascaded with second-order, 12-dB/octave low-pass filter, and a third-order, 18-dB/octave high-pass filter driving the front tweeter. The rear tweeter is driven through a 12-dB/octave high-pass filter and an on-off switch. (These are electrical measurements of the filters alone; the manufacturer's specs are for acoustic output, which also includes roll-offs imposed by the drivers themselves.) All drivers

are custom made for Snell by Vifa of Denmark and utilize such features as polypropylene cones, cast frames, and Ferrofluid-cooled tweeter coils. Bi-wire connections allow the two woofers to be driven separately from the rest of the system.

The Type B's impedance magnitude is shown in Fig. 6. The curve was run with the rear tweeter on and the front tweeter level control in the straight-up position. An easy-to-handle minimum impedance of about 4.5 ohms occurs at 290 Hz and at 20 kHz. The impedance reaches a maximum of 20 ohms at the closed-box resonance of 29 Hz. With the rear tweeter switched off, the system's impedance rises above 5 kHz instead of falling, and reaches a value of about 10 ohms at 20 kHz. With the tweeter level control at its highest position (full CW), the system's impedance above 1.6 kHz falls somewhat, though no lower than 4.4 ohms, and it rises a bit when the control is turned all the way down.

The curve has a max/min variation of about 4.4:1 (equal to 20/4.5) and thus will be only moderately sensitive to cable resistance. Cable series resistance should be limited to a maximum of about 0.068 ohm (68 milliohms) to keep cable-drop effects from causing response peaks and dips greater than 0.1 dB. For a standard run of about 10 feet, 14-gauge or heavier wire should be used. Snell's manual states that all their speakers are designed to be used with cables having a resistance of 0.15 ohms. This strikes me as a bit high, but I'm pleased that Snell designs with real cable properties in mind, and using cables of lower resistance (as I did) should do nothing more than raise output at resonance by a fraction of a decibel.

Complex impedance, plotted over the range from 5 Hz to 30 kHz, is shown in Fig. 7. The impedance phase angle (not shown) reached a maximum of +47° (inductive) at 18 Hz, and a minimum of -48° (capacitive) at 36 Hz. The Type B will not be a problem for any high-quality amplifier.

The Type B's 3-meter room curve is shown in Fig. 8 with both raw and sixth-octave smoothed responses. The system was in the right-hand stereo position, aimed at the listening location, and the test microphone was placed at

For most, the benefits of a pre/power amplifier set-up is rarely considered as many combinations cost thousands of dollars—most are discouraged well before a demonstration. Rotel, winners of **What Hi-fi?** "Best product of the year 1991 and Best System" has an affordable solution. Rotel introduces the 360watt 8ohms (Bridged Mono) amplifier that can be bought in stages.

Aclaimed by **Audiophile** (11/91), the RB980 can form the heart of your audio system, it can grow as your system grows. Begin by using one RB980 with 120watts nominal per channel and then add another when you need. **Audio Review** (2/92) measured the RB980; 137watts @ 8ohms per channel, 267watts @ 4ohms per channel, 388watts @ 2ohms per channel. **Audio Review** noted, "a really great performance. The sound quality is extraordinary for products in this price range."

BUILT FROM THE INSIDE OUT

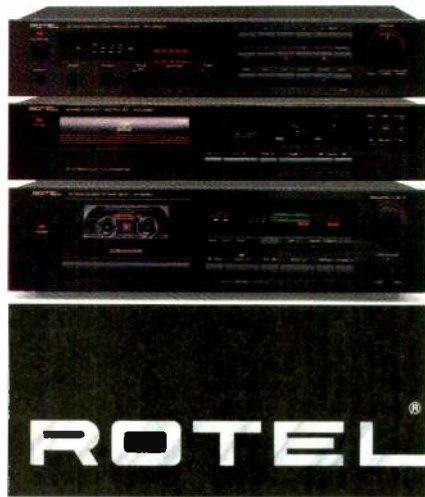


Rotel CD players. They have received worldwide acclaim. **Hi-fi Choice** (11/91) Rotel CD player RCL965 'Best Buy' "produces the sort of sound that many highend products wouldn't have a hope of achieving." **Hi-fi World** (11/91) RCL965 "effortless sound quality..." **CD & Hi-fi Buyer** (12/91) again reviewing the RCD965 "bass is tight, deep and where appropriate, thunderous, always well under control. High frequencies are sweet and clear..."

Shielded Toroidal transformer
WIMA polypropylene capacitors
BGF coupling capacitors

Designs developed in Eng and by audiophile Tony Mills, Rotel amplifiers truly are *built from the inside out* using only premium parts. Selected for sound quality, resistors and capacitors come from Germany and the UK, while special semiconductors originate in USA. If you're on a budget then consider the Rotel RB960 power amplifier, its of dual mono design and capable of 60watts per channel in stereo. By bridging a pair of amplifiers you can feed your speakers with a stunning 180watts. **What Hi-fi?** (3/92) says, "a thoroughly commendable performance. Great sound quality for price."

RTC950
RCD965
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Designed in Britain Enjoyed Worldwide

Even though the Snell B is quite large, its design gives it the uniform horizontal and vertical coverage of a much smaller speaker.

ear height (36 inches) at the listener's position on the sofa. The direct sound and 13 mS of the room's reverberation are included. Between 2 and 20 kHz the smoothed curve is quite well behaved and closely follows the on-axis response. Excluding the upper-bass room-effect peak at 170 Hz, the curve nicely fits a 7.5 dB (± 3.75 dB) window from 100 Hz to 20 kHz.

I also ran slow sweeps from 20 to 200 Hz (not shown) to check low-frequency response at the listening position and assess the effects of the two woofers individually. By alternately covering and uncovering the woofers, I determined that the main effect of the rear woofer was an increase in total system output below 50 Hz. It did, however, partially fill in holes at deep dips in the curve made with only the front woofer operating, decreasing the depth of an 80-Hz dip by nearly 15 dB and making a 32-Hz dip significantly narrower without appreciably changing its depth.

Figures 9 and 10 show the single-frequency harmonic distortion spectra versus power for the musical notes of E_1 (41.2 Hz) and A_2 (110 Hz). Distortion for our usual 440-Hz tone (A_4) is not shown because the only measurable distortion consisted of 1% second harmonic at full power. The power levels were computed using the rated system impedance of 8 ohms.

The E_1 (41.2-Hz) harmonic distortion measurements (Fig. 9) were a bit peculiar because the second and third harmonics rose to intermediate maximums and then fell as the power was increased to 100 watts. The second harmonic, for example, reached 10.5% at 31 watts, but was only 3.5% at 100 watts. Curiously, at full power the fourth harmonic dominated, at 20%, with the second and third harmonics at 2.6% and 5.2% respectively. However, intermediate peaks of 10.5% second at 31 watts and 6.5% third at 63 watts were reached. Even though fairly high distortion values were attained in the E_1 test, the generated distortion was not very objectionable, subjectively speaking. At 100 watts, the system generates a fairly loud 103 dB SPL at 1 meter at 41.2 Hz.

The A_2 (110-Hz) harmonic data is shown in Fig. 10. The second harmonic reached only 2.5% at 100 watts, with

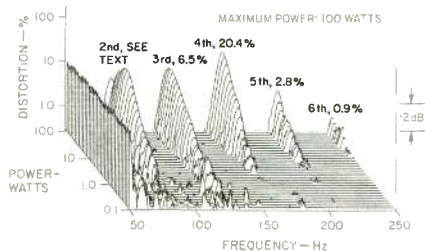


Fig. 9—Harmonic distortion for the musical tone E_1 (41.2 Hz).

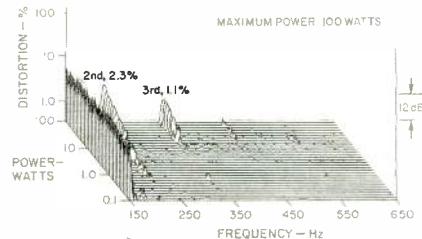


Fig. 10—Harmonic distortion for the musical tone A_2 (110 Hz).

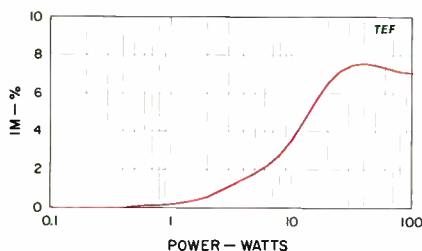


Fig. 11—IM distortion of 440 Hz (A_4) and 41.2 Hz (E_1) mixed in one-to-one proportion.

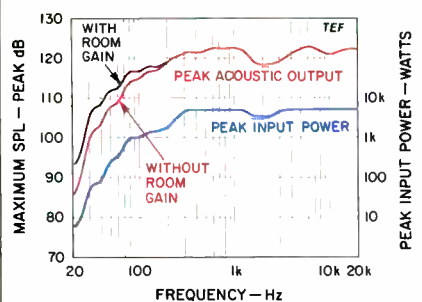


Fig. 12—Maximum input power and peak sound output.

the third reaching only 1.1%. At 110 Hz with 100 watts input, the system generates a moderately loud 104 dB SPL at 1 meter.

Figure 11 displays the IM created by tones of 440 Hz (A_4) and 41.2 Hz (E_1) of equal input power. The IM distortion rose only to the 7% to 8% range at full power. Interestingly, the IM distortion reached an intermediate peak of 7.5% at 40 watts and then fell to 7% at 100 watts. Overall, the Type B exhibited fairly high distortion in the E_1 (41.2-Hz) harmonic measurement but reasonable to low distortion values in the other measurements.

Figure 12 shows the short-term peak-power input and output capabilities of the system as a function of frequency, measured using a 6.5-cycle tone burst with third-octave bandwidth. The peak input power rises with frequency, reaching 5,000 watts above 300 Hz, with only occasional pauses on the way. Some limiting between 1.6 and 3 kHz was evident, presumably due to tweeter excursion limitations in the bottom of its range.

The upper curve in Fig. 12 shows the maximum peak sound pressure levels the system can generate, at a distance of 1 meter or axis, for the input levels shown in the lower curve. Also shown is the "room gain" of a typical listening room at low frequencies, which adds about 3 dB to the response at 80 Hz and 9 dB at 20 Hz. The peak acoustic output rises rapidly with frequency up to 300 Hz, then essentially follows the ups and downs of the on-axis response from 118 to 122 dB SPL. With room gain, the system exceeds 110 dB above 40 Hz and 120 dB above 200 Hz. A stereo pair of speakers can reach even higher low-frequency levels with bass material common to both channels.

Use and Listening Tests

The Type Bs are quite large and imposing systems. At 125 lbs. each, they are a real challenge to unpack and set up. I managed to do it by myself, but it was pretty much the limit of what one person alone could accomplish. Once set up, they present a very massive and stately appearance. The front of the speaker is essentially the edge left when one corner is lopped off a tall cabinet 17½ inches

The Snell's response was both smooth and detailed, with excellent imaging, and its bass was flatter than my reference system's.

square, and is the widest side of the speaker. While the manufacturer's specs say the cabinet is 17½ inches square, it's actually more like 25 inches wide and 17½ inches deep. Even though the Snell Bs' cabinets are quite large, their comparatively small frontal area and the D'Appolito driver arrangement gives them the uniformity of vertical and horizontal coverage you'd expect from a much smaller system. The systems are quite attractive, even in black-finished veneer, and should be even more attractive in real wood.

The set-up instructions provided with these speakers were generic to the whole Snell product line and did not cover anything specific to the Type Bs. Snell states that they are working on a manual for the Type B. The supplied 17-page owner's manual, however, was very extensive and provided much detail in many areas including bi-wiring, bi-amping, and an excellent section on room acoustics.

The manual does not say which of the two cabinets should be on each side of the setup. A call to Snell revealed that the speakers should be set up so that each rear woofer/tweeter combination faces diagonally towards the center of the rear wall rather than with the rear drivers facing the room's outside wedge. (Remember that the rear of each system is actually a 90° wedge, with two surfaces at 45° angles to the rear wall.) I did not experiment with any alternate configurations. Although spikes are provided, I did not use them because of the systems' large size and weight.

The high-frequency balance of the systems were most similar to my reference systems with the tweeter level control in the recommended straight-up position. I left it this way for most of my listening. The rear tweeter did lend a slight air of increased spaciousness to the sound of the systems. The rear of my listening room is somewhat more absorptive than a typical listening room and therefore attenuates some of the rear-directed high frequencies. Most listening was done with the rear tweeter on.

Input connections are made to a very accessible set of heavy five-way binding posts mounted on ¾-inch spacing. Listening was done both with and without bi-wiring using Straight

Wire Maestro cables. Amplification consisted of the Jeff Rowland Consummate preamp and Crown Macro Reference power amp driven by the Onkyo and Rotel CD players. The speakers were spaced 8 feet apart and slightly toed in towards my listening area, about 10 feet away.

First listening revealed a smooth, detailed response with excellent imaging, but with a somewhat reduced low end as compared to my reference systems. I found this somewhat strange because of past experiences with the system at CES and elsewhere, where the low end was quite exemplary. This puzzled me, because *Audio's* editors in New York had had the opposite experience, finding the bass somewhat fat and overbearing, as had a reviewer at another magazine.

Further listening and tests revealed that the combination of my room and reference speakers was actually giving me a significant amount of emphasis in the mid- to upper-bass range, and I'd gotten used to this. High-resolution tests of low-frequency response indicated that, at my listening position, the Snells actually had a much flatter response. My reference systems exhibited greater output in the range from 30 to 75 Hz, but less output below. Excluding a sharp dip at 32 Hz, exhibited by both systems, the Snells actually had extended response all the way down to 10 Hz in my listening room (presumably, the Snell's closed-box design energizes my room in the pressure mode below 20 Hz, while B & W's vented-box design rolls off quite rapidly below 20 Hz). At least in my listening room, whose walls are of conventional construction (plasterboard on 2 × 4-inch framing), Snell's design seems to deal with room boundaries very well indeed!

The Type B's handling of complex orchestration was outstanding when playing *Mozart: Sinfonia Concertante, K.364 and Concertone, K.190* (Sony SK 47693). Instrument placement was quite vivid, which attests to the excellent imaging qualities of the Bs. The particularly demanding choral music of *Mozart: Missa K. 47a and Mass K. 427* sung by the King's College Cambridge Choir (Argo/Decca 421 365-2) was rendered with good accuracy, cleanliness, and minimal strain.

The high-crest-factor rim shots on track 5 of *The Sheffield Drum Record* CD (Sheffield CD-14/20) were reproduced very cleanly at quite realistic levels. The level and input/output overload (IOC) indicators on the Crown Macro Reference power amplifier were put to good use here. I raised the level to the point where the IOC light lit momentarily at 4:40 into the track (where the highest peak occurs) and then listened to the rest of the track. This is a peak power of about 2,100 watts (± 130 peak volts across 8 ohms)!

The Type Bs even did a smashing job on Alan Jackson's *Don't Rock The Jukebox* country/western CD (Arista ARCD-8681; if you've never tried a little C & W, try this one first; sounds super on high-end gear!).

The Type Bs passed the stand-up/sit-down pink-noise test quite handily with no significant changes in timbre, equalling the performance of my reference systems. On third-octave, band-limited pink noise, the Bs also equalled the performance of my references in generating low frequencies. The only significant differences were that the B & W system's vented boxes produced some chuffing sounds while the Snells had somewhat more harmonic distortion, especially at the third-octaves centered on 20, 25, and 31 Hz. The fundamental air-moving capabilities of the two systems were pretty much the same, as evidenced by doors and windows rattling on the lowest bands.

I did succeed in bottoming out the woofers of the Type B by playing the notorious cannon shot on *Tchaikovsky: "1812" Overture* (Telarc CD-80041). Even though the woofers sounded quite (make that very) distressed, I believe I did no damage.

All things considered, the Type Bs performed quite flawlessly for me. As compared to my reference systems, which cost significantly more, they did an extremely good job, even surpassing them in some circumstances. Imaging, uniformity of response, accuracy, dynamic range, and appearance were all first-rate. The two-woofer low-frequency design worked very well with the acoustics of my listening room. One improvement that could be made, however, would be to reduce the woofers' low-frequency harmonic-distortion level.

D.B. Keele, Jr.

DYNACO QD-1 SERIES II SURROUND SOUND PROCESSOR

Company Address: 125 Cabot Ct.,
Hauppauge, N.Y. 11788.
For literature, circle No. 94

What if I were to say that if you own two or three spare loudspeakers you could create your own home theater system for less than \$80? You'd think I'd been sitting in the sun too long, right? Well, believe it or not, Dynaco's little passive surround sound decoder can turn your stereo system into a three-, four-, or five-channel surround or home theater system.

Those of us who remember the heady days of quadraphonic sound in the early 1970s may recall the original QD-1, developed by audio pioneer David Hafler. While the rest of us wrestled with "black box" four-channel decoders full of matrixing coefficients and solid-state amplification circuits, Hafler realized that the difference (L - R) information in a stereo program *always* contained the ambience information. He correctly concluded that no electronics were needed to extract this sig-

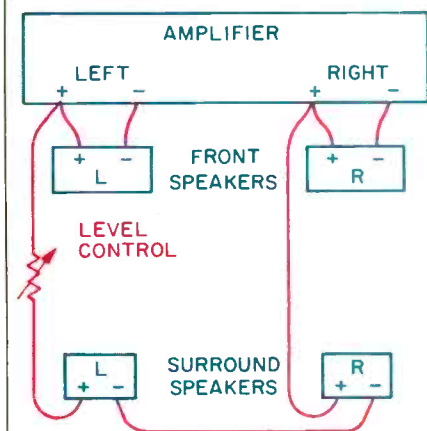
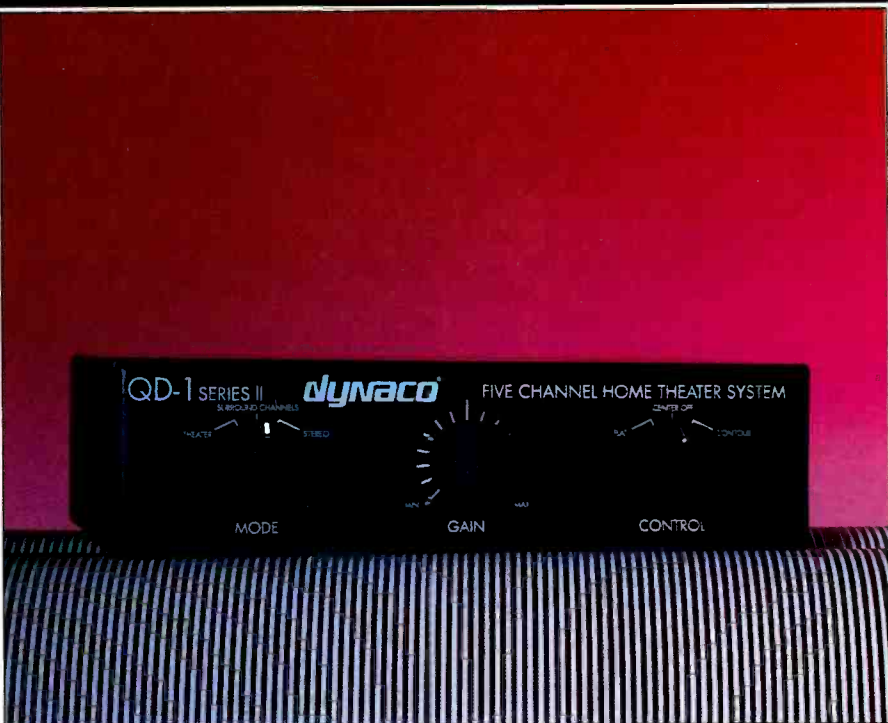


Fig. 1—The QD-1 Series II is basically a version of this simple hook-up, with a few features added, mainly for video surround.



nal and send it to a pair of rear-positioned speakers. One simply had to combine the in-phase left-channel amplifier output with an out-of-phase right channel amplifier output (Fig. 1). Doing that simply involved inverting a pair of wires of the right channel output relative to the left channel output of an ordinary stereo amplifier. Thus was the "passive" surround decoder born and, in those long-gone four-channel days, thousands of those little inexpensive decoders were sold and enjoyed by quadraphonics fans.

In reincarnating this system as the QD-1 Series II, Dynaco has kept its fundamental principles, modifying it only by adding some controls and a center-channel output, mainly to satisfy the needs of stereo and surround audio/video programs, which did not exist in the original decoder's day. (The center output is also useful, however, for music listeners whose front main speakers are more than 8 feet apart.) As Bob Rapoport, Sales and Marketing Vice-President for Dynaco, puts it, "The spatial and depth cues known as Dolby Surround are found in the L - R portion of the two-channel stereo soundtrack. [So it's] no surprise that a simple L - R decoder will send these surround signals to rear chan-

nels and provide 95% of the performance of the more expensive active decoders."

In addition to a master "Gain" control (which alters the level of the surround and center channels relative to the main front channels), the QD-1 sports a "Mode" control with positions for "Theater," "Surround" (for listening to the rear channels only, during setup), and "Stereo" (for deactivating the rear speakers). A third control offers positions for "Flat" response in all channels, "Center Off," and "Contour" (a high-frequency roll-off for the center and surround channels, recommended when playing material with Dolby Surround encoding). The QD-1's rear panel contains color-coded spring-loaded input and speaker terminals that accept just about any kind of speaker wire termination. Installation is a snap; simply connect the outputs of your existing stereo amplifier to the input terminals of the QD-1 and connect your speakers to its output terminals.

Center output, when switched in, is simply the sum of the left and right channels (L + R), modified by an LC circuit when the "Contour" setting is used. Front-channel outputs are unmodified and are simply "fed through" from left and right inputs to left-front

and right-front outputs. The left rear and right rear outputs get the derived L - R signals, as mentioned earlier, and together with the center channel output, can have their amplitudes altered by a ganged "Gain" control.

In an ideal decoder, difference signals would be completely absent from the center channel. In practice, center-channel output for L - R information is attenuated to inaudibility, or about -46 dB below L + R information.

Positioning the center and surround speakers took a fair amount of time. Bear in mind that the QD-1 does not provide the enhanced separation of Dolby Pro-Logic decoders. Still, seated at or near the so-called "sweet spot" I got an amazingly realistic surround-sound experience not all that different from what I have been experiencing with my permanent surround setup that includes a sophisticated surround preamplifier and multiple power amps and speakers. To be sure, when I moved very close to one of the front speakers, the illusion tended to disappear, but so long as I remained reasonably positioned between the left and right front speakers and about 10 feet in front of them, with my small rear-channel speakers some 5 feet behind me, the decoder produced an entirely accurate and realistic surround-sound experience from a variety of video-discs and videotapes that had Dolby Surround encoding. In my first listening tests, I used the TV monitor's own speakers (tied together in parallel) as a center channel, so only two additional inexpensive loudspeakers were added to my basic stereo setup. Later, I added a small center-channel loudspeaker driven from the center-channel outputs of the QD-1. I found this arrangement proved to be better for keeping on-screen dialog where it belonged, especially if I followed Dynaco's suggestion and set the control to the "Contour" setting.

Is the Dynaco QD-1 Series II going to put the makers of more expensive surround-sound decoders out of business? Not likely. But if you can come up with 80 bucks and a couple of inexpensive speakers, you may be as surprised as I was at how effectively the QD-1 can deliver home theater sound the way it was meant to be heard.

Leonard Feldman

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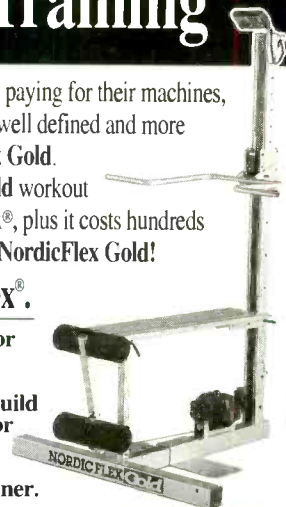
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TWO TO TANGO



Danzas And More. The Castellani-Andriaccio Duo

Fleur De Son Records FDS 57916-2, CD; ADD; 44:24.

Sound: A Performance: A

1685—A Glorious Trilogy. The Castellani-Andriaccio Duo

Fleur De Son Records FDS 57917-2, CD; DDD; 62:36.

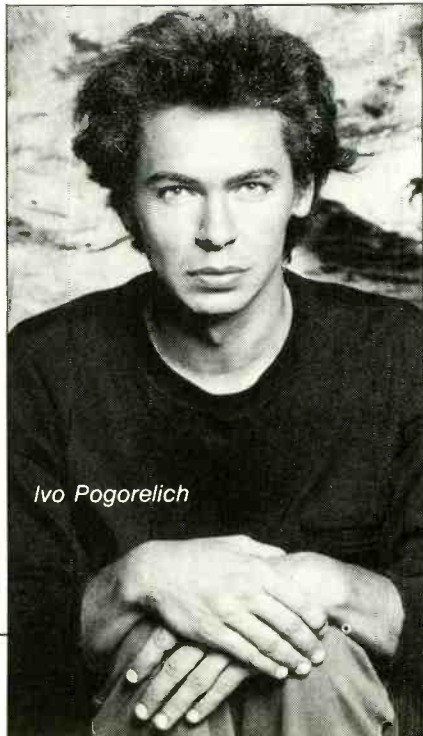
Sound: A Performance: A

The dynamics of a guitar duo can reflect a spectrum that ranges from the charged energy of double duelling virtuosi to the elegant poetry of twin musicians playing as a seamless unit. The Castellani-Andriaccio Duo, currently artists in residence at SUNY Buffalo, spin a glistening sonic web in the latter style, an approach that is getting them growing attention in guitar circles.

Indeed, the music contained on *Danza And More* and *1685—A Glorious Trilogy* sounds as if it were being played on a single instrument, so complementary are these two guitarists. Both Joanne Castellani and Michael Andriaccio employ a round, robust tone and manage, like magic, to control the emotional ebb and flow in almost perfect sympathy.

The *Danza* program curiously focuses on mainly 20th-century "dance"

forms, although the centerpiece consists of the sparsely melodic modern harmonies of Prelude and Fugue Nos. 3 and 4 from Mario Castelnuovo-Tedesco's Well-tempered Guitars, Opus 199. Prefacing these are three transcriptions from Joaquín Turina's *Danzas Gitanes*, Opus 55, originally for piano, which are full of rousing rhythms



Ivo Pogorelich

set against dark Spanish coloration. Concluding the program are five tangos, including the slinky 1930s ballroom drama of "The Castle Innovation Tango" by James Reese Europe and Ford Dabney, the sensuously churning classic "La Cumparsita" by Matos Rodrigues, and the complex bubbling nuances of *Tango Suite*, 1984 by Astor Piazzolla.

1685 refers, naturally, to the birth year of Baroque giants J. S. Bach, Domenico Scarlatti, and George Frideric Handel, whose music is showcased in sweetly attractive transcriptions. Included are Bach's English Suite No. 3 and the stately, *de rigueur* "Jesu Joy of Man's Desiring," three Scarlatti keyboard sonatas (k. 227, k. 87, and "Pastoral") and a "Little Fugue," the delightful and playful "The Harmonious Blacksmith," and the grandly sprawling 13-minute Chaconne in G major.

Both recordings, by the way, are superbly miked and provide the living-room ambiance that is needed to capture the sonority of the guitar without losing it in a sea of overblown New Age reverberation.

The electricity of the Castellani-Andriaccio Duo comes from the interplay between their remarkably tight, well-orchestrated control and educated interpretive skills. The effect is more subtle than some of the more pyrotechnic displays of other well-known duos—Presti-Lagoya and the Bream-Williams collaborations immediately spring to mind—but the results are equally moving and satisfying. *Michael Wright*

Liszt: Sonata in B Minor; Nuages Gris; La notte; La Lugubre Gondola II: Funérailles. Krystian Zimerman, piano.

Deutsche Grammophon 4317802, DDD; 66:05.

Liszt: Sonata in B Minor; Scriabin: Sonata No. 2, in G-Sharp Minor, Op. 19. Ivo Pogorelich, piano.

Deutsche Grammophon 4293912, DDD; 48:16.

How bemusing: From two rival pianists, from the same label, two disparate recordings of this magnificent old Romantic warhorse, released almost at the same time. That improbable coincidence provides the opportunity to compare two of the hottest young pia-

Illustration: Rick Tulka

Photograph: Susesch Bayat

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Model 9500



Ivo Pogorelich, the Byronic hothead, clearly regards almost any score as a mere convenient peg to hang a Pogorelich performance.

nists of their generation: Zimerman, the sensitive Polish poet, a Romantic in the great old tradition that helped him capture every prize in sight the year he won Warsaw's International Chopin Competition, and Ivo Pogorelich, the Moscow-trained Yugoslavian bad boy of modern pianism, surely the most willful and eccentric important pianist since the legendary Vladimir de Pachmann, who died in 1933.

Zimerman, by economizing on the sustain pedal as much as possible without diminishing the smoothness of his flowing legato line, plays with an uncanny harmonic transparency all too rare among pianists; he self-effacingly places his immense gifts entirely in the service of the composer as represented by the printed page. Pogorelich, the Byronic hothead, clearly regards almost any score as a mere convenient peg to hang a primarily subjective Pogorelich performance on, but at his best he makes wonderful music. Both have talent and technique to burn; your

fundamental relationship to music itself will largely determine your choice here. Zimerman, beyond the familiar "Funérailles," offers three remarkable shorter Liszt works you won't often encounter, and Pogorelich makes the most of Scriabin's super-pianistic early sonata. Both recordings benefit by the best sound Deutsche Grammophon's engineers can provide. *Paul Moor*

Rimsky-Korsakov: Night on Mount Triglav; Pan Voyevoda. Slovak Philharmonic, Bystrik Rezucha, conductor. **Marco Polo 8.220438**, CD; 57:24.

Sound: A — Performance: A —

Leos Janáček: Danube; Incidental Music to Schluck und Jau; Moravian Dances; Suite, Op. 3. Slovak Philharmonic, Libor Pesek, conductor. **Marco Polo 8.220362**, CD; 48:55.

Sound: A — Performance: A —

This pairing of colorful, rarely heard Slavic orchestral works features the

same orchestra, hall, record label, and producer. The enterprising Marco Polo label, based in Hong Kong, has been adding to the CD catalog, at a furious rate, never-before-recorded composers plus never-before-recorded works by well-known composers. Most of them fall into the Romantic or late Romantic periods.

That sorcerer of orchestration, Rimsky-Korsakov, pulled out all the stops in his opera *Mlada*, composed shortly after he first heard Wagner's *Ring* cycle. In the third act, a witches' sabbath is set on Mount Triglav, and the composer made an orchestral arrangement of it that can be compared to Mussorgsky's more famous festivities on "Bald Mountain."

Pan Voyevoda is also an orchestral suite from one of the Russian master's operas. It has a Polish theme of love, betrayal, and poisoning and uses aristocratic versions of Polish dances clearly associated with the music of Chopin. The five movements sound

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Janáček's work was influenced by the folk music of his native Moravia, by Russian music and culture, and later by French impressionism. "Danube" is a four-movement symphonic poem in which Janáček represents the great river as a woman. One movement includes a soprano vocalise part. Both the five Moravian Dances and the Suite make use of Moravian folk themes.

Both recordings, made in the Slovak Philharmonic's own concert hall, are well balanced and exhibit exemplary clarity.
John Sunier

Gesualdo: Tenebrae. Hilliard Ensemble.

ECM New Series 843867-2, two CDs; 2:03:44.

Don Carlo Gesualdo was that high-born Prince of Venosa who, in the early 17th century, wrote extraordinary, almost mad, vocal music in the form of madrigals, full of astonishing dissonance and atonality—this after he had procured the murder of his wife and her unwise lover. The madrigals have been marvelled at since the turn of our century—my own chorus has sung many of them—and compared, rather foolishly, to Richard Wagner's music. Gesualdo was in a position to compose exactly as he wanted to, which he did. It is music that one discovers with astonishment, then soon realizes that it is radical but very limited; once you've heard five or six of the madrigals you have heard them all.

In his later years, Gesualdo turned pious and wrote music for the church, no doubt hoping the Lord might forgive him for prodigious sins. Until now, not much of this music has been performed. Here is a lot—two whole CDs. In spite of the super-sacred sonic setting, a very holy sound indeed, the music is not much different from the Gesualdo madrigals, which are decidedly not holy in their texts! No offense, merely what was inevitable in this man's radical but restricted musical expression. It is just as astonishing in the hearing as are the madrigals, and this is a really excellent performance, full of life and highly musical. An all-male group, including a high counter-tenor of the bleating sort—no matter! It



is wonderful music, powerfully projected, beautifully in tune and understanding of the strange harmonies and passionate expression.

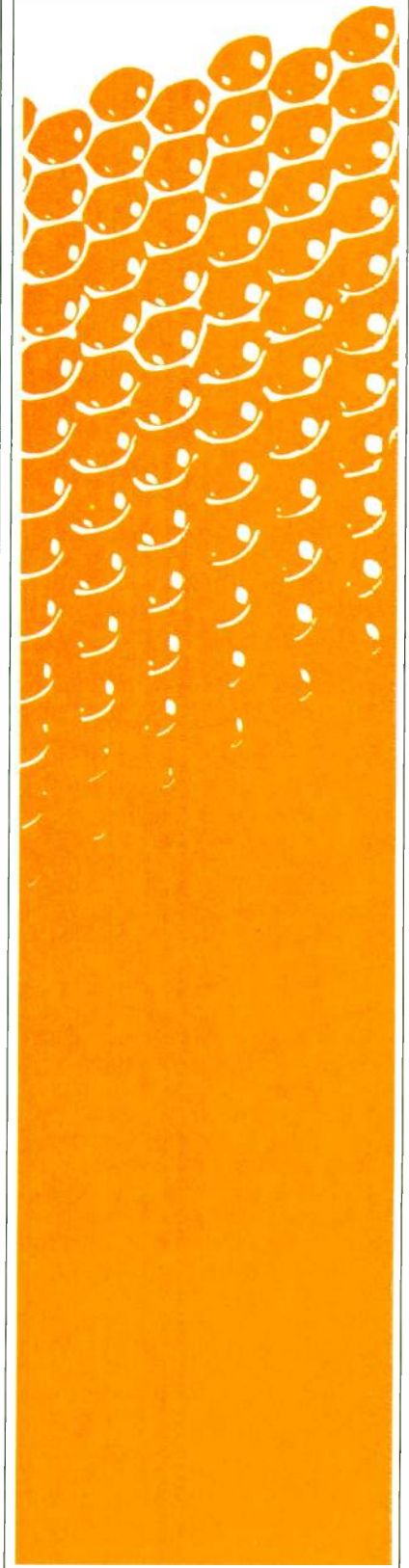
Very odd packaging indeed. The fat booklet has not only the text and translations but a relevant (?) poem by Paul Celan, a long, Romantic "prose poem" all about Gesualdo, and something called Tynset, by Wolfgang Hildesheimer—this in several languages—which was more than I could get to read. Not a word about Gesualdo himself, nor anything at all about the performers.
Edward Tatnall Canby

Handel: "Arias for Montagnana."

David Thomas, bass; Philharmonia Baroque Orchestra, Nicholas McGegan.
Harmonia Mundi HMU 907016.

David Thomas delivers real value, no doubt about it. His triumphant account of the Act III scena from *Orlando*, for example, may well be everything Antonio Montagnana (allegedly Handel's favorite bass) could have made of it. If, in some other numbers, an ultra-low note proves hard to produce, or a tricky bit of *fioritura* comes out a mite blurred, or an octave-plus leap is slightly awkward, there still is a great deal of marvelous singing—and top-drawer Handel—on this disc. The accompaniments are zesty and stylish, and Harmonia Mundi has captured all (in a San Rafael, Cal. studio) in extravagant detail. Andrew Porter's excellent notes are supplemented by full texts in four languages.
Robert Long

Photograph: Suzie E. Maeder



SWEET 'N' SOUR



Life is Messy: Rodney Crowell
Columbia CK 47985, CD; 42:49.

Sound: B+ Performance: B+

Candyland: James McMurtry
Columbia CK 46911, CD; AAD; 42:32.

Sound: B+ Performance: B+

Rodney Crowell's *Life is Messy* isn't really his side of his well-chronicled breakup with Rosanne Cash. Rather, it's his version of the aftermath. In contrast, James McMurtry, on his sophomore effort—*Candyland*—spins a series of tales about other people who haven't done all that well coping with life and who are somewhat sour about it. Crowell is supposedly a country artist while McMurtry is loosely figured in the rock area (mostly due to the sponsorship and production duties of John Mellencamp); but truthfully, these two artists and their albums are not far apart in spirit and execution.

Life is Messy is produced individually by Larry Klein (with whom guitarist Stuart Smith plays a pivotal part) and John Leventhal, with both efforts yielding a big, aggressive sound that—most of the time—isn't very country. The songs bristle with a very personal honesty, from the despairing title cut to

its revelatory flip side of the coin, "Alone But Not Alone," which was inspired by a Georgia O'Keeffe painting. The self-destructive "Let's Make Trouble" flat-out offends with its misogyny but is balanced by the gorgeous "What Kind of Love," developed from an idea fragment that Roy Orbison wrote but never fully developed into a song. Vocal support from Linda Ronstadt, Don Henley, Steve Winwood, and Shawn Colvin help make this album an eloquent personal document.

McMurtry's *Candyland* is a more external album and not autobiographical at all. It relies on a tight backup ensemble in which drummer Kenny Aronoff and guitarist David Grissom are the key players.

In *Candyland*'s songs, life isn't easy. For example, "Where's Johnny" is a story of a former high-school whiz kid who has become a 30-ish vegetable, rarely leaving his room at his parents' home. "Hands Like Rain" is a tender portrait of the pain old age brings and the memories it steals. "Safe Side," which has an irresistible guitar line, and "Candyland" are slices of life as

seen from both sides of the tracks. "Dusty Pages," a paean for friendship and love from a life companion, is an apt closer.

Throughout the album, McMurtry's songs are taut vignettes in which his sharp eye for detail suggests the storylines. His singing is much stronger and assured the second time out, but his very expressive guitar playing is under used. *Candyland* isn't an album of pretty tableaux, but it's quite compelling and subtle. *Michael Tearson*

A Little Something Extra: William Bell. **Stax SCD 8566-2.**

If William Bell's only accomplishment was writing "You Don't Miss Your Water," a minor hit for Otis Redding, or "Born Under a Bad Sign," Albert King's signature song, that would be reason enough to listen to his recordings. Bell, one of the first artists signed to the Stax label, had had a consistent career as a performer while being underrated as a singer, writer, and recording artist. Although checking out his greatest hits collections might be best advised, this anthology of unreleased material is a

highly listenable addition to most soul enthusiasts' shelves. The majority of this material is written or co-written by Bell, who hasn't been as visible as someone of his caliber should be. Chances are you've been hearing his talents in a second-hand fashion (his most recent hit was Billy Idol's cover of "I Forgot To Be Your Lover") but these long-buried gems are well-worth unearthing.

Jon and Sally Tiven

Time Takes Time: Ringo Starr. **Private Music 01005-82097-2.**

Never the heavy, Ringo's first release in a decade doesn't raise any new expectations. That said, he imitably croons a gentle, entertaining set of melodic pop tunes that explore mature themes of loving and living. Included are three songs of his own: Two



Photograph: Jimmy Ienner, Jr.

white-albumish, self-evaluations and a haunting portrait of the plight of run-aways. Bright, bouncy production by Don Was, Jeff Lynne, Peter Asher, and Phil Ramone guides a talented session band with familiar participants including Lynne, Benmont Tench, Waddy Wachtel, and Jeff "Skunk" Baxter while fleshing out some of the most famous steady back beaten drum sounds ever heard in rock.

Michael Wright

Ingenue: k.d. lang. Sire/Warner Bros. 26840-2.

Ingenue strips away k.d. lang's country persona to reveal a gleaming new image beneath. With no "twang" save occasional steel guitar, k.d. delivers an album of original torch songs in a soulful, convincing performance—her best yet. *Shadowland*, in 1988, contained hints of what would blossom here, but *Ingenue* develops the concept so fully that it feels far less a pose than the country k.d. did. Longtime writing partner and multi-instrumentalist Ben Mink is the glue of the album.

Michael Tearson

Sweet Talker: Original Music From the Movie: Richard Thompson. Capitol CDP 7 94490-2.

Thompson tackles what is essentially supposed to be background music with his characteristic sense of offbeat rhythms tempered by the requirement for tame melodies and harmonies that won't detract from this film, which is set in Australia. The results vary from Irish jigs with keyboards to what almost sounds like pure Dire Straits. Thompson sings on three typically quirky yet laid-back tunes while Texan John Andrew Parks sings a country pastiche about drilling for oil. As soundtracks go, this is better than most. But despite skillful writing and enthusiastic playing, it's not likely to be as endearing as Thompson's truly brilliant foreground efforts.

Michael Wright

Cruel Shoes. Rendezvous/RCA 61104-2.

Cruel Shoes, led by John Palumbo of Crack the Sky fame, is a sophisticated jazzy rock band reminiscent of *Royal Scam*-vintage Steely Dan complete with clever storytelling songs and very smart playing. Palumbo's vocals are much more upfront in the mix than in



k.d. lang

his previous band and this helps quite a bit. This one caught me by surprise, and I find I like Cruel Shoes much more than I did the artier Crack the Sky, mainly due to the much sharper focus of the music.

Michael Tearson

Come On Come On: Mary-Chapin Carpenter. Columbia CK 48881.

Mary-Chapin Carpenter's evolution as a songwriter and artist continues as she seeks and finds fertile subject matter besides heartbreak, while still attending to matters of the heart. Memorable songs include the hilarious "I Feel Lucky," a subtle piece of rural Americana "I Am a Town," and the assertively ironic "He Thinks He'll Keep Her." A duet with Joe Diffie, "Not Too Much to Ask," is too treacly for my tastes but it'll probably be a smash hit. The covers of Mark Knopfler's "The



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Mother's Finest offers a ubiquitous presence of banshee guitar wails combined with social and ethical awareness.



Bug" and Lucinda Williams' "Passionate Kisses," are both very spirited efforts. While not as striking as Mary-Chapin's debut or its successor, *Come On Come On* is nonetheless a thoroughly entertaining album.

Michael Tearson

Black Radio Won't Play This Record: Mother's Finest. **Scotti Bros. 72392 75235-2.**

Since the mid-'70s, Mother's Finest have been crammed into ill-fitting musical garb like disco and R&B, when what they really wanted to do was rock hard with a metal edge. Finally, with help from the Black Rock Coalition,

they have their chance. Featuring a new lineup behind co-vocalists Joyce Kennedy and Glenn Murdoch, the result is something like Tina Turner's torch meeting Guns N' Roses' grunge juggernaut. Like other Black Rock Coalition bands, there is the ubiquitous presence of banshee guitar wails combined with social and ethical awareness and certainly no apologies to stereotypists for being black rockers.

Michael Wright

Out of the Cradle: Lindsey Buckingham. **Reprise 9 26182-2.**

A purring pop machine on first listen, *Out of the Cradle* ultimately impresses by allowing us to hear the frequent clanging of its complex gears. Acoustic passages murmur sweetly, but when he goes electric, Lindsey Buckingham doesn't so much play guitar as struggle with it—to the point where "This Is the Time" closes with him fighting the strings to climb the fretboard. Still, it's the songs and production that dazzle most, and though Buckingham is customarily upbeat, his trials in the album's dark midsection are just as compelling. He pleads for wisdom at his father's grave in "Street of Dreams," where a persistent drizzle on the soundtrack becomes a soaking shower of both rain and guitar. There's room for improvement on this album—lyric clichés to be pruned, two final songs to be cut, human percussion to



Lindsey Buckingham

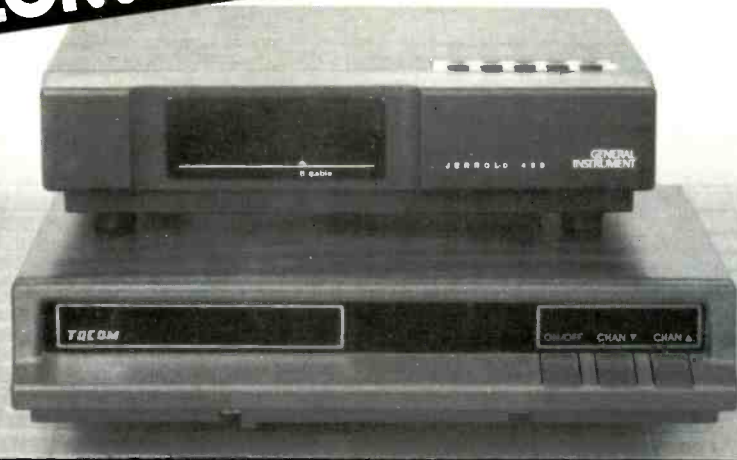
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The well-crafted songs on the new Black Crowes' recording avoid all the usual clichés.



Photograph: Mark Seiger

be nurtured—but the millions who bought *Fleetwood Mac* and *Rumours* should storm the stores for this invention of art and craft. Out of the cradle indeed, endlessly pop/rocking.

Ken Richardson

The Southern Harmony and Musical Companion: The Black Crowes. **Def American 9 26916-2.**

The follow-up to The Black Crowes' Stones clone-like debut continues the noise-laden, blues-nasty grunge with added inflections of southern soul, acoustic guitar intros, and B-3 organ heaviness. Chris Robinson's singing sounds like a cross between Rod Stewart and Tina Turner, perfectly suitable for their unpretentious and well-crafted songs that, while not offering new insights on the pop form, at least avoid the usual clichés. Looks like being ravens has helped this band beat the sophomore jinx. *Michael Wright*

Arc Angels. DGC DGCD-22465.

Following Stevie Ray Vaughan is a tough act but one being tried by this new band comprising the late SRV's rhythm section—Tommy Shannon and Chris Layton—with wunderkind singer/songwriter/guitarist and co-frontmen Charlie Sexton and Doyle Bramhall II. This Austin-based amalgamate eschews guitar pyrotechnics in favor of a thicker Texas R&B-flavored rock 'n' roll approach. Not that they don't occasionally reach some heavy levels of axe intensity, like on the ripsaw "Shape I'm In" or the "slide guitar meets jangly '60s pop" of "The Famous Jane." Songwriting is pretty good and this al-

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Photograph: Joseph A. Rosen

bum packs some gems. But even with two strong leaders, Arc Angels has a fairly uniform identity and lacks a unique voice that demands attention.

Michael Wright

Goin' Back to New Orleans: Dr. John. Warner Bros. 26940-2.

Goin' Back to New Orleans is a 66-minute, 18-selection history of New Orleans music, from tribal chants, to blues and jazz, to '50s R&B, all filtered through that living encyclopedia of Crescent City sounds, Dr. John. The album is performed with a ferocious love of the material by a veritable who's who and is beautifully produced by Stewart Levine. Listen to this as a companion piece and prequel to Dr. John's seminal New Orleans R&B album, *Gumbo*.

Michael Tearson

Born To Be Wild—A Retrospective, 1966-1990: Steppenwolf. MCA MCAD2-10389.

Thoughtless title notwithstanding, this two-CD set goes a long way to show how Steppenwolf is much more than "Born To Be Wild" yet falls short of being definitive. Liner notes, thorough on the band's formation, largely ignore its recording career. Song selection is deep, with two tracks from Steppenwolf ancestor The Sparrow, the complete "Monster/Suicide/America," and a previously unreleased John Kay stomp with Lowell George, "Live Your Life." Still, there are too many tracks from the debut LP, "For Ladies Only"

Goin' Back to New Orleans is filtered through the encyclopedia of Crescent City sounds, Dr. John.

remains needlessly edited, and the tale of Kay's boyhood escape from East Germany, "Renegade," is passed over for its sequel/ripoff, "The Wall." Bass is rich, but it occasionally mutes organ and guitar. So *Retrospective*—though far better than its predecessors—will likely leave the wolf pack a little hungry.

Ken Richardson

The Essential Collection: T. Rex. Relativity 88561-1063-2.

This boxed-set compilation includes 31 studio cuts and a marvelous eight-song acoustic set originally recorded for the BBC in 1972. However, a handsome and profusely illustrated book—with essays from writer Ira Robbins and producer Tony Visconti (Visconti produced the majority of the T. Rex catalog), along with excellent sonic restoration of the material presented, does not outweigh some serious flaws. Most notable is the omission of track-by-track annotation and, due to licensing problems, some sorely missed songs—"Get it On (Bang a Gong)"—to name but two. Also missed are B-sides that Relativity should have rights to. This set could have been presented as two CDs instead of three by combining discs one and two, thus making it less expensive at retail. Carping aside, *The Essential Collection*, though lacking in some essential material, is still a delightful listen.

Michael Tearson

Crisis: Defunkt. Enemy EMY 135. (Available from Enemy Productions, 11-36 31st Avenue, Long Island City, N.Y. 11106.)

Churning lopsided rhythms, chain-saw electric guitars, and a big-band horn section combined with socially-conscious lyrics only partially describe the pioneering experimental jazz/rock group Defunkt and its unclassifiable brand of mayhem. Gone is some of the earlier cacophony, although one could hardly call founder/trombonist Joseph Bowie's (son of Lester) groaning chants and dissonant harmonies "pop." Instead, *Crisis* is more like free-jazz tempered with R&B, as evidenced in the slow funk of "Groove Fak-ed," which features a sample from Coltrane's *Interstellar Space*. Defunkt is hardly easy listening, but it continues to be intellectual engagement from the edge.

Michael Wright

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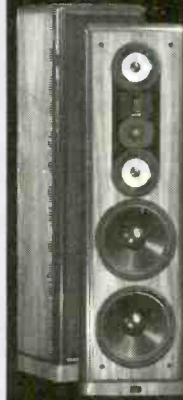
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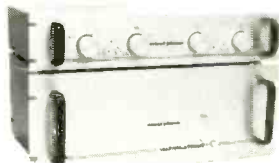
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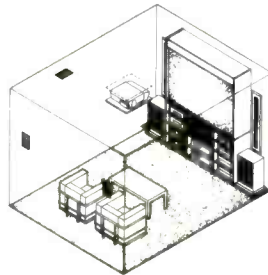
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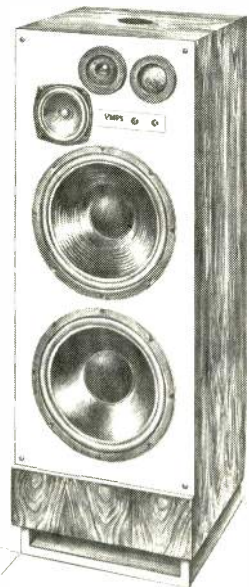
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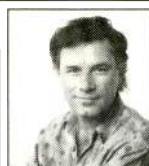
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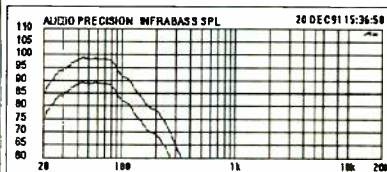
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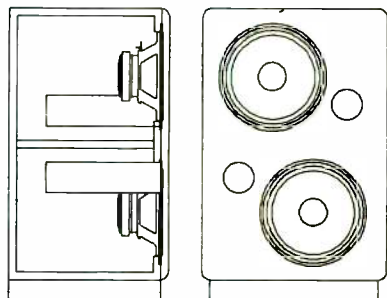
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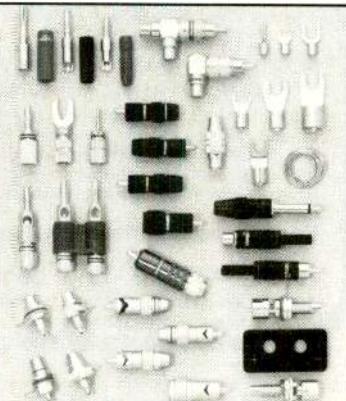


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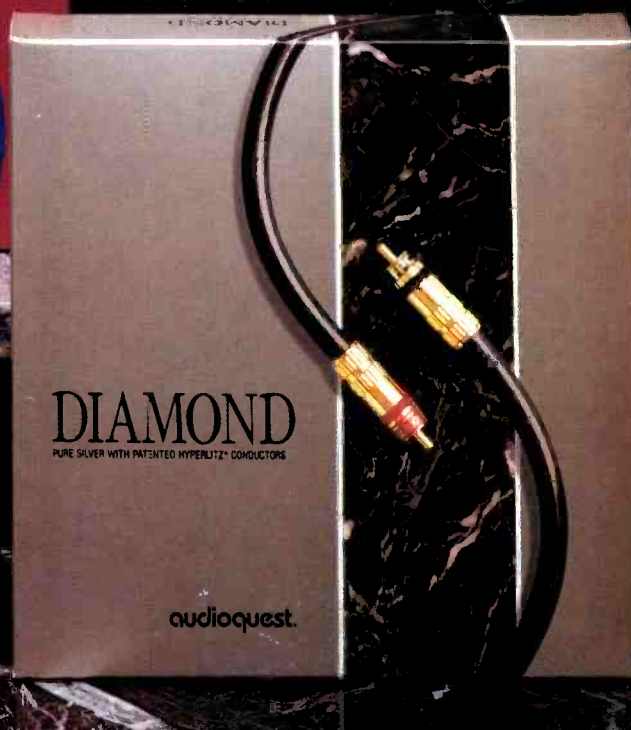
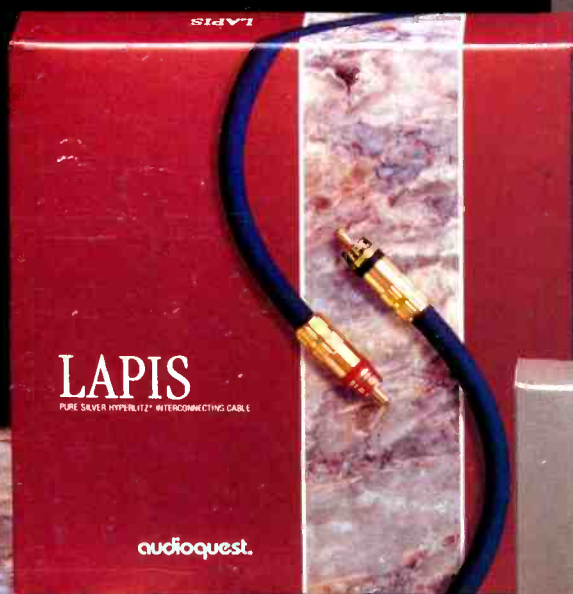


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